An Innovation Diffusion and Adoption Model: A Comparative Multiple Case Study Of An Intensive Academic-Orientation Boot Camp Program

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Abstract
The purpose of this multiple comparative case study was to examine why and how an intensive academic-orientation innovation was diffused and adopted at five different public research universities. The innovation under study was the Louisiana State University (LSU) Biology Intensive Orientation for Students (BIOS) program. Everett Rogers’ (2003) diffusion of innovation theory served as the theoretical framework for this study. Program documentation was collected and reviewed, an on-line survey was administered and completed by each program coordinator/director, and telephone interviews were conducted with each program coordinator/director. The study found there was relative fidelity in the adoption of BIOS and supported the presence of Rogers’ (2003) innovation attributes. A model was developed through this study to describe a successful innovation adoption process; essential elements, roles, and relationships were identified. Key findings of the study included the following: (a) need for a catalyst that the innovation addressed and impacted in a positive way; (b) a credible change agent, who was available to share knowledge about the innovation; (c) a champion, who was committed to the successful adoption of the innovation; and (d) an opinion leader, who supported the innovation adoption. The model further indicates there must be a productive and positive working relationship between the change agent and the champion, as well as an established positive working relationship between the champion and opinion leader. Discontinuation of the innovation adoption is possible if there is a change in opinion leadership or a less complex or less costly solution to the initial catalyst is discovered.
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CHAPTER I - INTRODUCTION

More than two-thirds of high school students are pursuing some type of postsecondary education because earning a college degree is viewed as a “prerequisite for access to jobs with employer-provided benefits” (Carnevale, 2007, p. 16). Student retention in higher education has received much attention by college and university administrators and is one of the most widely studied areas in higher education (Barefoot, 2004; Tinto, 2006). The focus and priority placed on student retention is a result of the continuing decline in college completion rates, even as more high school graduates pursue higher education than ever before (Bound, Lovenheim, & Turner, 2010; Talbert, 2012). Although there has been extensive research on the issue of student retention for the last several decades, retention and attrition rates have remained unchanged (Xu, 2015). According to the National Center for Education Statistics (2011), only about 59% of first-time, full-time freshmen graduate college within a six year period. A major concern for colleges and universities is the attrition between the first and second year of college, which is when the highest level of drop out occurs (Barefoot, 2004).

In addition to attracting more students to science, technology, engineering and mathematics (STEM) programs, increasing student retention and graduation rates in these areas are of high priority for colleges and universities across the country. A report by the President's Council of Advisors on Science and Technology (PCAST, 2012) predicted a shortage of nearly one million STEM college graduates in the national workforce over the next decade. Approximately 48% of bachelor’s degree-seeking students and 69% of associate’s degree- seeking students nationally who declared a STEM major between 2003 and 2009 left those disciplines by Spring 2009 (Chen & Solder, 2013). Overcoming
the shortage will require increasing the number of students who choose to pursue and successfully complete degree programs in STEM areas.

A common misconception held by students, parents, and even teachers is that high school programs, even college-preparatory track programs, are aligned closely with postsecondary education to provide preparation for success in college (Conley, 2005). However, K-12 and postsecondary education systems in the United States were established and intentionally developed separately from one another (Callan & Usdan, 1999; Conley, 2005; Kirst, 2000, 2004; Kirst & Usdan, 2007). High school programs were designed for students to graduate high school and become eligible for admission to college; unfortunately, high school graduates have not been taught or trained to be successful in college as part of their high school programs (Conley, 2005).

There is a large disconnect between expectations and experiences for students completing high school and entering college. Colleges and universities have traditionally offered new student orientation programs to educate students about what to expect in college with the hope of providing a smoother transition to college. These orientation programs include a wide range of activities, workshops, and services to share information related to the physical layout of the campus, available resources for success, opportunities for engagement, and traditions (Jacobs, 2003). Indeed, orientation programs can provide a general overview of student life in college to engage new students and can “help students set more realistic academic, personal, and social expectations” (Jacobs, 2003, p. 128), which can positively contribute to student retention. However, the statistics on successful graduation rates suggest more can be done.
In an effort to address the issue of retention, colleges and universities have also focused much effort on programs and initiatives targeting students who are viewed as being at-risk for not persisting in a postsecondary environment. Many colleges and universities offer bridge programs intended to provide academic and social experiences largely for new at-risk freshmen students to help successfully integrate with the institution. Another example for preventing student drop out is early alert systems; specifically, these include identifying students who perform poorly early in the term to be referred to tutoring, academic advising, or counseling (Barefoot, 2004). However, efforts at only targeting at-risk populations may be short-sighted because it is clear that at-risk students are not the only students leaving higher education before completing their degrees.

While maintaining many of its long held traditions, higher education has long been viewed as an agent of social change with its role in discovering, conserving, refining, transmitting, and applying knowledge (Elton, 2003; Kerr, 1982). In contrast, van Vught (1989) argued that “innovations are not likely to occur” (p. 260) in institutions of higher education because they are so steeped in tradition and “are conservative by nature” (p. 260). To address the issues and challenges related to increasing retention and graduation rates, it is both critical and necessary for colleges and universities to identify, consider, and adopt innovative approaches.

**Background of the Study**

In 2005, the Louisiana State University (LSU) biology department developed an intensive academic-orientation program called the Biology Intensive Orientation for Students (BIOS). The purpose of the BIOS program is to help “students make the
transition to the expectations of college prior to the start of the fall semester” (“BIOS Biology Intensive Orientation for Students Home”, 2016, para. 1). According to Sheri Wischusen, who co-founded and co-directs BIOS, BIOS was created in response to the following:

…a great need among our incoming science majors. They were the most successful students in their high schools, but they often weren’t challenged enough to have to learn effective study skills or time management or other key techniques vital to college success. (as cited in Jarreau, 2016, para. 7)

The program was recognized and awarded the Promising Practices Award in 2013 by the National Association of Student Personnel Administrators (NASPA). Results indicate showing higher success and graduation rates for BIOS participants have been published (Wischusen & Wischusen, 2007; Wischusen, Wischusen, & Pomarico, 2011). Additionally, Sheri and Bill Wischusen lead and facilitate an annual workshop hosted by Pearson Education Corporation for individuals from colleges and universities who are interested in adopting a program like BIOS at their institutions. This workshop covers a variety of topics related to planning, implementation, and evaluation of the program. Printed resources provided to workshop participants include sample BIOS schedules, evaluation forms, budget worksheet, and BIOS participant quotes.

According to Wischusen et al. (2011), the BIOS program provides an overview of the expectations and skills necessary to be successful in college and specifically, in biology courses. The BIOS program is a combination of “content lectures, examinations, learning styles assessments, study skills discussions, group work, and informational sessions” (Wischusen et al., 2011, p. 430). The week-long program was designed to give
incoming freshmen with a major in Biological Sciences an opportunity to experience the academic rigors of college through course lectures taught by faculty, homework assignments, exams, and a general chemistry lab experience before the semester begins. The program provides incoming Biological Sciences freshmen the opportunity to get a head start on course content for BIOL 1201 (Biology for Science Majors I), a required first semester freshman course.

Although the course material, lectures, homework assignments, and exams used in LSU BIOS are from the required introductory BIOL 1201 course taken by all incoming freshmen who major in Biological Sciences, the program is not taken for course credit. As a result, students’ academic performance on homework assignments and exams during LSU BIOS does not impact their grade point average at the university. Additionally, students participate in sessions that address skills critical to success in college, such as effective note taking, academic integrity, and managing stress. As such, LSU BIOS is intended to serve as an experience for new freshmen to recognize the academic rigor in college and to understand what it takes to be successful academically in college.

**Statement of the Problem**

Programs and processes in higher education deemed successful are often replicated over time; examples may include summer orientation programs, summer bridge programs, and intrusive early alert retention systems. The LSU BIOS program has been replicated at more than 25 colleges and universities across the country and include community colleges, private liberal arts colleges, and public research universities (S. Wischusen, personal communication, July 21, 2015). However, there is a gap in the current literature regarding how this innovative program was adopted and adapted at
other institutions. Moreover, although diffusion and adoption has been described theoretically, less is understood about how and why innovations are adopted at tradition-bound research universities.

**Purpose of the Study**

The purpose of the study was to examine why and how an intensive academic-orientation boot camp program was diffused and adopted at five public research universities. The research questions that guided this study included the following:

1. How was the Louisiana State University Biology Intensive Orientation for Students (BIOS) program adopted and adapted at each institution?
2. How did the program coordinators/directors make meaning of BIOS in relation to their institution and program?
3. How did the respective program coordinators/directors understand the development and implementation of their programs?
4. What did each program coordinator/director perceive as the critical components of their respective programs?

**Research Design**

A multiple comparative case study was conducted to understand how the LSU BIOS program was diffused and adopted at five public research universities. The participants for the study were the program coordinators/directors for each of the intensive academic-orientation boot camp programs. Data sources for the study included the following: (a) documentation, such as schedules, marketing information, and registration forms available on the program websites or shared electronically by program coordinators/directors; (b) an on-line survey administered through SurveyMonkey
completed by each program coordinator/director with an email introduction and request to participate from LSU BIOS co-director Sheri Wischusen; and (c) a semi-structured telephone interview with each program coordinator/director.

**Theoretical Framework**

Rogers’ (2003) diffusion of innovation theory served as the guiding theoretical framework for this study. An innovation is an idea that is “perceived as new” (Rogers, 2003, p. 36) by adopters. Diffusion has been described as the process whereby “an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p. 5). van Vught (1989) asserted that Rogers’ diffusion of innovation theory is probably the most widely utilized model involving innovations in higher education organizations. The four main elements of diffusion of innovation include: (1) the innovation, (2) communication channels, (3) time, and the (4) social system; these elements can be identified in every diffusion study, campaign, or program (Rogers, 2003). The five stage innovation-decision process was examined for each case. The five stages are (a) knowledge; (b) persuasion; (c) decision; (d) implementation; and (e) confirmation.

**The Cases**

There were five cases selected for this study. Stake (2006) argued that the benefits of a multicase study are optimized if there are no less than four cases and no more than ten cases. All five cases included in this study are public research universities and early adopters of the BIOS program; the programs were established from 2012 to 2014 and continue to operate. Brief descriptions of the programs are included below:
• Established in 2012, the length of the program at University A is five days and the participants are new freshmen enrolled in BISC 160 (Introductory Biology) during the fall semester following the program.

• Established in 2012, the length of the program at University B is four days and the participants are new freshmen life sciences majors or pre-med students and are required to be enrolled in BIO 311C (Introductory Biology I) during the fall semester following the program.

• Established in 2013, the length of the residential program at University C is six days and is open for all incoming first year students in the College of Science and the College of Engineering.

• Established in 2014, the length of the program at University D is five days and the participants are new freshmen enrolled in either BIOL 101 (Biological Principles I) or CHEM 111 (General Chemistry I) during the fall semester following the program.

• Established in 2014, the length of the program at University E is six days and the participants are new freshmen Biological Sciences majors participating in the residential Freshmen Interest Group (FIG) program and enrolled in BIO 1500 (Introduction to Biological Systems with laboratory).

**Significance of the Study**

This study contributes to the literature regarding how and why an innovation was successfully (as measured by duration of implementation) diffused through its adoption and adaptation at other universities. More specifically, the findings provide additional
knowledge and insight to the understanding and perspectives of the program coordinators/directors involving how and why the innovation was diffused and adopted at their respective institutions. The innovation studied was the LSU BIOS program, which was created to give new college freshmen the opportunity to learn and experience the expectations and rigors of college and to practice core skills necessary for success in college. By understanding how the program coordinators/directors understood the LSU BIOS program and how and why it was adopted and adapted at their institution, the study fills the void in the academic literature regarding the actual innovation diffusion and adoption process in higher education.

Delimitations

The delimitations utilized in this study were established to gain a better understanding of why the BIOS program was adopted at five public research universities, how the respective program coordinators understood the BIOS program, and how it was implemented at five public research universities. Therefore, the study is restricted to the diffusion of the LSU BIOS program at five public research universities.

Limitations

The study has the following limitations:

1. There are only five cases included in this case study, therefore, the findings are not generalizable;

2. Only Rogers’ (2003) diffusion of innovation model was utilized for this study; other theoretical frameworks related to innovation and change were not included in the study;
3. The study does not include an examination of the results or the success of the implementation of each program. For example, there is no analysis of student retention rates, student success in subsequent courses, first year grade point averages, or other quantitative measures typically examined to determine whether a program has been successful in positively impacting retention and student success.

**Definition of Terms**

For the purpose of this study, the following terms are defined.

*Academic-orientation boot camp program* – A week-long intensive program that incorporates academic activities, such as lectures, exams, and homework, with specific course content for incoming freshmen.

*At-risk students* – Students who meet one or more of the following criteria: underrepresented minority group, academically underprepared, first generation, low socioeconomic status, or have disabilities (Heisserer & Parette, 2002).

*Innovation* – An idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003).

*Retention* – Staying in school until the completion of a degree (Hagedorn, 2006).

**Summary**

Although more high school graduates are pursuing and enrolling in college than ever, higher education continues to face increased scrutiny over the declining retention and college completion rates. With distinctly separate and unaligned K-12 and postsecondary education systems, it is clear that successful completion of secondary education is not adequate preparation for the expectations and rigor of college. Along
with the traditional transition programs to college and targeted at-risk retention initiatives, the consideration and adoption of innovative programs and approaches are necessary to address the longstanding challenges related to retention and college completion. The purpose of this study was to understand how and why an innovative academic boot camp program was diffused and adopted by the individuals responsible for coordinating the development and implementation of their respective programs.

This dissertation is divided into five chapters. The first chapter provided an overview of the study. The second chapter includes a review of relevant literature. Chapter 3 provides a description of the methodology used in the study. Chapter 4 includes a description of each case, followed by a cross-case analysis. Finally, Chapter 5 includes a discussion of the findings, implications for practice, and recommended future research.
CHAPTER II - REVIEW OF THE LITERATURE

Using the diffusion of innovation model by Rogers (2003) as a theoretical framework, this study sought to investigate why and how an innovative and intensive academic-orientation program, designed to increase student retention and success, was diffused and adopted at five universities. This chapter provides a review of the literature on topics and issues related to existing systemic challenges facing high school graduates entering college; current transition programs offered by colleges and universities in an effort to retain undergraduate students; diffusion research; and the diffusion of innovation model. This chapter will be presented in four main sections: (a) disjointed K-12 and higher education systems; (b) misaligned academic expectations; (c) current transition programs; and (d) the diffusion of innovation theory.

Disjointed K-12 and Higher Education Systems

The K-12 and postsecondary systems of education in the United States have historically been disconnected and have lacked coordination. School districts and higher education institutions have operated largely in isolation from one another and without any incentives or mechanisms in place to work together (McGrath, Donovan, Schaier-Peleg, & Van Buskirk, 2005). In fact, K-12 and higher education have often been described as two different worlds, existing in isolation (Callan & Usdan, 1999).

Knowledge and skills emphasized as well as the standards for success in high school are often different from those of college (Kirst, 2004). Even if a high school course and a college course share an identical name, the college course instructor often emphasizes different aspects of the material, paces the course faster, and has different goals for the course (Conley, Aspengren, Stout, & Veach, 2006). Rote memorization is
often used in high school courses to teach content. In contrast, college courses are intended to provide opportunities “to increase their mastery of academic disciplines” and focus on giving students the opportunity to develop a mastery of the information through the development and use of analysis and critical thinking skills (Cooper, Watt, & Saunders, 1999, p. 5). New college freshmen often lack the understanding that being academically successful in college requires “both deeper knowledge of the content and the more general logical and analytical thinking skills valued at the postsecondary level” (Venezia & Jaeger, 2013, p. 119).

