

DISSERTATION

ENGINEERING STUDENTS' WITH FINANCIAL NEED AND THEIR PERCEPTIONS OF
SUCCESS IN THEIR COLLEGE EXPERIENCE: A PHENOMENOLOGICAL ANALYSIS

Submitted by

William R. Roberts

School of Education

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2016

Doctoral Committee:

Advisor: Linda Kuk

Sharon Anderson

Tom Siller

Craig Chesson

Copyright by William Randall Roberts 2016

All Rights Reserved

ABSTRACT

ENGINEERING STUDENTS' WITH FINANCIAL NEED AND THEIR PERCEPTIONS OF SUCCESS IN THEIR COLLEGE EXPERIENCE: A PHENOMENOLOGICAL ANALYSIS

The purpose of this study was to explore how engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum at a medium sized mid-western polytechnic university.

During this interpretive phenomenological analysis, interviews were conducted with 16 students which revealed four emergent themes and two super ordinate themes. The data from this study suggests participants focused on developing individual goals and strategies designed to learn coursework material positioning them to begin their engineering careers. The participants in the study relied upon personal support systems of family, faculty and staff member members at Superior Tech to guide them through their success journey. Although the participants were unhappy with their student loans, they indicated their career choice as an engineer would position them well for future financial stability. It appears participants considering engineering degrees will likely be inclined to make a significant investment in their educational experience if they have family encouragement, institutional support and the potential to begin a high paying career as an engineer. The study concluded with implications for practice for families of college students, financial aid practitioners, student success researchers, engineering faculty, student affairs professionals and future research possibilities.

Keywords: student success, financial aid, Pell grant, engineering

ACKNOWLEDGEMENTS

I would like to begin by thanking my advisor, mentor, and friend Dr. Linda Kuk. Linda made my doctoral experience both pragmatic and fun. I appreciate her ability to challenge me to see issues from multiple perspectives. Her breadth of experience throughout her storied career in higher education added practical examples to the coursework and research. I can say this with authority, at her core Dr. Kuk is a true student affairs professional that has nothing but her student's best interest in her heart; I've personally experienced this phenomenon. Working with Dr. Kuk has made me a better higher education professional.

I would also like to thank my committee members, Dr. Sharon Anderson, Dr. Craig Chesson and Dr. Tom Siller. I appreciate your encouragement, guidance and support throughout this process. Thank you for your time, editing, wise feedback and your enlightening comments. I truly appreciated working through the dissertation process with you. To the 2011 Colorado State Higher Education Leadership doctoral cohort, you are my teammates. I feel so fortunate to have experienced our doctoral journey together. Sara Thompson, Gwen Schimek and Liz Okuma, I don't know where to start to express my gratitude. The late nights, weekends, study sessions, lunches, dinners, story times, have left me with wonderful memories and three true friends.

Thank you to my Michigan Tech friends, mentors and coworkers. The students in this study indicated their success relied heavily on those around them. I lived the same experiences. Dr. Glenn Mroz, Dr. Bonnie Gorman, Dr. Les Cook, Mr. Eric Halonen and to all the staff in the financial aid and advancement offices, thank you. I appreciate your support, friendship and encouragement during this process. A special thanks to my good friends Karen Giddings and

Allison Carter. To Dr. John Lehman my friend, colleague and fellow Ram, I want to thank you for your inspiration and camaraderie. If it weren't for you, I would not have pursued this endeavor. Finally, I want to offer a big thank you to all of the students who participated in my study. You're the reason we as higher education professionals do what we do!

Grandma Florence and Grandma Norma, we started this doctoral process together but didn't get a chance to finish together. I know you would be happy with the outcome. To my family of educators, my father-in-law, Rick and mother-in-law Sally Northrop, sister-in law Melissa, brother-in-law Michael, and my niece Sophia Smits, thanks for your understanding for the shortened weekends, holidays and camping trips. My wonderful sister Molly, best friend and brother-in law John and niece Romy Kus you have been so wonderful throughout this process. You have been patient and encouraging, thank you. Mom and Dad, Gail and Randy Roberts, like the students in my study, you as parents have been so supportive in all of my pursuits. Your love and encouragement is more than I could have asked. Thank you for everything you have done and continue to do to support me. You have taught me persistence, courage and dedication. It's these traits that have been guiding principles throughout my doctoral experience. I love you all!

To my bright, handsome and adventurous son's, Randall Richard and Samuel Northrop Roberts, this degree was mostly for you. I couldn't have imagined being blessed with two finer young men to call my son's than you. You both are intelligent, curious, talented, and creative and will be highly successful in your educational endeavors. Your mother and I can't wait to see what you become. Whatever it may, be we are behind you all the way. Do everything the best you can, work and study hard and always be leaders.

My beautiful wife Amy, I don't know where to begin. You have willingly sacrificed so much throughout my educational experiences. The missed suppers, taking the boys to hockey, parent teacher conferences, and trick or treating, are a few of the things I know were hard for you. Your love, patience, kindness and support are what kept me going when things get tough. I pray that I can do the same for you. I promise that I will love you forever and always.

Finally, to my Lord and Savior, through you all things are possible. It is through your will, I have been able to successfully complete my doctoral journey. They say a PhD changes you. After my experience, I would agree. I feel that I am a better employee for Michigan Tech, a more caring brother, insightful son, patient father, and dedicated husband. I have everyone who is close to me to thank for this transformative experience.

DEDICATION

I dedicate this dissertation to my family:

To my mom Gail, dad Randy and my wife Amy, this dissertation is for you. Like any carpenter, blacksmith, or craftsman puts their mark on their work. Your names are my touchmark on this piece.

To my boys, anything in this world is possible with faith, will and Sisu. Live the strenuous life, never take a back seat and always charge hard. Your mom and I will always be here for you.

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGMENTS	iv
DEDICATION.....	vii
LIST OF TABLES.....	ix
CHAPTER 1: INTRODUCTION.....	1
Purpose Statement.....	8
Research Questions.....	8
Language and Terms.....	9
Study Delimitations	11
Limitations	12
Research Significance.....	13
Researcher’s Perspective	13
CHAPTER 2: LITERATURE REVIEW	15
STEM and Student Success	15
Financial Aid and Student Success.....	20
Student Success Theory and Models	29
Summary of the Literature	38
CHAPTER 3: RESEARCH METHODOLOGY	40
Purpose Statement.....	40
Research Questions.....	40
Study Design.....	41
Sampling Strategy, Participants and Site Overview	42
Data Collection	43
Data Analysis	46
Trustworthiness.....	47
CHAPTER 4: RESULTS.....	50
Participant Profiles.....	51
First Year Students.....	52
Second Year Students	53
Third Year Students	54

Fourth Year Students	55
Fourth Year and Beyond Students	55
Participant Profile Summary.....	57
Table 1. Summary of participant profiles	57
Major Emergent Themes.....	58
Theme One: Family influences on Student Success	58
Theme Two: Faculty and staff played a mixed role in student's success	62
Theme Three: Success measured by learning not grades	65
Sub Theme: Peer perceptions of student success.....	69
Theme Four: The individualized process by which students set goals and strategies	73
Sub Theme: Students strategizing not to fail	75
Super-Ordinate Theme.....	78
Super-Ordinate Theme One: Return on investment.....	78
Super-Ordinate Theme Two: Confidence in their choice to become an engineer	80
Answers to Research Questions.....	82
Research Question 1	82
Research Question 2	83
Research Question 3	84
Research Question 4	86
Research Question 5	89
Essence of the Phenomena.....	92
CHAPTER 5: DISCUSSION.....	93
Summary of Research the Study.....	93
Discussion of the Findings.....	94
Family support for academic success	94
Family role models with higher education experience	95
Family role models without higher education experience	96
Academic success despite family financial challenges.....	97
Faculty contributing to academic success.....	98
Faculty not contributing to academic success.....	100
Measuring success	100
Individualized goals and strategies	102
Return on Investment.....	104

Implications for Practice	105
Implications for Research	106
REFERENCES	109
APPENDIX A: LETTER OF INTRODUCTION TO ASSISTANT VICE PRESIDENT OF ENROLLMENT AND MARKETING.....	115
APPENDIX B: LETTER OF INTRODUCTION TO THE VICE PRESIDENT OF STUDENT AFFAIRS	116
APPENDIX C: LETTER SEEKING PARTICIPANTS FROM SUPERIOR TECH.....	117
APPENDIX D: LETTER TO STUDENTS SELECTED TO PARTICIPATE IN STUDY.....	118
APPENDIX E: LETTER TO STUDENTS NOT SELECTED TO PARTICIPATE	119
APPENDIX F: INFORMED CONSENT FORM.....	120
APPENDIX G: DEMOGRAPHIC QUESTIONNAIRE	123
APPENDIX H: GUIDING QUESTIONS FOR INTERVIEWS	124
APPENDIX I: MEMBER CHECK INSTRUCTIONS.....	125
APPENDIX J: FINAL THANK YOU EMAIL	126

LIST OF TABLES

Table 1. Summary of Participant Profiles.....	57
---	----

CHAPTER 1- INTRODUCTION

For over fifty years science, technology, engineering and math innovations have been a driving engine of the US economy (Hira, 2010). These innovations have secured America's place as a world leader, helping our nation create jobs. Since WWII, technological innovation has been responsible for nearly 75% of the growth in the American economy according to the US Department of Commerce (Atkinson & Mayo, 2010). Historically the United States has produced the world's top research scientists and engineers which have fueled the accelerated technological advances we enjoy today (Committee, 2012). The importance a highly trained science, technology, engineering and mathematically inclined workforce is broadly accepted as playing a major role in solving societies most pressing issues which range from national economic competitiveness, combating terrorism, to increasing our standard of living (Hira, 2010). To keep pace with the continued demand to expand technological growth and maintain a competitive position in the global economy, the US will require a steady stream of Americans with science, technology, engineering and math skills (Butz et al., 2004).

The demand for increased technological advances in nearly every sector of industry will need to be powered by an educated workforce that is highly trained in science, technology, engineering or mathematics, otherwise known as STEM (Hira, 2010). Employment in the multiple STEM fields vs non-STEM fields continues to grow. In a report from the Bureau of Labor and Statistics, STEM occupations are projected to grow 17% by 2020, whereas non-STEM fields are projected to grow by 14% (Committee, 2012). In 2011 nearly 26 million jobs, or 20% of the nation's workforce, was comprised of STEM jobs where a "high level of knowledge" in a STEM field is required (Rothwell, 2013).

There is a portion of the national conversation that suggests the need for a strong STEM workforce is simply a passing fad and that there are no current shortages of STEM workers, or predicted shortages in the foreseeable future (Butz, Kelly, Adamson, Bloom, Fossum, Gross, 2004). Additionally, there is growing evidence that our nation's global share of workers in the STEM based fields is on a decline and being replaced by an international workforce, weakening the US economy (Atkinson & Mayo, 2010). Acknowledging that there is conflicting information regarding the supply of qualified students to enter the workforce, there is evidence that predicting the national hiring trends is not only imprecise but also potentially skewed due to the recent recession (Atkinson & Mayo, 2010).

Although STEM literature may suggest varying views in regards to the actual demand of the STEM workforce, there is an abundance of rhetoric from agents of the Federal government that suggest both a strong demand for STEM jobs and for highly skilled STEM employees. Hira (2010) tells us that although STEM represents five percent of the nation's workforce, there is widespread belief among policy makers and business leaders that the STEM workforce has a disproportionately high influence on the nation (Hira, 2010). Both President Obama and President Bush emphasized the importance of STEM during their administrations'. President Bush introduced the American Competitiveness Initiative which enhanced STEM education and provided scholarships for students entering STEM fields (Rothwell, 2013). President Obama created the "Educate to Innovate" campaign and has proposed budget increases to support STEM education initiatives (Rothwell, 2013). In a congressional report by the Joint Economic Committee, the need for domestic STEM workers is directly related to a healthy US economy (Committee, 2012).

Promotion of STEM is also occurring at the state level. In states like Michigan that have traditionally relied on manufacturing are viewing STEM as a kick starter to their economy. In an October 2014 news release, Michigan's Governor Rick Snyder declared October STEM careers month and challenged employers across the state to promote how education can lead to opportunities for STEM careers. Governor Snyder called on industry, education, and policy makers to build a coalition to develop and foster a STEM culture in Michigan.

To maintain our competitive edge, we need to have qualified, bright and motivated undergraduate students filling the employment pipeline providing a highly skilled STEM workforce (Committee, 2012). With that in mind, the question of why US students are not filling the supply stream of qualified STEM workers bears further scrutiny. There is some evidence that suggests preparation at the K-12 education level is inadequate to prepare students for challenging STEM curriculums (Committee, 2012). However, the solution to feed the STEM economic pipeline is not as simple as increasing the numbers of students entering the STEM majors in college. Higher education can serve a significant role in functioning as a conduit for highly trained STEM workers. A collaborative partnership between Universities and the Federal Government can enhance the learning environments in which students can succeed. Recommendations to increase the number of scholarships (Hira, 2010), a commitment from the federal government to maintain Pell grants and for universities to keep the cost of a STEM education at an affordable level (Committee, 2012) are some of the policy suggestions that have been made to increase the quality and quantity of STEM graduates. However, are these efforts enough to supply what appears to be an increasing demand for STEM graduates?

A 2012 report from the President's Council of Advisors on Science and Technology (PCAST) predicts that the United States will experience a deficit of nearly one million STEM graduates within the next decade (Graham, Frederick, Byars-Winston, Hunter, & Handelsman, 2013). The PCAST report emphasizes a key element to enhancing STEM graduation rates is to focus on college completion rates (Graham et al., 2013). A Department of Education study focusing on STEM persistence found that only 41 percent of students who initially began their university experience in a STEM degree actually earned a STEM degree (certificate, associates, bachelors) within six years (Atkinson & Mayo 2010). Further evidence of the need to focus on STEM student persistence can be seen in a National Science Foundation study conducted from 1993-2007 which found a 23 percent dropout rate in engineering majors between the first and second year (Atkinson & Mayo 2010). Several universities have been slow to respond to enhancing persistence rates because of the challenging nature of understanding retention strategies (Graham et al., 2013). However, focusing on retention of students pursuing a STEM degree can be challenging for a variety of reasons.

Traditional aged university students enter into their higher education experience at a time in their lives when they are facing a variety of adjustments that can be impediments to their persistence and success in the classroom. Kuo, Hagie and Miller (2004) tell us that "College students bring increasingly complex issues to campus and choose to manage their academic careers and personal lives in a variety of ways (p.60)." The complexity of external environmental influences that students bring with them as they begin their university experience can be enhanced as students enter into challenging STEM curriculums. Understanding these complexities and how they impact the success of STEM students is an ever present challenge that colleges and universities are facing. According to Kuo, Hagie and Miller (2004), "these

strategies for dealing with personal and academic challenges are the fundamental issues that colleges and universities need to explore in order to help their students succeed (p.1).”

Using Kuo, Hagie and Miller’s (2004) assertion that universities need to understand student’s personal and academic challenges it could be assumed that there would be a variety of research studies that asked STEM students their views regarding success. However, there is still a relatively large gap in the literature that discusses how students set goals and strategies to achieve their self-defined determination of success (Yazedjian, Toews, Sevin, & Purswell, 2008). Understanding the phenomena of how STEM students formulate their goals and strategies to achieve their perception of success may help universities to enhance the STEM pipeline.

Whalen and Shelly (2010) suggested a need for a study that investigates how STEM majors’ environmental interactions with campus resources impacted their success. When evaluating how the individual fields which comprise STEM are performing, special attention should be directed to the engineering disciplines. Engineering has experienced a decline, graduating fewer students today than 20 years ago. This is both in absolute numbers and as a percentage of all degrees (Ohland et al., 2008). As institutions seek innovative high touch, high impact practices to assist students with realizing success in their engineering curriculums, a study investigating how engineering students develop a perception of their success would enhance the both the student success and STEM persistence literature. Having a directed focus on engineering persistence will be paramount to filling the engineering trunk of the STEM employment pipeline (Ohland et al., 2008).

In a study examining the indicators of engineering students’ success and persistence, high school cumulative grade point average (GPA) and standardized test scores were stated to

traditionally be accurate predictors of persistence in an engineering curriculum (Ohland et al., 2008). However, to slow the decrease of engineering graduates, a more in depth qualitative study may be needed to tease out the factors that comprise student persistence. Discovering engineering students' interests and perceived abilities might prove to be valuable in understanding how students persist in challenging engineering curriculums (Ohland et al., 2008). Consistent with Perna and Thomas' (2010) model of external influences on student success, Ohland et al. (2008) note that students' family background, interests and perception of success may impact their ability to persist. Exploring how engineering students formulate perceptions of success and plot their goals and strategies to reach a self-defined path to success may enhance practitioners' understanding of why students persist.

There is another looming juggernaut for engineering students seeking their degree. If an engineering degree becomes financially unattainable for students, all of the persistence research and efforts that are exerted may be in vain. In a study examining the risk factors of student dropout rates, students who are in a financially challenging position are at a greater risk of not enrolling or persisting to graduation (Chen & DesJardins, 2008). In Senator Casey's Joint Economic Committee's Report (2012) it was stated that a commitment to maintaining and funding federal financial aid programs would be vital to making college affordable helping students achieve STEM degrees (Committee, 2012).

One of the most prolific federal financial aid programs is the Pell grant. Pell grants are awarded to students who complete the US Department of Education's Free Application for Federal Student Aid (FAFSA) and have an expected family contribution (EFC) of zero to \$5715. Essentially, students with a zero EFC who qualify for the Pell grant have relatively low financial means and are in the greatest need of financial assistance. While engineering students who

qualify for the Pell grant receive financial assistance, a study revealed that students who have a zero EFC are a population at a higher risk of not persisting (George-Jackson, Rincon, & Martinez, 2012). Students with high financial need generally have financial circumstances that can prevent them from affording a higher priced engineering curriculum (Committee, 2012). Therefore, Pell eligible engineering students with the greatest financial need perhaps might be those at the highest risk of not persisting.

George-Jackson et al. (2012) stated there is a need to gain a greater understanding of low income student who pursue STEM degrees at selective public research institutions. Coupling George-Jackson's (2012) need for future research of low-income STEM students with the need to fill the engineering trunk of the STEM pipeline, creates an opportunity to develop insight into engineering students' goal setting process to achieve their perception of success. Research and reports summarizing student success advocate for researchers to challenge the norm of student success research and to pose distinctive research questions about how students engage in their higher education experience (Wolf-Wendel, Ward, & Kinzie, 2009). The rich research in student success would be enhanced by a study that challenges the norm and seeks perspective regarding how Pell eligible engineers set goals and strategies to achieve their perception of success.

Understanding that success is a process as well as an outcome, STEM institutions will be ahead of the curve when they understand how engineering students set goals and strategies to achieve their perception of success. Having a better understanding of how engineering students define success for themselves, universities can further support those students by addressing the barriers they encounter while striving to achieve their educational goals. It is this type of information that will help institutions with assisting in the nation's prosperity by enabling more

engineering students, with low financial means to achieve their goals of attaining a STEM degree.

Purpose Statement

The purpose of this study was to explore how engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their academic experience at a medium sized mid-western polytechnic university.

Research Questions

Crafting a primary research question for this qualitative study was directed towards revealing meaning by focusing on the “how” to understand students’ experiences (Smith et al., 2009 p. 46). Therefore, this study sought to provide insight to the following overall research question: How do engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their academic experience at a medium sized mid-western university? To further expand on the research question the following research questions were explored.

1. How do students at different levels of their educational experience (first year, second year, third year, fourth year) set their goals and strategies to determine educational success in their academic experience?
2. How do students at different levels of their educational experience explain educational success for themselves?

3. How does having a student loan impact the student's goals and strategies to achieve educational success?
4. How do student participants describe their interactions with faculty and staff members as a means of achieving their educational goals?
5. How do student's concepts of educational successes align with institutional success indicators?

Language and Terms

The language and terms included below are definitions of basic success and university related terms referenced throughout this study. The terms were collected from multiple sources and are provided to assist the reader with understanding key concepts in this study.

Dependent Student: Any student who cannot be independent based on the questions provided on the FAFSA (generally any student under the age of 24 who is not married, does not have a child, was not a ward of the court on their 18th birthday, not working on a graduate degree, not currently serving on active duty, and not a veteran of the armed services).

Expected Family Contribution: Commonly abbreviated as EFC. A measure of the family's financial strength to finance the total costs of their university experience using data gathered by the Free Application for Federal Student Aid (FAFSA) and applying it to a financial means formula established by congress.

Free Application for Federal Student Aid: Commonly abbreviated as FAFSA. A US Department of Education application that collects student and/or parent financial data for the purpose of applying for Title IV federal student aid. It also assists universities with determining financial need.

Financial Need: The standard calculation used by the US Department of Education as the total cost of attendance of an institution minus the student's EFC.

First Year Student: For the purposes of this study a first year student is an entering first year student who was currently enrolled in their first semester at Superior Tech.

First Generation Student: A student who is the first in their family to enroll in a higher education institution.

Gift Aid: Scholarships, grants and other funds that do not have to be paid back by the student.

Pell Grant: A federal grant that provides assistance to eligible undergraduate postsecondary students with demonstrated financial need to help meet education expenses. The Pell grant is awarded to students who have an EFC of \$0 to \$5157. (Higher Education Act of 1965, Title IV, Part A, Subpart I, as amended.)

