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The Influence of an Electronic Attendance Monitoring System on Undergraduate Academic Success

by

Charles Felix Childress, III

A Dissertation
Submitted to the Graduate School,
the College of Science and Technology
and the Department of Human Capital Development
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Approved by:

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ABSTRACT

Investing in human capital development increases education levels, workplace skills, and boost individual abilities. Undergraduate students who attend class and perform well are more likely to get jobs, due to their development of workplace skills. State governments, as the funding bodies for public universities, are finding it beneficial to increase the number of college graduates because a citizenry that is prepared for the job market is ultimately good for the state. States recognize that an increase in education can produce job opportunities for citizens. University administrators can employ tactics to increase graduation rates, one of which is monitoring students' class attendance.

This study uses a quasi-experimental design to analyze the influence of an electronic attendance monitoring system on undergraduate academic success. The researcher uses point-biserial and logistic regression to analyze archival data. Through this analysis of the current study, three findings were present: (a) an electronic attendance monitoring system increased academic success for students, (b) the presence of a positive relationship between electronic attendance monitoring and academic success, and (c) different literature-based demographics effect academic success of students depending on the course. Finally, the results show that attendance increases student academic success and implementing an electronic attendance monitoring system provides attendance accountability in the classroom.

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I realize that I am lucky! I have had the support and encouragement of many friends, family members, colleagues, mentors, students in the program, and undergraduate students at Southern Miss, even from those who did not fully understand what I was doing. Special thanks to my Mom, Dad, Katie, Martin, Johan, Uncle Jim, Aunt Phe, Uncle Steve, Aunt He, Ellen, and Lizzie thanks for all your support. Thank you to my many relatives for all your encouragement. Also, thanks to the many people in my life I consider close family without being blood related; you have truly made an impact on my life. Thanks to my grandparents (and others) for instilling pride, morals, and values in my life. While I name additional individuals, I also realize I will forget someone who has played a role in the completion of my degree. Please know that no matter your role, large or small, I am appreciative of your unending support.

The encouragement that everyone has shown me during the process has kept me focused on the project. As the saying goes, "Slow and steady wins the race." To my family, thank you for always trying to understand that this "little paper" meant so much and that the countless hours spent typing were not just playing games. To John Hubbard and Steve Ellis, THANK YOU! Your steadfast friendship and mentorship throughout this journey has meant the world to me. From the highest of highs to the lowest of lows, you were there for me and I will never forget it. To my other program colleagues, Donna, Robert, Deano, Steve, Ellie, Kristy, and Lisa, thanks for all the encouragement and friendship along the way. To the best class project partner, Tonya, thanks for always having just as much fun as I did, and for giving me another nickname, Chris.

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Now that the journey is complete, Let's Party!

DEDICATION

Throughout the journey to pursue my doctoral degree, I have had the support of many friends, family members, colleagues, mentors, students in the program, and undergraduate students I have worked with at Southern Miss. I have been fortunate to share the journey with many family and friends. I dedicate this research to my Mom and Dad, sister Katie, Brother-in-law Martin, and my family. Also, I want this research to affect all of my godchildren. Further, I dedicate my research study to anyone the research may affect in a positive way.

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CHAPTER I – INTRODUCTION

Students who enroll in a college or university make a personal decision to enhance their knowledge in a field of study (Pascarella & Terenzini, 1991; Robertson, Hurst, Williams, & Kieth, 2017). Simply stated, undergraduate students who attend class and perform well are more likely to get jobs following graduation due to their development of workplace skills. Multiple factors determine student academic success, including the personal level of engagement and the social support received (Mackinnon, 2012; Tinto, 1993, 1985, 2006). Nationally, only 60% of students who enroll as first-time, full-time freshmen complete a degree within six years of initial acceptance (U.S. Department of Education, National Center for Education Statistics, 2016). From another perspective, 40% of students who enter college do not complete a degree program (U.S. Department of Education, National Center for Education Statistics, 2016). This statistic offers an impetus for change. Universities across the country are attempting to create environments that focus on promoting academic success and skill building to increase student involvement, attendance, and academic success (Bailey & Morais, 2005). Implementing engagement-based initiatives has shown to provide the highest results to influence academic success of students (Fike & Fike, 2008; Tinto, 2006).

Research demonstrates a positive relationship between the frequency of class/lecture attendance and students' academic success (Moore, 2003). Crede, Roch, and Kieszczynka (2010) report that student attendance is a better indicator of academic success than standardized test scores or high school grade point averages. Additional research shows that students involved in lectures achieve higher grades than students who do not attend class regularly (Benzing & Christ, 1997; Bligh, 1998; Markham, Jone,

Hughes, & Sutcliffe, 1998). Students who regularly attend classes are able to connect with faculty (Kanfer & Ackerman, 1989). Specifically, Kanfer and Ackerman's (1989) research suggests that student engagement during the collegiate experience can change motivation levels of students, which tends to boost students' academic success rates.

The present study examines whether the use of an electronic attendance monitoring system impacts undergraduate student academic success. Additionally, this study is an expansion on previous research as it determines the influence of multiple literature-based demographic factors affecting attendance and academic success concurrently. Chapter I introduces the study and contains the background of the study, problem, purpose, research objectives, conceptual framework, significance, assumptions, and delimitations associated with the study. The chapter ends with a summary of presented materials. The background of the study provides information that describes the problem and purpose of the study.

Background of the Study

In 1990, Congress passed the Student Right-to-Know Act, requiring all colleges and universities eligible for federal funding to report graduation rates of students who begin each year together in a cohort (National Center for Education Statistics, 2017). Data originating from the National Center for Education Statistics (2017) highlights the problem of non-completion across the country. Many reasons exist to preclude someone from completing their degree program. One reason for non-completion is the lack of academic success in attempted courses (Noel, Levitz, & Saluri, 1985). Lack of attendance may cause low levels of academic success in the classroom (Romer, 1993).

Frequently, the lack of attendance points to the fact that attendance is not tracked in college classrooms (Dicle & Levendis, 2013; Newsom, 2016; O'Connor, 2010).

Recruitment and retention play a direct role in a university's enrollment (Noel et al., 1985). Recruitment of a prospective student begins as soon as the individual interacts with the college. Enrollment at a university begins when a prospective student registers for college classes after completing high school, attending junior or community college, or returning to college as a member of the workforce (Noel et al., 1985). Retention focuses on keeping students enrolled in university courses until degree completion so they can receive the necessary training and education for success in the workplace (Noel et al., 1985). Retaining students already connected to the institution is financially more feasible than attracting new students through recruitment efforts (Noel et al., 1985). By focusing on academic success, especially during the first year of enrollment, universities can positively impact retention and graduation rates (Fike & Fike, 2008; Tinto, 2006). Nationally, the retention rate for open-admission colleges and universities hovered around 62% for the fall 2014 cohort. This rate describes individuals who enrolled in the fall 2014 semester and returned to the same institution in the fall 2015 semester (National Center for Education Statistics, 2017).