Many students are unsure of how to successfully make the transition to college and are confused by the differences in standards and expectations for success because they encounter one set of standards and expectations in high school and then are faced with a whole new set of standards and expectations in college (Venezia, Finney, & Callan, 2007). In 2002, the National Research Council reported that college instructors were more inclined to expect their students to be able to exhibit complex cognitive skills and engage in a deeper level of thinking. Examples of those skills included the following: making inferences; interpreting results; analyzing conflicting explanations of phenomena; supporting arguments with evidence; solving complex problems that have no obvious answer; reaching conclusions; offering explanations; conducting research; and engaging in the exchange of ideas (as cited in Conley, 2008). Venezia et al. (2007) provided an example of how priorities and standards are markedly different between secondary and postsecondary educators through a study conducted by ACT. The study found that college instructors believed grammar and usage skills were the most important skills needed by incoming students. In contrast, high school teachers considered those skills to
be the least important and only about two thirds of high school teachers indicated teaching grammar and usage (Venezia et al., 2007).

Based on the existing evidence demonstrating the contradiction of valued skills between educators in secondary education and those in higher education, it is not surprising that K-12 educators do not feel knowledgeable on how to prepare their students for the challenges they will face in college. An unfortunate gap of knowledge exists where “K-12 educators do not know how to help students gain an understanding of those expectations” prior to starting college (Kirst, Venezia, & Antonio, 2004, p. 286). This lack of knowledge and the inability on the part of K-12 educators to share information can be attributed to the fact that K-12 education and postsecondary education are separate and unconnected systems of education.

The evolution of K-12 and postsecondary education developing into disjointed systems stemmed from how the United States created mass education systems for both (Kirst, 2000; Kirst & Usdan, 2007). Consistent with the European approach to education was the notion that only a small and elite group of students would be college bound; therefore, there was no need to align the two systems (Kirst & Usdan, 2007). In the late 1800s, there was no organized system or common standards for college admissions (Kirst & Usdan, 2007). For the small number of students who wanted to pursue higher education, high school educators wanted a more uniform approach to college admissions because some colleges and universities had developed their own admissions exams or only accepted students from preapproved secondary schools (Kirst & Usdan, 2007). As a result, the nation’s first blue ribbon education commission was appointed by the National Education Association in 1892 to recommend secondary school academic standards.
(Kirst & Usdan, 2007). The committee, referred to as the Committee of Ten and chaired by Harvard’s president Charles W. Eliot envisioned that only a tiny proportion of high school graduates would go on to college (Kirst & Usdan, 2007). However, their report recommended that all students be prepared with an academic education based in the liberal arts. One significant result of the Committee of Ten’s report was the creation of the College Examination Board to set uniform standards for each academic subject and a syllabus to assist high school students in their preparation for college-entrance examinations (Kirst & Usdan, 2007).

Even with more transparent standards and processes for college admission, changes in accrediting associations further contributed to the separation of secondary education and higher education systems (Kirst & Usdan, 2007). As the number of high schools began to rapidly grow throughout the country during the late 19th and early 20th centuries, colleges and universities were unable to keep up with accrediting high schools as they had done in the past. Simultaneously, the expansion of postsecondary institutions resulted in the regional high school accrediting associations separating from higher education accreditation. Although the intent of the split between high school and higher education accrediting associations was to lessen the workload, it also resulted in the de-emphasis of K-16 alignment (Kirst & Usdan, 2007).

Teacher education also contributed to the separation in systems. Teachers’ colleges, where elementary and secondary teachers were prepared in the mid to late 19th century, were linked to K-12 schools. However, the transformation of teachers’ colleges into multipurpose state universities resulted in only the education college having a
connection with K-12 teachers and students (Kirst & Usdan, 2007). The other parts of the new universities were not necessarily connected to secondary schools.

Kirst and Venezia (2001) argued that without any incentive or mandate to coordinate and collaborate between the systems, it is difficult to develop, let alone establish, consistent standards. This disconnect between the two systems of education also contributes to the increase of high school graduates who are underprepared for college level work (Kirst & Bracco, 2004).

**Misaligned academic expectations.** Many new freshmen entering college can have misguided or inaccurate views about the academic rigors and standards for success in college (Kirst et al., 2004). As a result, they are overly confident in their prospects for academic success in college, especially those who experienced academic success in K-12 with minimal effort. Many of these students were able to be academically successful without ever developing effective study skills; consequently, they tend to underestimate the academic rigors and high standards for success set by faculty at the college level (Sax, 2003; Venezia & Jaeger, 2013; Wischusen et al., 2011).

Despite reported increases in academic disengagement during high school, there are continued increases in academic success at the secondary education level. As a result, students are increasingly optimistic about their chances for academic success in college, while setting expectations to spend less time studying and engaging in academic related pursuits (Sax, 2003; Upcraft, Gardner, & Barefoot, 2005). Since 1966, the Cooperative Institutional Research Program (CIRP) has conducted annual surveys of new freshmen nationally which asks about background characteristics, attitudes, values, educational achievements, and future goals” (Sax, 2003). In 2002, the survey revealed academic
preparedness trends and attitudes of entering college freshmen. While there had been a record high of academic achievement in high school and an increase in A averages earned during high school, student commitment to study and do homework was on the decline (Sax, 2003). In other words, students entering college had experienced academic success in high school while spending less time studying and doing homework in high school. Unfortunately, this behavior was found to carry over into the first year of college. According to the National Survey of Student Engagement (2006), faculty reported that first year students ought to be spending close to twice the amount of time preparing for class than what was indicated by the students.

This unrealistic and inaccurate sense of what it takes to be successful carries over from high school into college. For example, Jensen and Moore (2008) found that freshman students enrolled in an introductory Biology course who were typically earning lower grades were more likely to predict higher grades than they actually earned; and no students ever predicted earning lower than a C in the course. Moreover, Krieg (2013) indicated that the academic transition and adjustment to college was a challenge for all students, regardless of ability or previous achievement. New college freshmen were “unfamiliar with the lack of structure and the amount of work required outside of the classroom” (Krieg, 2013, p. 636). For example, a top high school student who consistently experienced academic success in high school, might struggle as a result of not putting forth effort or utilizing resources (e.g., advisors, tutors) (Krieg, 2013) and could even for the first time have an experience involving academic failure or disappointment. In addition, if a student lacked the necessary self-efficacy and self-confidence to persist, the new experience of failure or disappointment for a previously
high-performing student could potentially have serious negative consequences in both the student’s outlook and performance during his or her college academic career.

Given their lack of experience taking college courses and or even being a college student, it is understandably difficult for new college freshmen to accurately or fully grasp the expectations of college faculty involving the depth of content knowledge and understanding required to be successful in a college level course. Being successful in college requires spending significant amounts of time engaged in learning outside of class, beyond reading the text and completing the homework assignments (Conley, 2008). Interestingly, even when faculty instructors are explicit in their expectations for success in their courses, some students seem somewhat resistant to change their perspectives and attitudes. For example, a qualitative study by Collier and Morgan (2007) that examined students’ understandings of faculty expectations showed that in some cases, students “either discounted or ignored the importance of the things that professors said” (p. 434) or reinterpreted what faculty said, thus not correctly understanding the message altogether. As a result of their study, Collier and Morgan asserted that mastering the role of being a college student must include understanding faculty members’ expectations, which is a necessary skill to demonstrate their knowledge of course materials.

**Current Transition Programs**

In an effort to prepare students to navigate the chasm between secondary and higher education, colleges and universities offer a variety of programs related to facilitating a transition for new freshman students to their institutions prior to the start of the academic year. These programs include summer orientation programs, summer bridge
programs, and more recently, intensive academic orientation programs, sometimes referred to as academic boot camp programs.

Orientation programs are offered by most colleges and universities—in fact, many are required—to all new college freshmen during the summer prior to the start of the academic term. The focus is on acculturation and retention through the dissemination of information about the institutional culture and expectations of its students, along with resources and opportunities for its students (Council for the Advancement of Standards in Higher Education, 2014). Bridge programs, on the other hand, frequently target students who are considered at-risk for not graduating college or are in need of remediation; these programs provide an academic and social integration experience prior to the start of the academic term. The newest type of program for new freshmen is an intensive academic-orientation program, sometimes referred to as academic boot camps created by academic departments or colleges. These programs are typically shorter in length than bridge programs, are intended for new freshmen whose academic major or interest correspond to the academic department or college offering the program, and take place just prior to the start of the semester. Though each of these programs shares a common purpose to provide opportunities for new students to make a smooth and successful transition to the institution, the focus of the programs, the intended participants, and length of time differ.

Orientation programs. Orientation programs have existed since the expansion of higher education in the United States in the late 19th century. In fact, formal orientation programs were offered at both Harvard and Boston University beginning in 1888 (Butts, 1971; Drake, 1966; Jacobs, 2003). In 2014, the Council for the Advancement of Standards in Higher Education (CAS) published its standards and guidelines for
orientation programs. They included the mission of orientation programs as facilitating the transition of new students into the institution (CAS, 2014). Orientation programs in higher education are used to educate all new students on the educational opportunities, expectations, resources, and student responsibilities of the institution. Jacobs (2003) argued that “no single activity can do more to set the academic tone of the collegiate experience and establish a comprehensive approach to student academic success than new student orientation” (p. 127).

Major goals of orientation programs for freshmen include: (a) assisting freshmen to adjust academically to college; (b) assisting students with their adjustment to college for maximum personal development; (c) assisting families to understand the academic and personal adjustments that must be made and the best practices for supporting and advising their students for success; and (d) facilitating the institutional knowledge about its incoming freshmen (CAS, 2014; Perigo & Upcraft, 1989; Upcraft & Farnsworth, 1984). Pascarella, Terenzini, and Wolfle (1986) identified some additional goals for incoming student orientation programs:

- acquaint students with the administrative regulations and expected behaviors of the institutions, introduce them to student organizations and activities, acquaint them with available student services, help them design an academic program, and provide opportunities to meet informally with the institution’s faculty in nonclassroom settings. (p. 156)

According to Pascarella et al. (1986), the general purpose of orientation programs is to facilitate integration into a new and unfamiliar academic and social setting. They asserted that orientation programs are a type of anticipatory socialization and defined
anticipatory socialization as “a process or set of experiences through which individuals come to anticipate correctly the values, norms, and behaviors, they will encounter in a new social setting” (Pascarella et al., 1986, p. 156). The results of their 1986 study supported the notion that a two-day orientation program served to facilitate successful anticipatory socialization by incoming students.

**Bridge programs.** According to Douglas and Attewell (2014), most bridge programs are found at colleges that are not selective in their admissions process. Yet, fewer than 8% of undergraduate students participate in these programs. Bridge programs have historically focused on providing academic and social integration opportunities for low income, first-generation, minority students or other students who are identified as being at risk for dropping out or who are underprepared academically. These students participate in the summer leading into their freshman year of college in hopes of positively impacting retention and graduation rates (Cabrera, Miner, & Milem, 2013; Garcia, 1991; Garcia & Paz, 2009; Tomasko, Ridgway, Waller, & Olesik, 2016). The majority of bridge programs include components such as the development of study and time management skills along with opportunities to utilize campus resources and services related to academic success (Cabrera et al., 2013).

The duration of bridge programs ranges from four to six weeks (Barnett, Bork, Mayer, Pretlow, Wathington, & Weiss, 2012; Institute of Education Sciences What Works Clearinghouse, 2015) and some include an on campus residential experience (Garcia & Paz, 2009). Some bridge programs are used to provide remediation for students so that their time to degree is not delayed (Douglas & Attewell, 2014) while
others are not based on a specific course, but on improving reading, writing, or math skills (Relles & Tierney, 2014).

**Intensive academic-orientation programs (academic boot camp).** Bridge programs provide rigorous experiences that typically last four to six weeks for incoming freshmen considered at risk for not persisting and graduating. However, the participant’s intended academic major in college is usually not considered a criterion for participation in the program nor is the course content for the program directly related to their major.

Academic boot camp programs for new college freshmen are relatively new and provide incoming college freshmen with intensive academic content based experiences to gain first-hand knowledge about the academic expectations and rigors they will face as college students. Summer-long programs are typically resource and time intensive and can be expensive. Freshman seminars, typically available during the student’s first semester in college “offer help too late for the first-semester strugglers” (Wischusen & Wischusen, 2013, p. 2). In contrast to the summer long programs and orientation programs, boot camp programs are short, intense, inexpensive, and very effective (Wischusen & Wischusen, 2013).

Some programs may be called bridge programs, but are more accurately described as intensive academic-orientation programs. For instance, the interdisciplinary Keck Science Department at Claremont McKenna, Pitzer, and Scripps Colleges described their one week program, the Summer Science Immersion Program (SScIP), as a summer STEM bridge program (Bhattacharya & Hansen, 2015). However, SScIP adopted components of the Louisiana State University Biology Intensive Orientation for Students (BIOS) program: a one week program that allowed participants to experience the
expectations of science coursework at the collegiate level taught by faculty along with mentoring provided by continuing students.

Intensive academic-orientation programs, sometimes referred to as academic boot camps, frequently target new freshmen who intend to study a particular discipline or pursue a specific major. The length of time of an academic boot camp ranges from several days to a couple of weeks. Some common characteristics in academic boot camps include: working in small groups; the presence and participation of mentors or trainers to guide participants; and the development of specific skills.

In addition to targeting new freshmen, boot camp programs are also used for development and training purposes. They include general professional development, faculty development, and medical students, medical interns and resident. For example, the Health Information Management (HIM) Research Training Institute was created in 2008 as an intensive, one week in person training event involving methods for conducting research, writing a literature review, reading funding announcements, identifying and refining a potential project or hypothesis, and drafting a proposal. At the conclusion of the program, participants continue to work with a mentor via email and phone to develop their projects and find appropriate funding (Biederman, 2012).

Boot camp programs have been utilized for faculty training and development. The Sisters of the Academy (SOTA) Institute Research Bootcamp (RBC) is a professional development opportunity developed in 2005 to support African-American female junior faculty and doctoral students to be successful in the academy. It is a bi-annual, seven-day program that provides individual and small group mentoring with a focus on knowledge and skill development. Tenured senior African-American female scholar mentors provide
individual and small group mentoring and are paired with participants based on research interests and fields of study. The program includes daily seminars, workshops on research methodology, writing for scholarly publication, and life management within academia (Jones & Osbourne-Lampkin, 2013). Another boot camp program for faculty development focuses on teaching faculty to redesign a current face-to-face course to an on-line course (Johnson, Wisniewsky, Kuhlemeyer, Isaacs, & Krzybowsk, 2012). The program is three days and work is done through small groups of three or four participants, who also all receive individual instruction with technology professionals. At the end of program, faculty members produce a substantively developed on-line course to be launched the following year.

Boo camp programs have also been used to train medical students and residents on specific skills, situations, and techniques (Chin, Roth, Rotenberg, & Fung, 2014; Cohen et al., 2013). According to Chin et al. (2014), surgical residents spend one day participating in a program where trainers teach them technical skills and the residents participate in an interactive panel discussion regarding triage and management of common emergency scenarios. Results of the study indicated that participants preferred learning through experiences rather than observation. Another boot camp for internal medicine interns focuses on specific clinical skills for three days; these particular clinical skills were frequently reported to be inadequate amongst internal medicine interns. Participants are assigned to small groups of six members where there are teaching sessions, opportunities to practice skills, and receive individualized feedback. Results showed that the boot camp improved participants’ clinical skills, reduced variation, and enhanced confidence (Cohen et al., 2013).
In summary, based on the existing disconnect between K-12 and higher education systems, which in turn causes misaligned expectations for students, many new freshmen either lack the necessary knowledge, have misperceptions, or are unclear about what it takes to be successful in college. While orientation programs have historically been offered to all incoming freshmen and bridge programs for targeted at-risk or underrepresented student populations, some colleges and universities are now also offering intensive academic orientations for new freshmen in an effort to improve retention and graduation rates. These programs provide opportunities for incoming college freshmen to get a realistic idea of academic life in college, the rigor and faster pace of college, and the expectations of faculty.