Persistence: The completion of an individual student's degree within a set timeframe to completion. For the purposes of this study persistence is defined as the completion of an engineering degree within a six year continuous enrollment period.

Retention: The percentage of students from a specific cohort who are retained. This metric is often presented as a measure of institutional quality.

Student Success: George Kuh et al. (2007) state student success is defined as “academic achievement; engagement in educationally purposeful educational activities; satisfaction; acquisition of desired knowledge, skills, and competencies; persistence; and attainment of educational objective” (Kuh, Bridges, Buckley, Hayek, Kinzie, 2007, p. 10).

Subsidized student loans: Federal loans that do not require a parent signature for the student to borrow and do not accrue interest while an undergraduate student is enrolled in at least 6 credits. When the student ceases to be enrolled for at least six months the interest begins to accrue and payments are required.

STEM: A common acronym used to describe students who are pursuing a higher education major in Science, Technology, Engineering or Mathematics.

Unsubsidized student loans: Federal loans that do not require a parent signature for the student to borrow. This loan does accrue interest while an undergraduate student is enrolled. When the student ceases to be enrolled for at least six months the interest is capitalized and payments are required on the new loan balance.

Zero Expected Family Contribution (EFC): Students who complete the FAFSA and are determined to have the maximum financial need on the US Department of Education's need scale. These students qualify for the maximum available Pell Grant.

Study Delimitations

This study was conducted with a group of 16 students attending Superior Tech a polytechnic university in the upper Midwest who have an expected family contribution equal to zero and are all dependent traditional students. The participants are a mix of males and females who represent all points of enrollment for an undergraduate student. For the purposes of this study the year that the participants are enrolled in at Superior Tech will be referenced as first, second, third and fourth year students. The participants were comprised of four first year, four second year, four third year and four fourth year students. First year students were enrolled in their first semester at Superior Tech. The selected participants are pursuing a variety of

engineering majors and all began their collegiate experience at Superior Tech. The participants all have a zero EFC and receive the Federal Pell Grant. Additionally, all participants have borrowed a student loan. The students with loan debt also have an external motivator to succeed in that they all will be required to repay some form of loan to the US Department of Education. No GI bill recipients will be included in this study. Additionally, transfers, independent, non-traditional aged students, as well as, other cross sections of the undergraduate engineering population are not included in this study.

Limitations

There are some limitations to this study design. The study sample was limited to one polytechnic institution, Superior Tech. The sample was a convenience sample selected from the student population at Superior Tech because that is where the researcher is employed. The study does not involve institutions from elsewhere in the country, thus wide reaching generalizations cannot be made that are applicable to other institutions.

Superior Tech is a polytechnic university located in a rural location in the upper Midwest. In some instances, student success can be impacted by a feeling of isolation and homesickness. In this regard, the study does not take into account any external influences due to the regional location of Superior Tech. Additionally, the student's perceptions may be shaped by institutional and academic department cultures. This study also employs a research approach which involved the study participants to recall their experiences. Their memories may not have been recalled with the greatest of accuracy or a lack of subjectivity. It is possible the participants may change their perceptions and their responses to match what they thought I will be hoping to hear as a researcher. To try and overcome this bias, I selected interview questions that probed at more of

the “how” and “why” which phenomenological research allows (Smith, Flowers and Larkin 2009).

Research Significance

This study’s findings may impact several areas of research. A goal of this study was to provide a perspective into how high financial need engineering students have made meaning of success through their lived experiences. Currently there is a dearth of research surrounding the student viewpoint or perception of success for financially needy engineering students. Specifically there is a vacuum of qualitative research in regards to Pell eligible, engineering students and their perceptions of success. This study sought to offer insight into what Pell grant eligible engineering students define as their goals and strategies for success and how their perceived behaviors may impede or enhance the achievement of these goals. Additionally, institutions looking for methods to assist their most financially needy students succeed may gain insight into how such students might perceive success. This research potentially provided insight and context to student affairs and engineering literature to build programs and services to help their students meet their goals of success.

Researcher’s Perspective

As an undergraduate, I attended the same institution the students in the study attend. I am also employed at the Superior Tech as the Director of Financial Aid. I work with the population of students in this study on a daily basis, assisting them with their financial aid at Superior Tech. Additionally, I am also a member of a student success committee at Superior Tech.

As a note of self-disclosure, I struggled with success in the classroom as an undergraduate. My initial struggles as a student and my unclear perception of what success was, forced me to make changes in my life that set me up for success. I am driven to help students succeed and avoid the mistakes I made. It was difficult to avoid the temptation of wanting to provide advice as students as they shared their story with me. I intended to make meaning of the interview experience with students and self-reflect on my journey to define my perception of success. It was a pleasure learning the student's success perceptions and implementing their relevant success strategies into my everyday work assisting students.

CHAPTER 2 – LITERATURE REVIEW

This section will discuss the relevant literature associated with student success. The chapter is broken down into four sections. The STEM section was designed to provide the reader with a background from the literature relating how STEM and engineering have been studied from a student success lens. The student success and financial aid section shares the literature that related to how financial aid and student success share a symbiotic relationship. The student success section was designed to provide the reader with an overall perspective of student success theory, varying definitions of student success, and how student success theory was put into practice. Finally, the summary will conclude a review of the relevant concepts from literature and how they relate to this study.

STEM and Student Success

According to the 2012 report from the President's council on science and technology (2012), the US workforce will have a deficit of one million science, technology engineering and math graduates (Olson & Riordan, 2012). The article suggested an improvement in college student retention is called for to help rectify the predicted shortage (Olson & Riordan, 2012). This section of the literature will focus on the persistence of students who are pursuing a degree in science, technology, engineering, and mathematics or STEM.

To begin reviewing persistence among STEM students, Graham, Frederick, Byars-Winston, Hunter and Handelsman (2013) provided a framework for viewing success. The authors begin by discussing the psychological origination of persistence, which were rooted in social and cognitive psychology, specifically motivation. The article's underpinning for motivation was confidence or self-efficacy, which underscores their point that schools must

address these two constructs. The authors suggested that learning and professional identification increase confidence which increases motivation (Graham, Frederick, Byars-Winston, Hunter, & Handelsman, 2013). Essentially the author's stated student learning is, "a mutually reinforcing experience" as they begin to identify with their profession (Graham et al., 2013 p. 1455).

Graham et al. highlight the Meyerhoff Scholarship Program at University of Maryland – Baltimore County which boasted high retention of STEM majors. In evaluating the 508 STEM majors, a retention rate of 86% was realized between 1993 and 2006 (Graham et al., 2013). The authors went on to further illustrate the point by indicating that this is nearly twice the nationwide average for all majors (Graham et al., 2013). The authors also illustrated similar successes at the University of California Berkeley and Louisiana State University. There were three common interventions that all three programs employed. They promoted early research experiences, active learning in introductory coursework and participation in STEM learning communities (Graham et al., 2013).

Graham et al. findings included a summary as to how institutions can further implement six initiatives that increase persistence for STEM majors. The first initiative noted that faculty and instructional staff at an institution should implement active learning in introductory STEM and undergraduate research courses. Second, students should be encouraged to create learning communities. Third, academic departments should implement rewards that incentivize effective teaching and implementation of active learning in early research coursework. Fourth, university administrators should dedicate resources for teachers to learn innovative teaching methods. Fifth, funding entities should apply the persistence framework to their evaluation of new STEM education initiatives. The sixth, accreditation entities should incorporate metrics of STEM persistence into their institutional evaluations.

Graham et al. (2013) findings concluded with how differential tuition pricing may impact low income engineering students ability to persist. Specifically the study addressed how the application of financial aid programs can reduce the financial burden to completing the higher cost engineering programs for low income students. In reference to the aforementioned human capital theory, the authors suggested that high tuition, high financial aid strategies should be examined thoroughly. The authors suggested that high aid, high tuition strategies are rarely funded at a sufficient level and institutions need to focus on how their policies impact low income students (Graham, Frederick, Byars-Winston, Hunter, & Handelsman, 2013).

With a specific nod to underrepresented students, the authors concluded that encouraging middle and high school outreach, including bridge style programs, facilitated degree completion (Graham et al., 2013). The authors also shared a concern that additional data must be gathered and examined regarding the widening gap between differential pricing and students ability to pay and how that impacts students decisions on enrollment and persistence in STEM (Graham et al., 2013). The authors proposed that future research is necessary in regards to how students perceive and react to tuition and financial aid to help further persistence in STEM fields (Graham et al., 2013).

Whalen and Shelly (2010) conducted a quantitative study to determine how multiple predictor variables affect degree attainment for STEM students. Additionally, the study looked to determine how the variables determined retention for STEM and non-STEM majors. During the study the researchers adjusted separately for students who retained in STEM fields or transferred to other majors yet remained enrolled. The study used student backgrounds, their financial scenario and other institutional variables to build a model that helps to answer questions about the college completion process (Whalen & Shelley, 2010). The study followed Astin's I-

E-O model (Astin, 1993) by considering the “Input,” “Environment,” and “Output” variables used in student persistence and degree completion research (Whalen & Shelley, 2010, p. 47). By using this model the study was able to drill down the larger categorical variables from the I-E-O model to further explore more detailed variables such as student background, academic measures and financial situation to get to understanding the intricacies of degree attainment.

Whalen and Shelly (2010) posed three research questions in their study. The first question centered on academic and financial support programs and other background characteristics that aid in the graduation of STEM and non-STEM majors within six years. The second question was whether STEM vs non-STEM majors had different retention. The third question asked if female and minority under-represented students in STEM majors had a greater likelihood of retaining than their traditional male counterparts pursuing STEM degrees within six years when controlling for the input, environmental and output variables described in the Astin (1993) model.

The participants of the study were from a Midwestern research institution, who entered as a cohort in the fall of 2000 (N=4,271) with a gender distribution of 54.8% male and 45.2% female. Using a regression analysis the researchers attempted to define variables for retention and graduation through a student’s sixth year. Other tests that were conducted included a Pearson chi-square to determine statistical significance and an odds ratio that suggested a “very strong effect” of higher cumulative GPA on retention and graduation (Whalen & Shelley, 2010).

Whalen and Shelly (2008) findings determined that the four monetary variables (financial need, work study support, loan aid, and gift aid) were significant predictors of six year graduation. The authors assert that financial aid in overall dollars awarded to STEM majors had

a positive impact on their overall student success. The study's findings also revealed that male non-minority STEM majors were 74.6% more likely to persist and graduate than their female and/or minority student counterparts. Participants who lived on campus and remained in campus housing for each additional year were 54.6% more likely to graduate and/or persist to year six. It was determined that students with high ACT scores who began in the STEM fields suffered a high attrition rate and changed their major to a non-STEM field. Another finding of note was that non-resident students had 47.2% likelihood of graduation in comparison to their resident student counterparts.

In a study conducted by George-Jackson, Rincon and Martinez (2012), they examined the relationship between low-income engineering students at two public research institutions and tuition differentials. The study employed the human capital theory as a theoretical framework. The study shared how the human capital theory in education can be related to the potential for an individual to increase their potential earnings over time. The authors stated that human capital theory in the context of their study would suggest that a reduction in the net price of an institution would improve access and retention of for low income students (George-Jackson et al., 2012). The article continued with the assertion that low income engineering students who are disproportionately affected by higher tuition might also benefit the most from the higher earnings associated with STEM education.

The study had four primary research questions that examined rates of participation for engineering undergrad programs, the cost of engineering programs by socio-economic status, the fluctuation of financial aid over time for engineering students and the graduation rates for students in engineering versus non-engineering fields. The study involved 6,307 students, where 80 percent of the students graduated in six years with nearly 20 percent receiving Pell (George-

Jackson et al., 2012). The study did not report a *p* value or significance. The study was limited to two public, four-year, predominately white, doctoral granting, research universities, by which the authors cautioned against making sweeping generalizations (George-Jackson et al., 2012). The authors also noted that using Pell as a proxy for low income students excludes other students who did not apply for or are ineligible for financial aid (George-Jackson et al., 2012).

There were several implications to this study in regards to the impact of differential tuition strategies and their potential shortfall. However, the study shed light on the challenges that lower income students pursuing higher cost STEM degrees face. The complexity of differential tuition and the overall higher costs of a STEM degree may in fact be forcing currently enrolled STEM students to look elsewhere to pursue their degree (George-Jackson et al., 2012). The study noted how critical gift aid money in the form of scholarships and grants is to the overall persistence of enrolled students. The study discussed how low income, Pell eligible students, who are debt averse have difficulty financing high cost engineering programs. Finally, the study noted how future research on how students and families perceive and react to different tuition rates (George-Jackson et al., 2012). The researchers shared that institutions might be at a recruiting disadvantage without having a thorough understanding of how low income students perceive tuition rates and structures (George-Jackson et al., 2012).

Financial Aid and Student Success

A considerable amount of student success literature suggests financial aid plays an important role in student persistence. St. John (1989) is an early pioneer in examining relationships between financial aid and student persistence. Using variables such as family background, academic achievement and type of financial aid package, St. John (1989) sought to

investigate the impacts of financial aid on persistence as a student progressed from year to year prior to earning their degree. The first conclusion that St. John drew from his study determined that students who received student loans only were at a higher risk of not persisting than students who received a combination of Pell grant and loans. The second conclusion St. John determined was that student financial aid of any type had a positive influence on persistence (St John, 1989).

A study by DesJardin, Ahlberg and McCall (2002) further built on how financial aid impacted persistence by investigating the multiple factors related to timely degree completion. Using a data set of 2,373 students who matriculated to the University of Minnesota-Twin Cities in the fall of 1991, they set out to apply an event history model to evaluate stop outs for students. Variables used in the study included race gender, residency, major, income bracket, age, test score, GPA, and financial aid. Using an odds ratio, the researchers determined that not all forms of financial aid made the same impact on student persistence and the impact of specific types of financial aid can vary over time ($p < .05$). The researchers found that while the sum of loans a student borrows in their first years can negatively impact a student's ability to persist; overall financial aid did positively impact their ability to persist. DesJardin et al. noted that financial aid impacted a student's ability to persist not necessarily graduate.

A study conducted by Chen and DesJardins (2008) explored the impact of multiple financial aid programs by income level on student persistence. The study utilized Beginning Postsecondary Students survey data sponsored by the National Center for Educational Statistics. This data followed the cohort of students who started their post-secondary education during the 1995-1996 academic year and followed them for six years (Chen & DesJardins, 2008). The hypothesis of the Chen and DesJardins (2008) study was that low-income students are more sensitive to net tuition than their higher income counterparts.

Using descriptive statistics, the study sought to determine the probability of dropout rates over time by parental income level and financial aid received. The students were divided into a low-income, middle-income, and high-income group. Students in their first year of school received the Pell grant at a rate of 72 percent in the low-income group, 17 percent in the high income group and .1 percent in the high income group. Low-income students dropped out of their institutions without returning at a rate of 38 percent. In contrast, the middle-income students dropped out at a rate of 31 percent and high-income students at a rate of 22 percent. Chen and DesJardins' (2008) analysis of the data showed that low-income students dropped out at a consistently higher rate than their higher income peers. The researchers also determined that other factors such as academic preparation, first year GPA, academic integration and educational aspirations impacted the odds of a student retaining (Chen & DesJardins, 2008).

Research studies such as Chen and DesJardin's (2008) work on the impact of Pell have shed light on the challenges that low-income students have with persisting year to year. Engle and Tinto (2008) further delved into the challenges that first generation students have with success and persistence in their study for the Pell Institute. Completing a bachelor's degree can be challenging for some low income first generation students. Engle and Tinto (2008) gathered data in their report from the National Center for Educational Statistics Beginning Post-Secondary Study (BPS:96/01) and underscored how only 34 percent of low income students completed their bachelor's degrees in six years compared to 66 percent of their peers at four year public institutions. Engle and Tinto (2008) noted that low-income, first-generation students were seven times more likely to earn their bachelor's degrees if they started at a four year institution, however, only 25 percent of them did so. Additionally, the researchers used data from NCES National Postsecondary Student Aid Study (NPAS: 04 UG). The NCES study highlighted unmet

financial need for low-income, first-generation students is nearly \$6000 which represents half of their median annual income of \$12,100.

Engle and Tinto (2008) highlight several constraints for low income first generation students in completing their degrees. While many of the low-income, first-generation students are from ethnic and racial minorities, the more conclusive factor was they have lower levels of academic preparation for higher education. Engle and Tinto also stated that many of the low-income, first generation ethnic and racial minority students are older, have financial obligations outside of college and are less likely to receive support from their parents (Engle and Tinto 2008). A clarifying point that Engle and Tinto (2008) made was their consideration of enrollment demographics and academic preparation for low-income, first generation students who were at a greater risk of not completing their degrees.

Engle and Tinto (2008) suggested that campus engagement can improve persistence rates among low-income, first generation students. Low-income, first generation students were less likely to meet with faculty, engage in study groups, and participate in extra-curricular activities. Engle and Tinto (2008) offered rationale for the lack of engagement in these activities may be linked to the student's lack of financial resources.

To further understand how students make choices regarding their enrollment, it is necessary to understand how student behaviors are impacted by circumstances and opportunities (Baum and Shireman 2013). Students can be impacted by their financial resources or lack of financial aid. Baum and Schwartz (2013) postulated the impacts on retention and persistence is not whether the money is available, but rather are the financial aid programs structured to maximize the impact on student success.

The current federal financial aid system was built at a time when half of the recent college graduates were enrolled at a higher education institution. Today, nearly two-thirds of the students who completed high school enrolled at higher education institutions (Baum & Schwartz, 2013). This load on the system has produced additional regulations and controls which in turn have complicated the application process. The authors aptly described the process as “byzantine in nature” when referencing the sheer complexity of the financial aid and enrollment process (Baum & Schwartz, 2013 p. 2). The authors stated the complexity surrounding the application of the student aid process may preclude students from accessing and persisting through their higher education experience. In addition, to the difficulty students experience with the FAFSA process, prospective students are inundated with information lamenting the challenging nature of completing the FAFSA process. In addition, students are bombarded by the media highlighting countless stories of crushing student debt and unemployment. Baum and Schwartz (2013) indicated that over time students internalize the compounding challenges of achieving a college degree and self-select themselves out of the process. Persistence can also be impacted by students who are struggling to succeed in the classroom and they are facing a decision of overcoming short term financial difficulties or facing the challenges of the classroom that at their present juncture simply don't seem worth the effort.

Baum and Schwartz (2013) described how students from different socio economic backgrounds view college persistence differently. Not attending a prestigious college or not persisting will be perceived as a loss to a student from an affluent background. As a contrast students from a less affluent background might view going to college as forsaking a family connection, incurring debt and passing over an opportunity to earn an immediate income (Baum & Schwartz, 2013).

A study conducted by Ziskin, Fischer, Torres, Pellicciotti and Player-Sanders (2014) had similar emergent themes regarding the difficulty of the FAFSA process. The study highlighted three emergent themes in their study. The first theme was centered on how the process surrounding the financial aid application is difficult to interpret (Ziskin, Fischer, Torres, Pellicciotti, & Player-Sanders, 2014). The second theme that emerged in the study settled more around how financial aid was inconsistent and failed to provide students with enough support from term to term (Ziskin et al., 2014). The final emergent theme centered on how students develop “logic” about financial aid through their individual interpretations of their economic environment (Ziskin et al., 2014 p. 446).

Evaluating the first theme in the study, the researchers commented how the students had “uneven understandings” and believed in inaccurate understandings of the financial aid process (Ziskin et al., 2014, p. 437). When interviewing students the researchers noted how the students were baffled by the process and it was apparent they were not certain as to how or why they qualified for specific financial aid programs. Year to year eligibility changes confused students. These seemingly arbitrary changes were perceived as “unaccountable” and caused students fear and panic (Ziskin et al., 2014, p. 438). The students, interviewed through focus groups in this study, had trepidation every year about how their financial aid would impact their overall ability to afford their tuition (Ziskin et al., 2014). This fear caused students to question their ability to return for the upcoming year.

The second theme was a more frustrating tone to the student’s comments. The students began to channel their frustrations through financial aid offices. The students felt as though the staff in the financial aid offices themselves were directly responsible for them not receiving

sufficient financial aid (Ziskin et al., 2014). The researchers reported in this theme the students felt “judged and ill served” in their dealings with the financial aid offices (Ziskin et al., 2014). The researchers pointed out that students from all social strata were equal in their confusion of the financial aid process. However, the resentment of the financial aid office as a barrier to their success was emerging from students who had financial stresses outside of their academic experiences. The students stated they felt as though the aid offices talked down to them and acted as an aid agency. The students felt as though they were being denied financial aid even though they really needed the aid. The researchers described the students as having a difficult time making sense of the large and complex system which they cannot predict or control. This created a sense of “financial aid insecurity” among the participants (Ziskin et al., 2014).

The researchers explored the students’ rationale on how to combine financial aid and wages to finance their college experiences in the third and final theme of the study. The students described the variety of sources they gathered their information regarding their financial aid. The researchers noted that their information came from three sources: family, professionals, and friends or peers (Ziskin et al., 2014). The researchers noted how the students interpreted the information they received as truth regardless if it was factual or not. Students used their peer’s experiences as grounds for decision regardless of how factual the information was. The researchers noted students relied upon individuals they personally knew regardless of whether these people were knowledgeable about financial aid.

The researchers also noted the students viewed loans as a last resort. The student’s comments from the study highlighted their aversion to student loans. The study noted students were loan averse but they viewed their loans as a “necessary evil” to ensure their degree

completion (Ziskin et al., 2014, p. 451). The researchers encountered students who felt the necessity of a loan would be worth it if they completed their degrees.