Successful completion of courses plays a significant role in determining college student retention rates (Slanger, Berg, Fisk, & Hanson, 2015). Effective academic success strategies focus not only on academic endeavors but also on activities to promote student academic growth through interactions both within and outside of the classroom (Roberts & Styron, 2010). Attendance accounts for a 31% increase in academic performance (Romer, 1993). Student engagement and involvement in campus activities

affect academic success and student retention (Tinto, 1975, 2006). Specifically, colleges can support academic success by encouraging interactions that promote classroom attendance (Benzing & Christ, 1997; Bligh, 1998; Markham et al., 1998; Tinto, 1993). One way to encourage class attendance is by using an electronic attendance monitoring system.

Problem Statement

When students are successful in college courses, they develop workplace skills to help fill the current skills gap in the workforce (Kaplan, 2017). Ideally, undergraduate students complete their degree programs in a timely fashion, while developing workplace skills that contribute to the human capital needs of society (Blackwell, Bowes, Harvey, Hesketh, & Knight, 2001; Noel et al., 1985; Pascarella & Terenzini, 1991; Robertson et al., 2017). However, the reality is organizations, researchers, and policymakers believe employees' workplace skills fail to match the requirements and needs for existing jobs (Altonji, Blom, & Meghir, 2012; Handel, 2003; Swanson & Holton, 2009). One factor contributing to this skill gap is the low level of undergraduate degree completion (Altonji et al., 2012; Swanson & Holton, 2009). On a national level, four out of ten undergraduate college students leave college without graduating, establishing a skills gap in human capital needs in the workforce (National Center for Education Statistics, 2017; White House, Office of the Press Secretary, 2009). In the state of Mississippi, five out of ten undergraduate college students leave college without achieving their degrees (Institutions of Higher Learning Board, State of Mississippi, 2013). Generally, poor college student attendance is due to a lack of accountability, which enables a low rate of attendance, while also limiting interactions between faculty and students (Jones,

Crandall, Vogler, & Robinson, 2013). Automated accountability tools can improve attendance, resulting in increased interaction between faculty and students, greater academic success, and increased graduation rates (Borland & Howsen, 1998). When students fail to complete their degrees, thus failing to develop workplace skills, the resulting lack of a sustainable workforce impacts an organization or state's competitive advantage.

Statement of Purpose

The purpose of the present study is to determine the influence of an electronic attendance monitoring system on undergraduate student success. Specifically, this study assesses if an electronic attendance monitoring system affects student academic success. Low class or lecture attendance among undergraduate students remains an issue in the collegiate setting (Lopez-Bonilla & Lopez-Bonilla, 2015). Much of the limited research investigating the link between an electronic attendance monitoring system and student academic success examines only one demographic variable (eg. sex, ethnicity, age, or campus residency). The present study examines the connection of multiple demographic factors simultaneously, showing how an electronic attendance monitoring system influences undergraduate student success, regardless of other demographic factors.

Research Questions and Objectives

The following research question guides the present study. Does the electronic attendance monitoring system have an effect on student success when considering literature-based demographics? The following research objectives guide the study:

RO1 - Describe the literature-based undergraduate demographic factors, attendance rates, and academic success rates of the student sample.

RO2 - Compare academic success rates of students in the sections of courses using the electronic attendance monitoring system in the Spring 2015 Semester with the sections of courses that did not use the system.

RO3 - Determine the relationship between undergraduate attendance rates and academic success in courses using an electronic attendance monitoring system.

RO4 - Determine the relationship between the literature-based undergraduate demographic factors and attendance rates on student academic success in courses using an electronic attendance monitoring system.

Conceptual Framework

A conceptual framework, shown in Figure 1, provides a graphic illustration of theories, connections, ideas, and interactions supporting the objectives of the present study (C. Roberts, 2010). The present study focuses on two major areas affecting student academic success in at the university level: student development and human capital development. Rodgers (1990) defines student development as "the ways that a student grows, progresses, or increases developmental capabilities because of enrollment in an institution of higher education" (p. 27). While student development focuses on the educational environment, human capital development focuses on the improvement or performance of an individual, a team, or an organization through the development of knowledge, skills, and abilities (Swanson & Holton, 2009).

Student development in college is inseparable from the level of faculty-student interaction. Astin's (1975) Theory of Involvement contends that academic success is based on the quantity and quality of interactions between faculty and students. The involvement theory describes how student involvement, and interactions between faculty

and students during college, enhances cognitive and skill development, both of which improve effective learning. According to Astin (1984), "Student involvement equates to the amount of physical and psychological energy that the student devotes to the academic experience" (p. 297). Involvement in the college classroom environment translates to increased academic success, which serves as a significant source of skill development, learning and student development (Astin, 1984).

The development a student receives during a college education increases the human capital of society by building workplace skills that benefit the student later in life (Dychtwald, Erickson, & Morison, 2006). These workplace skills relate to three areas that pertain to human capital development: economic, psychological, and systems focused on improving undergraduate student attendance rates and academic success (Becker, 1993; Crede et al., 2010).

Figure 1 presents the conceptual framework for the present study, showing the interaction of the three core research areas: attendance, academic success, and attendance-based demographics. The conceptual framework shows the student point of entry and separates courses according to use of the electronic attendance monitoring system.