**Diffusion of Innovations Theory**

Diffusion has been described as the process whereby “an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p. 5). In other words, diffusion is a “special type of communication in which the messages are about a new idea” (Rogers, 2003, p. 6) and where the sharing of new ideas can be either planned or spontaneous. There are four main components in the diffusion of new ideas: (a) an innovation; (b) communicated through certain channels; (c) over a period of time; (d) among the members of a social system.

According to Rogers (2003), *innovation* is defined as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 12). It is important to note that the amount of time elapsed since an innovation was created or discovered does not necessarily influence the perception of its newness. Even if knowledge about an
innovation has existed for a period of time, the perception of it being new is tied to the
decision-making process involving whether to adopt the innovation.

Rogers (2003) defined communication as “a process in which participants create
and share information with one another in order to reach a mutual understanding” (p. 5).
The diffusion process is a specific type of communication whereby the message content
of what is exchanged involves the new idea (Rogers, 2003). The second element of this
compontent is communication channels, which refers to “the means by which messages
get from one individual to another” (Rogers, 2003, p. 18). Mass-media channels,
interpersonal channels, and interactive communication are examples of communication
channels cited by Rogers (2003). Examples of mass-media channels include using a mass
medium such as newspapers, television, and radio to reach the masses; interactive
communication involves the use of the Internet. In contrast, interpersonal channels
“involve a face-to-face exchange between two or more individuals” (Rogers, 2003, p. 18).

The third component in the diffusion process is time. Rogers (2003) asserted the
inclusion of time as a strength in the process because it plays a role in: (a) the innovation-
decision process, which occurs in a sequence; (b) the level of innovativeness of an
individual, which can be determined by how early or late the innovation is adopted; and
(c) the rate of an innovation’s adoption in a system.

The final component in the diffusion process is the social system, which Rogers
(2003) defined as a set of interrelated units engaged in joint problem solving to
accomplish a common goal. Although the process of diffusion occurs within a social
system and impacts the social system, it is also influenced by the social system. Rogers
(2003) identified several ways the social structure of the system affects the diffusion of the innovation: (a) the effect of social structure and norms; (b) the role of opinion leaders, change agents, and champions; (c) the types of innovation decisions; and (d) the consequences of the innovation.

Rogers (2003) argued that a social system’s structure could facilitate or deter diffusion of an innovation. He defined *structure* as the patterned arrangements of the units in a system. Structure reduces uncertainty in a system and provides predictability, regularity, and stability to human behavior (Rogers, 2003). In addition to the structure, the norms of the system can also impact an innovation’s diffusion and adoption. *Norms* are defined as the established behavior patterns that serve as a guide for acceptable behavior of its members. Moreover, Rogers (2003) asserted that norms outline the behavior expected among members of a social system.

Within a social system are individuals who have the ability to influence the diffusion of innovation (Rogers, 2003). An *opinion leader* is considered to be an individual who has considerable influence, which stems from “expertise and competence, accessibility, or leadership in conforming to the system’s norms” (Lundblad, 2003, p. 55). Furthermore, an opinion leader serves as a social model for adopting or rejecting an innovation. A *change agent*, on the other hand, is not part of the social system, but is viewed as an individual who possesses some special knowledge or expertise (Lundblad, 2003). Rogers (2003) asserted that change agents often use opinion leaders in a social system as their “lieutenants in diffusion activities” (p. 27). Finally, a *champion* is an individual within an organization whose key role is to influence a successful innovation
adoption and implementation. Rogers (2003) described a champion as an individual who is charismatic, persuasive, and is able to contribute to diminishing barriers.

Rogers’ seminal work, *Diffusion of Innovations* (2003), is widely cited in publications involving innovation diffusion. Currently in its fifth edition, *Diffusion of Innovations* describes a general model of the diffusion of innovations that has been used as a framework for a variety of disciplines, including sociology, anthropology, public health, communication, marketing, geography, and education (Rogers, 2003). For over 60 years, there has been widespread scholarly research using Rogers’ diffusion model. Its theoretical framework for a variety of disciplines and its application to real world problems demonstrates its generalizability (Rogers, 2004). Furthermore, the diffusion model provides a straightforward and clear-cut methodology for scholars to use for collecting and analyzing data (Rogers & Adhikarya, 1979). However, one criticism of his diffusion framework has been that it does not address the role or impact of motivation (Kozma, 1985).

The number of diffusion publications has grown and continues to increase. For example, in 1962 when the first edition of Rogers’ book was published, there were a total of 405 diffusion publications; in 2003 when the fifth edition of his book was published, there were 5000 diffusion publications (Rogers, 2004). Rogers (2004) claimed that for a number of years, about 250 diffusion articles were published annually in a wide range of scholarly journals.

**Types of innovation decisions.** Rogers (2003) organized decisions related to adopting or rejecting an innovation into three categories:
1. Optional innovation-decisions are made by an individual independent of the decisions of the other members of the system;

2. Collective innovation-decisions are made by consensus among the members of a system;

3. Authority innovation-decisions are made by a relatively few individuals in a system who possess power, status, or technical expertise.

These three categories can be represented on a continuum that describes the level of involvement and responsibility an individual has in making the decision. The individual has almost sole responsibility for making an optional decision, whereas only some influence on the decision in a collective decision, but no say in an authority decision. Authority and collective decisions are more commonly found in organizations, whereas optional decisions are more common in the agriculture field or in consumer behavior (Rogers, 2003).

Consequences of an innovation. Consequences of an innovation are defined as “the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation” (Rogers, 2003, p. 31). Rogers (2003) identified three classifications of consequences:

1. Desirable consequences, which refer to the functional effects of the innovation for an individual or social system versus undesirable consequences, which refer to dysfunctional effects of the innovation.

2. Direct consequences, which refer to changes that occur in immediate response to the innovation adoption versus indirect consequences, which occur as a
result of the direct consequences. It is also referred to as the “consequences of consequences” (p. 446).

3. *Anticipated consequences* are changes that are recognized and intended by the members of a social system versus *unanticipated consequences*, which are neither intended nor recognized by the members of the social system.

Rogers (2003) argued that when introducing innovations, change agents are looking for systems where they expect that the consequences of an innovation will be desirable, direct, and anticipated. However, some unanticipated consequences that are indirect and undesirable are to be expected.

**Attributes of innovations and rate of adoption.** According to Rogers (2003), the perceived attributes of an innovation play a critical role in explaining the rate of adoption of an innovation. Rogers argued that the majority of the variance in the rate of the adoption of an innovation —ranging from 49 to 87 percent—is explained by the following five perceived attributes or characteristics of an innovation:

1. **Relative advantage**, which is defined as the extent to which an innovation is perceived as better than the previous idea. In other words, the greater an innovation is viewed as being advantageous, the faster the rate of its adoption. For example, a preventive innovation, which is an idea to lower the probability of some unwanted future event, has a relatively slow rate of adoption because the desired reward is delayed and distant in time.

2. **Compatibility**, which is defined as the extent to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of
potential adopters. An innovation that is compatible with existing values and norms will be adopted more rapidly.

3. **Complexity**, which is defined as the extent to which an innovation is perceived as difficult to understand and use. The more simple and easy to understand an innovation is, the more rapidly it is adopted.

4. **Trialability**, which is defined as the extent to which an innovation may be experimented with on a limited basis. When an innovation can be tried or tested, the adoption rate can be more rapid because the idea can be simultaneously vetted and learned.

5. **Observability**, which is defined as the extent to which the results of an innovation are visible to others. When the results of an innovation are readily available and accessible for others to see, the innovation is adopted more quickly.

Rogers (2002) asserted that innovations perceived as “having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations” (p. 990).

**Innovation-decision process.** The innovation-decision process is an activity in which there is information-seeking and information-processing with a focus to reduce uncertainty about the advantages and disadvantages of an innovation (Rogers, 2003). Therefore, the first stage of the innovation-decision process is the *knowledge stage* during which an individual learns of the existence of an innovation and gains an understanding of how it functions. Rogers (2003) indicated that the knowledge stage encompasses three types of knowledge:

1. **Awareness-knowledge**, which refers to information that an innovation exists;
2. *How-to knowledge*, which refers to information necessary to use an innovation properly;

3. *Principles-knowledge*, which involves information dealing with the functioning principles underlying how an innovation works.

Whereas the knowledge stage is more cognitive centered, the main type of thinking in the second persuasion stage of the innovation-decision process is affective (Rogers, 2003). The *persuasion stage* is when either a positive or negative attitude toward the innovation occurs and when the individual becomes more psychologically involved with the innovation (Rogers, 2003). In other words, the main outcome of the persuasion stage is a favorable or unfavorable attitude toward the innovation. Additionally, innovation-evaluation information to reduce uncertainty about an innovation’s expected consequences is sought during this stage and into the following phase, the decision stage.

The *decision stage* includes activities that lead to a choice to adopt or reject an innovation (Rogers, 2003). During this stage, an innovation can be tried on a trial or probationary basis. Rogers (2003) noted that rejection, defined as a decision not to adopt an innovation, can occur at every stage of the innovation-decision process. He identified two different types of rejection:

- *Active rejection* involves deciding not to adopt the innovation, after considering adoption.

- *Passive rejection*, also referred to as “nonadoption”, occurs when the innovation is never really considered for use.
Following the decision stage is the implementation phase, when the innovation is put into practice. Rogers (2003) pointed out that re-invention usually occurs during the implementation phase. Re-invention is defined as “the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation” (Rogers, 2003, p. 180). Rogers asserted that the more reinvention occurs, the more rapidly an innovation is adopted with a higher degree of sustainability.

In the final, confirmation stage, reinforcement and support for the decision to implement the innovation is sought by the individual or decision-making unit. Attitudes formed about the innovation are even more critical in this stage, as the individual is seeking supportive messages to prevent dissonance (Rogers, 2003). Dissonance was defined by Rogers (2003) as an uncomfortable state of mind.

If the dissonance is not reduced, discontinuance of the innovation may occur in one of two ways: replacement or disenchantment. Replacement discontinuance occurs when the innovation is rejected and replaced by a different innovation that is perceived as being better (Rogers, 2003). On the other hand, disenchantment discontinuance occurs as a result of dissatisfaction with the innovation’s performance (Rogers, 2003). In other words, the innovation was ultimately not perceived to have relative advantage (Rogers, 2003; Sahin, 2006).

Overview of diffusion research. The study of diffusion research began in the early 1900s in Europe as the fields of sociology and anthropology emerged as new social sciences. In particular, Gabriel Tarde’s 1903 publication titled *The Laws of Imitation* is credited for starting the diffusion of innovation research (Wejnert, 2002). Therefore
Tarde, a French lawyer and judge, is considered one of the “European forefathers of the diffusion field” (Rogers, 2003, p. 41).

Empirical research in the area of innovation diffusion did not begin until the 1940s and 1950s. A study conducted by Ryan and Gross (1943) at the University of Iowa involving the rate of adoption of hybrid seed corn amongst farmers in Iowa was instrumental in providing the basic framework for Everett M. Rogers’ diffusion model. According to Rogers and Adhikarya (1979), diffusion research began with studying individuals, such as the Iowa farmers, as adopters of innovations and has developed and evolved with newer diffusion research studies focusing on understanding how organizational leaders decide to adopt and implement innovations.

Wolfe (1994) identified three distinct research areas related to organizational innovation that have emerged:

- **Diffusion-of-innovation (DI)** research that addresses the diffusion of an innovation over time and/or space. The analysis of this research focuses upon the fit of hypothesized innovation-diffusion models to actual diffusion histories”.

- **Organizational innovativeness (OI)** research that addresses the determinants of the innovativeness of organizations by using a variance-research model where organizational innovativeness is a dependent variable that has been operationalized as a composite score based on a number of innovations adopted by an organization.

- **Process theory (PT)** research that addresses the process of innovation within an organizations.
Lundblad (2003) noted that Rogers’ diffusion-of-innovation model has been most useful in organizations that encounter difficulty in getting a new idea with obvious advantages to spread. However, a limitation of DI research is the strict assumptions of the diffusion model. These assumptions, which do not hold in most cases, include “an invariant unit of innovation and a definable population of potential adopters who are more or less equivalent” (Wolfe, 1994, p. 408).

In addition to the challenge of abiding by the assumptions, organizational DI research has faced additional difficulties (Wolfe, 1994). Early in organizational DI research, the characteristics or attributes of an individual adopter were assumed for an organization rather than recognizing that the process of diffusion of an innovation among individuals versus organizations were very different (Wolfe, 1994). It was the recognition that DI research models were limited by not incorporating issues unique to organizations which led to the organizational innovativeness and process theory areas of research.

**Innovation-diffusion research in education.** Early education-related diffusion studies were almost all conducted at Columbia University Teachers College in the 1920s and 1930s by Paul Mort (Rogers, 2003). Mort’s research focused on school systems and their innovativeness. After Mort’s death in 1959, Columbia University Teachers College lost its dominant role in educational-diffusion research (Rogers, 2003).

Although education has been the focus of many studies in diffusion research tradition, its role in contributing to the theoretical understanding of the diffusion of innovations (Rogers, 2003) has been less significant. In the field of education, much of the research has involved “the adoption of curricular changes and administrative changes in schools” (Lundblad, 2003, p. 61). Carlson (1971), who studied of the spread of modern
math among school administrators in Pennsylvania and West Virginia, was lauded as an exemplary example of an educational-diffusion-research study by Rogers. Currently, a popular area of diffusion research studies using Rogers’ framework in K-12 schools involves the utilization of technology in the classrooms and in teaching. For example, Dooley (1999) used Rogers’ diffusion framework to study educational technology integration and utilization in schools.

Institutions of higher education continue to have opportunities to innovate. Getz, Siegfried, and Anderson (1997) argued there is little research on the diffusion of innovation in higher education. Many of the studies in higher education that utilize Rogers’ framework involve integrating technology in teaching, faculty development, learning and teaching practices, and blended, on-line, or distance learning (Ball, Ogletree, Asunda, Miller, & Jurkowski, 2014; Bennett & Bennett, 2003; Drape, Westfall-Rudd, Doak, Guthrie, & Mykerezi, 2013; Porter, Graham, Bodily, & Sandberg, 2016; Smith, 2012; Sahin, 2006; Tabata & Johnsrud, 2008).

There have been studies in higher education that have used the diffusion-of-innovation theory outside of the abovementioned areas to study specific characteristics or factors. For example, Spiering and Erickson (2006) used Rogers’ diffusion model in the area of international education to study student decision-making process and reasons for studying or not studying abroad. Cragun, DeBate, Severson, Shaw, Christiansen, Koerber, Tomar, Brown, Tedesco, and Hendricson (2011) used Rogers’ framework to identify characteristics of cases that dental- and dental-hygiene-faculty members would be more inclined to adopt to use for teaching purposes.
Using Rogers’ diffusion of innovation model as a theoretical framework is appropriate for understanding how an intensive academic-orientation boot camp program created by the biology department at Louisiana State University was diffused and adopted at other universities, along with why and how the program coordinators/directors decided to adopt and adapt the innovation at their institutions.
CHAPTER III - METHODOLOGY

The purpose of this study was to examine why and how an intensive academic-orientation innovation was diffused and adopted at five public research universities. The innovation under study was the Louisiana State University (LSU) Biology Intensive Orientation for Students (BIOS) program. Everett Rogers’ (2003) diffusion of innovation theory served as the theoretical framework for this study. Four research questions guided the study:

1. How was the Louisiana State University (LSU) Biology Intensive Orientation for Students (BIOS) program adopted and adapted at each institution?
2. How did the program coordinators/directors make meaning of LSU BIOS in relation to their institution and program?
3. How did the respective program coordinators/directors understand the development and implementation of their programs?
4. What did each program coordinator/director perceive as the critical components of their respective programs?