The researchers' conclusions reflected information seeking patterns reflected by first generation students. The researchers noted their findings might suggest additional opportunities for outreach. There was also a supposition that first generation students might not interpret financial aid information the same way that educators might think they interpret information. The complications the students associated with gathering their financial aid information and completing the FAFSA form suggests that simplification of the federal financial aid process would help many students achieve persistence and success.

There is trend in America where entrepreneurs and private sector foundations are seeking to fund low income students to help advance the US workforce (McGroaty, 2000). A recent emergence of private scholarship assistance for low-income students has made higher education possible for many students (McGroaty, 2000). Many private sector organizations viewed the required education for workforce development and to maintain a healthy US economy (Arzy, Davies, & Harbour, 2006). To provide a sense of how students with scholarship funding perceived their campus experience, a phenomenological study by Arzy, Davies and Harbor (2006) was conducted. This study provided insight into scholarship recipient's perceptions of the lived campus experience and what influences their financial aid had on them. The researchers attempted to understand the lived campus experiences of bachelor's degree seeking, low income students, who received private foundation scholarship assistance. In addition, the study attempted to answer how the students participated in academic and social life, how the

foundation funding impacted the student's college choice and examined how other factors shaped the students college choice decisions (Arzy et al., 2006).

Fourteen traditional aged students, ranging from freshman to seniors with private scholarship assistance were selected for the study. The authors stated the students revealed rich descriptions regarding their lived campus experiences (Arzy et al., 2006). The study revealed four emergent themes of, experiences of affirmation, cautious engagement, vulnerability and transformation (Arzy et al., 2006).

The students in the study related their affirmation from their family to receiving and keeping their financial aid. The students spoke to their lack of financial means and how they were loan averse. One student commented that he was in his high school's college and career planning center every week looking for new scholarships (Arzy et al., 2006). He went on to state he received a significant amount of encouragement from family, teachers and counselors to continue to seek out financial resources to attend college (Arzy et al., 2006). Another student commented how his brother has a significant amount of loans. He went on to state, "I don't want to be paying off loans the rest of my life. I really don't have the money (Arzy et al., 2006)."

The vulnerability theme also had ties to the student's financial aid. The private foundation scholarship they received was a vehicle for those students to go to college and there was trepidation in regards to retaining their funds. A student in this study described their scholarship as a "gift," "blessing," and "a relief to their families (Arzy et al., 2006, para. 52)."

Additionally, the students commented that the foundation was not "out to take your scholarship away," but they did comment that "they had to work hard to keep it (Arzy et al., 2006, para. 53)."

Student Success Theory and Models

The federal government, policy makers and private think tanks have engaged in a crescendo of scholarly discussion about student success (Kuh, Bridges, Buckley, Hayek, Kinzie (2007); Kuh, Kinzie, Schuh, & Whitt, 2010; US Department of Education, 2006). The student success conversation has long been associated with constructs such as involvement, engagement and integration into a campus (Tinto, 2003 a.; Wolf-Wendel, Ward, Kinzie, 2009). Success literature includes a wealth of data and literature produced by colleges and universities, private consulting firms, think tanks and the federal and state governments, suggesting what metrics might be used to inform and predict student success (Kuh, Kinzie, Schuh, & Whitt, 2010). These metrics have traditionally included measuring persistence as students matriculate from year to year, average GPA, graduation rates, and placement statistics for graduates (DesJardins, Ahlburg, & McCall, 2002).

A report authored by Kuh, Bridges, Buckley, Hayek, Kinzie (2007) provided a background to analyze some the constructs that comprise student success. This report acknowledged multiple measures that could be implemented to gauge student success. It was noted there is a general agreement to the importance of these measures of success. To fully examine student success, the authors suggested the importance of developing a definition of success. An effective definition should take into consideration sensitive economic realities and the needs of workforce development. With these guiding principles George Kuh et al. (2007) define student success as “academic achievement; engagement in educationally purposeful educational activities; satisfaction; acquisition of desired knowledge, skills, and competencies; persistence; and attainment of educational objective” (Kuh, et al., 2007 p. 10).

The report indicated the foundation of student success is built from the student's precollege experiences and their background. Elements such as gender, race and ethnicity, socioeconomic status, family educational background and support, educational aspirations, academic preparation and expectations, enrollment choices and financial aid all were initial components that factored into student success. Scholarships, grants and work-study could be associated with higher retention rates and have a strong effect on low-income student performance.

Kuh et al. (2007) analyzed NSEE data to determine how engagement in educationally purposeful activities is positively related to grades and persistence. The researchers summarized their findings by sharing that correlations between institutional mean scores of NSEE clusters of educational practices and institutional graduation rates for 680 four-year colleges and universities were statistically significant ($p < .05$).

The authors' findings summarized how institutions can foster student success by creating stimulating and engaging classroom experiences. The authors postulate that this type of experience will be the primer for students to devote additional time and effort to enhance their learning and cement their study habits. Additional research findings included student engagement in purposeful educationally activates such as campus wide student success initiatives that assist students with developing skills and goal setting. First year seminar style courses (orientation or discipline based) that were incorporated into campus wide success initiatives helped students feel the campus environment is more supportive. The authors shared students who feel supported are more likely to have academic success. This support can come from the institution, and community. The author's findings indicate that family support, both

pre-college and during enrollment in college heavily contribute to student success. Kuh et al. (2007) also describes that student's pre-college academic preparation for post-secondary work is a major contributor to success in college.

To better understand the impact the student's environment can have on their success Tinto (2003 a.) authored a case study highlighting educational communities. There is no singular cause of student departure which was noted as often being mislabeled as dropout. Departure is a result of a variety of sources that derive from both the institution and the student. Academic rigor and underdeveloped study habits also result in student departure. Tinto (2003 a.) noted that adjustment to college is challenging for some students noting how the pre-college home environment influences student success in college. The goals (or lack of) that a student enters their higher education experience with can curtail a student's ability to succeed. According to Tinto (2003a.) it was evident that students with limited goals leave college before their degree is attained. Uncertainty surrounding a student's intended degree and career path will lead to departure under demanding and stressful conditions (Tinto, 2003 a.). A final note of Tinto's analysis includes how finances can influence a student's decision to depart. Students from disadvantaged backgrounds, who work and attend part-time and incur larger sums of debt, are likely unable to bear the cost burden and depart. Tinto made a connection of student's rationale for departing citing "personal reasons" is often a proxy for lack of financial aid. This connection was said to be tied to more of a value proposition of the quality student's degree and social experience (Tinto, 2003 a. p. 4).

Having shared causes for student departure, Tinto (2003 a.) built his case for the essential elements of an effective institutional retention program. Tinto's (2003 a.) summarized findings

include a collaborative institutional commitment among faculty, staff and administration is suggested to play a significant role in student retention. Tinto (2003 a.) shared that there is no singular institutional cure to solve retention problems. Multiple efforts including; curriculum enhancement, staff training, quality instruction, improved learning and assessment will help stem student departure. Restructuring the “freshman academic experience” can create quality student success programs that actively work and support students (Tinto 2003 a. p. 9). Tinto (2003 a.) explained student’s environmental influences both prior to and during their enrollment impacts their academic success (Tinto 2003 a.).

In a qualitative study conducted by Yazedjian, Toews, Sevin, & Purswell (2008), 22 students were interviewed in a focus group format. These students were asked about their definitions and strategies for success in their college curriculums. The participants in the success exploration study shared factors that contributed to what strategies they used to pursue their perception of success (Yazedjian, Toews, Sevin, & Purswell 2008). The students discussed things like attending class regularly, reading, and meeting with faculty. The students discussed choices they had to make between studying and social events, friends, and relaxing. The authors equated these choices to motivation. The students in the study also described participating in study groups, taking classes with friends and sharing class notes also helped them succeed.

The student participants who were interviewed in the Yazedjian et al. (2008) study had a slightly different vision of success than what most institutions would outline as their success metrics. The three themes that emerged from the study were “good” grades, social integration and the ability to navigate the college environment (Yazedjian, et al. 2008). While success in the classroom was a common theme, it was not the central tenant. Many of the students indicated

that navigating college life was itself a definition of success. The authors summarized their findings in this way, “These statements illustrate the importance students placed on being able to devote time to academics while also maintaining their social relationships (Yazedjian, et al. 2008).” The findings demonstrated that students are not necessarily aren’t focusing on the same outcomes as the institution when it comes to considering their success. Instead, this article suggested the lived experience of students is shaping what success means to them.

In a study conducted by Tinto and Pusser (2006), they constructed a model of student success built on institutional action that was intended to be useful to practitioners and researchers alike. Tinto and Prusser (2006) begin by distinguishing between the constructs of student persistence and student success. The authors classify persistence as student enrollment over time which may or may not be continuous and a facet of student success that must be managed by an institution. Success was characterized as a broad concept emphasizing different forms of persistence most notably degree completion.

The authors preface their success model by stating institutions who successfully manage persistence influenced “environments” to effectively manage student success. Tinto and Prusser’s model of institutional action to support success suggests institutional commitment through leadership and the investment of resources to positively impact success initiatives. Additionally, the model assumes a positive influence of campus climate with academic success expectations. An example that was provided for campus climate in relationship to student success is student performance in the classroom. One of the elements of the model for institutional action is support for students. Social, academic and advising support structures including freshman seminars, tutoring centers and professionally staffed advising centers were

noted as underpinnings for support. Tinto and Prusser stated that financial aid was a key component to institutional support noting that numerous studies cited the importance of financial aid to low-income student's success. Feedback in the form of assessment of student involvement or engagement was noted as a functional element of Tinto and Prusser's (2006) model for institutional engagement.

Tinto and Prusser (2006) stated in their findings that institutional commitment to student success was the most important investment a school can make. Academic, social and financial are three forms of support the authors cite to promote student success. High student expectations were suggested to be communicated through quality advisors. Tinto and Prusser (2006) described that in many cases students with low expectations will not experience a great deal of success. Institutions that provided their students with feedback were excelling found improvements in student success. The authors stated social and academic integration or involvement is another condition that an institution must meet to promote student success.

Expanding on their earlier college access and choice model from 2006, Perna and Thomas (2008), researched student success in a study that highlighted four layers that influenced student's success in higher education. The authors approach was to thoroughly examine literature and research of student success models in "top journals" which vary across disciplines (Perna & Thomas, 2008 p. 7). Their presumption was there is some overlap and centrality to the various success models they reviewed. The Perna and Thomas model was designed to review and summarize several theoretical and methodological models. Perna and Thomas's goal was to provide a thorough understanding for policy makers and practitioners to purposefully intervene and enhance student success (Perna & Thomas, 2008). The Perna and Thomas model is built on

four layers, internal context, family context, school context, and social, economic and policy context. Each layer is viewed through four lenses, economics, sociology, psychology, and education research perspectives.

The first layer, called “internal context,” was premised on how students are intrinsically driven by attitudes, behaviors and internal motivation to succeed (Perna & Thomas, 2008, p. 2). The review indicted psychology journals noted cogitative and non-cognitive processes can aid with understanding student success (Perna & Thomas, 2008). The psychology lens led Perna and Thomas to postulate self-regulated learning and academic control can influence success. Perna and Thomas (2008) also noted that research suggested that students with the best grades had strong academic control and were preoccupied with failure (Perry, Hladkyj, Pekrun, & Pelletier, 2001). The psychology journals examined the contributions of students’ academic goals to their academic performance. The education journals provided insight into how a student’s self-efficacy beliefs will inform their effort and perseverance. While the economics literature did little to influence the internal context layer of this model, sociology journals yielded positive relationships between solid study habits and academic performance.

The second layer of Perna and Thomas’s (2008) model, called “family context,” acknowledged that family influences impacts a student’s likelihood of success (p. 2). The economics lens influenced the model through examinations of parents who financed a majority of their child’s cost of attendance. Perna and Thomas (2008) suggested a greater likelihood a student will fail coursework and fail to attain their degree if parents finance a majority of the cost of attendance. By comparison students who funded their university experience through their own means like personal savings and employment are more likely to experience success. The

sociology lens influenced the construction of the model by highlighting literature that argues families seek to improve their child's success by maximizing the quality of schooling available to their children. The psychology literature highlighted how the relationship between family context and student success can be stratified depending on parents' education, immigrant status and ethnicity. Educational research applied to the second layer of the model showed how socioeconomic status is related to student success. Student success, segmented by parental socioeconomic status, can vary based on race and ethnicity.

The third layer of the model, called "school context," discussed the contribution K-12 and higher education institutions make to student success (Perna & Thomas, 2008 p. 3). Perna and Thomas highlighted several elements shared in economics journals such as the role of two versus four year institutions. Additionally, the economics journals revealed that institutional financial aid impacted student success and their "perceptions of opportunity costs (Perna & Thomas, 2008 p. 46)." The sociology literature relevant to the third layer discussed how students with lower financial means will enroll in less selective institutions which provide fewer of student academic support opportunities. Psychology journals reviewed by Perna and Thomas discussed how institutional engagement by students can influence their success. Perna and Thomas highlighted a study conducted by Wilson, Mason and Ewing (1997) which suggested students who participate in activities and take advantage of institutional resources such as counseling have stronger retention. Similarly, the education journals revealed that student engagement in undergraduate research, peer assessment, and small group learning helped increase persistence rates.

The fourth layer, called “social, economic, and policy context,” examined how “social conditions,” economic conditions,” and “public policies,” informed student success (p. 2). The economics literature contributed to the outermost layer of the model by highlighting how financial aid, specifically state funded aid and student debt in relationship to employment decisions and degree completion. The sociology lens of the model examined the literature in relationship to women’s engagement in the STEM fields. The psychology literature yield few results except for the role the media plays in student success by reviewing a study of commercials that play on stereotypes of women not performing as strongly as men in math. Finally, the education lens shows that state educational fiscal policies specifically financial aid tuition, and appropriations can shape student success.

In summary, Perna and Thomas (2008) concluded policy makers and practitioners can enhance student success through four venues. First, understanding the layers of this success model, policy makers and practitioners ought to recognize that impacts of success efforts may be limited by a student’s situational context. Federal support of financial aid impacted student success not only by providing aid resources but also helping students and families understand aid availability. Second policy makers and practitioners should understand that success policies are best coordinated with other institutional policies. Third policy makers and practitioners should realize there is no single or best policy that enhances student success. The fourth and final element called for policy makers and practitioners to support multiple measures of their institutional success effectiveness.

Perna and Thomas (2008) encouraged future researchers to use their model as a conceptual framework to “develop multi- and interdisciplinary approaches to understanding student success” (Perna & Thomas, 2008 p. 59). The authors noted the relatively few examples

of qualitative research in relationship to student success and urge future research in understanding the links and predictors of student success to other indicators of student success in other specific contexts.

Summary of the Literature

The literature has outlined the complexities low-income, Pell eligible, engineering students encounter while pursuing their degree. Engineering programs are traditionally higher priced programs. With the price of tuition steadily outpacing the purchasing power of the Pell grant (Engle and Tinto 2008), schools must invest time into helping these students graduate (George-Jackson et al., 2012).

While schools are investing in success programs and developing learning communities to assist their students succeed, it is important to get the student's perspective (Tinto, 2003 b.). Baum and Shireman (2013) stated understanding student's circumstances, behaviors and responses to opportunities will impact their education outcomes. Baum and Shireman (2013) went on to say how students process information; understand the influences and structure of the financial aid programs and how the institution influences their goals and aspirations is important to supporting student success.

There appear to be gaps in the literature that seek to understand student's perceptions of success specifically related to Pell grant eligible engineering students. Baum and Shireman's (2013) encouragement to understand student influences on their success leads me to believe there is potential to further advance the student success literature. Perna and Thomas's model (2008) may function as foundation to further understand the phenomena of how students establish goals and strategies to achieve their personal definition of success. Finally, Perna and Thomas's

multiple levels of influential context may help to better understand how student's families, financial situation, student debt, pressures of a rigorous curriculum and institutional staff and success policies influence their perceptions of success.

CHAPTER 3 – RESEARCH METHODOLOGY

Purpose Statement

The purpose of this study was to explore how engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum at a medium sized mid-western polytechnic university.

Research Questions

Crafting a primary research question for this qualitative study was directed towards revealing meaning by focusing on the “how” to understand students’ experiences (Smith et al., 2009 p. 46). Therefore, this study seeks to provide insight to the following overall research question: How do engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their academic experience at a medium sized mid-western university? To further expand on the research question the following research questions were explored.

1. How do students at different levels of their educational experience (first year, second year, third year, fourth year) set their goals and strategies to determine educational success in their college academic experience?
2. How do students at different levels of their educational experience explain educational success for themselves?
3. How does having a student loan impact the student’s goals and strategies to achieve educational success?

4. How do student participants describe their interactions with faculty and staff members as a means of achieving their educational goals?
5. How do student's concepts of educational successes align with institutional success indicators?

Study Design

The design of this study followed a constructivist viewpoint. More specifically, a social constructivist viewpoint. According to Creswell (2013) social constructivists conduct research to better understand the world in which they live and work (Creswell, 2013). The study sought to gain a broad understanding of the participants viewpoints which was forged through discussions with the participants in the field (Creswell, 2013). It is through these interactions with students that the researcher intended to listen carefully to how the students interacted in their educational environments (Creswell, 2013).

This study was designed to be a qualitative phenomenology, specifically an interpretative phenomenological analysis (IPA). As a qualitative study, "IPA is a research approach committed to the examination of how people make sense of their major life experiences" (Smith et al., 2009, p.1). Researchers who conduct an IPA are attempting to make meaning of life experiences. A researcher employs IPA to "know in detail what the experience for this person is like, what sense this particular person is making of what is happening to them" (Smith et al., 2009, p.3). In order for IPA study to be successful, there are two stages of meaning making in IPA research, first by the participant making meaning of the experience, and then by the researcher making meaning of the participant (Smith, Flowers, & Larkin, 2009).

Sampling Strategy, Participants and Site Overview

Purposeful sampling was employed to ensure a homogenous population. Smith, Flowers and Larkin advised that an IPA should seek “to obtain a group which is pretty homogeneous” (Smith et al., 2009, p.3). Homogeneity in an IPA was also understood to enhance the significance among the research questions (Smith et al., 2009, p.3). In seeking an optimum number of student participants for this study, Smith Flowers and Larkin provided guidance stating smaller sample sizes allows for detailed accounts of the individual’s experiences (Smith et al., 2009, p.51). Approximately 120 students were invited to participate in the study with the goal of achieving a sample size of 16 student participants. Selection of the students was based on purposeful selection of the population with efforts to balance the distribution of both male and female and resident and non-resident students to ensure homogeneity.

All the participants selected to be a part of this study were traditional students attending the same mid-sized polytechnic public institution in the upper Midwest. There were 16 students selected to participate in this study. The 16 students consisted of four students in their first year, four in their second year, four in their third year and four in their fourth year. All of the participants in this study completed a Free Application for Federal Student Aid, accumulated varying amounts of student loan debt and all received the federal Pell grant. According to the edicts of the Free Application for Federal Student Aid or FAFSA, receiving the federal Pell grant suggests the participants needed additional financial assistance beyond what their family could provide. All of the students in the study had an expected family contribution (EFC) between \$0 and \$5,500. The participants were all attending a polytechnic university that has an approximate resident cost of attendance of \$27,600 and non-resident cost of attendance of \$43,600 for two semesters. Finally, all efforts were made to include students who are first generation students.

The site of this study was located at a rural, upper Midwest, state funded polytechnic institution. The majority of the 120 majors at the institution are an engineering discipline. The institution is focused on delivering a traditional residential education experience. Approximately 7000 students attend the institution which is located in a town of approximately 14,000 residents. The institution is the largest employer in the town.

Data Collection

This study used the convenience sampling technique to collect data. The Assistant Vice President for Enrollment and Marketing at Superior Tech identified the potential student participants who meet the outlined criteria. The researcher provided an invitation letter (Appendix A) to the Assistant Vice President of Enrollment and Marketing at Superior Tech so that he was able to affirm the institutions approval of the study. The letter requested an invitation to invite up to 16 students, four from each year enrolled at Superior Tech.

The researcher informed the Vice President of Student Affairs at Superior Tech in writing of the study (Appendix B) and sought IRB approval. Once permission was granted and IRB approval permitted, a letter (Appendix C) was be provided to the Assistant Vice President for Enrollment and Marketing to send to the selected students inviting them to the study. The letter consisted of a brief description of the study, the estimated time commitment, a brief description of the interview, a disclosure that the interviews will be recorded, and a notice that students who complete the interview will receive a \$20 gift card. Additionally, the letter provided a reaffirmation of anonymity and confidentiality. The student participants were also instructed on how to contact the researcher to indicate their interest in taking part in the study and the deadline for responding.

Selection of the participants happened approximately one week after the deadline for responding to the invitation. It was the hope of the researcher that more than 16 students would volunteer for the study. However, if fewer than 16 students volunteered, an additional communication (Appendix C) would have been sent to request participation. If after the second communication and fewer than 16 students agreed to participate, the study would have proceeded with the volunteers. In that there were 18 volunteers, purposeful selection of the students was applied based on gender, and geographic location of their hometown. All efforts were made to evenly divide the student participants to have equal male and female participation.

Additionally, selection efforts included equal representation of in state and out of state students. This allowed for the purposeful selection of the population to ensure homogeneity. Homogeneity of the sample allows for the group of participants to be more closely aligned and add to the significance of the research questions (Smith & Osborn, 2007).