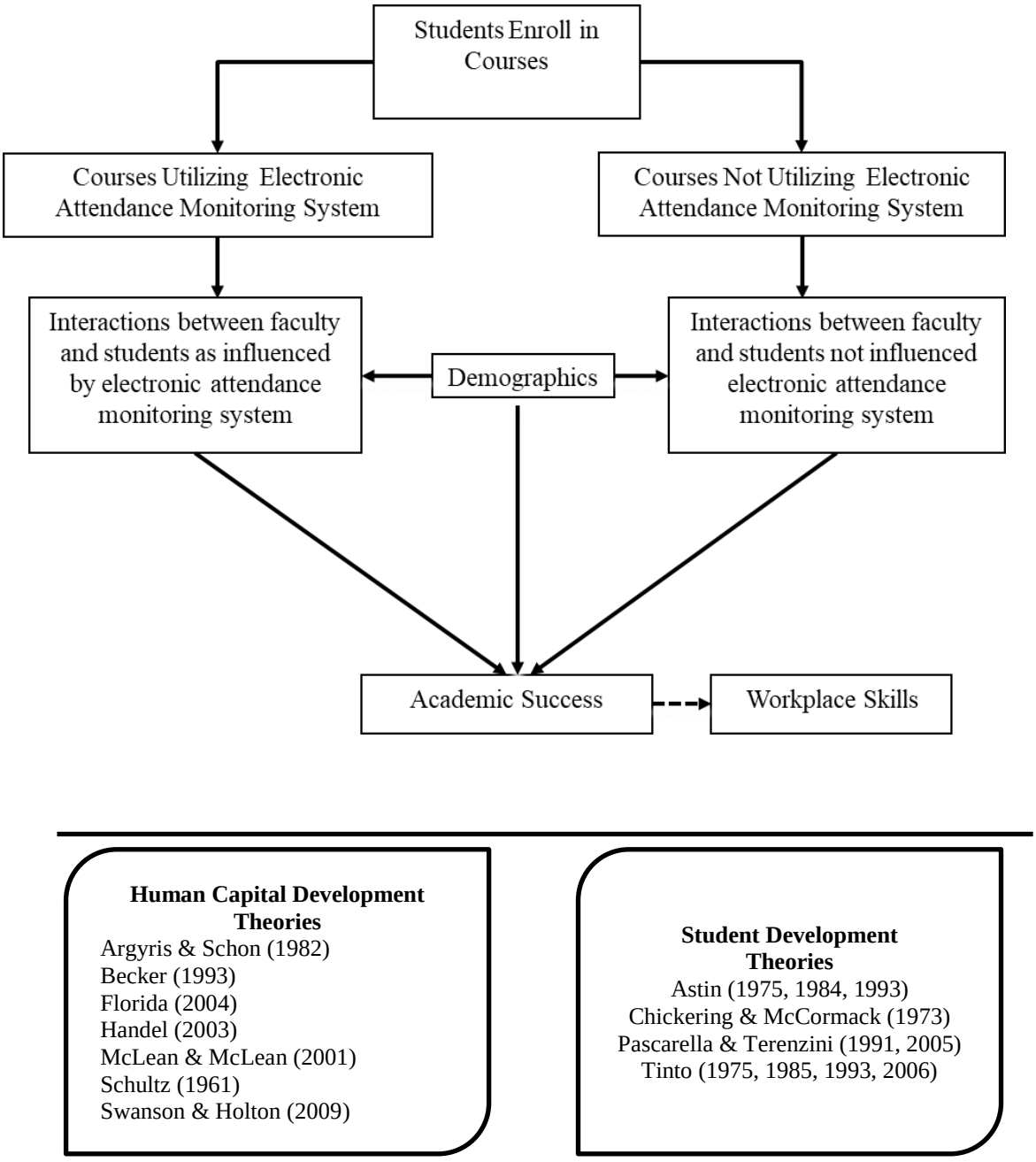

Figure 1. Conceptual Framework

Significance of the Study

The present study has relevance to three different audiences: the State, the university, and the individual. First, the study may identify factors to improve academic success throughout the state. According to the Education Commission of the States (2011), more than 71% of Mississippi's population did not have an education level equal to an Associate's Degree. Student academic success can increase by reducing barriers to persistence and increasing student retention levels. Improving undergraduate attendance and enabling student persistence can positively impact a state's education level leading to increased economic prosperity among its citizens (Adelman, 1999).

In Mississippi, consistent with trends across the nation, the system of funding state-sponsored colleges and universities has changed (SB 2851, 2013). In 2011, the Mississippi Legislature passed an Institutions of Higher Learning Appropriations Bill (SB 2851, 2013), to change the funding of universities to a performance-based allocation model (Institutions of Higher Learning Board, State of Mississippi, 2013). The new funding model links state-sponsored institutional funding to completed course credit hours, academic success, retention rates, and graduation rates (Institutions of Higher Learning Board, State of Mississippi, 2013). This new funding formula enacted a major change from earlier funding models, which focused on the total number of enrolled students (Institutions of Higher Learning Board, State of Mississippi, 2013). The revamped funding formula changed the focus for colleges and universities from attracting new students to promoting increased student academic success.

For the university, the present study seeks to determine the influence of an electronic attendance monitoring system on undergraduate student success. By affecting

undergraduate academic success through student retention, the university can expect to maintain or increase funding levels from the state (Institutions of Higher Learning Board, State of Mississippi, 2013).

From an individual perspective, on average those who have attained a bachelor's degree have a lower unemployment rate, earn $300 more each week than those who have not earned a bachelor's degree and develop workplace skills during their collegiate career (Altonji et al., 2012; Handel, 2003; National Center for Educational Statistics, 2005; Swanson & Holton, 2009). By analyzing data examining relationships between attendance, academic success, and literature-based demographics, the present study focuses on improving the collegiate atmosphere for individuals. Specifically, the present study fills a gap in the research because previous research has only focused on identifying one or two demographic traits at a time instead of looking at multiple traits simultaneously. By looking at multiple demographic factors at the same time, the opportunity exists to examine relationships between these demographics. Further, the university chosen for the present study has not previously conducted a similar study. Therefore, the university and similar institutions could use the findings to develop tactics to impact students' academic success based upon the outcomes of the data, or they could seek to duplicate the study at their site.

Definition of Terms

The present study contains the following terms aiding the reader throughout the document.

1. *Academic Success* – When a student achieves a grade of A, B, or C in a course taught at the university (The University of Southern Mississippi, 2014)

2. *Participating Classes* – The courses where faculty volunteered their class section(s) for the electronic attendance monitoring system (M. Arrington, personal communication, 2015)
3. *Non-participating Classes* – Comparison class sections of the courses taking part in the electronic attendance monitoring system (M. Arrington, personal communication, 2015)
4. *Electronic Attendance Monitoring System* – describes the actual attendance monitoring procedure, where a member of the university's Institutional Research Office was present to collect attendance data (Dicle & Levendis, 2013)

Assumptions of the Study

The four assumptions of the present study concentrate on the classroom experience between the participating classes that used the electronic attendance monitoring system and the non-participating classes. First, the researcher assumes all course sections are equally challenging, regardless of section or course material. The present study compares course sections that implemented an electronic attendance monitoring system to course sections that did not implement a monitoring system. If the faculty teaching the courses are not utilizing similar curriculums, an effect on the outcome would occur (Shadish, Cook, & Campbell, 2002). Second, the researcher assumes faculty members use the same grading criteria, including the grading scale and rigor of grading. The grading scale for the course sections should be similar; as having one faculty member use one grading scale and another use a different grading scale would impact the end-of-term course grades (Gump, 2006). Third, the researcher

assumes similarity of the physical classrooms for the students enrolled during the semester of the electronic attendance monitoring system. While the physical characteristics of classroom selection are out of the control of the researcher, different dynamics exist in a smaller classroom as opposed to a larger classroom regarding attendance (Gump, 2006). Last, the researcher assumes the quality of effort and teaching remains the same regardless of the faculty member tasked with course instruction. Faculty enthusiasm for teaching a course subject has been shown to impact students' choice of attendance (Longhurst, 1999).

Delimitations of the Study

Delimitations describe the selections made by the researcher, which set the constraints for the current research study (Roberts, 2010). The present study used archived data; therefore, those who implemented the actual program produced the delimitations. The population of students enrolled during the Spring 2015 Semester delimits those available for the sample. The Office of Institutional Research selected the courses in which to offer the opportunity to participate in the electronic attendance monitoring system (M. Arrington, personal communication, 2015). The system was implemented only in sections in which the faculty volunteered to participate (M. Arrington, personal communication, 2015). The volunteering of courses in this fashion delimits those available to be included in the sample.

Chapter Summary

The present study focuses on the premise that when student academic success is limited, students face barriers to achieving their degrees (Pascarella & Terenzini, 1991; Singell & Wadell, 2010). Undergraduate student attendance in collegiate classes,

specifically in the general education category, remains problematically low at institutions across the country (Moore, 2003; Noel et al., 1985; Singell & Wadell, 2010). University administrators continue to increase focus on academic success.