This chapter is divided into eight sections. The first section is a description of the research design, a comparative multiple case study. The second section provides an overview of the five cases that were the focus of the study. The third section describes the data sources; this is followed by a description of the participants included in the study. Data collection is found in the fifth section. The sixth section describes the analysis of the data. The seventh section provides the background of the researcher. A summary of the methodology concludes the chapter.
Research Design

Due to the exploratory nature of this study, a qualitative methodology was employed. Qualitative research was appropriate for this study because it was conducted to understand and explore a social or human problem with a desire to study it in a natural setting (Creswell, 1998; Denzin & Lincoln, 2003). Qualitative research seeks to answer questions that stress how social experiences are created and given meaning; the inquiry process is value laden (Denzin & Lincoln, 2003). According to Denzin and Lincoln (2003), a qualitative research design consists of a “flexible set of guidelines that connect theoretical paradigms first to strategies of inquiry and second to methods for collecting empirical material” (p. 36). In addition to presenting a detailed view of the topic to be studied and explored, Creswell (1998) identified the following attributes to determine if a researcher is willing to conduct qualitative research:

- a commitment to spending extensive time in the field;
- a desire to engage in an involved, complex, and time-consuming data-analysis process with large amounts of data to be reduced to a few themes or categories;
- a desire to study individuals in their natural setting.

According to Stake (2006), “qualitative case study was developed to study the experience of real cases operating in real situations” (p. 3). Case study is frequently used as a research method in education as a procedure to develop a deeper understanding of a situation or of a complex social phenomena rooted in real-life situations (Merriam, 1998; Yin, 2014; Verschuren, 2003). Moreover, Merriam (1998) argued “case study has proven particularly useful for studying educational innovations” (p. 41) and is a well suited
research design for looking at process. Case study involves the development of an in-depth analysis of a case, which is often a program, event, activity, process or one or more individuals. According to Creswell (2014), “cases are bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time” (p. 14).

For this study, a multiple-comparative, case-study design was used to examine the diffusion of the LSU BIOS program. Multiple-case study is “a research design for closely examining several cases linked together” (Stake, 2006, p. v). All of the selected cases were linked based on their interactions with BIOS co-directors, Sheri and William Wischusen, the information received from the Wischusens about the LSU BIOS program, and the use of LSU BIOS as a model to adopt at their institution. This research was an explanatory case study, which is defined as a case study whose purpose is to explain how or why some condition came to be (Yin, 2014).

Stake (2006) argued one of the primary reasons for doing a multicase study is to examine how the program or phenomenon performs in different environments. Defined as “an object or phenomenon or condition to be studied” (Stake, 2006, p. 6), Stake asserted that the quintain is central to multicase research because it is the collective target of what the research is trying to understand. The quintain for this study is why and how the diffusion and adoption of the LSU BIOS model occurred at the selected public research universities.

Although a specific number of recommended cases to include in a multiple case study does not exist, Stake (2006) asserted that the benefits of a multicase study became limited if fewer than four or more than ten cases are chosen.
The Cases

Five cases were chosen for this study using criterion purposive sampling. All five cases were public research universities that were early adopters of the LSU BIOS program and were still offering their intensive academic orientation programs to incoming freshmen at the time of data collection. All five cases also met two of the main criteria Stake (2006) recommended for selecting cases:

- Relevance to the quintain;
- Good opportunities to learn about the complexity and contexts.

University A. University A is a public flagship university located in the south and offers undergraduate, graduate, and professional degrees. According to the University’s website, the undergraduate student enrollment in Fall 2015 was 18,084 with 1,053 full-time instructional faculty. Established in 2012, the program under study at University A targets life science majors, pharmacy majors, and students interested in pursuing medical or dental school. The length of the program is five days. Participants are required to be enrolled in BISC 160 (Introductory Biology) during the fall semester following the program.

University B. University B is a public flagship university located in the south and offers undergraduate, graduate, and professional degrees. According to the University’s website, the undergraduate student enrollment in Fall 2015 was 39,619 with 3,000 full-time instructional faculty. Established in 2012, the program under study at University B targets life science majors. The length of the program is four days. Participants are required to be enrolled in BIO 311C (Introductory Biology I) during the fall semester following the program.
University C. University C is a public research university located in the east and offers undergraduate, graduate, and professional degrees. According to the University’s website, the undergraduate student enrollment in Fall 2015 was 22,304 with 1,819 faculty. Established in 2013, the program under study at University C is a residential program open to incoming first-year students in both the College of Science and the College of Engineering. The length of the program is six days.

University D. University D is a public flagship university located in the southeast and offers undergraduate, graduate, and professional degrees. According to the University’s website, the undergraduate student enrollment in Fall 2015 was 25,254 with 2,331 faculty. Established in 2014, the program under study at University D is open to incoming first-year students who are enrolled in either BIOL 101 or CHEM 111 for the fall term. The length of the program is six days. Participants experience coursework in either Biology or Chemistry.

University E. University E is a public flagship university located in the Midwest and offers undergraduate, graduate, and professional degrees. According to the University’s website, the undergraduate student enrollment in Fall 2015 was 27,812 with 3,214 faculty. Established in 2014, the program under study at University E is open to incoming first-year students who are Biology majors and participating in a Freshman Interest Group (FIG). The length of the program is five days. Participants experience coursework in both Biology and Chemistry.

Data Sources

Qualitative research generally does not limit itself to a single method; rather, there is a spectrum of methods that can be selected and used based on the research questions
and the research tradition (Flick, von Kardorff, & Steinke, 2004). In other words, the researcher must determine the appropriateness of utilizing a wide range of methods that are interconnected with the purpose of gaining a better understanding of the subject matter that is being studied (Denzin & Lincoln, 2003). Empirical materials can include the following items: “case study; personal experience; introspection; life story; interview; artifacts; cultural texts and productions; observational, historical interactional, and visual texts” (Denzin & Lincoln, 2003, p. 5). Three sources of data were collected and analyzed for this study: (1) documentation associated with each case; (2) an on-line survey; and (3) telephone interviews.

**Documentation.** Institutional webpages of each selected case were carefully examined for information related to their intensive academic-orientation program. Relevant program documents, such as curricula, schedules, registration or application forms, and evaluation forms available on-line or provided by the program coordinators were examined. These documents were used to generate a description of the program as well as to understand the purpose and goals of the program.

**Survey.** The purpose of the survey was to gather additional information and data about each case. Questions addressed the following topics: when the program was offered in relation to the start of the fall semester; the program time; how many years the program was offered; reasons for developing and implementing the program; stakeholder involvement; program evaluation methods; cost of the program to the institution and to the participants; and critical program components (see Appendix A for the complete survey). In addition to analyzing these data as a source, results from the survey were used to craft specific follow-up questions for each program coordinator/director.
**Telephone interview.** After reviewing the results of the completed surveys for each participant, a telephone interview was conducted with each program coordinator/director. Interviews are a primary way to research and investigate an educational process through the experience of the individual people who carry out the process (Seidman, 2013). Interviewing involves interacting with a specific person or persons to collaborate “in producing retrospective (and prospective) accounts or versions of their past (or future) actions, experiences, feelings and thoughts” (Rapley, 2004, p. 16). Additionally, Kvale and Brinkmann (2012) described interviews as an “interchange of views between two persons conversing about a theme of mutual interest” (p. 2) whereby “knowledge is constructed in the inter-action between the interviewer and the interviewee” (p. 2).

Interviewing is one of the most common and most powerful methods to develop an understanding of other human beings (Fontana & Frey, 1994). There are three major types of interviewing: structured, semi-structured, and unstructured. A structured interview includes asking a series of pre-established questions which have a limited set of response categories. In other words, all respondents are asked the same set of questions in the same sequence so there is very little flexibility. In contrast, unstructured interviewing can provide greater breadth as it does not impose limitations. Semi-structured interviews include a number of questions prepared in advance and is characterized by having relatively open questions (Wengraf, 2001). Under the right conditions, semi-structured interviews can provide much richer data than structured interviews. Figure 1 illustrates the type of interview to conduct, based on the phase of theory development. For example, Wengraf (2001) asserted that if the researcher is trying to develop a model or theory, an
unstructured interview is a better fit. In contrast, if the researcher wants to test a theory or model, a structured interview is a better approach.

Figure 1. Spectrum from Unstructured to Fully Structured Interviewing, and Possible Relationship to Phases in Development of a Theory (adapted from Wengraf, 2001, p. 61)

For the purpose of this study, semi-structured and intensive telephone interviews were conducted with the program coordinators/directors. Charmaz (2014) described intensive interviewing as a one-sided conversation whereby the researcher’s speaking role is limited to focusing on encouraging the participant to speak to explore the participant’s perspective involving their experience with the research topic. Moreover, the interviewer’s stance is that of an interested learner (Charmaz, 2014) thereby complimenting the participant’s role as an expert in his or her own life and experiences.

The purpose of utilizing intensive interviewing is to obtain information, gain insight into experience, and elicit reflections from the participant about that experience (Charmaz, 1991). Key characteristics of intensive interviewing include:

- Selection of research participants who have first-hand experience that fits the research topic
- In-depth exploration of participants’ experiences and situations
- Reliance on open-ended questions
• Objective of obtaining detailed responses

• Emphasis on understanding the research participants’ perspective meanings, and experiences

• Practice of follow up on unanticipated areas of inquiry, hints, and implicit views and accounts of actions (Charmaz, 1991, p. 56).

It is critical that the types of questions, word choice, and the manner in which the researcher interacts with the participants reflects a respect for the interview participants’ traditions and situations throughout the interview. A typical goal of intensive interviewing is a conversation that is smooth and not direct, intrusive, or confrontative. In addition to intensive interviewing, informational interviewing was also used to gather accurate facts and details needed to understand each case (Charmaz, 2014).

The questions used for the telephone interviews followed a general format, but were tailored based upon the results of the survey. In general, the questions explored topics relevant to the adoption, development, and implementation of their programs as well as soliciting additional explanations to responses from the on-line survey.

Participants

The participants were the coordinators or directors of each academic-orientation boot camp program. Information identifying the program coordinator/director or the program coordinator/director’s contact information were publicly available on each program’s website. A description of each coordinator/director is found in the case descriptions in Chapter 4.

Data Collection
The study was conducted under the auspices of the University of Nevada, Reno (UNR) Institutional Review Board (IRB) through the Research Integrity Office (RIO) as Exempt research (Appendix B). The study fulfilled the definition of Exempt research as the risk to participants was minimal, individual privacy was protected, and the data remained confidential (566. Exempt Review and Approval, 2016).

The documents were collected in two methods. The information from the website was publicly accessible. Other documents (e.g. curriculum, schedules, registration) were collected electronically following the telephone interviews.

The on-line surveys were administered using SurveyMonkey. Administering the on-line survey was an appropriate, efficient, and consistent method to ask questions and to gather information from a variety of respondents across the country. Utilizing a survey sponsor can lend legitimacy and induce trust for respondents, thereby positively affecting the respondent’s decision to respond (Dillman, Smyth, & Christian, 2014). Therefore, an introduction and request for participation in the study from the LSU BIOS co-director, Sheri Wischusen, was sent through email to each program coordinator/director. The email outlined the components of participation, which included completing the on-line survey, participating in a phone interview, and sharing any relevant documents related to the program, such as schedules, syllabi, course materials, or forms used for evaluation (see Appendix C). An information sheet (see Appendix D) was attached to the email so the participant had a more detailed understanding of the study. Upon receiving notification and confirmation that a program coordinator/director agreed to participate in the study, an email with the link to the on-line survey was sent from SurveyMonkey.
Through SurveyMonkey, completion of the on-line surveys was monitored and subsequent reminder emails were also sent through SurveyMonkey. One program coordinator/director completed the on-line survey one day after receiving the email with the on-line survey link, so a reminder email was not necessary. Three program coordinators/directors were sent the first email reminder to complete the on-line survey a week after the initial email invitation with the link to the on-line survey had been sent; they completed the on-line survey without requiring additional reminders. One program coordinator/director required a second reminder email, which was sent one week following the first reminder email, followed by a third email reminder a week later; the on-line survey was completed a couple of days following the third email reminder.

Upon completion of the on-line survey, the program coordinators/directors were contacted by email to request an appointment for a telephone interview. Interviews were conducted via telephone to reduce the time and expense of data collection as travel to five universities located across the country was not feasible. The shortest interview lasted 40 minutes and the longest interview lasted 55 minutes; the average interview lasted 49 minutes. Each telephone interview was audio recorded to facilitate focusing on the conversation and to take notes. Two electronic devices were used to record each telephone interview: a Sony voice digital recorder and an iPhone 6 application called Voice Record. At the conclusion of each interview, the audio files were saved to a password-protected, on-line cloud system and on a password-protected computer. Once the audio files had been saved, the digital files on both devices were immediately deleted. All telephone interviews were transcribed and saved on both a password-protected on-
line cloud system and on a password-protected computer. Notes taken during each interview were secured in a locked cabinet and subsequently shredded.

**Data Analysis**

The data were analyzed in three phases: description of the case; interpretation of the adoption and adaption; and comparison of the cases. Initially, each case was analyzed separately. Specifically, the documentation associated with each boot camp program and results of the surveys and interviews were examined to develop a detailed description of the program as implemented. As a form of member-checking (Stake, 2010), descriptions of the program were sent to the program coordinators/directors to verify accuracy of the description. Corrections were made as appropriate.

Once the boot camp descriptions were compiled, the interviews were re-analyzed to provide a more nuanced understanding of the way the BIOS program was understood, why it was adopted, and how it was adapted to reflect the respective university context. Additionally, the interviews were also analyzed to identify the ways the programs reflected Rogers’ (2003) diffusion-innovation model.

For this study, the concepts identified in the analysis were compared with the critical elements of LSU BIOS. More specifically, the analysis studied the following: reasons for developing and implementing the program; stakeholder involvement; program evaluation methods; cost of the program to the institution and to the participants; and critical program components. This analysis provided information related to how LSU BIOS was adapted within each university context.

Following the analysis for each case, a comparison of the cases was conducted. Similarities and differences in the adoption and adaptation were examined.
Interpretations of the adoption and adaptation by the program coordinators/directors were analyzed to provide an explanation for the similarities and differences among the camps.

**Researcher Background**

For the last 13 years, I have been a director overseeing undergraduate advising, recruitment, and retention for a Science, Technology, Engineering, and Math (STEM) college at a western public research university. I develop and implement programs related to undergraduate student retention, recruitment, and academic advising with my staff. I am an appropriate person to do this research on the diffusion of the BIOS program at public research universities because in 2013, I developed and implemented the pilot intensive academic boot camp modeled after the LSU BIOS program at my institution. I also served as a resource to some colleagues at my institution who also eventually led the development and implementation of an intensive academic boot camp for their units.