Students who were selected to participate in the study were notified through a letter (Appendix D) both welcoming to and thanking them for participation in the study. The letter to selected students contained the details of interview dates, times, and locations and instructions on how to respond. Students who were not selected also received a letter notifying them (Appendix E). An informed consent form (Appendix F) and a demographic questionnaire (Appendix G) was included with the welcome letter with instructions to bring the completed forms to their interview. All student participants were also sent a final thank you letter at the conclusion of the study (Appendix J).

IPA seeks to engage people's reflections in their life experiences. To gain insight into this personal experience, students were interviewed to better understand their vision of academic

success. Van Manen (1990) tells us, “the interview may be used as a means for exploring and gathering experiential narrative material that may serve as a resource for developing a deeper and richer understanding of a human phenomenon” (Van Manen, 1990). Meeting times were scheduled and semi-structured interviews were conducted in a quiet but public setting in the Student Financial Service Center on the Superior Tech campus. Before the start of the interview, participants were asked again to consent to a recording. The participants signed an informed consent form (Appendix F) that was covered prior to the start of the interview. This form reiterated the anonymity and confidentiality of the study. At this time participants were asked to select a pseudonym to support the goal of confidentiality.

The goal was to make the students feel like the interview process was more like a “directed conversation with a purpose” (Smith et al., 2009, p.57). The interviews began as a conversation to make the student feel comfortable. The interviews progressed into a relational dialogue where the students share their perceptions of what success is to them and how they made meaning of their perceptions through developing goals and strategies. All interviews lasted approximately 90 minutes with prepared questions, as well as follow up questions. While the interviews followed the list of guiding questions, there were instances where the conversation deviated from the agenda. However the dialogue flowed; all questions were covered during the interview. This was done to ensure the consistency of the interviews among the participants and add to the validity of the study.

The guiding interview questions were developed to gently ease the student participants into a conversation surrounding the research questions. In many IPA studies, research questions are pitched at the abstract level because it is not usually helpful or effective to ask the questions directly of the participants (Smith et al., 2009, p.58). A guide for question development in an

IPA is to prepare questions that are “open” and “expansive” encouraging the participant to talk at length (Smith et al., 2009 p.59). Questions used in this study (Appendix H) were open ended beginning with “what do you think”, “how would you describe” and “tell me about.” The student voice is a central tenant of this study. To better understand the students perspective, follow up prompts and probing questions were asked to assist with expanding the detail of the lived experience (Smith et al., 2009, p.60). At the close of the interviews, the participants were thanked and presented with their \$20 gift cards.

Data Analysis

Shortly after the interviews were concluded, the recording was transcribed and bolstered by the authors field notes that were collected. Once the data was transcribed and analyzed, a member check was conducted (Appendix I). The member check consisted of interview transcripts and interpretations being shared with the participants to see if the data “rings true” (Merriam, 2002). The participants were provided 10 calendar days to review the member check and respond to the author indicating any discrepancies or misinterpretations.

Researchers conducting an IPA are not prescribed to employ a single method for data analysis, rather there are multiple approaches that can be utilized (Smith et al., 2009, p.79). This study analyzed the data using the Smith, Flowers and Larkin six step approach for new researchers (Smith et al., 2009, p.82).

Step one (reading and re-reading) was accomplished through complete immersion into the recorded and transcribed data. Transcripts were listened to multiple times and field notes were thoroughly analyzed, listening for emergent themes and developing narratives. Step two (initial noting) was to divide the data into meaning units surrounding the student experience.

This step allowed for the initial analysis of the goals, strategies and success narratives shared by the participants. Descriptive, linguistic and conceptual comments were formulated based on the thoughts, language and topic areas the student shared. Step three (developing emergent themes) were initiated by examining exploratory comments from step two reflecting on both the participants and researchers words and emerging themes. Step four (searching for connections across emergent themes) was an organizational process for the data which will chart the connections between the themes of success and failure. Steps five and six (moving to the next case and looking for patterns across cases) began with an initial write up of the data noting how there were similarities between the participants yet each distinctly different. This writing introduced the super-ordinate theme and the essence of the study.

Trustworthiness

A quality IPA must take into consideration the importance of validity (Smith et al., 2009 p.184). Lincoln and Guba have taken this notion one step further by stating that there is precedent for trustworthiness to ensure the strength of a study (Lincoln & Guba 1985). The Lincoln and Guba model for trustworthiness utilized four criteria; dependability, credibility, conformability and transferability (Lincoln & Guba 1985).

The dependability and credibility of this study was built on the concept of a member check (Appendix I) (Lincoln & Guba 1985). A member check consisted of synthesizing the data gathered and interpreted from transcripts and field notes and soliciting feedback from the participants regarding the researcher's conclusions (Maxwell, 1996). The students in this study were sent transcripts of their interviews to ensure accurate transcription of the data. The

participants were given instructions on how to complete the member check and were given a deadline of ten days to return the member check if there were any discrepancies.

Confirmability is the practice of confirming the general findings of the data through an objective description (Lincoln & Guba 1985). Confirmability was further described in the Yazedjian et.al, (2008) study examining the student definition of success. They described confirmability as “findings which represent the experiences of those in the setting and were not merely the interpretations of the researcher (Yazedjian et al., 2008).” To help achieve confirmability, Creswell (2013) added perspective by emphasizing the importance of asking the probing follow up questions. Probing follow up questions were also underscored by Smith et al., (2009). In an effort to transport the reader to the setting and understand the discussion, rich and thick descriptions were used to describe participants and convey findings (Creswell, 2013). This type of description helped to provide perspective and enhance emergent and superordinate themes in the study (Creswell, 2013). Finally a “thick and rich description” augmented the validity the study (Creswell, 2013). The thick and rich descriptions were gathered during the interview process through a biographical questionnaire. Additionally, probing questions were asked of the participants to clarify their answers.

Interview conversation details can be easily forgotten by researchers. To help aid in the retention of data that adds to the richness of the conversation, a field log is often utilized to assist the researcher with preserving conversation details (Lofland & Lofland, 1999). A field log was a tool used in this study to allow the researcher to maintain a record of observations, impressions, participant availability, and interview schedules. The field log was also used to record any immediate reflections. To keep the field log organized, a demographic questionnaire was provided to the students to collect background information (Appendix G). Information provided

by the student participants on the questionnaire was used to enhance the rich description of the students.

Creswell tells us the validity of first-class qualitative research is enhanced by comments from the researcher describing how their background may have influenced and shaped the interpretations of their findings (Creswell, 2013). To that end, I began my undergraduate college experience as a STEM student studying forestry and wildlife biology. In addition, my undergraduate experience began at Superior Tech. I initially struggled to find success as a student. It wasn't until I prioritized my interests and made changes to my curriculum that I began to find a groove and find success in the classroom. As interviews were conducted, I heard similar experiences to my undergraduate experience and developed a kinship with the students.

As an employee in the Student Affairs division for over 14 years at Superior Tech, it is a part of my daily job to assist the students with success. By default, I am spending what Creswell calls "prolonged time in the field (Creswell, 2013)." This immersion enhances my credibility to convey an in-depth understanding of the phenomenon that I am researching.

Information heard and gathered from these interviews has had a transformative impact on me as a professional. Moreover, my immersion as an employee and my role as a researcher facilitated the enhancement of programs and services offered at the institution to assist students achieve success.

CHAPTER 4 – RESULTS

In this chapter, the results of the participant interviews will be discussed. To provide an accurate context for the discussion, participant profiles will be presented. This chapter will also present the major themes and super ordinate themes.

The overall research question that has guided this study is how do engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their academic experience at a medium sized mid-western university? To further expand on the overall research question the following research questions were explored.

1. How do students at different levels of their educational experience (first year, second year, third year, fourth year) set their goals and strategies to determine educational success in their academic experience?
2. How do students at different levels of their educational experience explain educational success for themselves?
3. How does having a student loan impact the student's goals and strategies to achieve educational success?
4. How do student participants describe their interactions with faculty and staff members as a means of achieving their educational goals?
5. How do student's concepts of educational successes align with institutional success indicators?

Participant Profiles

Sixteen students were interviewed during the course of this study. The students represented two males and two females in each level of enrollment ranging from students in their first semester through the final year prior to graduation. All of the participants were enrolled at a Midwest polytechnic university where the majority of the student population is enrolled in engineering disciplines. All of the participants in this study were enrolled in engineering. Ten students were paying resident tuition and six students were paying non-resident tuition.

All sixteen participants qualified and received the federal Pell grant when the data was collected. Five of the students had a zero EFC, which meant that according to the federal standard at the time they receive the maximum allowable federal Pell grant. This indicated that these students were in need of the most financial assistance available by the institution. All student participants borrowed federal student loans. Twelve of the students had previously borrowed federal student loans and have accumulated debt. Only the four students in their first semester did not have accumulated debt. Four of the participants were first generation, meaning that neither of their parents attended college.

Seven of the students resided on campus when the research was conducted and were paying room and board at the institution. This university requires that students reside on campus their first four semesters. Although there is a policy to appeal and request release from the commitment to live in the university residence halls. The following biographical overview will provide further background on the student participants.

First Year Students

At the time of the study, Ember was an in state first year student studying Chemical Engineering. Ember was receiving approximately \$17,000 in gift aid funds including the federal Pell grant at the time of the study. She has borrowed approximately \$7,000 in subsidized/unsubsidized student loans and expects to graduate with approximately \$20,000 in student loan debt. Ember's parents did not borrow alternative/parent PLUS to assist her with funding. Ember resided in the residence halls on campus. Her parents have some college experience but did not graduate with their degrees.

At the time of the study Rose was an in state first year student studying Mechanical Engineering. Rose currently receives approximately \$20,000 in gift aid funds including the federal Pell grant. She has borrowed approximately \$3,500 in subsidized/unsubsidized student loans to date and expects to graduate with approximately \$15,000 in student loan debt. Rose's parents had not taken out any loans to assist her with funding. Rose resided in the on campus residence halls. Her mother had a graduate degree and her father did not have college experience.

Gimli was an out-of-state first year student studying Computer Engineering. Gimli received approximately \$25,000 in gift aid funds including the federal Pell grant. He had borrowed approximately \$7,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$60,000 in student loan debt. Gimli's parents borrowed approximately \$15,000 in alternative/parent PLUS loans to assist him with funding. Gimli resided in the on campus residence halls. His parents both have bachelor degrees.

Tyrone was an in state first year student studying Civil Engineering. Tyrone received approximately \$9,000 in gift aid funds including the federal Pell grant. He had borrowed approximately \$7,000 in subsidized/unsubsidized student loans and expects to graduate with approximately \$40,000 in student loan debt. Tyrone's parents borrowed approximately \$7,000 in alternative/parent PLUS loans to assist him with funding. Tyrone currently resides in the on campus residence halls. Tyrone was a first generation student.

Second Year Students

Fuzzy was an out-of-state second year student studying Mechanical Engineering. Fuzzy currently receives approximately \$12,000 in gift aid funds including the federal Pell grant. She has borrowed approximately \$12,500 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$60,000 in student loan debt. Fuzzy's parents borrowed approximately \$18,000 in alternative/parent PLUS loans to assist her with funding. Fuzzy currently resides off campus. Her mother has some college experience and her father does not.

Tadley was an in state second year student studying Mechanical Engineering. Tadley received approximately \$15,000 in gift aid funds including the federal Pell grant. He has borrowed approximately \$7,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$30,000 in student loan debt. Tadley's parents did not borrow alternative/parent PLUS to assist him with funding. Tadley resided off campus. His parents both had education and training beyond high school. His mother has a bachelor's degree and his father has trade school certifications.

Meg was an out-of-state second year student studying Civil Engineering. Meg was awarded approximately \$25,500 in gift aid funds including the federal Pell grant. She borrowed approximately \$12,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$75,000 in student loan debt. Meg's parents borrowed approximately \$16,500 in alternative/parent PLUS loans to assist her with funding. Meg resided in the on campus residence halls. Her mother has a bachelor's degree and her father has an associate's degree.

Michael was an out-of-state second year student dual majoring in Mechanical and Materials Science Engineering. Michael received approximately \$21,000 in gift aid funds including the federal Pell grant. He borrowed approximately \$10,800 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$50,000 in student loan debt. Michael's mother borrowed approximately \$11,000 in alternative/parent PLUS loans to assist him with funding. Michael resided in the on campus residence halls. His mother has a master's degree.

Third Year Students

Saphira was an in state third year student studying Biomedical Engineering. Saphira received approximately \$11,500 in gift aid funds including the federal Pell grant. She borrowed approximately \$15,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$15,000 in student loan debt. Saphira's parents did not borrow alternative/parent PLUS loans to assist her with funding. Saphira resided off campus. Saphira was a first generation student.

Rod was an in state third year student studying Mechanical Engineering. Rod received approximately \$16,000 in gift aid funds including the federal Pell grant. He borrowed approximately \$21,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$33,000 in student loan debt. Rod's parents borrowed approximately \$6,000 in alternative/parent PLUS loans to assist him with funding. Rod currently resides in the on campus residence halls. His mother has an associate's degree and his father has college experience.

Rusty was an in state third year student studying Computer Engineering. Rusty received approximately \$9,500 in gift aid funds including the federal Pell grant. He has borrowed approximately \$34,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$60,000 in student loan debt. Rusty's parents did not borrow alternative/parent PLUS loans to assist him with funding. Rusty resided off campus. Rusty was a first generation student.

Kristy was an out-of-state third year student studying Mechanical Engineering. Kristy received approximately \$25,000 in gift aid funds including the federal Pell grant. She borrowed approximately \$19,500 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$40,000 in student loan debt. Kristy's parents did not borrow alternative/parent PLUS loans to assist her with funding. Kristy resided off campus. Her parents both have associates degrees.

Fourth Year and Beyond Students

Mia was an in state fourth year student studying Mechanical Engineering. Mia received approximately \$14,000 in gift aid funds including the federal Pell grant. She borrowed

approximately \$30,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$66,000 in student loan debt. Mia's parents borrowed approximately \$10,500 in alternative/parent PLUS loans to assist her with funding. Mia resided on campus in the residence halls. Her mother has a master's degree and father does not have college experience.

Buck was an in state fourth year student studying Mechanical Engineering. Buck received approximately \$12,000 in gift aid funds including the federal Pell grant. He borrowed approximately \$8,200 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$10,000 in student loan debt. Buck's parents did not borrow alternative/parent PLUS loans to assist him with funding. Buck resided off campus. His mother has an associate's degree and his father has a master's degree.

Rick was an in state sixth year student studying Mechanical Engineering. Rick received approximately \$10,000 in gift aid funds including the federal Pell grant. He borrowed approximately \$43,500 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$100,000 in student loan debt. Rick's mother borrowed approximately \$35,500 in alternative/parent PLUS loans to assist him with funding. Rick resided off campus. His mother earned an associate's degree and his father does not have college experience.

Louise was an out-of-state fourth year student studying Environmental Engineering. Louise received approximately \$40,000 in gift aid funds including the federal Pell grant. She has borrowed approximately \$27,000 in subsidized/unsubsidized student loans to date and expected to graduate with approximately \$40,000 in student loan debt. Louise's parents borrowed

approximately \$18,800 in alternative/parent PLUS loans to assist her with funding. Louise resided off campus. Her mother has an associate's degree and her father has a master's degree.

Participant Profile Summary

Table 1. Summary of participant profiles

Pseudonym	Enrollment Status and Residency	Current Gift Aid	Expected Debt at Graduation	Parental Borrowing	Mother's Education Level	Father's Education Level	On/Off Campus Living	Cumulative GPA
Ember	1st Year Res.	\$17,000	\$20,000	\$0	College No Degree	College No Degree	On	2.05
Rose	1st Year Res.	\$20,000	\$15,000	\$0	Graduate Degree	No College	On	3.17
Gimli	1st Year Non-Res.	\$25,000	\$60,000	\$15,000	Bachelor Degree	Bachelor Degree	On	3.31
Tyrone	1st Year Res.	\$9,000	\$40,000	\$7,000	No College	No College	On	3.79
Fuzzy	2nd Year Non-Res.	\$12,000	\$60,000	\$18,000	College No Degree	No College	Off	2.31
Tadley	2nd Year Res.	\$15,000	\$30,000	\$0	Bachelor	Bachelor	Off	3.31
Meg	2nd Year Non-Res.	\$12,000	\$75,000	\$16,500	Bachelor	Associate	On	3.55
Michael	2nd Year Non-Res.	\$21,000	\$10,800	\$11,000	Masters	N/A	On	3.02
Saphira	3rd Year Resident	\$11,500	\$15,000	\$0	No College	No College	Off	2.88
Rod	3rd Year Resident	\$16,000	\$33,000	\$6,000	Associate	College No Degree	On	3.84
Rusty	3rd Year Resident	\$9,500	\$60,000	\$0	No College	No College	Off	2.73
Kristy	3rd Year Non-Res.	\$25,000	\$40,000	\$0	Associate	Associate	Off	3.70
Mia	4th Year Res.	\$14,000	\$66,000	\$10,500	Masters	No College	On	3.38
Buck	4th Year Res.	\$12,000	\$10,000	\$0	Associate	Masters	Off	3.71
Rick	6th Year Res.	\$10,000	\$100,000	\$35,000	Associate	No College	Off	2.76
Louise	4th Year Non-Res.	\$40,000	\$40,000	\$18,800	Associate	Masters	Off	3.33

Major Emergent Themes

Throughout the course of this study several emergent themes were uncovered. This section reviews the themes that developed in the study.

Theme One: Family influences on student's success

All of the students in the study shared that their perceptions of success was influenced by members of their families. In many instances these family influences were parental, while in other cases, the influences were from siblings and other family members. Parental influences were experiential in terms of what parents encountered in their own personal higher education experience. Parents without a college background provided encouragement, advice and emotional support.

For example, Rose shared that her sister recently graduated from Superior Tech. "I'm following in her footsteps and that's what she did." Rose went on to say, "I came from a competitive family, my family members put a lot of pressure on me." She shared that her family frequently asks her, "Are you getting A's, are you at the top of your class?" Rose graduated at the top of her class in high school. As Rose pursued higher education, her family held her to that high expectation of all A's. Rose commented on the expectation of all A's, "I know that this is a really smart college and that's really hard to do here."

Ember had a similar story. Ember relied heavily on her father's tenacious advice that he provided to her. She stated, "My dad is like the main role model." "He tells me; if you're having trouble just keep pushing through." Ember had stated that her dad encourages her "if you get stuck, just push on through; things are bound to get better at some point." Ember shared that

her father was in the Army and served in Kuwait. Ember takes that advice to heart and she likes to be the role model for her younger siblings setting an example of success for them to follow.

Meg was the valedictorian of her high school. She was accustomed to receiving all A's in high school. As she enrolled in Superior Tech, her parents expected her to do her best, but continued to expect all A's and top grades. When things don't go Meg's way in a class she shared, "they are kind of like what did you get on that, I'm like this is college, understanding it, is it." Meg commented that her parents have pushed her in her academic career, "They want me to achieve my best they see my potential." Meg stated that her family's cliché is "we want you to do better than we did." Meg summarized her family has always been very supportive of what she could do, "so that was probably a nice push." "They weren't like you shouldn't do this because they know that I can make it through college and do something better."

Rusty recalled that prior to attending Superior Tech he was contemplating working for a year at his grocery store job and saving his funds to assist with tuition. Rusty shared, "I have to say that a lot of it was my parents, they are always pushing me to do my best." Rusty went on to say that once he began finding success with placement tests as far back as elementary school his parents pushed him to do his best. That encouragement has followed him to Superior Tech. Rusty reflected, "I'm happy they pushed me like they did."

Mia felt that she had very supportive parents who were always behind her. Mia shared how her first two years were a struggle academically. The grades Mia's received are what she described as "pretty bad grades." She went on to say that, "I never got put on academic probation but I was hanging on a 2.5 which is below the cut off point for a lot of companies." Mia indicated, "They never harped on that and I think their goals are the same as mine." She went on to say, "They really want to see me succeed with what I have and they want me to

succeed outside of college and saw me improve my grades a lot.” According to Mia, her GPA was never really important to her parents.

Saphira went into detail regarding her parents support for her education, “Mom never had a college education and she really wanted us to go to college.” Saphira graduated from high school with a 4.0 was proud of the A’s she received on her homework and tests. That changed as she enrolled at Superior Tech. Her parents were surprised when she began to receive B’s, B/C’s and some C’s. Saphira shared her parents surprise, “they were like, you have to do well in school.” Saphira was satisfied with the grades she was receiving and credits her father, “With my dad, I think he um... sees it as I did my best and I gave it all that I could, now I like think of it more of that way too.” Saphira also stated that her parents struggled financially at times. “I’ve seen how my dad struggled a lot and it’s very hard for him to stay on his feet and I’ve seen him struggle a lot and I wanted to get an education so I don’t have to live check to check or worry about how or where things are coming from or have my family see me in that position if that makes sense.”

Tadley’s parents were similar to the other students where they were very supportive of his pursuit of higher education. Much of his family’s motivation for higher education was rooted in their financial struggles. “My parents weren’t always well off.” Tadley went on to say, “When I was young my mom worked at Dow chemical and she made pretty good money, she lost her job and my parents got divorce and that’s when everything went downhill a little bit and since then I always had to work for what I wanted.” Tadley shared that he has been through some tough times when life was challenging but his parents support for his education has persevered. Tadley stated, “My father always tells me, ‘I’m already way past the ed level he had, he praises me with how far I’ve done in college.’” Tadley’s mother also adds support and

encouragement, “My mom went to college when I was a child, so she had a tough time because she was balancing work, me and a marriage so she tells me all the time that I’m going to get through it and keep working hard...she just wants me to get the degree.”