The present study seeks to determine the influence of an electronic attendance monitoring system on undergraduate student success in classes that historically have a low academic success rate. Additionally, the researcher examines multiple attendance-based demographics to examine relationships between these demographics, attendance rates, and academic success. Chapter II presents a literature review that focuses on providing a link between human capital development and student development. In Chapter III, this present study focuses on the research objectives, research design, data collection, and analysis. Chapter III discusses the research methods employed, using a quasi-experimental design using archival data. Analysis of these courses determines if a difference occurs in the Spring 2015 Semester in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

CHAPTER II – LITERATURE REVIEW

Literature reviews give the opportunity for the researcher to examine earlier research to support the present study (Roberts, 2010). The purpose of the present study is to determine the influence of an electronic attendance monitoring system on undergraduate student success. Chapter II includes a review of relevant literature regarding the areas of human capital development, student development, undergraduate student attendance and subsequent behavior changes, how these changes affect academic success, and undergraduate student demographic factors that affect attendance, and their connection to the electronic attendance monitoring system. Throughout the development of the literature review, the researcher conducted multiple searches to find pertinent material to support the present research study. Multiple literature searches are necessary so that the researcher can ensure that a robust network of sources helps shape the conceptual framework and research objectives (Roberts, 2010). The researcher used various web-based research sites such as Google Scholar and the University of Southern Mississippi online research library, as well as consulting with reference librarians at the University.

Defining Human Capital Development

Human capital development theory involves any program or intervention a person receives to enhance their skills and productivity, which, in turn, creates a positive impact both for the affiliated organization and for the individual (Smith, 1988). For example, an organization may have a program that encourages employees to achieve a higher level of education, including a bachelor's degree. By promoting an increased education attainment for employees, the organization allows the individual to interact with subject

matter experts in a setting that promotes innovation and skill development (Astin, 1975). The Bureau of Labor (2015) estimates that individuals who attain a bachelor's degree gross approximately one million dollars more in lifetime earnings than people who do not attain that degree. By pursuing additional education levels, individuals increase their academic and workplace skills development and affect their personal economic stability (Noel et al., 1985; Pascarella & Terenzini, 2005). From the employer perspective, having educated employees in the workplace helps to ensure the company stays competitive locally, regionally, and globally. Focusing on human capital development within higher education and increasing opportunities for training and career development can create employees who will position the organization for global competition (Swanson & Holton, 2009).

Not only does human capital development link closely with student development and academic success, student development is human capital development. In high-performing states, partnerships exist between the business sector and academic institutions (Praxis Strategy Group, 2010a). By linking business and academic partners, people can collaborate, fostering the opportunity for innovation and feedback to occur in terms of preparing citizens for industry needs (Praxis Strategy Group, 2010b). Governors and other government leaders search for ways to offer a competitive advantage for their state's citizens by providing workforce development and workplace skills training (Praxis Strategy Group, 2010b). In addition to providing a competitive advantage for the state or region, government officials know that human capital development remains one of the best ways to increase the wealth and to provide economic stability to individuals and takes a partnership that includes all stakeholders (Florida, 2004; Schultz, 1961). For

instance, California developed a higher education master plan in the 1960s to promote human capital development involving all education partners from the community college system to the elite universities (Praxis Strategy Group, 2010a). Apparently, the master plan was successful, as California has one of the more educated populations in the country (Praxis Strategy Group, 2010b).

When examining human capital development, three domains (psychological, economic, and systems) link human resource development with undergraduate student attendance, academic success, and student development (Swanson & Holton, 2009). These three domains also involve ethics and the relationship that exists with external and internal environments (Swanson & Holton, 2009). The psychological domain focuses on human behaviors that influence an organization (Swanson & Holton, 2009). The economic domain of human resource development relates to the sustainability of organizations by way of encouraging workplace skill development and succession planning (Rothwell, 2005; Swanson & Holton, 2009). The systems domain involves the relationships of organizations and how they assist or hinder the goals of their partnerships (Swanson & Holton, 2009). These three domains interact, giving a holistic human resource development approach for professionals in the industry (Swanson & Holton, 2009).

Psychological Domain

The psychological domain helps to explain the relationship between human capital development and student development. The psychological domain combines three areas of psychological study: Gestalt psychology, behavioral psychology, and cognitive psychology (Lee, 2007; Swanson, 1999). Gestalt, which in the German

language translates to organization and configuration, explains that employees provide contributions to influence the experience in a workplace setting in a holistic way (Lee, 2007; Olson & Hergenhahn, 2013; Swanson, 1999). Behavioral psychology speaks to the idea that people respond to different stimuli based upon their present capacity, experiences, and the various forces influencing them (Swanson & Holton, 2009). Cognitive psychology attempts to integrate the Gestalt and behavioral psychology subsets (Lee, 2007; Swanson, 1999). Cognitive psychology states that humans organize their lives by goals and around purposes (Tolman, 1948). The psychological domain of human capital development operates effectively when these three areas interact. Human capital development professionals may then work to clarify any goals of the organization and develop the knowledge and ability of individuals, owners, and leaders while considering the goals and behaviors of all participants (Lee, 2007; Swanson, 1999). The psychological aspect relates to the present research because, when initiating any new intervention, especially one that may affect the future, ensuring that everyone understands the human capital intervention is essential to the project's success (Fuller, 1997; Kolb & Kolb, 2005; Kotter, 2008; Russell, 2007). Further, the psychological domain supports undergraduate student attendance by stating that a holistic experience provides the best path for academic success and workplace skill development. Without the interactions created by being present in a classroom, a student misses the opportunity for development.

Economic Domain

The economic domain of human capital development relates to both organizations and the population. Becker (1993) emphasizes that everyone should view investments in

increasing human potential and productivity the same way as investments in traditional capital improvements. One such supporting theory for the economic domain, the scarce resource theory, states that everything has an economic significance to an organization or individual (Swanson, 1999). Scarce resource theory further explains that limitations exist for everything, which requires us to make hard choices as to how monetary expenditures provide the greatest return on investment. Further, when considering the scarce resource theory, organizations focus on the benefit that any investment has on the bottom line for the organization (Swanson & Gradous, 1986). For example, the environment limits raw materials; money limits organizations; and time limits humans. The scarce resource theory states that organizations need to be strategic in the use of capital to receive the highest return on investment and best impact on the organization (Swanson, 1999). Scarce resource theory also forces decision makers to prioritize initiatives, ensuring that each initiative has the appropriate impact they seek (Swanson & Holton, 2009).

The sustainable resource theory and scarce resource theory are similar, but have one major difference (Swanson & Gradous, 1986; Thurow, 1993). The sustainable resources theory focuses on long-term implementation of initiatives as opposed to the scarce resource theory, which focuses on short-term initiatives (Swanson & Gradous, 1986; Thurow, 1993). Sustainable resource theory focuses on using new processes and technologies to implement initiatives to be successful over extended periods of time (Swanson & Gradous, 1986; Thurow, 1993). For instance, finding talented and well-educated employees is essential for the long-term sustainability of organizations (Thurow, 1993). By promoting the further education of employees, organizations promote the holistic development of employee's skills through the interactions between

subject matter experts and employees, thus giving the organization a competitive advantage (Florida, 2004). The employee's skill based competitive advantage replaces the global competitive advantage that, in the past, centered on natural resources or capital funding (Swanson, 1999).