Furthermore, I have led the continued evolution and modification of the program. For instance, our college’s intensive academic boot camp program began with only targeting new freshmen who were Biology and Neuroscience majors; it has now grown to include all 14 of our college’s undergraduate academic majors. Additionally, though the intensive academic-orientation boot camp began as an optional program for new freshmen, participation is now required for all incoming freshmen with declared majors offered by the college.
Summary

This multiple comparative case study explored why and how the LSU BIOS program was diffused and adopted by five public universities, discovered how the program coordinators/directors understood the LSU BIOS program, explored how they developed and implemented their programs, and identified their program’s critical components. A review of relevant program documents and program websites was conducted, information from an on-line survey completed by the program coordinators/directors was collected, and a follow up semi-structured phone interview with each program coordinator/director was completed. Data were analyzed to describe each case, examine similarities and differences between cases, and to develop a model for why and how the LSU BIOS program was successfully diffused, adopted, and adapted at the selected institutions.
CHAPTER IV - RESULTS

The purpose of this study was to examine why and how an academic-orientation innovation was diffused and adopted at five different public research universities. The innovation under study was the Louisiana State University (LSU) Biology Intensive Orientation for Students (BIOS) program. Specifically, this study explored how the program coordinators/directors at the five universities understood the LSU BIOS program, how they understood the adoption, development, and adaptations of the innovation at their institutions, and what each perceived as the critical components of the innovation. This chapter is divided into six sections. The first five sections describe how LSU BIOS was implemented at each of the five institutions. The sixth section consists of a comparison among the five cases and the original innovation.

Case Study University A

The Biology Bootcamp was designed as a five-day intensive program to prepare incoming freshmen enrolled in BISC 160 (Introductory Biology for Science Majors) and the corresponding lab for what was expected in their first year of college by providing information, resources, and tools necessary for success. Students who were required to complete BISC 160 included majors in biology and pharmacy, as well as students who planned to pursue medical school or dental school. At the time of the study, the Biology Bootcamp director was a lecturer in the biology department, had served as the instructor and course administrator for BISC 160 for 15 years, and oversaw the Health Professions Advising Office.

Several driving forces were identified as contributing to the establishment of the Biology Bootcamp. Survey results indicated that orientation for students and improving
course completion rates were very important, followed by improving overall retention, retention in the discipline, and improving GPA. Interviews with the Biology Bootcamp director revealed that there had been a general concern with the number of students who received D or F grades or withdrew (i.e., DFW) from BISC 160. The idea was for students to learn early in their postsecondary experience whether they were genuinely interested in pursuing a STEM major. Indeed, the Biology Bootcamp director indicated that in her role as instructor and advisor, she had encountered many freshmen who wanted to be doctors, some who had an interest in science, and others who were not interested in science. Biology Bootcamp was created to encourage students who thoroughly enjoyed science, as well as help students who did not enjoy science, to make that discovery prior to starting their freshman year in college.

Biology Bootcamp was established at a time when specific people were in key roles at the university. The Biology department chair had expressed an interest in the LSU BIOS program, based upon what he had learned at a professional meeting. The lecturer who eventually became the director of the Biology Bootcamp, learned of the LSU BIOS from the department chair and felt the program could address the DFW concerns for BISC 160. Because the Biology Bootcamp director had attended Cornell University for graduate school at the same time as the Wischusens (the designers of the LSU BIOS), she felt very comfortable contacting the Wischusens in Fall 2011 for specific information. She also attended the Gulf Coast Summer Institute workshop, which was directed by Bill Wischusen, the following July 2012.

The actual planning for the Biology Bootcamp began in Fall 2011 when the director designed a program with a budget. Because of the complexity of an academic
boot camp that would be implemented one week prior to the beginning of the fall semester, several other key players were included in the planning. Academic faculty in the biology department, staff from the Financial Aid and Residence Life/Housing Offices, and current students were identified as having very important roles during the initial planning phase. Staff from the Office of Admissions and Orientation had an important role.

There were some challenges in planning for the Biology Bootcamp, largely because the university was experiencing a period of growth with limited space and resources that were being stretched. Additionally, taking on the planning and implementation of Biology Bootcamp was an extra task for the director; she had a 12-month contract and did not receive additional compensation nor a reduction in her existing administrative load to plan and implement the program. Three years after the initial implementation, the director transitioned into a nine-month instructional faculty position, which allowed her to receive a month of summer salary to manage the program.

The Biology Bootcamp program was first offered in August 2012. Only freshmen who enrolled in BISC 160 and its laboratory could participate in the Biology Bootcamp. Because the program could not be offered to the approximately 800 students enrolled in BISC 160, a selection process was developed. Applications were available during and after the regular orientation sessions held in the summer for all freshmen. Freshman orientation sessions started at the end of May and ran through the first week of July. To ensure that all students had the opportunity to apply to Biology Bootcamp, the first 12 students who applied from each freshman orientation session were given priority; other students were placed on a wait list. In 2012, all 87 students who applied were accepted.
into the program; in 2013, the number of students was 74. The number grew to 96 in 2014. There were close to 200 applicants in 2015 and close to 300 applicants for 2016; the director selected 100 participants for 2015 and 147 participants for 2016 to create a diverse participant cohort that was more representative of the freshmen class. Because there were more applicants than participants in 2015 and 2016, it was possible to create control groups to study program effectiveness.

A program fee of $350 per participant ensured that Biology Bootcamp would be self-sustaining. Need-based scholarships were made available for students whose Free Application for Federal Student Aid (FAFSA) demonstrated a financial need. The biology department provided the scholarship funding for biology majors. For non-biology majors, the director contacted the various departments for funding; no records were kept regarding the sources of funding for non-biology majors. The program fee included the costs of the textbook and on-line textbook access for BISC 160 and the corresponding lab, a student response clicker, all scheduled activities, a Biology Bootcamp t-shirt, and the opportunity to move into their residence hall room early. On-campus meal plans were available for an additional cost of approximately $50.

At the time of the study, Biology Bootcamp took place one week prior to the start of the fall semester. The program included the following activities:

- student and parent orientation/introduction session
- eight biology content lectures delivered by BISC160 faculty
- three exams
- four peer-mentor study sessions
- one lab experience in biology
• four supplemental instruction sessions
• session with academic advisors and health-professions-advising-office advisors
• ice-cream social
• boot camp program completion ceremony

The program utilized current undergraduate students to serve as peer mentors, many of whom had participated in Biology Bootcamp themselves; each peer mentor was assigned to a group of participants. The size of the assigned groups was larger when the program first started; with improved recruitment of peer mentors and increased emphasis on the role of peer mentors, at the time of data collection, there were six participants in each group led by a peer mentor. Lectures focused on specific course content. Assessments included instruments comparable to those that would be used in participants’ fall course(s) (e.g. tests, on-line quizzes, homework, etc); faculty directly responsible for the course taught the lectures and the program was infused with study skills training.

At the time of the study, the Biology Bootcamp staff consisted of the program director, three biology faculty who delivered the lectures, another biology staff member who was involved with program scheduling and coordinating the lab experiences, and peer mentors. All of the staff were compensated for their respective roles. Although the program was and is self-funded, the biology department provided some initial start-up funding.

Student survey/evaluation forms and quantitative measurements, such as GPA, retention rates, etc. were used to evaluate the program. Survey data revealed that there have been two significant outcomes for the program. The first outcome was that students
were knowledgeable about available resources as a result of participating in the Biology Bootcamp program. Second, students understood and recognized that they needed to use those resources to be successful.

Since Biology Bootcamp was established, a new dean and department chair have been appointed. Although they are both very supportive of the Biology Bootcamp program, there is a possibility it could be discontinued. The director recently developed a new Biology parachute course called BISC 150, designed to target students enrolled in BISC 160 who earned 50% or less on the first exam. The new BISC 150 would use the same textbook and cover the same content as BISC 160, but focus on critical-thinking skills in the context of Biology principles. Students would keep and use the on-line homework assignments already completed for BISC 160 and stay enrolled in the BISC 161 lab course; according to the director, most students have been successful. The new BISC 150 would count as science general education credits, which would benefit students who decided to change their major out of the life sciences. For students who decided they want to stay in the life sciences and were required to complete BISC 160, the BISC 150 course would serve as preparation for BISC 160. At the time of the study, the biology department had approved the BISC 150 course and, based feedback from the dean, the director anticipated that the university committee would also approve it. If approved, the director would teach the BISC 150 course, which would accommodate more students than the Biology Bootcamp program. The addition of this course would also mean that students would not have to pay to participate in a separate program prior to the start of the fall term nor would there be a need for the director to have to invest extensive time with program planning and coordination.
Case Study University B

The Biology Intensive Orientation Session (BIOS) bootcamp program was designed for incoming freshmen enrolled in BIO 311C (Introductory Biology I). According to the website, the program was designed to provide participants “with the tactics to tackle college biology, insight into the expectations of college professors, and also opportunities to network with your peers and to meet faculty”. With as many as 20% of students unable to successfully complete the intense and challenging BIO 311C course, the BIOS focused on helping students gain the necessary skills to excel in biology. At the time of the study, the BIOS bootcamp program coordinator was a distinguished senior lecturer in the biological science department of molecular biosciences in the College of Natural Sciences.

University B is a highly selective institution for undergraduate admissions and at the time of the study, it was difficult to be admitted into the College of Natural Sciences, which houses the School of Biological Sciences. Interviews with the program coordinator revealed that many of their biological science students entered the university with the singular goal of becoming physicians. Majors required to complete BIO 311C included: biology, chemistry, biochemistry, nutrition, human ecology, some engineering majors. Survey results indicated that improving retention, along with increasing collaboration and teamwork, were very important reasons for implementing BIOS. Orientation for students, improving course-completion rates, and improving GPA were also identified as important reasons for developing the program. Interview data revealed a more nuanced understanding of the purpose behind adopting the program. Students were reported to
lack an understanding of the field of biology, resulting in feeling overwhelmed with the science courses.

The BIOS bootcamp program coordinator first learned about the LSU BIOS program while attending a biology leadership conference in mid-2000s and was intrigued that research and evaluation were being conducted on the LSU BIOS program. Upon returning from the conference, she shared information about the program with department colleagues. However, the actual discussion to adopt and implement the program did not occur until several years later in Spring 2012. The timing of adoption and implementation at University B coincided with their two-year curriculum revision process for their introductory biology courses. As part of that process, the (future) BIOS bootcamp coordinator and her colleagues had regular bi-weekly meetings that included plans for integrating active learning and tutorials for the courses. It was during this planning process that BIOS was thought to be an appropriate platform for the curricular revisions.

University B’s BIOS bootcamp program coordinator attended a workshop in June 2012 led by the Wischusens on how they started the LSU BIOS program. This workshop was described as very helpful with planning and implementing the program at University B just a few months later. Although the coordinator did not go to LSU to observe their BIOS program before implementing the program at University B, she communicated extensively with the Wischusens during the planning process. Survey results indicated that the academic advisors had important roles during the initial planning phase. The dean of the college, academic faculty, orientation office/program, tutoring/skills center, residence life/housing, classroom scheduling, and current students had somewhat important roles. The tutoring/skills center staff were somewhat important in the initial
planning process of the program; in the first year of the program, the tutoring/skills-center staff provided presentations. Although some of their materials continued to be used, the tutoring/skills-center staff were no longer involved with the program at the time of this study.

One of the challenges they faced was identifying when to hold the program in relation to the start of the fall semester. Ultimately, the availability of on-campus university housing determined that the program would be offered the week before the start of the fall semester. This way, participants who had on-campus residence-hall assignments were able to move into their residence hall rooms for the duration of the program without incurring expensive housing costs; furthermore, all program participants were able to easily transition into the start of the fall semester. It must be noted, however, that the students had to arrange for their own housing; there was no coordination between University B’s BIOS program coordinator and the residence life staff about specific students.

The program was first offered in August 2012. The goal was to have 50 participants the first year. When 70 participants registered, they accepted all of them. Subsequent to its first offering, the program has averaged 100 participants.

Although the dean of the college and the department chair were supportive of offering the program, no financial support was provided by the college or the department. To ensure the program would be self-sustaining, a $250 fee registration fee was established, with an additional $50 late registration fee. There were need-based fee waivers available for students who were eligible for a Pell Grant. However, it was not a
complete fee waiver; students were required to pay a $50 fee. The registration fee included the following materials:

- program cost
- biology course packet
- iClicker
- lunch and refreshments daily
- dinner on the final day of the program

Participants were responsible for breakfast and dinner on all days other than the final day of the program. They also were responsible to pay for their housing in the residence halls during the program.

At the time of the study, the four-day-long BIOS bootcamp took place one week prior to the start of the fall semester. The program included the following activities:

- student and parent orientation/introduction session
- six biology content lectures delivered by BIO 311C faculty
- four learning strategy sessions led by the BIO 311C faculty
- six team study sessions led by graduate teaching assistants
- three exams
- session on how to make connections in biology led by the faculty
- a lab experience in biology
- group project and presentation
- lunch with all of the fall BIO 311C faculty
- session on undergraduate research opportunities
- session on career and health-professions coaching
- panel discussion with current students on how to be a successful freshman

Students were divided into small groups during the program based on their fall course(s); faculty directly responsible for the course were involved. The idea was that small groups of students aid in building a cohort and a sense of community in a large college at a large university with a large number of students taking science courses. Lectures focused on specific course content; assessments included instruments comparable to those that would be used in participants’ fall course(s) (e.g. tests, projects, homework, etc.); faculty directly responsible for the course were involved; and the program was infused with study skills training. The program did not use a textbook; participants were provided with material developed by the faculty. Homework was not assigned. The BIOS bootcamp program coordinator described their program model as being “a simpler model” than the LSU BIOS because of limited resources.

The BIOS bootcamp program staff consisted of the program coordinator, along with two additional biology faculty, who delivered the lectures and presented at the learning strategy sessions. An introductory biology lab instructor oversaw the lab experiences during the program; graduate-teaching assistants served as group leaders, facilitated team study sessions, and led review sessions for exams. All of the staff were compensated for their participation. Current undergraduate students were utilized for an undergraduate panel discussion (not compensated) on how to be successful freshman.

After the first year, the dean encouraged the expansion of the BIOS bootcamp program to other departments in the college. The dean invested in publicizing and marketing the program during the summer orientation sessions and in recruiting
participants. Moreover, the dean delegated an individual in his office to provide some logistics help, such as in developing an on-line registration system and scheduling rooms. The college-wide support continued for two years. Although three departments, chemistry, math, and computer science, offered the program during the two years of college-wide support, they abandoned the effort when college-wide support was no longer provided; they also had difficulty finding instructors; and there was a sense that the effort was too complicated without additional support. The department of molecular biosciences has continued to offer the program; the coordinator reported that students get really excited during the program, feel that the program is worthwhile, and report on evaluations that they are glad they participated.

Student survey/evaluation forms and quantitative measurements, such as GPA, retention rates, etc. were used to evaluate the program. Survey data revealed that there have been three significant outcomes of their program. The first outcome was that participants formed study groups that persisted into the fall semester. Second, participants indicated they felt more prepared for the fall semester as a result of participating in the program. The third significant outcome of the program was that participants earned a slightly higher grade in the BIO 311C course in the fall semester than non-participants.

**Case Study University C**

The Science, Technology, Engineering, and Mathematics (STEM) Boot Camp was designed as a six-day residential program for incoming freshmen with a major in the sciences, mathematics, or engineering to accomplish the following: (a) to provide new freshmen an idea of what to expect during their first semester of college; (b) inform
students about undergraduate research opportunities; (c) increase retention of STEM majors; and (d) increase the four-year graduation rate of STEM students. The STEM Boot Camp was an outreach initiative of an existing STEM Accelerator Program. The STEM Accelerator Program was established by the College of Science as an effort to increase undergraduate retention and graduation in STEM disciplines. The STEM Accelerator program included the following initiatives: (a) increase the number of STEM majors; (b) improve the retention rates of STEM students; (c) reduce the time to graduation; and (d) help STEM graduates find employment or continue their education.

At the time of the study, the STEM Boot Camp coordinator was an assistant professor in biology and was also involved with the college’s STEM Accelerator Program. The STEM Boot Camp coordinator discovered the LSU BIOS program in Spring 2012 while conducting some on-line research on retention initiatives; she participated in a webinar about the program. Her interest in adopting the LSU BIOS program was because she felt it was a different approach to preparing new freshmen students for success. First, it focused on academics, exposed students to course content, and provided students the experience of taking exams. Second, the LSU BIOS program addressed the social aspect of freshmen getting to know one another prior to the fall semester. Many of the introductory classes at University C were very large, so it was challenging for new freshmen to get to know other students in their courses.