Mike credits his mother as a significant contributor to his success. “My mom is very big on school, she wasn’t a top “A” student in her class, but she always made sure that I did my schoolwork.” Mike recounted how his mother has supported his education as far back as elementary school, “My mother, when I was younger, she would be like if you get an “A” in this class you will get this video game, then I realized that if get good grades good things will come so then I decided to keep rolling with it.” Mike stated that his mother’s encouragement will hopefully lead to a scholarship to assist with his funding, “we hope that college a high GPA will help me with scholarships.”

Kristy had several family members who attended Superior Tech for biomedical and civil engineering. She was particularly shaped by one of her uncles who attended Superior Tech while serving in the National Guard while he was enrolled. “He was able to go to school while being deployed was amazing to me that he actually put in so much hard work into continuing his degree.” In addition Kristy’s older siblings were an influence on her, “I think my older siblings have definitely done that, just setting a good example for me in terms of hard work and actually trying to do well vs. slacking off.” Kristy’s influences were shaped by her parents support.

“My parents were not always about getting A’s, they were more about are you actually trying to do well in school. If we did well of course they would be happy. If we didn’t do well it was more like what did you learn from that and how can you improve from here.”

Kristy has confidence in her degree and her institution that is due in part to her family's influences, "I had multiple aunts and uncles who came here for things like so I knew that this school was a very good school and that I would get a good education here."

Rod shared how his parents influenced his success goals and strategies, "a long time ago, as young as I am, my parents helped set my goals for me." Rod recounted how his father strongly encouraged his pursuit of higher education and his success. He felt that doing well in school was instilled in him at a young age and continued through his experience at Superior Tech.

Gimli was influenced by his parents and his brother. Gimli revealed that his parents were firm in their desire for him to pursue a degree. Speaking for his parents, Gimli shared, "They basically said you have to go to a four year school, even though I might have been like, I want to go to a two year school learning the same kind of stuff. Gimli also compared his desire to succeed to watching his brother. Towards the end of his high school years and college he really got into learning, I wanted to take after him with his jumpstart of learning and jumpstart mine."

Theme Two: Faculty and staff played a mixed role in the student's success

The faculty and staff at Superior Tech played a role in the student's success. Several participants in the study noted how their success, goals and strategies were supported by faculty and staff at the institution. Students noted how they felt inspired and motivated by their professor's interest in their academic career. Rod summarized this inspiration well by noting the enjoyment his faculty seemed to express in their teaching roles was inspiring, "some of them seem to be pretty happy with what they're doing and I kind of want a little bit of that too."

Other students described how getting to know their faculty members on more of a friendship level became more of a partnership in learning. The students didn't want to let the faculty down by not doing the work and understanding the material.

Rose stated, "I know that a lot of the professors here want their students to succeed, especially professor C." Rose went on to describe how Professor C discusses supplemental instruction centers and encourages students to meet him during his office hours and after class. Rose went on to say, "it's really inspiring because it shows they really do care about their students and it really inspires me to do the best that I can."

Tyrone also mentioned Professor C, "Professor C helped, his exams always had tricky questions, things switched around from how we learned them." Tyrone also had positive interactions with teaching assistants in his courses. Their recent experiences with the courses was guiding and motivating. Tyrone described it as, "Well a lot of the TA's influence me because they tell about their experiences and they say the same thing it's about the experiences and not the grade so much."

Mike's experiences with faculty and departmental advisors have also been influential, "The faculty here are really nice and I feel comfortable talking to anyone." Mike described his faculty and advisor Dan, as "a cool guy." Mike went on to share, "Networking with him helps me to get in touch with other researchers in my field." Mike described how he felt empowered by his faculty and their interest in him and his degree is motivating. "The faculty are easy to talk to and easy to get in touch with, they put you at ease." "I can get my questions answered without feeling like I am a bother."

Fuzzy delineated her faculty influences as “It hasn’t been as much goals, but motivation.” Fuzzy has had to work a lot of jobs across campus to help support her tuition. As a result she has become acquainted with many faculty and staff members. Fuzzy went on to say, “they know my scheduling and they tell me keep at it and that I’ll get through it...it’s been more like support.

Saphira also has become acquainted with several faculty and staff across the Superior Tech campus. “I know a lot of the faculty and staff since I worked with orientation last year and I know a lot of people in the learning center really want to see me to succeed and they’re always there to help you and that’s helped me if I ever need anything they’ll help me out.” She went on to describe “the professors have always stressed going to the learning centers and I really utilized those and go to those when they have open hours to talk to them. Saphira set a personal goal to get to know her faculty this year. She rationalized this goal by saying, “That way if I do struggle a little bit they are like ‘oh she’s trying.’” Saphira felt inspired by her faculty who are motivated by a desire to see students succeed. Saphira summarized her motivation through faculty engagement as, “They want you to understand it and take time out of their day to see you.

Rusty felt inspired when he approached his faculty and asked them questions. “Talking with professors means a lot.” Rusty indicated the transactional relationship of student students asking questions and faculty assisting provided a platform to become better acquainted and made asking future questions easier to ask. This led to a better understanding of the coursework.

Rick shared a similar experience with his faculty. After over hearing an elevator conversation between two faculty members sharing they needed assistance with design work, Rick politely interrupted the conversation and offered his assistance. The relationship that ensued with Dr. Beard was transformational for him. “I worked with these people though Dr. B and it was huge for me, it was like an internship.” Rusty explained how the work he performed

was true engineering tasks and he was compensated for his work and talent. “I had more experience and I was feeling good.” Rick went on to share, “I feel with engineering I feel that I’m at home with this more so than other things.”

Kristy linked her learning of the material and achievement in the class to the relationship and quality of the faculty member. “I think that when I find those good professors, those ones who explain a problem but they explain what the right answer is but they also say why is the relevant and why are we learning this.” Kristy described the better she gets to know a faculty member the more she will learn in future courses. A key to Kristy wanting to take several courses from an individual was directly related to that instructor’s ability to apply the coursework to real world scenarios. “That definitely motivates me to make sure that I’m doing the best that I can.”

Theme three: Success measured by learning not grades

Nearly all of the student participants across the educational levels explained educational success for themselves not by the grades they earned in the classroom but by what they were learning in the class.

As an incoming student to Superior Tech, Ember was confident that she was going to get all A’s similar to her high school experience. As Ember had a few weeks of experience as an engineering student she began to evolve when she realized she was not going to get all A’s, “if the C is the best I could get, then I would call that a success.” Ember further described academic success for herself, “It’s not a letter grade thing, if I did the best I could then that’s my A.” Ember went on to say, “it’s less so that I need to get the A and more like I need to do the best that I can, while still understanding the material. While Ember did note that grades were

important to maintain her financial aid, they were not her overall motivator, “the actual honor of the Dean’s list would be nice, a little ego booster, but it’s not necessary, I don’t deem that as my peak.” Ember felt as though learning and understanding was the most important outcome of her coursework.

Gimili shared that learning the material was how he described academic success. “Mostly what you get out of each class and what you also learn but then also what you learn from life experiences coming out of those classes.” Gimili noted that grades are important but it was because it was expected, “high grades are important to me because all throughout high school my parents are like basically nagging me that I have to have, well not nag me but were like if you do this we will do this special, so I kind of get rewarded for having good grades and it also helps not have as many nagging teachers on me as long as I keep getting good grades.” Gimili qualified his definition of success as, “Life isn’t always about learning all the time, it’s about learning and having fun while you’re learning.”

Tyrone described academic success as being satisfied with what he learned in his classes. “You can cram for an exam but you can’t really learn it.” Tyrone went on to share that passing classes are important but that is secondary to learning the material in his coursework. Meg echoed what Tyrone described, “Success would be understanding all of the things that I’ve learned and putting it to mind and knowing it, I want to know thoroughly what I’m doing.” Louise also looked to learning as her perception of academic success, “I think that it’s just making sure I learn something and hopefully being able to use that info in the future.” Additionally, Michael prioritized learning the material as success for himself, “Basically understanding the material and draw connections between each process because you know math

physics and science have connections between them.” “Once you can draw connections to those topics you can apply them to real world applications.”

Although Fuzzy struggled to define success for herself momentarily, her eventual answer was also in congruence with her classmates, “I think it’s knowing what you’ve learned and being able to reflect upon that in an effective way. Fuzzy noted that her motivation to learn the material comes from a fear of entering into the workforce and not knowing the material she has learned school. Fuzzy further clarified that not learning the material in school and applying it to her future employment, “then I don’t think its educational success.” Saphira was also challenged to determine a definition of success for herself but settled on the following;

“I’ve noticed that college is a lot harder than high school so I’ve lowered my standards slightly to what I can attain and still strive for, um, but even if you have a really crappy grade like a C/D or a D you may not be just good at test taking and if you come out understanding the material and are able to explain it and reproduce it somehow. I’ve heard that you can explain it to a 5th grader than you know it.”

Saphira expressed her discontent with measuring success through a GPA.

“I don’t like GPA because I get turned down for a lot of internships because my GPA isn’t at the requirement but I don’t think that reflects how well I know the material or how well I work or how hard I work for what I do, I mean I have 18 credit this semester so sometimes I get swamped and get behind and you can’t help it.”

Kristy noted that success to her focused somewhat on what she considered the “obvious of good grades,” however she qualified that by saying, “I think the other part of it is actually getting something out of all your classes and actually being able to apply all that knowledge to real world problems or situations and also being able to carry that information into other classes that follow up with that.” Kristy felt that, “It’s not about remembering every little thing that you have learned it’s about getting the broad picture.” Kristy described her outlook on success prior

to enrolling at Superior Tech as a “high school mindset” by wanting to get A’s in all of her courses. She then went on to say, “And then I got realistic, because you can’t do perfectly in every single class and coming in you’re not going to understand everything.” Learning and having the ability to apply her knowledge is academic success to Kristy.

Rusty was looking forward to completing his degree but he also defined academic success for himself as what he was learning in the classroom. He felt that being on the Dean’s list would have been nice but was not success to him nor was it a goal of his,

“I just want to understand what I’m learning and know what I’m supposed to know. Like I said before, it (Dean’s list) would be nice and would be a good accomplishment to have but if it doesn’t happen it doesn’t happen. The main goal is to avoid failure for myself.”

Mia related her student success to being prepared to enter the workforce and have a degree from an institution that has a solid reputation. She further described her student experience, “I had that hands on experience that I will be able to relate to my work experience and a lot of the actual knowledge learned.” Mia did discuss grades in relation to her vision of student success, “I’ve learned that grades are basically like cut off points for certain jobs, it’s really what you take out of the classes.” Mia summarized her definition of student success by saying, “even if I don’t get the best of grades, I tried my best and got the most knowledge out of it, then I’m happy.”

Buck and Rick looked at student success as what they learned from the course, but qualified their notion of student success by describing they were learning and preparing for the workforce. Rick described his learning as “developing the engineering mindset” which to him meant to “To be a lifelong learner and understand that you really need to bust hump sometimes and really get more in that mindset.” Rick described how he had friends who graduated with

very high GPA's who realized their grades really didn't mean that much. With that in mind Rick stated, "Really for me academic success is defined as the ability to get into professional success."

Buck also shared that his definition of academic success was closely aligned to what he learned and had the ability to apply to his profession;

"Really being prepared for life as cheesy as that sounds, really that's why we're here in college. I mean some people get good grades by cheating their way through classes or whatever and take shortcuts. I try to apply myself as much as possible. Cause if you don't take the time to learn it in the real world it will come back to bite you."

Sub Theme: Peer perceptions of student success

Students in the study commented how their peers had a much different view of grades and student success than they did. Participants felt as though their peers place a much higher emphasis on grades. Some of the participants described how their peers were only concerned with grades and not the knowledge they took away from the course. In comparison to their peers, the participants felt unique in their strong desire to learn their coursework material and their diminished concern for the grades. Some participants went so far as to suggest that their peers go through the motions just to get a grade. Participants described how upset students, who are motivated by grades and not learning, get when they receive a B in a course. While some participants respected their peers' motivation to get grades, other participants opined that if their peers placed a greater emphasis on learning they wouldn't be upset over the grades they were receiving.

Other participants described how peers are struggling with their courses and consequently not doing well due to a lack of desire to learn the material. Some participants described how their peers who were unsure of their future careers developed a sense of indifference over their

grades. Finally, some of the participants discussed how they perceived that their peers were motivated by potential future earnings and not learning the material.

Tadley felt that his peers had a different perception than he did. He felt that most of his peers were looking to get a high grade. Tadley underscored this by stating, “I think most students just want to get throughout the class, but I really strive to do well in every class.” He felt that he was learning more than his classmates regardless if they have better grades than him. “I hate to sound tacky but I feel like I work harder not maybe smarter but I work hard for getting the grades I do.” It is Tyrone’s perception that he is getting more out of the course work and learning more than his peers. Tyrone echoed Tadley’s remarks by stating, “My peers match their success by what looks good on a resume.” Meg discussed her observations of her peer’s perceptions of success, “I’ve noticed that they’re into learning for the grade to just know it and then just throw it to the side. They get frustrated and don’t understand it and they say whatever.” Meg differentiated what frustrates her by noting that she wants to understand and learn the material.

Fuzzy noted that she never talks to her friends about grades. Ember also stated that she does not have conversations with her peers about student success. She recalled that if a success conversation does happen it will be in passing. Ember did say, “From what I’ve picked up they always try to reach for that A.” Ember shared how she is satisfied with a grade of a C if felt as though she put forth the best effort she had. “My peers all try to go for that letter grade, not necessarily what they would deem their A, it’s like I’m satisfied with a C if I tried my best.” Ember qualified her stance, “It matches my family, do the best you can, that’s what we call success, it might have been just how I was raised kind of thing. “

Saphira felt her definition of academic success was much different than that of her peers. “I don’t think it matches quite up with what they think because I do think more about the learning than the GPA.” Saphira went to describe how her friends equated a 4.0 and taking 18 credits to being a hard worker which was synonymous with success. Saphira further qualified this, “people are often most focused on knowing the material for the test to get the grade and then moving on to the next thing and the next thing.” Saphira admitted that she knows about this practice because she has found herself doing this from time to time;

“when it does get so swamped and I have three exams I need to make sure I know that material for that so I don’t kill my GPA and I don’t have to struggle to get it back up and so then it’s like it goes into one ear and you keep it and shake it out so you get ready for the next exam to cram the next information.”

Saphira likened this behavior to a high school practice. “Know it, get the grade and forget it basically.”

Rusty has also experienced his peers placing a great deal of emphasis on their grades. “I know a lot of people who are like, I need to get straight A’s and I need to get the grades.” Rusty respects the work ethic of these students, “I don’t know that I’ve seen any of them get a B on an assignment and go out of their way to get everything done correctly.” Rusty did advise that getting A’s is important to these students and they do everything they can to maintain that image. “I can applaud that.”

Rick felt that engineering students at Superior Tech are focused. In Rick’s experience many students were very interested in maintaining their GPA above the 3.5 mark, “For a lot of people I’ve talked to they’re really proud of that.” Rick felt that this was motivated by corporate GPA minimums. “When you look at a lot of companies they look at 3.0’s and above.” Rick went on to say, “I think a lot of people here are interested in maintaining their GPA’s peer wise.

I had a friend who was really concerned about that and at the end he was not that concerned.” Rick noted that his friend graduated with a 3.95 GPA and quickly realized once he hit the workforce that a GPA was vain and it didn’t matter all that much.

Louise had a bit of a different take on her perceptions of her peer’s emphasis on their grades. She felt that although she was not grade focused that other students are. Louise equated this desire to be successful in the classroom to a desire to earn a high wage upon graduation;

“Definitely, other students in other departments are like about making a lot more money. I’ve seen that civils tend to be a little bit more greedy, while environmental engineering majors would like to leave the world a little bit better than when they came.”

Louise indicated that she would prefer to work for a non-profit and stated,

“I know you don’t make a lot of money but I’m pretty sure you’d make enough to do the things I want to do.” She further qualified her position by saying, “I don’t know what I would be spending a ton of money on other than paying back my loans, these degrees cost a lot.”

Rose also correlated her peer’s perceptions of success to a financial metric. She described how her roommate wanted to get high grades and didn’t care if she has to repeat a class to do so. “She doesn’t really mind that she is going to take longer to finish her degree so that’s different because that’s taking longer than it needs to kind of stresses me out.” Rose’s perception was that students don’t often utilize all the resources on their first attempt of the course and will feel comfortable taking the course again to get a better grade even if they previously passed the course. Rose equated her peer’s capacity to take classes additional classes to the students not having to worry about money.

Theme Four: The individualized process by which students set goals and strategies to achieve success

All of the students in this study had individualized strategies to achieve their view of study success. These individualized strategies included unique study processes and personalized reward structures. Participants adopted what may be considered traditional strategies and goals for educational success. These strategies included working ahead on the syllabus; time spent reviewing work and working with faculty. For some students, creating a list was a helpful strategy to accomplish their educational goals. Students had different strategies for prioritizing their lists. Most students who created lists did so in order to accomplish homework, study for tests, and to allow their weekends to be free.

Mike had several strategies for achieving success. Prioritization was a key element to Mike finding the time to be successful. “I try to set times to study to get a 3.5 (GPA) and I set aside time to study.” Mike used a strategy to work ahead in his classes. “I try to get ahead in my classes, so if I have a question about a certain topic I will be able to ask the professor ahead of time before it’s too late. Before you know it could be the exam and you can end up behind.”

Tadley also used a strategy to work ahead. Most days he was trying to work at least a week ahead in his courses. Tadley also reevaluated his weekly plan daily, “I’m pretty busy so I also set a schedule day by day. Most of my days start at 8am, so I am either getting homework done for the next day or trying to plan ahead so you know during the next day what you are going to do.” Creating a daily and weekly check list was another success strategy for Tadley. “I come up with a list of stuff to accomplish on time so you can get through the day and the week to get the grades you want to get, weekly but sometimes it changes daily but weekly.” At the end

of the week Tadley would reevaluate his plan, “When it comes to the weekend I’ll plan the next week for meetings, classes and homework and studying for exams.”

Fuzzy also created a plan and a check list to work ahead in her courses. She was balancing student organizations, coursework, working as a dance instructor and several other campus jobs. To accomplish all of this Fuzzy noted;

“I guess I start with a to do list then I get a calendar going of things going on for the entire month and I allocate for work the amount of homework and study hours I need to do and it goes day by day from 8 – midnight. For most of my classes I do my work a week in advance, in case I fall behind I have a week to get things back in order. I allocate more time to certain areas than others in my academics. Like with my statics class I know I need to allocate 3 times as much as I would take in my economics course.”

Saphira also used a list as a success strategy to prioritize her work Saphira provided an example of how she prioritized.

“Usually what I do is it kind of depends on if it’s a lot of homework based stuff or tasks based stuff. I make lists and prioritize what is due when. Monday or Wed, morning/afternoon, do I have all day to work on it, when are my classes, when are my free times. Then based on where my free time is I’ll work on it and get done what I can get done to get it done as soon as I can and kind of move on to the next thing and move down the list. If its task based then I basically do what comes first, what’s going to take the most time and what kind of time do I need to a lot to it. And then how do I fit the other homework and assignments in to that. So a lot of prioritize it what’s going to be due first and what needs to get done first.”

Kristy shared a similar rationalization for creating a list and her prioritization strategy. Kristy was a working student and she indicated that she was generally trying to balance a 15 credit course load and approximately 20 hours of work per week at two different jobs. “I really have to prioritize things, a lot, because every class pretty much I’ve had for every semester, my

level of homework is here (hand gesture for high) and my level of time is here (hand gesture for low).”

Two students in the study noted their creation of a list was to prioritize their time so they could reward themselves. Gimili’s strategy involved allowing for free time on the weekends. He enjoyed socializing with other students and built his list to include time for fun.

“I look at what time I have between my classes and then I set up like an hour to work on my homework and then do my homework in between my classes. I strategize when it is a good time to take a brake and when is a good time to actually study. Of course, trying to keep the weekends free as much as I possibly can.”

Similar to Gimli, Meg had an individualized system of prioritization which was structured around a reward for her accomplishments. After completing her list which included a strict regimen for study, Meg would have a little fun if she achieved an 80% or higher on exams, She set up what she called the “80% club.” Meg purchased a small Matchbox style car for every exam she received an 80% or higher on.

“Last year I set up a system to get to what I called the 80% club. For every exam I got above an 80% I bought myself a little matchbox car and made a little parking garage and I ended up with a whole stack of cars. It was so much fun.”

Sub Theme: Students strategizing not to fail

Several students indicated in the study that failing a course was a concern of theirs. The students who noted this fear had already experienced failure and were trying to overcome the after effects on their grades or were concerned about not progressing in their courses. The exception to this was Rose. While Rose feared failure, the fear stemmed from her sister recently graduating from Superior Tech with a high GPA and securing a solid first job. “My sister recently graduated from here, I’m following in her footsteps and that’s what she did.” Rose’s

fear of failure impacted her strategy for success, “As far as the strategies go, I study a lot so that I don’t fail any of my classes, because that would put me behind.”

Tyrone discussed how he structured his list with the notion of not failing courses. Tyrone indicated that he wanted to do “relatively well in school.” He then proceeded to describe his priority, “I really don’t want to fail, not failing is important. I try to keep a running list of everything I have to get done. I usually try to get most of it done on the weekends because the weeks get pretty chaotic.”