Systems Domain

The third foundation of human capital development lies with incorporating a holistic systematic approach to promote workplace skill development (Swanson, 1999). Systems theory allows for the implementation of an intervention designed to increase the skill development of individuals (Chalofsky, 1992; Swanson, 1999). For individuals seeking to further their education in an area, systems theory supports the development of opportunities for learning activities and idea sharing to focus on personal growth to build skills in individuals and aid in career development (Gilley & Eggland, 1989). Systems theory dictates the gathering and analysis of performance data to encourage a long-term focus on skill development and performance improvement (Gilley & Eggland, 1989; Swanson, 1999; Watkins, 2010). Essentially, systems theory states that people who want to learn more should do so and their employer or school should encourage that type of behavior.

Providing the opportunity for students to interact with faculty in the collegiate environment, while learning workplace skills, is a fundamental core function of the collegiate atmosphere. By involving the three foundation areas of human resource development, individuals can build an unbiased opinion on ways to improve the current climate in an organization or, in this case, the academic success rates in the college

classroom. Further, the literature shows the need to change behaviors associated with low classroom attendance which, by nature, increases the interactions with faculty.

Connecting Human Capital Development and Today's Higher Education

The exploration of human capital development has existed since the ancient Greeks began the first education process, which focused on interactions between teachers (faculty) and students to develop skills. As societies evolved and flourished, other cultures developed similar systems focused on educating their populace. Over time, these systems included monasteries, merchants, craft guilds, and apprenticeships leading to the development of public schools for training the population in basic skills. The interactions occurred because of the educational opportunities allowed individuals to develop skills. This is the basis of the education process.

Since the beginning of its existence, higher education sought to create an opportunity for students to explore intellectual curiosity through enrollment in a variety of courses, specifically, courses in the liberal arts discipline (Berrett, 2015; Sellingo, 2015). Conversely, today's culture sets expectations of job attainment for college graduates (Sellingo, 2015). On February 28, 1967, Ronald Reagan delivered a speech while serving as Governor of California, during a budget crisis in the state. This speech was centered on the need for higher education to shift away from intellectual discovery and toward educating citizens about skills needed for jobs (Berrett, 2015). From this point on, society began to reshape views of college, and cultural changes began to reinforce the need for more practical degrees, as opposed to exploration of the liberal arts (Berrett, 2015). With the change in educational philosophy, students became customers, and the higher education community transformed into a venue where students learn

workplace skills needed to become productive members of society (Berrett, 2015). Regardless of the change, the interactions between faculty and students continued to be important, to ensure the environment existed to promote learning and innovation. As the change in educational philosophy continued, so did the mechanisms for publicly funding state colleges and universities.

Public higher education institutions derive funding through a variety of financial sources, including tuition dollars, private giving, and state allocations. In 1978, Pfeffer and Salancik introduced the notion of resource dependency theory, which says that organizations depend on their internal and external environments for resources. Internal environments serve those within the university, while external environments, such as budgets and world affairs affect the university. Further, Pfeffer and Salancik (1978) explain that the organization's behavior responds to changes in environments. If a resource change occurs, then the entity must adapt to the changes, preventing the change from destabilizing the organization. To guarantee the survival of the institution, this adaptation to change must happen (Pfeffer & Salancik, 1978). For colleges and universities in Mississippi, the need to adapt to a change in external resources is paramount. In 2013, The Mississippi Institutions of Higher Learning Board—the external entity that directs funding—changed to a new funding model for colleges and universities which specifically distributes 85% of an institution's state funding based on students' academic success and graduation statistics (Institutions of Higher Learning Board, State of Mississippi, 2013). As such, colleges and universities in Mississippi must adapt to this change in their funding resource to prevent destabilization of their organizations.

Astin (1975) stated that a focus on academic success, by encouraging faculty and student interaction, promotes higher retention and graduation rates. At The University of Southern Mississippi, entering freshman students complete an average of 85% of attempted courses, but the first-year retention rate is 75% for the university (Institutions of Higher Learning Board, State of Mississippi, 2014). In 2014, The University of Southern Mississippi's Student Success Committee issued a report focused on improving academic success rates. One suggested method of doing so focuses on the implementation of an electronic attendance monitoring system (The University of Southern Mississippi, 2014).

Student Development and Human Capital Development

Promoting student development through interactions between faculty and students increases academic success during the collegiate years and sets up a critical base for the future success of individuals (Astin, 1993). While examples exist of individuals who enjoy success without a bachelor's degree, many people need the academic and workplace skill development that occurs while achieving a degree to experience job and income security (De Gregorio & Lee, 2002). In 2009, more than 75% of available jobs needed an education level above a high school degree (White House, Office of the Press Secretary, 2009). Per the Bureau of Labor Statistics (Torpey & Watson, 2014), the number of available jobs needing at least a high school education has held steady at 73%. Becker (1993) introduced research correlating higher salaries with more highly educated employees. These employees develop enhanced workplace skills and higher productivity rates through academic interactions between faculty and students (Becker, 1993). Further, the more highly educated an individual becomes, the greater the benefit to the

community (Florida, 2004). Focusing on academic success strategies offers benefits for all involved at the university and community level (Astin, 1975).

Social Interaction

Research over the past four decades link student involvement to higher retention and academic success (American College Testing, 2010; Bean & Metzeler, 1985; Berger & Braxton, 1998; Pascarella & Terenzini, 2005; Tinto, 1993). Tinto (1993) reports that sustained social interaction among faculty and students improve knowledge retention. Further, the higher the level of student involvement or engagement, the more positive impact a student receives in the areas of academic and workplace skill development (Tinto, 1993). When students pursue post-high school education, they continue to focus on academic and workplace skill development, refining learning processes through social interaction following Kolb's theory of experiential learning (Kolb & Kolb, 2005). In other words, to develop intellectually and socially, students need to interact with others and with the faculty who are the subject matter experts (Kolb & Kolb, 2005). Students arrive at college with expectations and perceptions of a campus culture, and universities strive to aid students as they assimilate to this culture (Gerdes & Mallinckrodt, 1994; Harrison, 2006; Lowis & Castley, 2008). Astin (1975) surmises that the more interactions between faculty and students in the classroom during their collegiate career, the higher the likelihood of retention. Depending upon the campus of enrollment, a student could choose from several student organizations—such as general and specialized organizations, professional organizations, honors organizations, or Greek Life organizations—to gain both personal development and social interaction. As a strategy, universities should promote social interaction of undergraduate students and faculty to

increase student retention and graduation rates (Astin, 1975; Noel et al., 1985). When involved in campus organizations, students develop workplace skills through both the social involvement between their peers and their interaction with university faculty and staff (Patton, Renn, Guido, & Quaye, 2016).

Workplace Skill Development

The development of workplace skills—such as autonomy, personal integration, impulse expression, introverted thinking, and complex thinking—occurs heavily in the college years (Patton et al., 2016; Chickering & McCormack, 1973; Gianoutsos, 2011; Sternberg, 2013). According to Gianoutsos (2011) and Sternberg (2013), employers report difficulty finding the previously mentioned workplace skills because many students leave higher education institutions before completing a degree plan. The negative impact on human capital development affects the local area due to the lack of refined workplace skills one receives in the postsecondary education setting (Patton et al., 2016). Companies continue to spend more time training employees on skills not developed as part of the collegiate experience (Cappelli, 2011). Thus, academic success remains a priority for everyone at a college or university as students are trained to meet the needs of the business world.