In June 2012, a few months after participating in the BIOS webinar, she attended the LSU BIOS workshop led by the Wischusens on how they started the LSU BIOS program. Materials were provided to help workshop participants create and implement a similar program at their institutions. Interviews with the STEM Boot Camp coordinator
revealed that upon returning from the BIOS workshop in June 2012, she spoke to the
director of the STEM Accelerator Program at the time and he was immediately
supportive of offering the program.

The STEM Accelerator Program director asked the STEM Boot Camp
coordinator to lead the creation and implementation of the program at University C for
the following summer. Beginning in Fall 2012, she followed the guidelines and
information provided by the Wischusens and contacted the various offices (e.g., housing,
room reservations, and catering) on campus to set up the program. Adoption and
implementation of the LSU BIOS program were widely supported by the college,
academic departments, and faculty. The Provost’s Office provided institutional grant
funding for the program.

Survey data indicated that the involvement of the admissions office and classroom
scheduling were very important. The admissions office provided information on all
admitted students who intended to matriculate at University C. Staff of the classroom
scheduling office secured all of the necessary rooms for the program. The involvement of
the tutoring/skills center and current students was also important.

The first STEM Boot Camp was offered in August 2013, about a month before
the start of the fall term because that was the last opportunity the residence life/housing
office allowed residential programs and camps to be held. The first year, the effort was a
Biology Boot Camp program for new freshmen biology majors only. Biology was
reported as one of the largest majors at University C with over 1500 students. There were
23 participants for the Biology Boot Camp and the program followed the LSU BIOS
program’s schedule very closely. Along with two other biology faculty members, the
STEM Boot Camp coordinator delivered the biology content lectures. They hired upperclassmen to serve as counselors during the Biology Boot Camp program. The coordinator was pleasantly surprised the first year of the program how seriously the participants took the program, how they invested the time and energy to do the work, and how they studied together while living in the residence hall because participation in the program was not counted towards a grade nor did the participants earn course credit.

In 2014, the year following the Biology Boot Camp, the STEM Accelerator Program welcomed a new director who wanted to expand the program to include all STEM majors (thus the name change to STEM Boot Camp). This included students with majors in the College of Science and the College of Engineering. Although many of the engineering and math majors had done very well in their calculus course in high school, it was observed that many of the students had no idea what they were doing in the Calculus I course offered during the STEM Boot Camp; they could not explain why they were doing a certain step, nor explain how they got their answers. As a result, in 2015, a two and a half day math boot camp program was created as an addendum to and conducted just prior to the STEM Boot Camp.

A program fee of $600 per participant covered the cost of the textbook, meals, and on-campus housing. At the time of the study, the STEM Boot Camp took place one month prior to the start of the fall term. The program included the following activities:

- parent orientation session
- seven content lectures
- two exams and a comprehensive final exam
sessions on learning styles, time management, study skills, preparing for exams, and career preparation

- group study sessions
- discussions on exam results

The available course content during the program were Calculus I, General Chemistry, and Cellular Biology. The participant’s major determined which course content the student had during the program.

At the time of the study, the STEM Boot Camp staff consisted of the program coordinator; faculty instructors from biology, math, and chemistry; and graduate and undergraduate students, who led review sessions and served as learning assistants. All faculty instructors, graduate students, and undergraduate students were compensated. In addition, meals and housing were provided for the graduate and undergraduate students. Lectures focused on specific course content; assessment included instruments comparable to those that would be used in participants’ fall course(s) (e.g. tests, projects, homework, etc); faculty directly responsible for the course were involved; and the program was infused with study skills training. However, it was not important for students to be divided into small groups during the program, based on their fall course(s).

Since the inception in 2013, one of the challenges for the STEM Boot Camp has been student recruitment. The College of Science typically admitted over 700 students each fall and all were notified about the STEM Boot Camp by the program’s coordinator. The goal was to have 80 participants, but that goal has never been achieved. In 2014, there were 51 participants; the program averaged 60 participants in subsequent years.
Furthermore, more than half the participants have been freshmen from the College of Engineering.

Despite not meeting the program’s enrollment goals, the College of Science and the STEM Accelerator Program continued to offer the STEM Boot Camp for several reasons. First, the STEM Boot Camp program coordinator has observed how students have been transformed by the experience. She described students who were extremely shy on the first day at the meet and greet event were totally different people by the end of the program. Second, students reported on evaluations that the experience was positive. Finally, data for the 2013 participants showed participants doing extremely well compared to the control group of students who did not participate; more of the participants were being retained in their major and their GPAs were much better than the control group. The students who changed majors from biology stayed in STEM majors.

Student survey or evaluation forms, interview/focus groups, and quantitative measures (e.g., GPA, retention rates, etc.) were used to evaluate the program. Survey data revealed two significant outcomes of their program. First, STEM Boot Camp participants were more aware of the expectations of being a STEM major. Second, students who participated in the math boot camp program passed the math placement exam and as a result, were able to enroll in a college-level math course in the fall term.

During the interview, the STEM Boot Camp coordinator offered ideas for the future. Based on exit survey results, students want a lab experience during the STEM Boot Camp program. She is communicating with the course coordinator for cell biology and for chemistry to see what labs could be done during the STEM Boot Camp. She also anticipates that including a lab experience will probably require adding a day to their
program, but she believes that students would benefit from that experience. She also identified the need to include transfer students in their STEM Boot Camp program. There is a large local community college that is a feeder school to University C. According to the STEM Boot Camp coordinator, they have found that many of their transfer students are underprepared and have other obligations, so they are often not successful in their courses at University C.

**Case Study University D**

The Science Intensive Orientation for Students (ScIOS) program was designed as a five-day intensive academic program for new freshmen, intended to help students make the transition to college. There are two tracks within ScIOS: Biology Intensive Orientation for Students (BIOS) was established for new freshmen enrolled in BIOL 101 (Biological Principles I); Chemistry Intensive Orientation for Students (ChemIOS) was established for new freshmen enrolled in CHEM 111 (General Chemistry I); both courses were offered for the fall term. At the time of the study, the ScIOS director was the associate dean for undergraduate STEM education in the College of Arts and Sciences and a faculty member in the biology department.

The ScIOS director was hired as a new associate dean in August 2013 to specifically focus on STEM education issues in the college. Having been in administrative roles for many years and to “get up to speed” on the latest in teaching science, he attended a number of professional meetings throughout Fall 2013 to learn about current best practices and trends in undergraduate science teaching and retention. This was considered important because the biology department was described as somewhat “traditional” in that faculty generally gave lectures without much creative
thought to teaching methods. Rather than trying to invent something new, LSU BIOS appealed to him.

Survey results indicated that improving retention in the discipline was very important for developing ScIOS, followed by improving overall retention, course completion rates, and GPA. Interviews with the director revealed a concern with the number of students who received D or F grades in biology and chemistry courses or students who withdrew, which led to many students changing their major out of the sciences. In fact, he described that some faculty members felt it was their responsibility to “weed out those people who weren’t up to it and get them to change their major to something else”. He believed that the ScIOS program had the potential to “rescue a lot of science majors before they even get started” because the program allowed students to experience what the rigors and expectations of college courses were like. He viewed this program as a more extensive orientation focused on academics and also an opportunity to reinforce information about campus resources introduced during the university-wide summer-orientation program.

The ScIOS director attended a professional meeting in November 2013 where he participated in a workshop presented by Bill Wischusen about LSU BIOS. He decided during the workshop that LSU BIOS was a good idea for the following reasons: (a) the data LSU had on the results of their BIOS program; (b) the longevity of LSU BIOS; and (c) the program was a model that could be replicated. Moreover, he felt the Wischusens were very open and willing to help him replicate the program at University D. The Wischusens provided him with a thumb drive that contained materials and resources to help set up the program. By December 2013, with the approval and support from the
college dean, he made the decision to adopt and offer the program starting in August 2014.

As a new administrator and new faculty member at University D, it was very important that he had the college dean’s approval and support to offer the program. The greatest challenge adopting the program at University D for the ScIOS director was the initial program planning logistics. Since he was new to University D, he did not have established contacts in the departments and offices on campus. Once he identified the appropriate individuals in each area, he consulted with staff in those offices to get information and advice during the planning process.

He contacted and worked closely with staff of various offices on campus who played important roles in the planning process; these included the enrollment/registrar and financial-aid offices. He also discovered that marketing the ScIOS program during the summer-orientation sessions was effective because he had a table at all of the resource-fair events held during every summer orientation session where he met students and their families and directly marketed the program. The residence-life/housing office also had a very important role during the planning process to allow participants to move into their residence-hall rooms early for the ScIOS program.

In August 2014, the first year of the program, a biology-course-content track was offered. The ScIOS director ran the program and recruited an assistant professor from the biology department to teach all of the lectures and write and grade the exams because the director felt that it would be too much work for him to do everything in the classroom as well as oversee the program. In the first two years of the program, he sent a postcard to every student whose intended major required the course content that was being offered in
the ScIOS program. There were 36 participants for the first year. With the success of the program the first year, he decided to expand the program to include a chemistry-course-content track. Students who were enrolled in both BIOL 101 and CHEM 111 for the fall term were allowed to self-select their course-content track. He found that more students chose the chemistry track for two reasons. First, there were more students who were required to take CHEM 111 for their majors (e.g., engineering). Second, biology majors indicated they felt more comfortable with biology content and were more concerned about chemistry, so they chose the CHEM 111 track. The second year of the program had roughly the same number of participants as the first year.

During the third year of the program (August 2016), there was an increase in the number of participants to almost 60 students. He attributed the increase of participants to increased marketing of the program. He had purchased a half-page advertisement in the summer-orientation-program magazine that every student received. He also sent a PowerPoint slide and a printed flyer marketing the ScIOS program to the colleges at University D whose programs require either the BIOL 101 and/or CHEM 111 courses.

As a new associate dean and faculty member, he was in a unique position to adopt and implement the program because he was not given any teaching assignments and had been given a three-year start-up package, which he used to fund the ScIOS program, which operated at a net loss from the fees only. The total cost of the program was $33,000 and the program was subsidized by about $10,000 through his start up package. Without the subsidy, the cost of the program would be $650 per student; however, he felt that $450 was a more reasonable and attractive fee that students would be willing to pay. Students were required to pay a non-refundable $100 deposit at the time of registration.
The program fee included all meals, the required textbook for either BIOL 101 or CHEM 111, and an iClicker2. Program participants had the opportunity to move into their assigned residence hall room early to use for the duration of the program for an additional housing fee of $80. There were a limited number of grants for students who had demonstrated financial need; the criteria for determining financial need was set by the university and students had to have a complete FAFSA on file.

At the time of the study, SciOS took place one week prior to the start of the fall semester. The program included the following activities:

- student and parent orientation/introduction session
- seven content lectures delivered by faculty
- three exams
- review sessions to prepare for each exam
- exam-results-discussion sessions
- research presentations by faculty in the department
- tours of department research labs
- two learning-strategies sessions
- group-work and study sessions
- pre-medical student-orientation session

Lectures focused on specific course content; assessment included instruments comparable to those that would be used in participants’ fall course(s) (e.g. tests, projects, homework, etc); faculty directly responsible for the course were involved; and the program was infused with study-skills training. Although participants were divided into small groups, SciOS did not emphasize the use of small groups. At the time of data collection, the
program utilized three undergraduate student mentors who led group work and study sessions, a faculty member from biology, and a faculty member from chemistry. The faculty members who taught in the program and the undergraduate student mentors were compensated for their participation. The ScIOS director already received a summer salary as an administrator, so he did not receive any additional compensation for running the program. Staff members from campus offices, such as the student-success center, undergraduate research, health and wellness, student integrity, and the career center presented information during the program.

Student survey/evaluation forms and quantitative measurements, such as GPA, retention rates, etc. were used to evaluate the program. Although improved student performance and retention in the major have been significant outcomes of the program, the sustainability and continued operation of the program is in question. The director’s start-up funding has now run out, so he will not be able to continue to subsidize the program. The college also now has a new dean, so it is unclear whether the college will want to support it as a college-wide initiative.

**Case Study University E**

The Biology Intensive Orientation [institution] Experience (BIOME) was designed as a six-day residential intensive academic program to increase academic success for new freshman students majoring in the Biological Sciences. Students were required to be enrolled in BIO 1500, Introduction to Biological Systems (with laboratory), for the fall term and be part of a living-learning environment program called the Freshman Interest Group (FIG) program. Students who participated in a FIG program lived on the same floor of a residence hall and were co-enrolled in three courses and a
pro-seminar for the fall term. Each FIG had up to 20 participants and there were typically two FIGs affiliated with BIOME. At the time of the study, the BIOME program coordinator was the Coordinator of Student Services for the Division of Biological Sciences who had been in that role for 12 years.

There were several conditions that led to the creation of the BIOME program. Survey results indicated that improving overall retention, retention in the discipline, and GPA, along with providing networking opportunities for students and introducing research opportunities earlier were very important reasons for developing and implementing the program. Furthermore, orientation for students and improving course completion rates were also important reasons for developing the program. It must be noted that interviews with the program coordinator revealed that the BIO 1500 course did not face the same DFW issue as other institutions.

The Coordinator of Student Services, who was the BIOME program coordinator, enjoyed autonomy in her role and was always looking for ideas that were different, fun, and energetic. During the Spring 2013 term, the dean of the college shared a journal article featuring the LSU BIOS program and indicated he thought she might find it interesting. Upon reading the article, she was “instantly intrigued” and subsequently reviewed all available documents and articles related to the LSU BIOS program. She knew that as long as the program was self-sufficient, the program could be implemented because the dean already thought the program was a good idea; she had also received approval from the department chair. She contacted Sheri Wischusen to ask questions about the program and received an invitation to participate in the LSU BIOS workshop in
June 2013; at the workshop, she received a binder with additional materials to aid in planning the program.

The planning for the BIOME program continued through the Fall 2013 term. Survey results indicated that the academic faculty and academic advisor involvement were very important during the initial planning process. She described the academic faculty were immediately supportive of the program.

The greatest challenge she faced occurred soon after she started the planning process. She had to wait for nearly six months for the staff of the FIG program and residential life/housing to agree to a partnership with BIOME. It was only then that actual planning could begin. Staff of the classroom scheduling office were important because they secured and reserved all of the classrooms on campus used for the program.

External funding for BIOME was sought during the planning process for the first year. The BIOME program coordinator wrote and received a small grant to fund the program. She also contacted Kaplan, Inc., who provided supplies and covered the cost for producing and copying the manuals distributed to participants. The graduate office paid the stipends for the four graduate students who ran the labs for the program participants and a science vendor provided the supplies to do the labs. The dean also provided some funding to cover students with demonstrated financial need.

The program was first offered in August 2014 with two FIGs; 20 students in each FIG. Due to the University’s tremendous growth in enrollment during the second year of the program, four BIOME FIGs were offered. With the decrease in enrollment after the second year of the program, two BIOME FIGs were offered in subsequent years.
For the program to be self-sustaining, participants paid a program fee of $225, which covered the cost of food, housing, all textbooks including a copy of *The Immortal Life of Henrietta Lacks*, and lab supplies. Need-based scholarships were available for students whose FAFSA demonstrated financial need; students also submitted a 500-word essay that explained how or why a degree in biology aided or contributed to their career aspirations.