Ember described her goals and strategies for success are mostly centered on her learning center appointments. Ember described that Superior Tech offers coaches and study space for students who are looking for additional assistance in specific study areas. Ember stated, “Currently I have two learning center meetings, I have a success coach, I am going to office hours, asking questions, all things I wasn’t doing last year.” Ember shared that she originally struggled with her goals and strategies. Eventually she stated, maybe just like hitting that rock bottom is what I needed to actually change my goals and well not necessarily my goals but my strategies, maybe it was like a wake-up call.”

In addition to planning lists, Fuzzy also noted that she was working from previous failures. Fuzzy has a significant amount of commitments outside of her classroom work. This was a catalyst for Fuzzy to reduce her outside commitments and focus on her success strategies.

“When I first came to Tech I got on academic probation. The next semester I got off of it and my grades were not as high as I would have liked them to be. I am just trying to do better than I did last year last semester. I don’t know I just think about it. So my goal is not to be too hard on myself when it comes to these things, just know the material.”

Rusty discussed his strategy for success. “I study, when I can, until I feel comfortable with the material, do practice exams, do all my homework.” He was more comfortable with turning in homework that was incomplete or incorrect then asking questions. “I will turn in incomplete homework and then talk with the professor to explain I didn’t know what was going on.” While Rusty indicated that he attempted all of his homework he went on to say, “Just because I don’t have a desire doesn’t mean that I don’t want to be or to sum it up I’m not striving to go above and beyond but I’m not settling for mediocrity either.”

Rod was the only student who suggested that he had a propensity to procrastinate. While Rod expressed a fear of failure he felt as though his procrastination was a strategy that worked for him. “I guess I always do get it done but sometimes I do work right up to the clock but sometimes I kill myself to get it done. Rod indicated that he will always turn in his work and ask for assistance when he needs it, “I’m not the person who is like oh well I didn’t get this done, so many times I just stay up all night and get ready for an exam. I guess it is more behavioral maybe.”

Louise shared how her fear of failure was very stressful. Being involved in several organizations was challenging while trying to learn the material. “I put a lot of time in my homework, I had to sit down for several hours at a time and being like in class and organizations is hard to find all that time sometimes so I’ve been lucky.” Resolving herself to a strategy to learn the material and not be overly concerned with her GPA Louise shared, “So I’m like, well I’m not knocking down how much I try, so I had to figure out where that level was.” Louise indicated that she had to plan her strategy for her courses in small pieces. “I have one class that I was like I don’t know how long this is going to take me.”

Super-Ordinate Themes

One method used in interpretive phenomenological analysis is to identify patterns between the emergent themes (J. A. Smith, Larkin, & Flowers, 2009). The super-ordinate theme is the result of the patterns between the emergent themes which can be used to help identify larger issues within the data. The following section will review the super-ordinate themes.

Super-Ordinate Theme One: Return on investment

One super-ordinate suggested that students found value in the degree they were pursuing. The students were asked if they felt their degree was worth the time and the expense. Students at all levels indicated their degree was worth the time and the investment they were making in themselves. All students in this study did borrow a student loan and all students felt that they were going to be able to pay off their loans with the completion of their degree. An example of the super-ordinate theme can be illustrated through Mike's response, "Yes, I'm paying to improve myself, that's what college is all about. Yeah it might seem overpriced now, but if I put in the work now it will pay off later."

Louise had a sense of optimism and confidence in regard to her degree being worth the investment. "I'm sure it will be worth it, I'm just scared about the transition from getting a job but I'm sure I'll get one." Louise noted that she was willing to sacrifice a bit to ensure that her investment would be worth it, "I'll just have to live like a college student for years after, I don't know I'm just excited to buy better food." Rose was enthusiastic about her investment in herself.

"I know that I will be able to get a return on my investment once I graduate and I know that Superior Tech prepares their students to enter in the working world. With the career fair that recently happened they are also really passionate about getting the students to the jobs. So I'm not alone in that process."

Rod also supported the super-ordinate theme of his education being worth the investment, “I guess I haven’t really thought about that specifically, I guess if I didn’t I wouldn’t be here, the action kind of states that, the action of enrolling and staying here and fulfilling that.” Meg shared that her father was concerned about her student loans,

“Definitely, my dad was worried about the loan part of it. I convinced him that it was an investment in myself and the only person I can hurt at this point is me because of the financial burden. If I stick to my goals and actually do what I want to and succeed through my vision it will all pay off.”

Saphira and Kristy felt as though their degree was going to be worth the investment for them. They also took the investment a step further to indicate that a degree in today’s workforce is a necessity. Kristy noted, “Years ago it wasn’t a big deal if you didn’t have a degree, but now it doesn’t matter what your going for, if I want to achieve some sort of success, I’m going to have to go to college.” Saphira had a similar response to college being worth the investment. Saphira said,

I definitely think the way the world and society is going you have to have a college degree to do anything anymore and coming from a reputable school like Tech and with a degree in bio-medical engineer and a minor I Spanish and a military background I feel like in the end it is going to pay off and it might really suck right now but I know that years down the line I’m going to be glad that I did it when I’m sitting on a Saturday in my house with my family just hanging out and I’m not worried about how we’re going to be paying for food next week.”

Fuzzy felt that her degree would be worth the investment for her. She was working from the premise that if she has a good experience and a solid academic record her investment in her education will have been worth it.

“I will be at a job or owning my own company and being able to make enough to pay back student loans. Like in my mind student loans are nothing compared to the lifestyle that I want to live. I think that I shouldn’t be afraid of how much something is going to cost because the thing that is the most valuable to me is my future

and not having one that's in poverty, or not having success in my future.”

Super Ordinate Theme Two: Confidence in their choice to become an engineer

As a group there was a strong sense of pride in being an engineer. The student participants noted how difficult the curriculum was and the challenge was to learn the material so they could find success in their careers. The students all noted that the cost of their degree was significant and in order to finance the degree they all had to borrow student loans. Several of the participants noted their loan debt was very high. While most of the participants indicated they wished they didn't have to borrow student loans they felt their prospective engineering salaries were worth their investment.

Tyrone shared that he had confidence in his career choice as a function of his investment in his education, “Yes, just the starting salaries of engineers makes it seem that it will be worth it.” Ember also felt a strong sense of confidence in her prospective salary. Ember shared,

“I'm not worried about having to pay off loans, once I get out there and get a job they should be easy enough to pay off. I obviously looked at how much I was going to make and that did tie into me picking chemical engineering but it didn't really like dominate that decision. It was like a little added plus kind of thing.”

Buck shared that he had a several people who helped him to invest in his degree including his parents, grandmother and Superior Tech. Buck referenced other members of his family who pursued degrees outside of engineering and STEM and felt that they were struggling financially. Buck noted,

“If I were in a different profession other than engineering (headshake) and I think owe less than \$15 or \$20k, which is a lot of money if you took that and put it on the table, sadly that's not a lot if you put it on the table. It's scary, it should be a lot but it isn't.”

Mia was very confident in her choice of engineering major. Mia is preparing to graduate and already has a position secured. Mia stated,

“I have already got a job offer that I know is going to even with the amount of loans that I have to pay them off in five years. Now that I have a job offer, I’m not stressed. It’s worth it to me, yes absolutely, I know that there is such a good job placement rate for this school for engineering and I don’t know how I would feel if I wasn’t in engineering. I would be a lot more stressed out.”

Rusty was also very confident in his choice to be an engineer and had strong visions of his future,

“It is an investment; you will put money in and hopefully get more out. With my degree you never hear of low paying engineering jobs and if you do it’s in relation to other ones. I feel as an engineer I will be well off. I don’t want to be super rich or anything like that. I want to be able to go on vacation, when I want to go on vacation. Eventually any kids I have can play the sports they want and I can get them what they need.”

Tadley was a Pell Grant recipient and credited both the Pell program and his confidence in his choice to be an engineer with his ultimate success,

“If I didn’t have the Pell grant, I would think differently and be a whole lot more worried. But due to the fact that it covers so much I’m not worried. I have friends that have like \$60K already (in debt) and they are like third years. I know I won’t have that much debt due to the program that I have. Coming out as an engineer I will be fine. Tech is a good decision so far and seems to have played out well. Happy with my major, happy with the opportunities that have already been presented to me.”

Rick also described his choice of becoming an engineer critical in nature to his sense of place. Rick had tremendous engineering work experience as a student where he was “compensated for his work and talent.” Rick described this experience as “opening his eyes to future possibilities” of what may lie ahead as an engineer. Rick noted, “Yes, I will have a lot of debt, six years of college is not cheap.” Rick advised that he has “come to terms” with his current position of being in debt. “With that confidence and understanding of the situation I’ve

realized that this (engineering) is a well-paying field and that is something I can budget for intelligently to pay off that debt right away. Rick was not concerned about not being able to pay off his investment. He was certain that with his engineering degree he was strongly positioned for his future.

“I think to feel that my investment is worth it, I have to feel that I’m in a good place and I feel that I’m in a good place. I feel with engineering I feel that I’m at home with this more so than other things.”

Answers to Research Questions

This section will review answers to the major research questions derived through the data gather from the student participants. There was alignment between some of the emergent themes and the research questions. This section is organized to answer each question in the order they were initially presented.

1. How do students at different levels of their educational experience (first year, second year, third year, fourth year) set their goals and strategies to determine educational success in their college curriculum?

The viewpoint of the participants was such that they had varied strategies for setting goals and strategies for themselves. There seemed to be a variation by individual student rather than by educational levels for the students. Students at several stages of enrollment used multiple strategies to prioritize their time and organize their work. Yet with the varied approaches, there were some students who had similar methods to setting their goals and strategies such as prioritization, working with faculty, reviewing, and working ahead on homework.

Mike uses a strategy to work ahead in his classes. “I try to get ahead in my classes, so if I have a question about a certain topic I will be able to ask the professor ahead of time before it’s too late. Before you know it could be the exam and you can end up behind.”

Tadley also used a strategy to work ahead. Most days he is trying to work at least a week ahead in his courses. Tadley also reevaluates his weekly plan daily, “I’m pretty busy so I also set a schedule day by day. Most of my days start at 8am, so I am either getting homework done for the next day or trying to plan ahead so you know during the next day what you are going to do.”

2. How do students at different levels of their educational experience explain educational success for themselves?

All participants’ at all academic levels explained their educational success as learning their coursework. There was little deviation across the educational levels on how the participants described educational success for themselves. The emergent theme for their explanation of success was their strong desire to have the ability to learn the material in preparation for their future as an engineer. Meg shared her perception of success; “Success would be understanding all of the things that I’ve learned and putting it to mind and knowing it, yes I want to know thoroughly what I’m doing.” Mike’s perception of success was similar, “Basically understanding the material and draw connections between each process.” Fuzzy’s definition of success was, “I think its knowing what you’ve learned and being able to reflect upon that in an effective way.”

Several participants felt that grades were secondary to learning their coursework. Ember prioritized her perception of success for herself as learning the material above her grade in the course. “It’s not a letter grade thing, if I did the best I could then that’s my A. Ember went on to describe her success in learning the material “if the C is the best I could get, then I would call

that a success. She summarized her perception of success as, “it’s less so that I need to get the A and more like I need to do the best that I can, while still understanding the material.” Saphira characterized success in terms of learning the material as a priority over her grade.

“um, but even if you have a really crappy grade like a C/D or a D on the material, you may not be just good at test taking and if you come out understanding it and are able to explain it and reproduce it somehow. I’ve heard that you can explain it to a 5th grader than you know it. Yes, I would say that um... that’s why I don’t like GPA because I get turned down for a lot of internships because I my GPA isn’t at the requirement but I don’t think that reflect how I know the material or how well I work or how hard I work for what I do I mean I have 18 credit this semester so sometimes I get swamped and get behind and you can’t help it.”

There were some participants who described not failing as an important component to their educational success. However, it was their ultimate desire to learn the material to successfully progress in their coursework that overshadowed their fear of failure.

While learning the material was important to Rose, a component of her perception of success was not failing. She stated, “Definitely between high school and college it has changed from grades to passing the course. Not failing is important, although I’m not failing any courses, the letter doesn’t matter to me as much.” Tyrone also indicated that not failing is important to him. “I want to set my goal based on that I want to do relatively well in school and I really don’t want to fail.”

3. How does having a student loan impact the student’s goals and strategies to achieve educational success?

The participants described an apprehension for borrowing a student loan. There was a general uneasiness in regards to taking on debt. However, the student participants all described a sense of value to the degree. There was what could be described as a return on investment by the participants. The participants described a sense of their degree being worth it. They realized that

as an engineer their starting salaries were going to be higher than average. They described that they knew there was going to be a progressively lucrative payoff throughout their career. The participants indicated that the eventual payoff did ease the burden of debt they were incurring.

The participants shared that having a student loan incentivized their learning. The burden of debt focused their studies and consequently their desire to learn the coursework material.

Mike described how his loan pushes him. “I have to do good so I can get out of here fast so I don’t owe so much money. Mike’s loans push him to further describe his success. “I have to get a high GPA so I can apply for more scholarships so I don’t have to take so much loans.”

Fuzzy described her perception of how her loan affects her success by saying, “my mind is always on how am I going to pay for the next year at school?” Fuzzy further described her motivation and perceptions of her student loan,

“Yes it influences me, its motivation. I know that if I get lazy or procrastinate, and I say oh I don’t want to do this homework assignment, then I could fail the class there’s like a zero dedicated to my GPA and then my loan or scholarship is gone and then school is gone.”

Buck’s student loans and the high cost of his education impacts his goals and strategies for success. Buck described the cost of attendance at Superior Tech as “really, really expensive” and equated his higher cost of attendance and loans to pursuing an engineering degree. “If I were in a different profession and I think owe less than \$15 or \$20k, which is a lot of money if you took that and put it on the table.” Buck went on to share, “without financial aid, I wouldn’t be here.” As Buck described how his loan impacted him he stated, “Because there is so much money going to my education, it makes me want to strive to do better.”

Mia’s strategies for success were impacted by her student loan. “I don’t know, I’m not sure, when I was getting more financial aid I think I worked less hard.” Mia had significantly more financial aid in her first year including an ROTC scholarship. That changed after her first

year with a dip in her cumulative GPA. Mia indicated that she didn't realize the incentive to learn her coursework, "I had college my college paid for my first year, I definitely worked a lot less hard and it kind of seemed like it was free money." Mia discussed how her perspective changed after she had to borrow a student loan to fund her education;

"Once I started to get loans and stuff that I knew that I had to pay back and having to actually pay for myself, kind of, well I don't know, a lot of it was like it's my money now. I still get scholarships but it's like a lot of it is loans. A lot of what I'm living off of is loans. I don't really want to fail a class or waste my money because I now that future me is going to have to pay it off. It's me going to have to work a little harder."

Rick's aversion to debt initially pushed him to rush his degree. "I want to get myself out in four years so I wasn't using up extra money each year to support myself." Rick described how this initial strategy pushed him to take on a higher credit load and academically push himself beyond his capability. Rick's approach of "get out fast and get this done, and be happy" was more than he could handle. Rick shared that his initial approach, "didn't really end well." Rick is now close to completing his degree and he discussed how his loans have forced him to take a little extra time and focus on learning the material. "I want to get my education and make sure its solid and that will take care of the financial situation it's not the other way around."

4. How do student participants describe their interactions with faculty and staff members as a means of achieving their educational goals?

The students had very individualized interactions with faculty at Superior Tech. These individualized interactions have been both a vehicle and a barrier to students achieving their educational goals. Several participants described their interactions with staff members as generally a positive interaction. They discussed how staff created a supportive atmosphere through assistance and encouragement. Rusty contextualized how his educational goals have

been positively impacted by faculty interactions, “talking with professors means a lot.” Rusty felt supported in his courses and his goals of learning his coursework material, “A lot of the faculty are helpful if you approach them and ask them questions, they get to know you and it’s easier to talk with them.”

Rose shared her positive interaction with faculty at Superior Tech. She named a faculty member and described his positive interaction. “I know that a lot of the professors here want their students to succeed, especially professor “C”. Rose described her faculty interaction as “really inspiring” and described how faculty “really do care about their students and it really inspires me to do the best that I can.”

Tyrone described how his faculty helped him to learn the coursework. “Professor “C” helped; his exams always had tricky questions, things switched around from how we learned them.” In addition to faculty Tyrone mentioned that teaching assistants were very impactful in terms of him achieving his educational goal of learning the material. “Well a lot of the TA’s influence me because they tell about their experiences and they say the same thing it’s about the experiences and not the grade so much.”

While many of the students described a positive interaction, there was a mixed response with some students in the study who had less than positive interactions with faculty. Kristy had mixed interactions with faculty. She described how her “level of achievement” in classes “is dependent upon how much you’re learning.” Kristy explained her educational goal of learning,

“If you have a really good professor you learn a lot in that class. I think that when I find those good professors, those ones who explain a problem but they explain what the right answer is but they also say why is the relevant and why are we learning this. They apply it to something in the real world. That definitely motivates me to make sure that I’m doing the best that I can.”

Rod had similar positive and negative experiences with faculty. Rod described his faculty interactions as “pretty encouraging” as he pursued his goal of learning the coursework. Rod was initially reluctant to share his interactions with faculty, but eventually opened about how he felt unsupported by faculty. “I like some of the faculty here so I can’t say; well I’ve had my doubts about some of the professors like anyone else probably.” Rod shared that many of the faculty are “pretty happy with what they’re doing.” Rod found that when faculty enjoy teaching, that motivated him in his learning.” Rod shared, “I kind of want a little bit of that too, they enjoy what they do.”

Some students shared that they didn’t necessarily have or need faculty and staff interaction to find success. Student participants shared that they did not have a great deal of interaction beyond the transactional environment of the classroom. They described a sense of independence and finding success through their own means. Mia had a strong sense of independence when asked about her degree.

“Gosh, I did a lot of this on my own. Not to say that there haven’t been people who have supported me but a lot of the goals and educational stuff I realized on my own and I kinda just...well I like to do things myself. I guess I haven’t had too much strong interaction with faculty. So I mean other than them being a part of teaching me the knowledge that I need to know for my career. I wouldn’t say that faculty have had too much of my educational goals there either. I just kind of set them myself.”

Buck shared a similar independent tone toward his faculty interactions when he stated, “Tough question....I can’t think of too many instances where that was key.’ Tadley shared a comparable ambivalence to his interaction with faculty.

“I wouldn’t say I have come into contact with a lot of faculty because I don’t go to them I like to teach myself if I need it. I don’t like going to help sessions because I like making myself learn the material I do it on my own. I would say I haven’t really met a lot of faculty so I don’t know if I can answer that question.”

One of the students in their first year of enrollment automatically assumed the question was pertaining to his high school faculty and began to share his experiences in the high school environment. When the student was asked to share his experiences to date at Superior Tech he did not share any information noting that he did not know any of his faculty well enough yet.

5. How do student's concepts of educational successes align with institutional success indicators?

When evaluating the student's views on cumulative grade point average and being named to the Dean's list, there was a mixed response from the participants. Students felt it was acceptable to receive a lower grade than what they had hoped because many worked hard to learn the material in the course. Fuzzy described how it was not that important to her or have grades that are "dean's list worthy." Fuzzy elaborated,

"I'm not shooting for an A or anything, just a C so I can pass it. So I know a lot of people if they get a C they feel bad. But for me a C is like it's above a 2.0. I'm not on academic probation so I'm fine."

Rusty's perspective on his GPA and the Dean's list was more of a desire learn his coursework material and not to fail. When referencing the Dean's list Rusty stated; "Like I said before, it would be nice and would be a good accomplishment to have but if it doesn't happen it doesn't happen, the main goal is to avoid failure for myself." Rusty indicated

"It would be nice if I was a Dean's list student every semester but that's not really the goal. I just want to understand what I'm learning and know what I'm supposed to know. Like I said before, it would be nice and would be a good accomplishment to have but if it doesn't happen it doesn't happen. The main goal is to avoid failure for myself."

Meg recounted prior to coming to Superior Tech she had "was always on the high education list." While Meg was accustomed to being on an honor list, she said, "It's not my

main goal to be on the dean's list." Students felt that grades were important benchmarks for employment and financial aid, they were less important to them than walking away from the class knowing they learned the material. While Mike placed a high value on learning his coursework material, he felt GPA and the honor of the dean's list was important. "If I'm on the dean's list I have a chance to get scholarships, that's really important to me."

Some students noted that they were working to maintain a specific GPA to retain and reinstate their financial aid. Ember was an example of her grades being important for financial aid. "I mean right now it's (grades) important so I can keep my fin aid because we're at the point that if I don't get my presidential scholarship back, then I won't be able to continue going here." Ember talked about being able to learn the material and improve her grades. She clarified that "the actual honor of the dean's list would be nice, a little ego booster, but it's not necessary, I don't deem that as my peak."

When asked how important it was to the participants to be included on the Dean's list for outstanding academic performance, two of the participants noted that being on the Dean's list is very important to them. They described it as an indicator of how hard they are working and was a measure of success to them. These two students described being on the Dean's list as expected. Tadley was one of the students who placed an emphasis on being on the Dean's list.

Tadley view of being on the dean's list was essential to the success he has experienced.

"I would say it's very high on the priorities all the time because it's gotten me to where I am today which is an internship at a company this past summer and a coop after my freshman year, I'm the leader of an enterprise sub team and I'm not really that worried about grades because I've been working so hard that its routine to keep working for the next 2.5 years to finish out."