Connecting Attendance, Student Development, Academic Success and Human Capital Development

Higher education offers an avenue for the development of skills in a focused subject area. Providing opportunities for subject specific knowledge through the higher education process supports human capital development, defined as follows:

> Any process or activity that, either initially or over the long term, has the potential to develop adults' work-based knowledge, expertise, productivity, and satisfaction, whether for personal, group, or team gain, or for the benefit of an organization, community, nation, or ultimately, the whole of humanity. (McLean & McLean, 2001, p. 315)

Offering opportunities for students to have a peer-to-peer interaction, as well as a faculty-student interaction, are principal factors supporting academic success (Noel et al., 1985).

Creating an environment centered on academic success and workplace skill building leads to increases in student attendance, involvement, and academic success (Bailey & Morais, 2005). The Student Success Steering Committee had the following to say about the importance of undergraduate student attendance:

> Studies show that class attendance can significantly improve academic performance and lower the time it takes to complete a degree. Regular class attendance promotes faculty/student engagement and allows for early assessment of the student's strengths and weaknesses. Absences more than 10% of the scheduled classes are detrimental to a student's chance of success. (The University of Southern Mississippi, 2014, p. 10)

Just as human capital development professionals find themselves in an ever-changing and innovative society, so do the professionals in higher education. Because constant change occurs, post-secondary education must adapt, giving university professionals the opportunity to interact frequently with students who are the future workforce. These interactions are critical to the development of human capital, as the

three domains of human capital development show; thus, they are important to the local community, the state, the region, and society as a whole (Becker, 1993; Florida, 2004).

Human Capital Development and Mississippi

Human resource is, simply put, the development of human capital or people (Swanson & Holton, 2009). Human capital includes the skills, knowledge, competencies, social network, professional network, creativity, and personal attributes humans have (McLean & McLean, 2001). People find employment in a multitude of organizations, and each type of organization and job requires a different skill set. Therefore, leaders must create plans to support the continuous education of their employees by incorporating research, theory, and practice into the development of programs (Marsick & Watkins, 1994). Then, as organizations lay a path to carry out their goals, it is paramount to remember how human capital development aims to create productive and educated citizens of society (Swanson & Holton, 2009). The collegiate setting offers one place for this education to occur by increasing the academic and workplace skills of the future workforce. Because of this, academic success and human capital development intertwine. Becker (1993), a pioneer in the human capital research field, stressed that the human capital sector relies on skilled workers. President Obama argued that education provides the best means to create these skilled workers (White House, Office of the Press Secretary, 2009). In his joint address to Congress in 2009, President Obama said the following:

> Right now, three-quarters of the fastest-growing occupations require more than a high school education. And yet, just over half of our citizens have that level of education. We have one of the highest high school dropout rates of any

> industrialized nation and half of the students who begin college never finish. This is a prescription for economic decline, because we know the countries that out-teach us today will out-compete us tomorrow. That is why it will be the goal of this administration to ensure that every child has access to a complete and competitive education from the day they are born to the day they begin a career. (para. 62)

In his speech, President Obama stated 75% of the available jobs now require above a high school education, adding that the country must establish a pathway to success through educational opportunities (White House, Office of the Press Secretary, 2009). Businesses consider education level of the local population before investing in a geographic area (Florida, 2004). Education increases the knowledge level of potential employees and offers one of the most important capital investments that an organization or region can make (Florida, 2004). To that effect, the higher the education a person achieves, the more mobile the person becomes, which leads to greater opportunities, income security, and wages for the individual (Schultz, 1961). The Bureau of Labor Statistics (2015) recently published a table describing the differences in earning and unemployment rates based upon education level. Figure 2 reinforces the President's remarks made before Congress and provides a parallel to the state of education in Mississippi. As Chapter II continues, research, figures, and tables highlight human capital development and its importance to Mississippi.

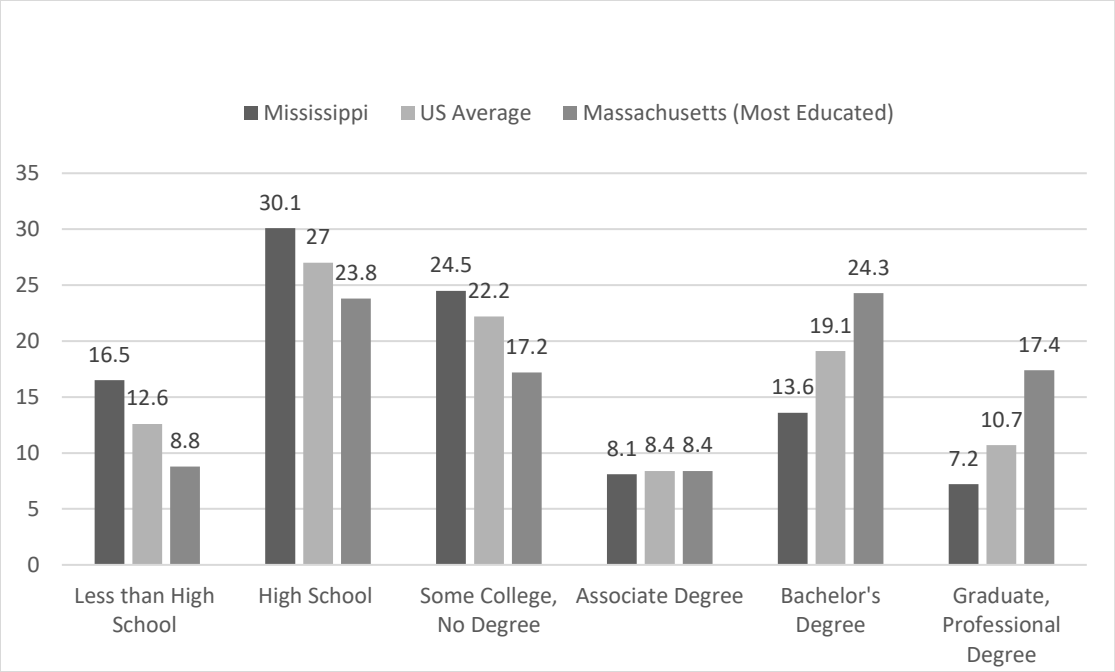

Figure 2. Educational attainment of working adults aged 25 to 64

Note. Net Migration of 22 to 64 year olds by education level (2005-2009). Adapted from "College Completion in Mississippi: The Impact on the Workforce and the Economy" by Education Commission of the States, 2011. Copyright 2011 by Education Commission of the States. Adapted with permission of the publisher. See Appendix A for statement of permission from organization.

In 2013, the Mississippi Legislature passed an Institutions of Higher Learning Appropriations Bill (SB 2851, 2013), adopting a performance-based allocation model linking institutional funding to completed course credit hours, retention rates, and graduation rates (Institutions of Higher Learning Board, State of Mississippi, 2013). The new funding formula—the performance-based allocation model—caused a meaningful change from earlier funding models, which focused primarily on the total number of enrolled students at each university. The new design created a shift in focus from student enrollment to student retention by distributing state educational funds based upon retention and graduation rates, not overall numbers (Institutions of Higher Learning Board, State of Mississippi, 2013).