The program included the following activities:

- parent-orientation/information session
- four biology-content lectures and four chemistry-content lectures delivered by faculty
- a quiz and an exam in both content areas
- review of quiz and exam results sessions led by the faculty
- research presentations by faculty in the department
- tours of department research labs
- a lab experience in both biology and in chemistry
- book-reading discussion on *The Immortal Life of Henrietta Lacks*
- attend faculty instructors’ office hours
- faculty and campus resource-networking dinner
- session on how to get involved in undergraduate research led by the faculty member in charge of the honors undergraduate research program
- sessions on successful study strategies and how to network led by the academic advisors
Lectures focused on specific course content; assessment included instruments comparable to those that would be used in participants’ fall course(s) (e.g. tests, projects, homework, etc.); faculty directly responsible for the course were involved; and the program was infused with study-skills training. Participants were divided into small groups for research-lab tours and for office-hour visits.

The role of the FIG program for BIOME was very important because all BIOME participants were co-enrolled in three classes together for the fall term, lived on the same floor of the same residence hall, and continued to meet once a week in a pro-seminar with a faculty mentor who was part of the BIOME program. The Program Assistants (PAs), who were hired by the FIG program and assigned to a specific FIG community, escorted the participants who belonged in their FIG to certain events during BIOME, such as their first lecture and research-lab tours. The PAs also led small-group discussions on the assigned book, attended all research presentations and held study sessions in the residential hall in the evenings. The BIOME FIG PAs were biology upperclassmen who lived on the same floor as the FIG students. Additionally, faculty members who were assigned as mentors to the BIOME FIGs participated in the networking dinner and other activities to get to know the participants prior to the start of the fall term.

At the time of this study, BIOME staff consisted of the program coordinator, the academic advisors, a faculty member from biology and another from chemistry to deliver the lectures, and four graduate students who ran the lab experiences. The academic advisors were given compensatory time off for their involvement in the program. The biology and chemistry faculty and the graduate students were compensated for their participation.
Student-survey/evaluation forms and quantitative measurements, such as GPA, retention rates, etc. were used to evaluate the program. Survey data revealed that significant outcomes of the BIOME program included higher grade-point averages and higher retention rates for participants compared to non-participants. Additionally, faculty reported that program participants were actively engaged in their classes during the fall term, attended faculty office hours regularly, networked with faculty and staff, actively sought out and engaged in undergraduate research, and formed study groups.

**Cross-Case Analysis**

Table 1 provides an overview of program information for LSU BIOS and all adopted cases and includes the following information: program length; timing of when the program was offered in relation to the start of the fall term; the average number of participants; the program cost to the participant; whether financial support was available for participants; whether living in on-campus housing was required for participants; whether a parent session was offered; and the number of years the program has been offered. At the time of the study, the innovation, LSU BIOS, was a six-day intensive program. One adopted program was also six days in length, three programs were five days in length, and one program was four days in length. The LSU BIOS took place three weeks prior to the start of their fall term. Four adopted programs were held one week prior to the start of their fall term and one adopted program was held one month prior. On average, LSU BIOS had 300 participants. One adopted program averaged 40 participants, two programs averaged 60 participants, and two programs averaged 100 participants. The LSU BIOS program had a fee of $350 per participant and offered a limited number of scholarships. One adopted program’s fee was $225, two adopted programs were $300,
one adopted program was $450, and one adopted program was $600; all but one of the cases offered need-based financial support to participants. The LSU BIOS did not require participants to live in the residence halls, but offered an on-campus housing option for an additional fee. Three adopted programs offered on-campus living accommodations for an additional fee. Two adopted programs required living in the residence halls as part of their program. The LSU BIOS held a session specifically for parents as part of their program. All but one of the adopted programs offered a parent session. As the original innovation, LSU BIOS had been offered for 12 years. Two of the programs had been in existence for three years, one adopted program for four years, and two adopted programs for five years.

Table 1

Program Information Overview

<table>
<thead>
<tr>
<th>Case</th>
<th>Program Length of time</th>
<th>Timing of program</th>
<th>Avg. # of participants</th>
<th>Program fee</th>
<th>Financial support</th>
<th>Residential program</th>
<th>Parent session</th>
<th># Years program offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSU</td>
<td>6 days</td>
<td>3 weeks</td>
<td>300</td>
<td>$350</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>12 years</td>
</tr>
<tr>
<td>A</td>
<td>5 days</td>
<td>1 week</td>
<td>100</td>
<td>$300</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>5 years</td>
</tr>
<tr>
<td>B</td>
<td>4 days</td>
<td>1 week</td>
<td>100</td>
<td>$300</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>5 years</td>
</tr>
<tr>
<td>C</td>
<td>6 days</td>
<td>1 month</td>
<td>60</td>
<td>$600</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>4 years</td>
</tr>
<tr>
<td>D</td>
<td>5 days</td>
<td>1 week</td>
<td>60</td>
<td>$450</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>3 years</td>
</tr>
<tr>
<td>E</td>
<td>5 days</td>
<td>1 week</td>
<td>40</td>
<td>$225</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Note. Timing of program is in relation to the start of the fall term. Program fee is the cost to the participant. Financial support refers to whether fee waivers or scholarships are provided for participants. Residential program refers to whether participants must live in an on-campus residence hall as part of the boot camp program.

Table 2 provides information about the rate of adoption of the boot camp program at each institution, the professional roles of the program coordinators/directors at their respective institutions, the organization or department that offered the boot camp program, and the eligibility criteria for participants. Two adopted programs had rates of
adoption that were less than a year, the rate of adoption at another two adopted programs was a year, and one adopted program was five years in the making. The LSU BIOS had two co-directors who operated the program; one was a biology faculty member and the other was an administrator in the college dean’s office. All cases in the study had one program coordinator/director. Three were academic faculty; one held a dual role of serving as an administrator in the college and as a faculty member in the biology department, and another was a staff member responsible for student services, including academic advising in an academic department. The LSU BIOS had both an academic department and a college involved in offering the program. Three of the adopted programs were offered by an academic department and two adopted programs were offered by the college. The LSU BIOS required participants to be incoming new freshmen and enrolled in BIOL 1201. All adopted programs required participants to be new freshmen. Three adopted programs required participants to be enrolled in specific courses for the fall term. One adopted program required that students had a declared STEM major with enrollment in either Calculus I, General Chemistry, or Cellular Biology and one adopted program required students to be biological sciences majors participating in their FIG program and enrolled in BIO 1500.
Table 2

Program Background Information

<table>
<thead>
<tr>
<th>Case</th>
<th>Rate of adoption</th>
<th>Role of program coordinator/director</th>
<th>Organizational involvement</th>
<th>Eligible program participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSU</td>
<td>N/A</td>
<td>Academic faculty &amp; College administrator</td>
<td>Academic department &amp; College</td>
<td>Enrolled in BIOL 1201</td>
</tr>
<tr>
<td>A</td>
<td>&lt;1 year</td>
<td>Academic faculty</td>
<td>Academic department</td>
<td>Enrolled in BISC 160 Enrolled in BIO 311C</td>
</tr>
<tr>
<td>B</td>
<td>5 years</td>
<td>Academic faculty</td>
<td>Academic department</td>
<td>All STEM majors enrolled in either Calculus I, General Chemistry, or Cellular Biology</td>
</tr>
<tr>
<td>C</td>
<td>1 year</td>
<td>Academic faculty</td>
<td>College</td>
<td>Enrolled in either BIOL 101 or CHEM 111 Biological Sciences major, FIG participant, and enrolled in BIO 1500</td>
</tr>
<tr>
<td>D</td>
<td>&lt;1 year</td>
<td>Administrator/academic faculty</td>
<td>College</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1 year</td>
<td>Student Services staff</td>
<td>Academic department</td>
<td></td>
</tr>
</tbody>
</table>

Note. Rate of adoption is the amount of time between first learning about LSU BIOS to offering their program. All eligible program participants had to be new freshmen.

The LSU BIOS identified the five following components as being critical to their program:

1. Content focused on a specific course(s)
2. Assessment of instruments comparable to those that will be used in participants’ fall course(s) (e.g. tests, projects, homework, etc)
3. Students are divided into small groups during the program, based on their fall course(s)
4. Program is infused with study-skills training
5. Involvement of faculty directly responsible for the course

Table 3 provides information on how each case rated the level of importance for each LSU BIOS critical component in their boot camp program. All cases rated program content focused on a specific course(s), including assessment of instruments comparable
to what would be used in their fall course, infusing study-skills training, and involving faculty directly responsible for the course as either very important or important. Three programs rated dividing students into small groups during the program, based on their fall course(s) as being very important; one program indicated it was somewhat important; and one program indicated it was not important.

Table 3

*LSU BIOS Critical Components*

<table>
<thead>
<tr>
<th>Case</th>
<th>Course content</th>
<th>Assessment instruments</th>
<th>Student small groups</th>
<th>Study skills training</th>
<th>Faculty involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
</tr>
<tr>
<td>B</td>
<td>I</td>
<td>I</td>
<td>VI</td>
<td>I</td>
<td>VI</td>
</tr>
<tr>
<td>C</td>
<td>VI</td>
<td>I</td>
<td>NI</td>
<td>VI</td>
<td>VI</td>
</tr>
<tr>
<td>D</td>
<td>VI</td>
<td>I</td>
<td>SI</td>
<td>VI</td>
<td>I</td>
</tr>
<tr>
<td>E</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
</tr>
</tbody>
</table>

*Note.* VI = very important; I = important; SI = somewhat important; NI = not important

Table 4 provides an overview of the reasons LSU BIOS was adopted at each institution. Each program coordinator/director rated the level of importance for the following five reasons:

1. Orientation for students

2. Improve overall retention

3. Improve retention in the discipline

4. Improve course completion rates

5. Improve GPA

All cases rated all of the abovementioned reasons for adopting LSU BIOS at their institutions as either very important or important.
Table 4

*Reasons for Adopting LSU BIOS*

<table>
<thead>
<tr>
<th>Case</th>
<th>Orientation for students</th>
<th>Improve overall retention</th>
<th>Improve retention in discipline</th>
<th>Improve course completion rates</th>
<th>Improve GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VI</td>
<td>I</td>
<td>I</td>
<td>VI</td>
<td>I</td>
</tr>
<tr>
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<td>I</td>
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<td>C</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
</tr>
<tr>
<td>D</td>
<td>SI</td>
<td>I</td>
<td>I</td>
<td>VI</td>
<td>I</td>
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<td>E</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
</tr>
</tbody>
</table>

*Note.* VI = very important; I = important; SI = somewhat important

**Summary**

Results from the program document review, on-line surveys, and telephone interviews revealed similarities and differences among the cases. Although there were differences in program length, timing, number of participants, and programs fees, overall all five adopted programs reflected high fidelity to LSU BIOS. All programs were directly connected to specific, challenging coursework taken during the first semester of the freshman year. All involved academic faculty who taught the identified course.

In addition to adopting the innovation with relative fidelity, all of the coordinators/directors interviewed indicated that their versions of LSU BIOS either addressed a problem or enhanced an existing effort. It must be noted, however, that both problems and enhancements related to the same issue: retention of students in STEM fields of study. Lastly, interviews revealed that all of the program coordinators/directors experienced the Wischusens’ willingness to share information about LSU BIOS and answer questions during the planning and implementation process. The next chapter will discuss the findings in light of Rogers’ (2003) diffusion of innovation theory and suggest
a model to explain why and how LSU BIOS was diffused and adopted at the five institutions.
CHAPTER V - DISCUSSION

The purpose of this multiple comparative case study was to examine why and how an innovation, the Louisiana State University’s Biology Intensive Orientation for Students (BIOS) program, was diffused and adopted at five public research institutions. The research questions that guided this study included:

1. How was the LSU BIOS program adopted and adapted at each institution?
2. How did the program coordinators/directors make meaning of LSU BIOS in relation to their institution and programs?
3. How did the respective program coordinators/directors understand the development and implementation of their programs?
4. What did each program coordinator/director perceive as the critical components of their respective programs?

This chapter is divided into four sections. The first section is a discussion of the key findings of the study. The second section describes the sustainability for innovation, which is followed by the implications for practice in the third section. The fourth section identifies recommendations for future research and the fifth section is the conclusion of the study.

Key Findings

A diffusion of innovation occurs when “an innovation is communicated through certain channels over time amongst the members of a social system” (Rogers, 2003, p. 11). Findings from this multiple comparative case study illustrated that the innovation under study, the LSU BIOS program, was diffused with relative fidelity to all five institutions. The general characteristics of the innovation that were deemed to be
important by the original innovators were replicated. Specifically, the following activities and/or characteristics were identified as critical and were in evidence:

- An anchor course that was perceived to be a “gateway” (i.e., challenging and required for academic progress) class to the major or required for professional school;
- Use of actual exams and other assessments;
- A smaller supportive learning environment;
- The infusion of study-skills training;
- The involvement of faculty responsible for teaching the course.

Additional similarities included:

- Emphasis on using campus resources;
- Opportunities to connect with peers and with faculty;
- Use of current graduate or undergraduate students as mentors or tutors;
- A student-and-parent orientation/introductory session on the first day of the program;
- A closing ceremony or celebratory meal.

In all five cases, the issues of retention and student academic success during the first-semester transition from high school to the university, as well as a general lack of understanding among new freshmen regarding what college-level science courses entailed were identified as concerns. For all of the cases, the observation that the LSU BIOS program had been evaluated and demonstrated to be a success was a determining factor in adopting the program. As such, the innovation appeared to simultaneously meet
an acknowledged need and to have credibility among the individuals who adopted the effort. These similarities were consistent with Rogers’ (2003) concepts of both compatibility and relative advantage.

The diffusion of LSU BIOS provided the opportunity for new freshmen interested in STEM majors or introductory and foundational STEM-course content early to increase their likelihood for success. According to Conley (2005), students who failed “an entry-level college course because they lack[ed] the prerequisite skill” (p. 114) often decided to avoid pursuing a major in that area. Adoption of LSU BIOS at the five institutions was intended to give a larger number of students the opportunity to learn how to be successful in STEM courses to avoid failing, but it also gave them the knowledge and opportunity to determine whether a STEM discipline was what they wanted to pursue. In essence, diffusion of LSU BIOS dispelled many inaccurate assumptions and notions held by incoming freshmen about their preparedness for success in college.

In all cases, logistics was identified as a major obstacle and complex challenge. Resolving logistical issues could not be accomplished within the academic departments or college responsible for implementing their boot camp programs. To overcome the challenges of housing, meals, space, payment, etc., coordination had to occur with offices of residence life/housing, financial aid, classroom scheduling, tutoring/skills center, and cashier/bursar. In some ways, this finding was inconsistent with Rogers’ (2003) contention that innovation must be perceived as relatively easy to understand and to use. In all cases, the coordinators/directors had a conceptual understanding of the intent of BIOS, but implementation in all cases was highly complex and required a great deal of
coordination. Despite the complexity, all five boot camps were adopted and continue to operate.

Beyond Roger’s (2003) specific innovation attributes, there appeared to be other factors that may explain how and why BIOS was diffused with such fidelity in these five cases. Two notable factors identified in this study were the roles and relationships among key individuals. Rogers described three key roles in the process of diffusion of innovation: the change agent, the champion, and opinion leaders. In this study, the Wischusens were the change agents because they introduced the original innovation and were influential in the innovation-decision process for each of the adopters. Moreover, similar to Rogers’ (2003) findings, they possessed “a high degree of expertise regarding the innovation being diffused” (Rogers, 2003, p. 368), which was illustrated by their role in creating and implementing LSU BIOS and based on their extensive experience running the program. All of the boot camp program coordinators/directors in this study served as innovation champions; each advocated for and actively contributed to the successful adoption of the innovation in their organizations. The opinion leaders in this study were the individuals in leadership roles, such as the academic department chair or dean of an academic college, because their roles allowed them to exert their influence in their social systems to support the innovation. Each of the individuals in his or her respective role was essential in the adoption and implementation.