Kristy also felt the Dean's list was a benchmark for her success. Although she described "getting something out of your classes" was an indicator of success for her, she described the

Dean's list metric as "pretty important." Kristy did very well in high school and she felt that "I have to continue that level of achievement and keeping those grades up, because even though it's not always the best way to measure for how well you're doing in school, it's a pretty good estimate." Kristy felt that if she was not achieving dean's list level grades, she was not putting my best effort forth.

Superior Tech also places a high emphasis on outcomes, specifically job placement. When examined from that perspective, all of the students indicated a desire to graduate and earn an engineering position. They all aligned with this institutional success indicator. Rusty shared "With my degree you never hear of low paying engineering jobs, I feel as an engineer I will be well off." Buck also indicated that he was striving hard for an engineering position, "Graduating and moving into a position that you feel is solid is the goal." Mia's goals and vision aligned with getting a position as well. She shared, "A lot of my educational goals are based on finding a job and being successful in my career and getting that knowledge for my career so I guess they are intertwined usually thinking about the future when I take a class." Saphira's goals also aligned with institutional outcome goals,

"I definitely think the way the world and society is going you have to have a college degree to do anything anymore and coming from a reputable school like Tech and with a degree in bio-medical engineer and a minor I Spanish and a military background I feel like in the end it is going to pay off."

Essence of the Phenomena

The focus of a phenomenological study is to examine the convergence and divergence of a reasonably homogenous sample. (Jonathan A. Smith, Flowers, & Larkin, 2009) To that end the essence of the shared experience can be captured through convergence of the data. In this study the data suggested the students sought success through the development of their own individual goals and strategies, while learning their coursework material, positioning them to begin their careers as engineers. The participants in the study relied upon personal support systems of family, faculty and staff member members at Superior Tech to guide them through their success journey. While they have some reservations regarding the debt they are incurring, participants felt their ultimate career choice as an engineer would position them well for future financial stability.

CHAPTER 5 – DISCUSSION

Smith et al. (2009) suggested the discussion section in an interpretive phenomenological analysis (IPA), consists of providing an account of the data, offering an interpretation of the data and making a case for what the data means. This section will offer a discussion and meaning of the findings presented in chapter 4. The following discussion of the findings help to frame the underpinnings of the purpose of this study. Chapter 5 will close with a discussion of the implications for practice and research.

Summary of the Research Study

This study sought to provide insight to the following overall research question: How do engineering students at different educational levels, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their academic experience at a medium sized mid-western university? To further expand on the research question, the following research questions were explored.

1. How do students at different levels of their educational experience (first year, second year, third year, fourth year) set their goals and strategies to determine educational success in their academic experience?
2. How do students at different levels of their educational experience explain educational success for themselves?
3. How does having a student loan impact the student's goals and strategies to achieve educational success?
4. How do student participants describe their interactions with faculty and staff members as a means of achieving their educational goals?

5. How do student's concepts of educational successes align with institutional success indicators?

This interpretive phenomenological analysis was designed to interview 16 engineering students at Superior Tech, a medium sized mid-western university poly-technic university. In this study, there were four first year, four second year, four third year and four fourth year students interviewed. The following sections will discuss the findings from this study.

Discussion of Findings

Family support for academic success

Most student participants indicated their parents and or family provided positive emotional support throughout the student's academic experience. The participants described receiving emotional support from parents, siblings and other members of the student's family. Several students discussed challenges their engineering curriculums posed to their overall academic success plans. These students described how positive emotional support and encouragement from family helped to develop their goals and strategies for academic success in an engineering curriculum. Many of the students in this study who had strong parental and family support expressed their ability to achieve their perceptions of academic success.

The data from the study suggests student participants who engaged in healthy and positive communication with their parents and family felt supported. Perhaps the positive dialogue with their families may have provided a sense of security and direction for the study participants in an academic environment where they felt vulnerable. Students in this study who engaged in family dialogue, regardless of the topic, consistently expressed that they felt supported and empowered to establish a foundation for academic success.

Parental and family support fostering student's academic success appears to be consistent with the literature. Kuh, Bridges, Buckley, Hayek and Kinzie, (2007) stated family and friends can be a contributing factor in "shaping aspirations and reinforcing behaviors consistent with academic achievement" (p. 29). Perna and Thomas (2008) also suggested that parental and family support may provide a solid foundation for student success. Perna and Thomas (2008) further described how academic success can be nurtured through increased parental involvement (Perna & Thomas, 2008).

Family role models with higher education experience

Several participants explained how they perceived parents, siblings and other family members who attended higher education institutions as academic success role models. Some of the participants described how family role models frequently inquired how the participants were performing academically. Many of the participants described feeling a sense of obligation to their role model to be successful in their academic endeavors. Some participants described how their role models were inspirational to them as they developed goals and strategies to achieve their personal version of academic success. Some participants indicated they mirrored their personal academic success vision in the image of their family role model's vision of academic success. Many of these students interpreted what academic success meant to their family role model and personalized it to fit their academic experience.

The participants expressed through conversations, they emulated their family role model's views of academic success. Perhaps the expressed experiences of the students contributed to an understanding of how sharing experiences between family members who attended college helped encourage and strengthen the participants resolve to be academically successful themselves. Engagement in success dialogue between the participants and their

family role models may have given the students in this study a head start in developing their personal view of student success and helped the participants to achieve what they perceive as academic success.

The literature noted that family and friends can be a contributing factor to student success by “shaping aspirations and reinforcing behaviors consistent with academic achievement” (Kuh, Bridges, Buckley, Hayek, Kinzie, 2007, p. 29). Kuh, et al., (2007), went on to describe how students who engaged in academic success dialogue with family members may follow their role models’ academic successes. Perna and Thomas (2008) discussed how family educational achievement can positively influence student success. Students finding inspiration in their family members’ success in higher education supports Baum and Shireman’s (2013) findings which described students seeking emotional support from their family.

Family role models without higher education experience

Some participants indicated they had inspirational family role models who did not attend a higher education institution. The participants indicated their role models without a college background inspired them to formulate their goals and strategies for academic success. Although these role models did not pursue a post-secondary degree, the participants described admiration in how these non-college attending family members worked hard to achieve a personal goal. The students also admired their role model’s strong work ethic and commitment to their careers, raising a family or helping the student to attend Superior Tech.

Using work ethic and commitment as their inspiration, many students in this study did not appear to rely on parents and family role models who graduated from a college or university to achieve their self-perception of academic success. Perhaps the participant’s admiration of

their role model's work ethic, commitment to career and family had a transformative effect on the student's vision of academic success. The participants appear to have replicated their role model's strong work ethic and commitment in their goals and strategies to achieve academic success.

Family influences on student's academic success were consistent with the Perna and Thomas (2008) student success model which described family inspiration as a major contributor to student success. Parental educational experiences influencing student success supported Perna and Thomas's success model. Perna and Thomas (2008) illustrated how parental educational level may impact a student's perception of academic success. Perna and Thomas (2008) inferred parents with higher education experience may influence a student's success more than a parent without higher education experience. Similarly, Kuh, et Al., (2007) described how the influences of family members can bolster a student's view of academic success.

Academic success despite family financial challenges

Some student's expressed how their academic success plans were influenced by a family member's perceived lack of success in their career. These participants described growing up in a difficult economic family situation as a result of parent's lack of employment or underemployment. The participants with this type of challenging economic background indicated a primary motivator for them attending Superior Tech was to avoid the dire financial situation they grew up in. A few participants described their financially challenging upbringing motivated them to pursue an engineering degree and a lucrative salary.

The participants with a challenging financial environment also described having positive relationships with their parents and family. These students expressed having positive discussions

with their parents and family nurturing their desire to perform well in their academic careers. The students with a financially challenged background described developing their goals and strategies with the goal to work hard, complete their degree and become financially secure.

Perhaps participants who were seeking a financially transformative experience committed to their engineering degrees primarily for the salary potential. Additionally, it appears financially challenged families positively influenced some participant's vision of academic success. Perhaps for a number of participants in this study, academic success was less dependent upon the family's educational level or economic status and more dependent upon the very act of communication itself. It is possible these participants internal drive to achieve their vision of academic success and change their financial future may have been enhanced by academic success conversations with their family.

A student positively responding to an undesirable family situation challenges the concept of "habitus" which describes how previous experiences can impose a subconscious limit on a person's educational and professional ambitions (Bourdieu and Passeron, 1977). Students seeking academic success despite parental academic background rejects Perna and Thomas's (2008) reference to the sociological affects family can have on student success. Perna and Thomas (2008) described how "family background has an important influence on high school and college enrollment" (p. 42). The participants in this study appeared to enroll in Superior Tech to be different than their parents.

Faculty contributing to academic success

The majority of the participants indicated their faculty member's contributed to their goals and strategies for academic success. These students described how faculty provided

emotional support, curriculum assistance, and set an example of professionalism. Most participants described developing a friendly relationship with their faculty members and likened it to the support they received from family. It appears some students in this study developed relationships with their faculty and envisioned some of their faculty as mentors. Several participants responded to the enthusiasm and positive coaching of their faculty and expressed a strong desire to achieve so as to not disappoint their faculty members. Some students in this study indicated they felt challenged by their faculty to learn their coursework material and exceed their professors' expectations. The participants who reported a desire to exceed their professors' expectations reported adjusting academic goals and strategies to achieve higher expectations set by faculty mentors. Some students indicated the more they interacted with their faculty, the more they learned and felt like engineers.

These findings suggest faculty who developed relationships with students in this study may have motivated participants to work harder and learn the coursework material. It is also possible faculty who developed positive relationships and set challenging expectations may have encouraged the participants in this study to set loftier academic goals.

Students engaging with faculty and having a transformative academic success experience supports the student success literature. Kuh, et al., (2007) state faculty often have the ability to engage their students and deploy innovative learning strategies that promote student success. The literature also provides examples of faculty showing regard for their students, setting higher expectations and taking responsibility for their students learning are enabling student success (Kuh, et al., 2007). Faculty influencing student goals and strategies is also present in the Perna and Thomas (2008) student success model.

Faculty not contributing to academic success

Three participants in the study felt as though their faculty members did not play a role in their individual academic success. These students acknowledged their faculty were well versed in their subject matter. The participants also indicated they knew their faculty offered office hours and were accessible for additional help if the students needed assistance. The three students indicated they did not feel as though they needed their faculty to assist them with their goals and strategies to achieve academic success. These three students were highly motivated and had a strong sense of self and indicated they preferred to learn by themselves.

The three students who did not feel faculty enabled their academic success may have developed a vision of success which was more about individualism and self-reliance. These three self-motivated students may see their vision of academic success and efforts in the classroom as the result of their personal achievement and not their faculty contribution. Perhaps these highly motivated students may be limiting their relationships with their faculty to ensure that they alone are responsible for realizing their goals and strategies to succeed.

The three students who indicated their faculty did not influence their goals and strategies for academic success having a high degree of self-motivation supports the Perna and Thomas (2008) student success model. Perna and Thomas (2008) stated intrinsic motivation to succeed is inherent for students to experience academic success. Perna and Thomas (2008) inferred that students might have varying degrees of intrinsic motivation.

Measuring success

The participants in the study were introspective in how they described success for themselves. Their views of success were less metrically related and more pedagogical. Grades,

while important to some students in the study, were secondary to a majority of the participant's drive to learn their coursework. Several participants indicated the engineering knowledge they learned was their personal benchmark for measuring success. These participants recounted how they aggressively pursued new engineering knowledge and sought to establish connections between their courses to fulfill their desire to succeed. Most students in the study expressed that their academic goal was to apply their new knowledge to future courses and ultimately their careers as engineers.

Perhaps some participants in this study were inclined to set their goals and strategies to learn their coursework and not to earn a specific GPA. The students in this study may see their grades and GPA as more of a metric used by Superior Tech rather than themselves to measure learning. Certain participants indicated that they believed themselves to be more successful and developed a deeper connection to engineering as they completed additional coursework. These students appeared to have modified their success plans, enabling them to migrate through their engineering curriculum more quickly to begin their career as an engineer.

Students' who established academic success goals to learn their coursework were similar to Perna and Thomas (2008) discussion where the authors shared that a student's motivation to learn may be related to their goal achievement. Participants who measured academic success by learning challenges a previous student success study which indicated that good grades are a student's benchmark of academic success (Yazedjian, Toews, Sevin, & Purswell 2008).

Students' identifying with their field of study as they take additional courses supports the academic success literature. Graham, Frederick, Byars-Winston, Hunter, & Handelsman (2013) suggested a similar finding where learning and professional identification increased student

confidence which in turn increased motivation. Graham et al. (2013) went on to say learning is “a mutually reinforcing experience” which helps students identify with their profession (p. 1455).

Individualized goals and strategies

Most participants described designing customized academic goals and strategies in order to achieve their perception of success. The methods the participants employed to achieve academic success included developing prioritized lists, becoming task oriented, and harnessing a fear of failure to use as motivation. Most participants had varied academic success strategies and goals, however, all had a common success objective which was to learn their coursework material.

Parental finances and financial aid renewal criteria influenced how some of the students in the study set their goals and strategies to achieve academic success. Some participants with family financial challenges were completing their degree as quickly as possible to reduce the financial burden they were imposing on their family budget. Other students in the study were setting their goals and strategies to retain their financial aid or have their financial aid reinstated due to a drop in their GPA. The participants expressed that a loss of financial aid would be, or had been financially devastating. These participants described their established goals and strategies as enabling them to graduate as quickly as possible while maintaining their eligibility for the Pell grant and other financial aid.

The data from the study suggested that student participants alleviated their academic performance anxieties by constructing personalized academic success plans. Perhaps personalized approaches to learning strategies may have been the inspiration students in this

study needed to understand their coursework. The process of developing a personalized academic success plan may encourage a student to adhere to their plan.

It appears that parental financial status and the financial aid students received impacted how the participants established their goals and strategies for academic success. The development of success plans to meet financial aid benchmarks suggests participants used financial aid renewal criteria as goals in their overall success plan.

Students developing customized academic success plans to alleviate academic anxieties supports Perna and Thomas's (2008) student success model. Perna and Thomas (2008) described how "perceived academic control, high preoccupation with the fear of failure a strong relationship between higher grades and increased effort in coursework," led to less student anxiety, and the monitoring and achievement of academic goals (p. 36). Students finding inspiration in personalized academic success plans is consistent with Perna and Thomas's success model. Perna and Thomas (2008) go on to say, "Student success is determined by an individual's motivations and attitudes" (p. 39). Perna and Thomas (2008) also discussed a motivational success strategy which is "self-regulated learning" (p. 39). The findings also support a Tinto and Prusser (2006) study which noted, students who have highly developed goals and strategy were achieving their perceptions of success.

Financial aid acting as a self-described motivator for academic success supports a study by Arzy, Davies and Harbor (2006), where students described their scholarship as a "gift," "blessing," and "a relief to their families" (para. 52). Additionally financial aid influencing student success supports a Kuh, et al., (2007), study that suggested financial aid may play a role in how students develop their goals and strategies for academic success.

Return on Investment

Most of the participants indicted financing their education at Superior Tech was a major investment for them. The participants described how they borrowed out of necessity to finance their education at Superior Tech and remain enrolled. Some of the students' parents took out a loan on behalf of their student to assist them in funding their college experience. All of the participants described varying degrees of dissatisfaction with having to borrow a student loan. However, the same students in the study who were loan averse described how they viewed their loan as investment in themselves. Throughout the course of the interviews, several students described a perceived societal norm that engineering producing higher salaries than other career fields. The participants discussed how their loan was going to "pay off" when they graduated and became an engineer.

It might be said the participants in this study accepted the transactional experience of borrowing a student loan for the opportunity to earn a lucrative salary as an engineer upon graduation. The participants desire to recover their investment may have encouraged them develop academic success plans enabling them to complete their degree as rapidly as possible to begin their engineering careers.

Participants envisioning their academic experience as an investment in themselves support the Perna and Thomas (2008) success model which described future salaries as an incentive for students to pursue academic success. Similar to the literature, this study revealed that most of the students were loan averse (Ziskin et al., 2014). Additionally this study supports Ziskin et al., (2014) findings' which indicated students view their education loan as a necessary investment if they completed their degrees.

Implications for Practice

There are multiple implications for practice for families, financial aid practitioners, student success researchers, engineering faculty and student affairs professionals as a result of the findings from this study. Similar to Perna and Thomas (2008) and Kuh, et al., (2007), parental and family support was shown to support student success. Parents and family seeking to assist their students should be engaged and encouraging with their students. Parents who both are non-college and college graduates appear to have a tremendous capacity to positively influence their child's higher education experience.

Financial aid professionals may experience engineering students who are loan averse. Perhaps explaining the potential return on investment for an engineering degree during advising and recruiting sessions may assist financial aid professionals as they counsel Pell eligible engineering students who are seeking to secure a student loan. Pell grant eligible students, who understand the salary potential of engineering fields, may be more likely to acquire a student loan enabling access to polytechnic institutions.

Another finding suggests student success practitioners and institutional leaders may look beyond traditional metrics such as grades, cumulative GPA and the Dean's list to measure student success. Students who are focused on learning coursework material may have a feeling of success regardless of their GPA or recognition for the traditional Dean's list. Student success practitioners, career center staff and other institutional leaders should engage students who are less concerned with their grades and explain how a low GPA may impact their future financial aid eligibility and employment opportunities.

Data from this study and from the literature indicated dialogue regarding a student's chosen major promotes academic success and builds affinity for their future career. Perhaps engineering faculty may assist students with their academic goals and strategies and ultimately earning their engineering degree by facilitating classroom dialogue regarding the benefits of an engineering degree. Additionally, engineering faculty may facilitate learning by engaging and developing relationships with their students.

Finally, student affairs professionals may encourage and assist students in adopting personalized academic success plans to help address concerns regarding performance in the classroom. The journey to achieve one's self definition of success appears to be a highly individualized phenomena. Student affairs professionals may support student success by providing opportunities in orientations, workshops, conferences and classrooms to develop personalized success plans. Self-reflection on what success really is for individual engineering students has the potential to support a student beginning their careers.

It appears some students may have a propensity to increase the pace of their curriculums by taking additional credits and over exceed their capacity to learn. Student affairs professionals may support Pell grant recipients and engineering students in their success endeavors by hosting periodic check in's to monitor success plans and help them follow realistic strategies for achieving their goals.

Implications for Research

This study focused on understanding engineering student perceptions of success. This study included a very homogenous population of students at only one university who were Pell grant eligible and secured a student loan. Future studies may include the same study parameters and

narrow the focus to a single discipline of engineering. Another research option may include the same study parameters but broaden the participants to include other STEM majors such as biology, chemistry and mathematics. Additionally, it would be interesting to apply the same parameters of this study to other non-STEM majors. Using data gathered from a similar study of non-STEM majors, a comparative analysis between STEM and non-STEM majors would perhaps yield interesting results that may complement the student success literature.

Researchers may choose to expand to additional polytechnic institutions to better understand student perceptions of success, including students attending institutions in different regions of the country. Perhaps a comparative study that evaluates definitions and strategies for student success across multiple polytechnic institutions may produce a different insight into student's perceptions of success. Finally, a study that is longitudinal in nature, investigating individual student's evolution through their curriculum, evaluating their goals and strategies and perceptions of success throughout their higher education experience has the potential to help our understanding of student success goals.

Throughout the course of this study students appeared to relate their acceptance of student loans to the potential for their return on investment as an engineer. A future research study might explore connections between students borrowing habits and their perceptions of return on investment as an engineer. A research study that explores the motivations for students to enroll in engineering may provide insight into the perception of return on investment as an engineer.

The participants in this study indicated that a GPA does not fully quantify what they have learned in their coursework. They described coming away with additional knowledge beyond what they were tested on or had to recite in their coursework. While it may be a challenge,

perhaps a study that explores new methodology, other than GPA, to measure or quantify learning may provide insight into how to support student success.

The students in this study indicated relationships with their faculty impacted how they approached and established their goals and strategies for success. The students indicated they wanted to meet the academic standards their faculty set for them. Based on the literature and on data from this study, it is possible students may recalibrate their goals and strategies to achieve a higher standard if they have a good relationship with a faculty member. This concept would possibly have diminishing returns at some point if faculty established academic standards that students were not prepared for. A study that explored the establishment of academic standards and the achievement of those standards may contribute to the literature.

Participants discussed developing a success strategy that utilized learning centers. Superior Tech defines learning centers as free tutoring centers, based on academic departments, spread throughout the campus. Tinto and Prusser (2006) investigated how social, academic and advising support structures including freshman seminars, tutoring centers and professionally staffed advising centers contributed to student success (Tinto and Prusser, 2006). Additional research into how tutoring centers or learning centers can assist engineering students with the development of their academic success plans may further student success literature.