In the past, state-funded public institutions of higher education in Mississippi have relied on two major sources of funding: state appropriations and student tuition. Between fiscal years 2008 and 2014, state appropriations for higher education decreased by 25% across the nation (Mitchell, Palacios, & Leachman, 2014). The adjustment in funding has affected many state higher education budgets. A new tactic sees higher education institutions' funding tied to performance metrics (Quinton, 2016). In fact, 26 states have already adopted the tactic with another 10 states considering adopting the new way of distributing state funding for institutions of higher education (Quinton, 2016). With changes and innovation coming to higher education funding, citizens and lawmakers must make sure future students have access to education. In addition to the state placing an increased focus on academic success, the Southern Association of Colleges and Schools asked universities to develop a five-year strategic initiative focused on the success of current students (Southern Association of Colleges and Schools Commission on Colleges, 2015). The University of Southern Mississippi has chosen to develop their Quality Enhancement Plan to obstacles to academic success, and by extension, student retention.

The Organization of Economic Co-operation and Development (2014) ranks the United States 14th out of 37 countries as it pertains to college degree completion. According to Figure 2, in 2011, only 29.8% of adults in the United States aged 25-34 had a bachelor's degree or higher (Education Commission of the States, 2011). Regarding the present study, the eight four-year publicly financed universities in Mississippi have a joint six-year graduation rate average of 50% among students who make the decision to enroll in a bachelor's degree program (Institutions of Higher Learning Board, State of

Mississippi, 2014). To address this graduation rate issue, the Institutions of Higher Learning reconfigured the funding methods to reward successful schools by focusing on academic success, retention, and graduation (Institutions of Higher Learning Board, State of Mississippi, 2013). Schiller (2008) states,

> Research shows that having large numbers of college graduates in a region increases that region's economic growth and that spillovers (also called externalities) are an important factor in generating more rapid growth. Aware of this connection, educators, state and local governments, and businesses around the country are making efforts to increase the educational attainment of their local workforces, especially the number of college graduates. (para. 16)

According to Schiller (2008), a clear link exists between human capital development and college academic success, and by proxy, student retention, which over time leads to graduation.

Human Capital Development Today

Employers operate in an environment that expects quick change, adaptability, and results (Miller & Ireland, 2005). As students prepare for the workplace, they must develop the proper academic and workplace skills needed to prosper; these workplace skills develop while a student attends college. Chickering and McCormack (1973) define some of these skills as personal integration, complexity, impulse expression, autonomy, estheticism, and introverted thinking. Further, research from Chickering (1974) and Handel (2003) offers that confidence, integration to social scenes, increased job-specific skills, awareness of situations, and stability are examples of workplace skills developed by students as they progress through college. However, many researchers, policy makers,

and organizations believe employees' work-related skills do not match the requirements for existing jobs (Handel, 2003).

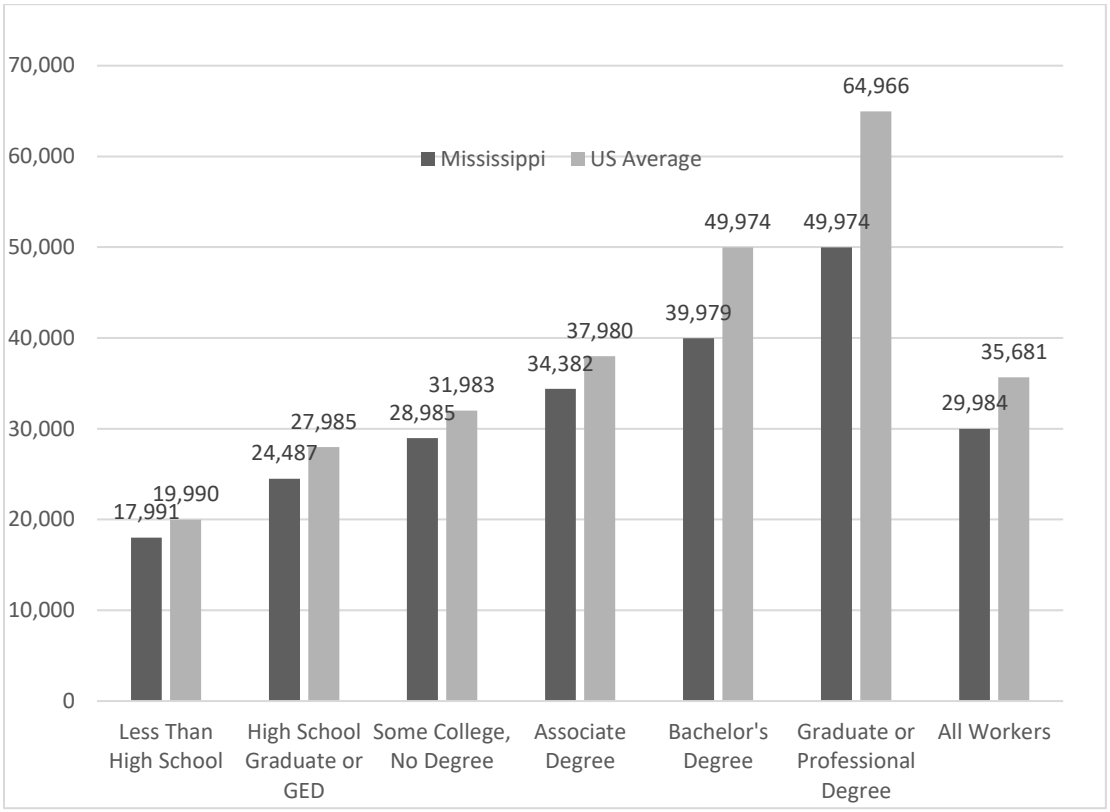

Figure 3. Median annual wages for employed workers aged 25 to 64 by level of education

Note. Net Migration of 22 to 64 year olds by education level (2005-2009). Adapted from "College Completion in Mississippi: The Impact on the Workforce and the Economy" by Education Commission of the States, 2011. Copyright 2011 by Education Commission of the States. Adapted with permission of the publisher. See Appendix A for statement of permission from organization.

Companies and states' prosperity rely on preparing a viable workforce and developing a sustainable pool of human capital talent (Florida, 2004). Figure 3 presents information on the status of the median annual wages for employed workers aged 25 to 64 by their level of education as originally provided by the Education Commission of the States (2011). The information, gathered in 2011, would have been available to inform decisions to adjust the funding formula for the Institutions of Higher Learning in Mississippi. As states look to offer opportunities for their citizens, the focus on education

attainment remains at the forefront of initiatives for the country and for the individual states to improve the financial security of residents.

Human Performance Interventions and Behavior Change

Interventions are tactics used in human capital development to promote change through a coordinated improvement process (Fuller, 1997). Specifically, interventions in human capital development revolve around theories of action designed to increase effectiveness (Argyris & Schon, 1982; Fuller, 1997). Interventions can take many forms, including job aids, training games, rewards, recognition, team building, conflict management, process redesign, and newsletters (Fuller, 1997).