The relationships among the individuals, change agent, champion, and opinion leader, in these roles were also key. The Wischusens (change agents) did not simply write a manual that could be followed. Rather, they provided the how-to knowledge; that is, the information required to use an innovation properly. According to all of the program
coordinators/directors in this study, the Wischusens’ on-going willingness to provide materials, resources, and guidelines with detailed information about LSU BIOS and to answer all of their questions were critical in their decision-making process to adopt the program and to the subsequent successful adoption at their respective institutions. Three of the five program coordinators/directors (champions) participated in an intensive in-depth boot camp planning workshop led by the Wischusens and hosted by Pearson Education Corporation. This finding supported Rogers’ (2003) assertion that effort by the change agent must be made to support clients to ensure the success of the adoption of the innovation by the clients.

Rogers (2003) further argued that “change agents’ success in securing the adoption of innovations by clients is positively related to the extent he or she works through opinion leaders” (p. 388). This was not the case in the diffusion and adoption represented in this study. Namely, the opinion leaders in this study had no direct communication with the Wischusens nor did they have a relationship with the Wischusens during the decision-making or the adoption process. Rather, it was the program coordinators/directors (champions) who had regular communication and a working relationship with the Wischusens which supported their decision-making, adoption, and implementation processes. Durlak and DuPre (2008) also argued that it was the program champions who played a critical role in adopting an innovation through the entire diffusion process from adoption to sustainability.

In contrast, the relationship between the champion (coordinator/director) and the opinion leader (department chair or dean) and the opinion leader’s support within the institution were critical components. In all cases at the time the decision was made to
adopt the innovation, it was observed that there was an established and positive relationship between the champion (program coordinator/director) and the opinion leader (the department chair or dean). Furthermore, there was support for the adoption and implementation of the program from the opinion leaders. Indeed, the department chair/dean was highly supportive of the adoption.

Findings from this study suggest a model for the successful diffusion and adoption of an innovation. Figure 2 provides an illustration of a proposed BIOS Innovation Adoption Model. First, there must be a catalyst (e.g., challenge or opportunity) identified by the potential adopters that could be addressed or solved by the innovation. Second, there must be a change agent whose knowledge and experience with the innovation makes him or her credible; the change agent must be willing to share time, experiences, and information with the adopters. Next, there must be a champion, who is committed to working on the successful adoption of the innovation, as well as an opinion leader, who is supportive of the innovation and its adoption at the institution.

**Figure 2. BIOS Innovation Adoption Model**
The three key players of the model cannot exist in isolation. Findings from this study suggest that it is essential that there be an on-going relationship between the change agent and the champion during the diffusion and adoption process. Furthermore, the working relationship between the opinion leader and champion must be positive and established. See Figure 3.

**Figure 3. Relationships among the BIOS Innovation Adoption Model**

Sustainability of the Innovation

Findings from this comparative case study revealed that diffusion and adoption of the LSU BIOS did not guarantee sustainability. It appeared that the catalyst itself contributed to the sustainability of the innovation for the organization. For example, the primary reason for adopting LSU BIOS at all institutions was to address a perceived or identified problem, such as the DFWs or low retention. When a less complex or less costly solution was identified, as in Case A, sustainability of the innovation faced a higher likelihood for being discontinued. Specifically, a course was developed to address the DFW concern. In addition to being less complex and costly, the new solution would be available to a larger number of students.
Availability of time, money, and people were also challenges to sustainability. Implementation of all of the boot camp programs was described as costly. All of these programs were expected to be financially self-sufficient and all program coordinators/directors wanted to keep the program costs low to make it more affordable for students. In fact, several program coordinators/directors pursued opportunities for institutional or outside funding to help reduce some of the program costs. When funding was in jeopardy, sustainability was questioned. For example, in Case B the college dean initially encouraged the expansion of BIOS to other departments by providing logistical and marketing support. Once the dean’s support ended, the departments other than the molecular biosciences department discontinued offering their boot camp programs, citing the logistical challenges and time required to offer the program.

Case D offers an example of loss of financial support complicated by a change in the relationship between the champion and opinion leader. The director used his own start-up funds to support the program; when they were exhausted, no new source of funding was identified. In addition, with the departure of the original opinion leader, the college’s dean, it was unclear whether the new college dean would want to support the innovation as a college-wide initiative.

**Implications for Practice**

It is not uncommon to recognize an innovation as novel and important. When a problem or concern is recognized or identified, it is critical to make sure that the problem is actually addressed by the innovation under consideration. As such, it is important to identify the concern or need before considering the adoption of an innovation. Both the champion and the opinion leader must recognize that there is a need or concern
and agree that the innovation being considered can indeed impact the identified need or concern. Findings from this study highlight the role that context played in the adoption of the innovation. At its foundation, fidelity of adoption was contextually determined; each institution had a recognized concern for which LSU BIOS offered a solution.

An innovation, in and of itself, cannot address a problem. Roles and relationships are critical to successful adoption of an innovation. Reading material or reviewing information about an innovation with the intent to adopt is different from establishing and developing the necessary relationships to adopt an innovation with fidelity; it is the relationships that provide rich context and perspective. Relationships between the change agent and champion, along with the relationships between the champion and the opinion leader must be considered in the successful diffusion and adoption of an innovation.

The findings of this study offer administrators in higher education insights regarding the diffusion and adoption of an innovation. Given the conservative nature of higher education, its hesitancy to change, and its wariness to adopt innovations, this study highlights the importance of roles and relationships of key players and the significance of identifying innovation attributes when considering an innovation adoption. By taking these factors into consideration, both leaders and practitioners can increase the likelihood of successful innovation diffusion and adoption.

**Recommendations for Future Research**

The goal of this study was to understand why and how an innovation intended to address retention and student success was successfully diffused and adopted. Recommendations for further research are identified below:

- Compare the outcomes of the programs included in this study.
• Compare the adoption and adaptation of this innovation in other settings (e.g. institution type, size, and geographic location).

• Compare the outcomes of the programs in other settings.

• Explore and study unsuccessful BIOS adoptions or discontinued sites to determine what factors contributed to the innovation rejection or discontinuation.

• Explore and study sites who had expressed an interest in adopting BIOS, but did not follow through on adoption and implementation.

Conclusions

The goal of this study was to develop a model for how and why the LSU BIOS innovation was diffused and adopted at the five institutions included in this study. Among the cases included in this study, there was relative fidelity in the adoption of BIOS. Findings also supported the presence of specific innovation attributes identified by Rogers (2003). Roles and relationships were found to be necessary to ensure a successful adoption of the innovation. Lastly, adoption of an innovation does not guarantee sustainability. A proposed model was created to describe the adoption process. The key elements of the model and the presence of specific roles included the following: a catalyst (e.g., challenge or opportunity) identified by the adopters; an innovation with the presence of specific attributes identified by Rogers (2003); a credible, knowledgeable, and experienced change agent; a champion committed to working on the successful adoption of the innovation; and an opinion leader supportive of the innovation adoption.

The model identifies the need for a catalyst that the innovation directly addresses. Indeed, the innovation being considered for adoption must be perceived to positively impact the catalyst. Relationships among the champion and the change agent, as well as
opinion leader and champion, are essential. Namely, there must be a change agent who is willing to share their knowledge and information about the innovation, thereby cultivating a positive relationship with the champion. The champion must also have a positive working relationship with the opinion leader, who must be supportive of the innovation and its adoption. Innovation adoption can be vulnerable to discontinuation when a less complex or costly solution is discovered or if there is a change in opinion leadership.
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Appendix A

On-line Survey

Intensive Academic Orientation Program Survey

Survey Introduction

This survey is intended to gather background information about your program and to identify programmatic elements you believe are critical to planning and implementing a successful academic intensive program for new freshmen. This on-line survey should about 15 minutes to complete.

By completing this brief survey, you will be contributing to the best practices for this unique program. This information can serve as a resource for you and for others who are interested in modifying or improving their existing programs or are interested in creating and implementing a similar program at their institution.
Intensive Academic Orientation Program Survey

Program Background

1. In relation to the start of the fall semester, when does your intensive academic program for new freshmen take place?
   - 1 week prior
   - 2 weeks prior
   - 3 weeks prior
   - Month prior
   Other (please specify)

2. What is the LENGTH OF TIME for your program?
   - 3 days
   - 4 days
   - 5 days
   - 6 days
   Other (please specify)

3. How many YEARS has the program been offered?
4. Please indicate the level of importance of the following reasons for developing and implementing an intensive academic program at your institution.

<table>
<thead>
<tr>
<th>Reason</th>
<th>VERY IMPORTANT</th>
<th>IMPORTANT</th>
<th>SOMewhat IMPORTANT</th>
<th>NOT IMPORTANT</th>
</tr>
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<tbody>
<tr>
<td>Orientation for students</td>
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<td></td>
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<tr>
<td>Improve overall retention</td>
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<tr>
<td>Improve retention in the discipline</td>
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<tr>
<td>Improve course completion rates</td>
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<tr>
<td>Improve GPA</td>
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<tr>
<td>Other (please specify)</td>
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</table>
5. During the INITIAL PLANNING PROCESS for implementing your program, please indicate the level of importance related to the INVOLVEMENT of the following stakeholder roles.

<table>
<thead>
<tr>
<th>Role</th>
<th>VERY IMPORTANT</th>
<th>IMPORTANT</th>
<th>SOMEWHAT IMPORTANT</th>
<th>NOT IMPORTANT</th>
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<tr>
<td>Provost</td>
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<td>Dean of the college/Academic Dean</td>
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<tr>
<td>Academic Faculty</td>
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<tr>
<td>Academic Advisors</td>
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<tr>
<td>Orientation Office/Program</td>
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<tr>
<td>Tutoring/Skills Center</td>
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<tr>
<td>Enrollment/Registrar Office</td>
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<td>Financial Aid Office</td>
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<tr>
<td>Cashier/Bursar Office</td>
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<tr>
<td>Residence Life/Housing</td>
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<tr>
<td>Classroom Scheduling</td>
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<tr>
<td>Current Students</td>
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<tr>
<td>Other (please specify)</td>
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</table>
Intensive Academic Orientation Program Survey

Program Components

12. The BIOS program at LSU has identified the following program components to be critical for their program. Please indicate the level of importance these are for your program.

<table>
<thead>
<tr>
<th>Component</th>
<th>Very Important</th>
<th>Important</th>
<th>Somewhat Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content focused on a specific course(s)</td>
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<tr>
<td>Assessment of instruments comparable to those that will be used in participants’ fall course(s) (e.g. tests, projects, homework, etc)</td>
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<tr>
<td>Students are divided into small groups during the program, based on their fall course(s)</td>
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<tr>
<td>Program is infused with study skills training</td>
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</table>

13. Please indicate any additional CRITICAL COMPONENTS utilized in your program.
Appendix B

IRB Approval

DATE: October 27, 2016
TO: Janet Usinger, Ph.D.
FROM: University of Nevada, Reno Institutional Review Board (IRB)

PROJECT TITLE: [978011-1] How an Intensive Academic Orientation Program was Adopted and Adapted: A Comparative Multiple Case Study
REFERENCE #: Social Behavioral
SUBMISSION TYPE: New Project
ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: October 27, 2016
REVIEW CATEGORY: Exemption Category # 2

The Research Integrity Office, or the IRB reviewed this project and has determined it is EXEMPT FROM IRB REVIEW according to federal regulations. Please note, the federal government has identified certain categories of research involving human subjects that qualify for exemption from federal regulations.

Only the Research Integrity Office and the IRB have been given authority by the University to make a determination that a study is exempt from federal regulations. The above-referenced protocol was reviewed and the research deemed eligible to proceed in accordance with the requirements of the Code of Federal Regulations on the Protection of Human Subjects (45 CFR 46.101 paragraphs [b]).

Reviewed Documents

- Advertisement - Recruitment E-mail (UPDATED: 10/24/2016)
- Application Form - Exempt 2 Application (UPDATED: 10/24/2016)
- Consent Form - Information Sheet (UPDATED: 10/24/2016)
- Questionnaire/Survey - Survey (UPDATED: 10/24/2016)
- University of Nevada, Reno - Part I, Cover Sheet - University of Nevada, Reno - Part I, Cover Sheet (UPDATED: 10/24/2016)

If you have any questions, please contact Valerie Smith at 775.327.2370 or at valeries@unr.edu.

NOTE for VA Researchers: You are not approved to begin this research until you receive an approval letter from the VASHC Associate Chief of Staff for Research stating that your research has been approved by the Research and Development Committee.

Sincerely,

Richard Bjur, PhD
Co-Chair, UNR IRB
University of Nevada Reno

Janet Usinger, PhD
Co-Chair, UNR IRB
University of Nevada Reno
Appendix C

Email Script

Dear XXX,

Christina Cho, University of Nevada, Reno is conducting a research study on the adoption and adaption of the BIOS program. I am inviting you to participate in this comparative multiple case study because your program has been identified as one of five cases that was an early adoption and continues to operate in a research university context.

Participation in the study will include completing an on-line survey, participating in a follow up telephone interview, and sharing program related documents. The attached information sheet provides additional information about the study.

If you are interested in participating, please contact Christina Cho directly at cycho@unr.edu or 775-682-8790. Thank you for your consideration!

Sheri Wischusen
Appendix D

University of Nevada, Reno

Educational Research Information Sheet

<table>
<thead>
<tr>
<th>Title of Study:</th>
<th>How an Intensive Academic Orientation Bootcamp was Adopted and Adapted: A Comparative Multiple Case Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator:</td>
<td>Janet Usinger, PhD, <a href="mailto:usingerj@unr.edu">usingerj@unr.edu</a>, 775-682-9083</td>
</tr>
<tr>
<td>Co-Investigator:</td>
<td>Christina Cho, MA <a href="mailto:cycho@unr.edu">cycho@unr.edu</a>, 775-682-8790</td>
</tr>
</tbody>
</table>

You are being invited to participate in a research study. The purpose of the study is to examine how and why Louisiana State University’s innovative Biology Intensive Orientation for Students (BIOS) program was adopted and adapted at your institution. We are asking you to be in this study because you are a program coordinator for the intensive academic orientation bootcamp program at your institution. We expect to enroll 5 participants, one for each case included in the study.

If you agree to be in this study, you will complete an on-line survey administered through SurveyMonkey; provide any relevant documents, such as curriculum, schedules, or evaluations; and participate in a telephone interview. The survey questions relate to program planning, implementation, and logistic details. The survey will take about 20 minutes to complete. Results from the survey will be used to craft specific follow up questions to be asked in a telephone interview that will last approximately 30 minutes. After a description of the case has been written, you will have the opportunity to review the case for accuracy as a form of member checking; this should take approximately 30 minutes. Your participation in this study is completely voluntary.

This study is considered minimal risk. No sensitive or personal questions will be asked. Although we cannot promise that you will benefit from being in this study, engaging in this research will give you an opportunity to reflect upon your professional practice.

We will treat your identity with professional standards of confidentiality and protect your private information to the extent allowed by law. We will do this by only allowing access to your study records to the researchers identified above and the University of Nevada, Reno Institutional Review Board. All data will be reported at the aggregate level and we will not use your name or other information that could identify you in any reports or publications that result from this study.

At any time, if you have questions about this study or wish to report an injury that may be related to your participation in this study, contact Janet Usinger, PhD, at 775-682-9083, or Christina Cho, MA, at 775-682-8790. You may discuss a problem or complaint or ask about your rights as a research participant by calling the University of Nevada, Reno Research Integrity Office at (775) 327-2368. You may also use the online Contact the Research Integrity Office form available from the Contact Us page of the University’s Research Integrity Office website at: http://www.unr.edu/research-integrity/contact-rio.