REFERENCES

- Arzy, M. R., Davies, T. G., & Harbour, C. P. (2006). Low Income Students: Their Lived University Campus Experiences Pursuing Baccalaurate Degrees with Private Foundation Scholarship Assistance. *College Student Journal*, 40(4), 750-766.
- Astin, A. W. (1993). *What matters in college? four critical years revisited*. San Francisco: Jossey-Bass.
- Baum, S., & Schwartz, S. (2013). Student Aid, Student Behavior, and Educational Attainment.
- Bourdieu, P., & Passeron, J. C. (1990). *Reproduction in education, society and culture* (Vol. 4). Sage.
- Butz, W. P., Kelly, T. K., Adamson, D. M., Bloom, G. A., Fossum, D., & Gross, M. E. (2004). *Will the Scientific and Technology Workforce Meet the Requirements of the Federal Government?* : ERIC.
- Committee, U. C. J. E. (2012). STEM Education: Preparing for the Jobs of the Future. *Washington DC*.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage.
- Chen, R., & DesJardins, S. L. (2008). Exploring the Effects of Financial Aid on the Gap in Student Dropout Risks by Income Level. *Research in Higher Education*, 49(1), 1-18.
- DesJardins, S. L., Ahlburg, D. A., & McCall, B. P. (2002). A Temporal Investigation of Factors Related to Timely Degree Completion. *Journal of Higher Education*, 73(5), 555-581.

- DesJardins, S. L., Ahlburg, D. A., & McCall, B. P. (2002). Simulating the Longitudinal Effects of Changes in Financial Aid on Student Departure from College. *Journal of Human Resources, 37*(3), 653-679.
- Engle, J., & Tinto, V. (2008). Moving Beyond Access: College Success for Low-Income, First-Generation Students. *Pell Institute for the Study of Opportunity in Higher Education*.
- Forsyth, D. R., Story, P. A., Kelley, K. N., & McMillan, J. H. (2009). What Causes Failure and Success? Students' Perceptions of Their Academic Outcomes. *Social Psychology of Education: An International Journal, 12*(2), 157-174.
- George-Jackson, C. E., Rincon, B., & Martinez, M. G. (2012). Low-Income Engineering Students: Considering Financial Aid and Differential Tuition. *Journal of Student Financial Aid, 42*(2), 1.
- Graham, M. J., Frederick, J., Byars-Winston, A., Hunter, A.-B., & Handelsman, J. (2013). Increasing Persistence of College Students in STEM. *Science, 341*(6153), 1455-1456.
doi: 10.2307/42619390
- Griffin, K. (2006). Striving for Success: A Qualitative Exploration of Competing Theories of High-Achieving Black College Students' Academic Motivation. *Journal of College Student Development, 47*(4), 384-400.
- Hira, R. (2010). US Policy and the STEM workforce system. *American Behavioral Scientist, 53*(7), 949-961.

- Kuh, G. (2007). *Piecing together the student success puzzle research, propositions, and recommendations*. San Francisco, Calif.: Wiley Subscription Services at Jossey-Bass.
- Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2010). *Student success in college: Creating conditions that matter*: John Wiley & Sons.
- Kuo, J., Hagie, C., & Miller, M. T. (2004). Encouraging College Student Success: The Instructional Challenges, Response Strategies, and Study Skills of Contemporary Undergraduates. *Journal of Instructional Psychology*, 31(1), 60-67.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, Calif.: Sage Publications.
- Lofland, J., & Lofland, L. H. (1999). Data logging in observation: Fieldnotes. *Qualitative research*, 3, 3-12.
- Maxwell, J. A. (1996). *Qualitative research design an interactive approach*. Thousand Oaks, Calif.: Sage Publications.
- McGroarty, D. (2000). Building a better scholarship program. *Philanthropy*, 14 (1), 22, 25.
- Merriam, S. B. (2002). *Qualitative research in practice examples for discussion and analysis*. San Francisco: Jossey-Bass.
- Olson, S., & Riordan, D. G. (2012). Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics. Report to the President. *Executive Office of the President*.

- Ohland, M. W., Sheppard, S. D., Lichtenstein, G., Eris, O., Chachra, D., & Layton, R. A. (2008). Persistence, engagement, and migration in engineering programs. *Journal of Engineering Education, 97*(3), 259-278.
- Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model *HIGHER EDUCATION*: (pp. 99-157): Springer.
- Perna, L. W., & Thomas, S. L. (2008). Theoretical Perspectives on Student Success: Understanding the Contributions of the Disciplines. *ASHE Higher Education Report, 34*(1), 1-87.
- Perry, R. P., Hladkyj, S., Pekrun, R. H., & Pelletier, S. T. (2001). Academic control and action control in the achievement of college students: A longitudinal field study. *Journal of Educational Psychology, 93*(4), 776-789. doi: 10.1037/0022-0663.93.4.776
- Rothwell, J. (2013). The hidden STEM economy. *Washington, DC: Brookings Institute.*
- Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis theory, method and research*. Los Angeles: SAGE.
- Smith, J. A., & Osborn, M. (2007). *Qualitative psychology: A practical guide to research methods*: Sage.
- Snyder, Rick (2014). Retrieved from http://www.michigan.gov/snyder/0,4668,7-277-57577_59874-338417--,00.html
- St John, E. P. (1989). The influence of student aid on persistence. *Journal of Student Financial Aid, 19*(3), 5.

- Tinto, V. (2003a.). Student success and the building of involving educational communities. *Higher Education Monograph Series, Syracuse University* (2).
- Tinto, V. (2003 b.). Learning better together: The impact of learning communities on student success. *Higher Education monograph series, 1*(8).
- Tinto, V., & Pusser, B. (2006). Moving from theory to action: Building a model of institutional action for student success. *National Postsecondary Education Cooperative, 1*-51.
- U.S. Department of Education (2006). A test of leadership: Charting the future of U.S. higher education. Washington, DC: Author.
- Whalen, D. F., & Shelley, M. C., II. (2010). Academic Success for STEM and Non-STEM Majors. *Journal of STEM Education: Innovations and Research, 11*(1-2), 45-60.
- Wilson, S.B., Mason. T.W., and Ewing, M.J., (1997). Evaluating the impact of receiving university-based counseling and services on student retention. *Journal of Counseling Psychology, 44*, 316-320
- Yazedjian, A., Toews, M. L., Sevin, T., & Purswell, K. E. (2008). 'It's a whole new world': A qualitative exploration of college students' definitions of and strategies for college success. *Journal of College Student Development, 49*(2), 141-154. doi: 10.1353/csd.2008.0009
- Van Manen, M. (1990). *Researching lived experience human science for an action sensitive pedagogy*. Albany, N.Y. State University of New York Press.

Wolf-Wendel, L., Ward, K., & Kinzie, J. (2009). A tangled web of terms: The overlap and unique contribution of involvement, engagement, and integration to understanding college student success. *Journal of College Student Development*, 50(4), 407-428.

Ziskin, M., Fischer, M. A., Torres, V., Pellicciotti, B., & Player-Sanders, J. (2014). Working Students' Perceptions of Paying for College: Understanding the Connections between Financial Aid and Work. *Review of Higher Education*, 37(4), 429-467. doi: 10.1353/rhe.2014.0028

APPENDIX A: LETTER OF INTRODUCTION TO ASSISTANT VICE PRESIDENT OF ENROLLMENT AND MARKETING

Date

Name

Institution

Dear Dr. Lehman,

Thank you for meeting with me and volunteering to assist with my research study. As we discussed, I am a doctoral candidate in the Higher Education Leadership program at Colorado State University's School of Education and currently working on my dissertation.

The purpose of this study will be to explore how engineering students, at a medium sized mid-western university, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum.

1. What are the lived experiences for high need students, attending Superior Tech, and
2. How these students made meaning of their educational goals, strategies and their perceptions of success while pursuing an engineering curriculum?

As we discussed, I am asking you to invite up to 16 students to participate in this study. The breakdown of the 16 students will be four first year, four second year, four third year and four fourth year. Here are the following student attributes for the 16 students I am asking for you to include in your query:

- Pell eligible
- Enrolled full time in an engineering discipline
- Accepted a subsidized and/or unsubsidized loan
- First generation according to the FAFSA
- Exclude students who are receiving the GI Bill or other veteran benefits

I have also enclosed my conditional IRB approval to begin the study and understand this will need to be submitted to your research approval board before you are able to invite any of your students. To assist you, I've attached a sample letter of invitation.

Thank you again for agreeing to assist me with my study. I will be contacting you in approximately a week to begin the research board approval process. I have provided my contact information below to answer any additional questions you may have.

Sincerely,

William R. Roberts

48080 Bootjack Road

Lake Linden, MI 49945

Phone: 906-369-3111/Email: wrrobert@mtu.edu

APPENDIX B: LETTER OF INTRODUCTION TO THE VICE PRESIDENT OF STUDENT AFFAIRS

Date
Name
Institution

Dear Dr. Cook,

I am writing to inform you of a doctoral research study that is scheduled to be conducted at (institution name). I am a doctoral candidate in the Higher Education Leadership program at Colorado State University's School of Education and currently working on my dissertation.

The purpose of this research study will be to explore how engineering students, at a medium sized mid-western university, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum.

1. What are the lived experiences for high need students, attending Superior Tech, and
2. How these students made meaning of their educational goals, strategies and their perceptions of success while pursuing an engineering curriculum?

It is my intention to invite up to 16 students to participate in this study. The breakdown of the 16 students will be four first year, four second year, four third year and four fourth year. I will be selecting students who have the following attributes:

- Dependent undergraduate students according to the FAFSA
- Pell eligible students with a zero EFC
- Enrolled full time in an engineering discipline
- Accepted a subsidized and/or unsubsidized loan
- First generation according to the FAFSA

Dr. John Lehman, Assistant Vice President of Enrollment and Marketing, has agreed to assist me with identifying the 16 students that will be included in this study. I have also enclosed my conditional IRB approval to begin the study and understand this will need to be submitted to the research approval board at (institution name) before students are invited.

I have provided my contact information below. Please feel free to reach out to me with any additional questions you may have.

Sincerely,
William R. Roberts
48080 Bootjack Road
Lake Linden, MI 49945
Phone: 906-369-3111/Email: wrrobert@mtu.edu

APPENDIX C: LETTER SEEKING PARTICIPANTS FROM SUPERIOR TECH

Date

Name

Dear (Name),

As the Assistant Vice President of Enrollment and Marketing at (institution name), I have agreed to assist Mr. William R. Roberts who is seeking potential participants in a research study involving students enrolled here at (institution name). Mr. Roberts has completed his coursework and is a doctoral candidate in the Higher Education Leadership program at Colorado State University. He will be responsible for conducting this research.

The purpose of this study will be to explore how engineering students, at a medium sized mid-western university, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum.

This letter is being sent to a group of currently enrolled, Pell grant eligible, engineering students who have borrowed a federal student loan at (institution name). Mr. Roberts is seeking up to 16 students to participate. Mr. Roberts will select students randomly from those who respond to him by (date one week from date of letter).

Mr. Roberts is going to request that if you agree to assist him with the study to participate in a 60-90 minute interview at a mutually agreed upon location. The purpose of the interview will be to gather your perceptions of what goals and strategies to you use to achieve your definition of success. There is the potential that Mr. Roberts may request a second 60-90 minute interview.

Mr. Roberts has provisions in place to ensure the identities of all participants will not be revealed and responses will be kept confidential. All participants and the institution will be given pseudonyms. Your participation in this study is solely voluntary. If you choose to participate in this study, under no circumstance will your name be revealed to me or to anyone else beyond the researcher himself. As you would expect, there is no penalty for students who wish not to participate

All students who choose to participate in the interview process will be compensated for their time by receiving a \$20 Visa gift card.

If this sounds interesting and you are inclined to participate in this study, please contact Mr. Roberts directly at 906-369-3111 or via email at wrobert@mtu.edu. If you would like to get additional information about the study, please feel free to contact him.

Sincerely,

Dr. John B. Lehman

Assistant Vice President of Enrollment and Marketing

APPENDIX D: LETTER TO STUDENTS SELECTED TO PARTICIPATE IN STUDY

Date

Name

Dear (Name),

Thank you for volunteering to participate in my study. I am so pleased that you have agreed to assist me. As Dr. Lehman indicated in his letter, my name is Bill Roberts and I am a doctoral candidate in the Higher Education Leadership program at Colorado State University. Throughout the course of this study I encourage you to contact me anytime with any questions at wrrobert@mtu.edu or by calling me on my cell phone at 906-369-3111.

For my dissertation research I will be exploring how engineering students, at a medium sized mid-western university, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum. My intention is to gather information during a 60-90 minute discussion. I will be collecting this information by interviewing up to 16 people.

To participate in this study, a one-on-one interview with you will be required. I anticipate these interviews to take no more than 90 minutes each. Below are a list of possible dates, times and locations for these interviews. Please respond with a time that works best for you. If the dates and times are not convenient for you and you would like to take part in the study, please respond with a list of dates, times, and locations that are more convenient for you.

(List of dates, times, and locations)

Your confidentiality is paramount during this process. That said, these interviews will be recorded and transcribed. The transcriptions will be kept secure and confidential and all consent forms will be kept separate from the interview transcriptions to keep participants identities confidential. Once the interviews have been transcribed, I will email a copy of the transcripts back to you in order to give you the chance to review them to ensure they were transcribed accurately. You will have ten days to review the transcripts and give submit any corrections to the researcher.

As was mentioned earlier, all information collected will be kept confidential and secure. At the beginning of the interview you will select a pseudonym. Under no circumstances will your real names be released to anyone. That said the aggregated data collected will be analyzed and reported as a part of my dissertation using your selected pseudonym. A summary of the results will be available upon request.

I look forward to hearing from you.

Sincerely,
William R. Roberts

APPENDIX E: LETTER TO STUDENTS NOT SELECTED TO PARTICIPATE

Date
Name
Institution

Dear (Name),

Thank you for expressing interest in my study. Unfortunately my study has reached a participant capacity and I am unable to include you at this time. It is my intention to keep your name on file for one year if I continue with this research beyond this specific study. If you should choose to opt out of any future studies please let me know and I will remove your name as a potential applicant.

Thank you for your willingness to volunteer.

Sincerely,
William R. Roberts
48080 Bootjack Road
Lake Linden, MI 49945
Phone: 906-369-3111
Email: wrrobert@mtu.edu

APPENDIX F: INFORMED CONSENT FORM

Project title:

Engineering Students' with Financial Need and Their Perceptions of Success in Their College Experience: A Phenomenological Analysis

Researcher(s):

William R. Roberts
Doctoral Candidate & Co-Principal Investigator
906-369-3111
Colorado State University
william.roberts@colostate.edu

Linda Kuk, Ph.D.
Faculty Advisor
Associate Professor & PI
Colorado State University
linda.kuk@colostate.edu

Introduction:

You are being asked to take part in a research study conducted by William R. Roberts for completion of a dissertation under the supervision of Dr. Linda Kuk in the School of Education at Colorado State University. You are being asked to participate because you are a currently enrolled student at (institution name) who is pursuing an engineering degree, borrowed a federal student loan and Pell grant eligible. Up to 16 students will participate in this study. Please read this form carefully and ask any questions you have before deciding whether to participate in the study.

Purpose:

The purpose of this study will be to explore and better understand how engineering students, at a medium sized mid-western university, who have high financial need as determined by the FAFSA process, set goals and strategies to achieve what they believe to be success in their college curriculum. Participants in this study will contribute to a greater understanding of how Pell grant eligible engineering students set goals and strategies to pursue their self-defined perception of success. This information you provide will help to inform the student success literature.

Procedures:

As a participant in the study you will be asked to participate in no more than two 60 to 90 minute interviews regarding your experience with setting educational goals and strategy, college preparation, and influences on your goal setting process. Specific topics of the interview include questions regarding how your financial need has impacted your goal setting process, how does your student loan impact your success strategy and other influences on your educational goals and success achievement. Other questions will include how did your success strategies influence your selection of an engineering curriculum, what are your impressions of how the faculty staff at (institution name) have influenced the achievement of your educational goals and vision of success in college, and your impressions about how your goals and success indicators align with (institution name). This interview will occur at a mutually agreed upon location and will be audio recorded and then transcribed at a later time. Your name will not be used and the name of your institution at which you are enrolled will be given a pseudonym. I will also be sending you a copy of the transcript to ensure that your statements are accurate.

Risk/Benefits:

The probability and magnitude of harm or discomfort anticipated in the research are no greater than ordinary encountered in everyday life. There is however a possibility that you may feel discomfort talking about your personal finances, feelings and goals. A synopsis of the findings of the study will be provided to all participants who may benefit from learning about the experiences of their peers. The benefits associated with the study will perhaps contribute to the literature working to inform and increase the relationship between student's perception of success and the institutions.

Compensation:

All students participating in the interview process will receive a \$20 Visa gift card as compensation for their time contributed to the study. Students who begin the interview process and cease their participation in the study for any reason or at any time will still be compensated with the \$20 Visa gift card.

Confidentiality:

All information collected that identifies individuals and the institution will be assigned pseudonyms and will be kept safely secured by the researcher. All consent forms will be stored separately from the interview transcripts to keep participants identities confidential. All data, including the audio recordings, will be kept in a secure location with access only available to the researcher. All data will be destroyed within two years of the completion of the study.

Voluntary participation:

Participation in this study is completely voluntary. There is no penalty for students who wish not to participate. You have the right to terminate your involvement in this study at any time for any reason. If you do not want to be in this study, you are free not to answer any question or to withdraw from participating at any time without penalty. Often it can become difficult to discuss personal finances and life goals during the interview process. If you become uncomfortable during the interview you are encouraged to notify the researcher and the interview will be rescheduled or terminated.

Questions:

If you have any questions about this research study, please feel free to contact the researcher, William R. Roberts or the faculty advisor, Dr. Linda Kuk at the contact information listed below:

Researcher:
William R. Roberts
48080 Bootjack Road
Lake Linden, MI 49945
Phone: (906) 369-3111
Email: william.roberts@colostate.edu

Faculty advisor
Linda Kuk
Associate Professor
School of Education
209 Education Building
Colorado State University
Fort Collins, CO 80523-1588
Phone: (970) 491-7243
Email: linda.kuk@colostate.edu

Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, William Roberts at 906-369-3111. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553. Please keep a copy of this consent form for your records.

State of Consent:

Your signature below indicates that you have read and understood the information proved above, have had an opportunity to ask questions, and agree to participate in the research study. The research will provide you a copy of this signed form for your records.

The undersigned freely and voluntarily consents to participation in the research.

Participant's Signature

Date

Researcher's Signature

Date

Please return the signed informed consent form when we meet for our conversation.

APPENDIX G: DEMOGRAPHIC QUESTIONNAIRE

Please take a moment to answer the questions listed below. This information will assist in further information the results found in this study and will only be used by the researcher. Your name will not be used and this data will be kept in a secure location with access only available to me. All data will be destroyed within two years of the completion of this study. Please return the signed informed consent form when we meet for our conversation.

1. Hometown _____
2. Where do you currently reside (parent/guardian's home, college residence hall, off campus) _____
3. What is the highest education level of your parents
Mother: _____
Father: _____
4. Do you receive gift aid scholarships/grants (money you do not have to pay back)? If so, roughly how much? _____
5. What is the total of your subsidized/unsubsidized student loans to date? _____
6. Have you borrowed alternative/parent PLUS loans and if so, how much? _____
7. How much loan debt do you expect to have when you graduate from college? _____
8. What was your cumulative high school GPA? _____
9. What was your ACT/SAT composite test score? _____
10. What is your current cumulative GPA in college? _____
11. What is your current major? _____
12. Do you have a dual major? _____
13. Did you change your major while enrolled? _____ If so, how many times? _____

APPENDIX H: GUIDING QUESTIONS FOR INTERVIEWS

Educational goals, strategies and perceptions of success:

- What are your educational goals?
- How do you set your educational goals and strategies?
- How do you define educational success for yourself?
- How does your definition of educational success match your peers and family?
- How have your educational goals and your perception of educational success for yourself changed over time?

Influences on your perceptions of success:

- How did you come to decide to major in engineering?
- What are your long term goals?
- How do your current educational goals and strategies prepare you to meet your long term goals?
- Who has influenced your educational goals and strategies as you define educational success for yourself?
- How have your interactions with faculty and staff members at (institution name) influenced and/or shaped your educational goals and vision of success?

Financial aid and success:

- How did receiving financial aid including your student loans influence how you set your educational goals and strategies?
- How did your perception of your financial need influence the selection of your college and major? Tell me about the process by which you made that decision?
- Do you feel that college will be worth the financial investment for you? Why?

Educational success:

- How important is it for you to have high grades and/or to be on the Dean's List? How does this impact how you set your educational goals and strategies?
- To what degree have you struggled academically to achieve your view of educational success?

APPENDIX I: MEMBER CHECK INSTRUCTIONS

Date
Name
Institution

Dear (Name),

As we discussed, I have attached a copy of the transcript on (date). This transcript was created based on the recorded conversation from our interview, interpreted and transcribed by me. Please take some time to review this transcript. If you notice any discrepancies or would like to clarify any of your responses please feel free to contact me.

If I do not hear from you by (date) I will assume that you believe that transcript is an accurate record of our conversation. At this point my intention will be to proceed with the study.

As I mentioned in some of our earlier communications, I will forward you a summary of the findings when I have completed the study. Again, I would like to personally thank you for your time and participation you contributed to this study

Sincerely,
William R. Roberts
48080 Bootjack Road
Lake Linden, MI 49945
Phone: 906-369-3111
Email: wrrobert@mtu.edu

APPENDIX J: FINAL THANK YOU EMAIL

Date
Name
Institution

Dear (Name),

I would like to personally offer my appreciation and gratitude for your assistance with my dissertation research. I have attached a summary of my findings that you so graciously contributed to. Your willingness to participate has helped me a great deal. More importantly, it's my hope that your participation will help inform others about how students make meaning out of their self-defined student success strategies.

Sincerely,
William R. Roberts
48080 Bootjack Road
Lake Linden, MI 49945
Phone: 906-369-3111
Email: wrrobert@mtu.edu