Before beginning any intervention, leaders need to obtain information on the employees or group members taking part in the intervention process (Argyris & Schon, 1982; Russell, 2007). When implementing a change in an organization, leaders provide the knowledge and ideas needed for the betterment of the organization (Kotter, 2008). Testing the impact of a change could occur by creating employee focus groups, testing on a small population of employees while measuring the outcomes, or examining similar programs at other organizations (Kotter, 2008). Researchers test the program's effectiveness by establishing a control group to compare the data from the beginning of a program to after the program concludes (Argyris & Schon, 1982; Fuller, 1997). However, the programs sometimes rely on the premise that people enact change when they realize their behavior has the opportunity for improvement (Argyris & Schon, 1982; Fuller, 1997; Kotter, 2008). The researcher of this present study seeks to find if the implementation of an electronic attendance monitoring system affects academic success

rates (Dicle & Levendis, 2013; O'Connor, 2010; University of Southern Mississippi, 2014).

Human Performance Interventions

Colleges and universities adopt different innovative strategies to improve academic success rates. In college, all students, especially undergraduates, make decisions affecting their behaviors, including class attendance (Newman-Ford, Fitzgibbon, Lloyd, & Thomas, 2008). Some reasons for student absenteeism are travel and weather, external commitments (work, volunteering, sports), illness, peer group influence, parental influence, and college discipline (Longhurst, 1999). Additionally, student perception of course rigor and attitudes regarding the importance of attendance can also affect attendance rates (Gump, 2006).

From a university perspective, one of the most effective strategies to improve academic success rates is to focus on undergraduate student attendance and promote interaction between faculty and students (Romer, 1993). Just as in a job setting, people are not able to perform at their best if they are not in attendance. The same holds true for the collegiate classroom: A person's ability to absorb information increases with his or her presence in the classroom. Crede et al. (2010) and Moore (2003) found that increased attendance rates of undergraduate students positively affected academic success and that a student's attendance in a classroom setting provides a stronger indicator of success than high school grade point averages or standardized test scores. Bligh (1998) found that undergraduate students who regularly attend lectures achieve higher grades due to their attendance and interaction with faculty and students. Research shows that the time students spend attending class positively affects their end of course academic grade

(Stanca, 2004; Thomas & Higbee, 2000; Vidler, 1980). Further, increasing undergraduate student classroom attendance and interactions with faculty can improve academic and workplace skill development, while also increasing students' motivation levels to succeed (Kanfer & Ackerman, 1989).

Attendance Monitoring Systems

To find the potential effect of undergraduate student attendance, universities such as The University of Mississippi, University of Glamorgan (United Kingdom), Loyola University New Orleans, and the University of Northern Arizona have each recently implemented attendance-monitoring software systems on their campuses (Dicle & Levendis, 2013; Newman-Ford et al., 2008; Newsom, 2016; O'Connor, 2010). By encouraging undergraduate student attendance in the classroom, universities like the ones mentioned above have the potential to aid students in academic growth by promoting interaction.

Loyola University New Orleans' attendance-monitoring software, developed by two faculty in the College of Business, uses radio frequency identification chips, embedded in the student ID card to log a student's attendance (Dicle & Levendis, 2013). Of the students using the technology, 97.5% approved of the method to track undergraduate student attendance, while the faculty appreciated not needing to determine attendance for each class meeting (Dicle & Levendis, 2013). The University of Northern Arizona funded their program through the federal stimulus to support education initiatives (O'Connor, 2010). The project outfitted one building under construction with the new attendance trackers. The identification card system used by the students already had the radio frequency identification chips embedded. The RFID type of intervention

took years of planning to implement (O'Connor, 2010). Within Mississippi, the University of Mississippi (Ole Miss) has adopted a similar strategy of attendance monitoring by using wall mounted card scanners (Wiley, 2013). Ole Miss uses a system where students scan the barcode on their ID cards, registering their attendance in a system that faculty and the university can use to track attendance and provide data for other university reports. By monitoring attendance, Ole Miss allows for statistical modeling to occur and places emphasis on the interaction between students and faculty (Newsom, 2016). The University of Glamorgan (United Kingdom) used a formalized attendance monitoring system, which allowed for data-sharing with the university community that showed expected grades of students based upon their absenteeism (Newman-Ford et al., 2008). Electronic attendance monitoring systems allow universities to find students needing interventions to improve their opportunity to succeed academically (Newman-Ford et al., 2008).

Implementing Behavior Change Practices

Human capital development practices incorporate improvement processes to promote changes in behavior (Fuller, 1997). These behavior changes in human capital development revolve around theories of action designed to increase effectiveness (Argyris & Schon, 1982; Fuller, 1997). Testing the impact of a behavior change occurs through many different facets such as creating employee focus groups or conducting a test on a small population (Kotter, 2008). No matter the format, researchers must always measure the outcomes of behavior change endeavors (Kotter, 2008). Researchers use data from a control group to compare the beginning and end points of the intervention and to establish the behavior change's effectiveness (Argyris & Schon, 1982; Fuller,

1997). However, the behavior change endeavors incorporate that individuals change upon realizing that improvements can be made to their behaviors (Argyris & Schon, 1982; Fuller, 1997; Kotter, 2008). The researcher of this present study seeks to find if the formal attendance-monitoring procedure affects academic success rates (Dicle & Levendis, 2013; O'Connor, 2010; University of Southern Mississippi, 2014).

When looking to implement behavior change practices, two theories support such endeavors, The transtheoretical model of change and the theory of planned behavior. The psychological domain for human capital development serves as a base for observing and as a starting point to research behavioral changes (Epstein & Sheldon, 2002; Tanner-Smith & Wilson, 2013). School attendance provides not only the opportunity for interactions between faculty and students, but also the opportunity to develop social and workplace related skills. (Epstein & Sheldon, 2002; Tanner-Smith & Wilson, 2013)

The transtheoretical model of change is a multistep process that sees individuals work through intentional behavior changes (Edwards-Stewart, Prochaska, Smolenski, Saul, & Reger, 2017). The theory applies to a variety of settings, populations, and behaviors presenting different stages that individuals progress through (Prochaska et al., 2008). The different stages of the transtheoretical model of change are pre-contemplation, contemplation, preparation, action, and maintenance (Edwards-Stewart et al., 2017). Individuals move through these stages at different paces when attempting to modify a behavior. Many people envision behavior change as a single event that occurs to correct a behavior (Epstein & Sheldon, 2002; Tanner-Smith & Wilson, 2013). However, the transtheoretical model of change suggests that time plays an important part in the behavior change process.

Transtheoretical Model of Change

As individuals prepare for behavior changes, they must realize their starting points in the process. The different stages of the transtheoretical model of change provide a framework for individuals to assess their readiness to implement change. In order to implement the changes, individuals must work through these stages in order. The first stage, pre-contemplation, takes place when individuals are not ready to act on a needed behavior change in the next six months. Sometimes, individuals become stuck in this stage because they lack the information necessary about the consequences of their existing behavior. When multiple unsuccessful attempts occur, individuals can become resistant to implementing the needed change. The second stage, contemplation, occurs when an individual intends to make a change in the next six months. Individuals in this stage are aware of the benefits if they implement the behavior change but are not willing to take immediate action to implement the change. The preparation stage occurs as individuals realize the need to take action immediately to affect their lives. Individuals in this stage have already taken some steps to address their shortcomings or distractions and stand ready to implement behavior change actions. The action stage occurs as individuals make specific changes or modifications to behaviors in their lives. These actions are observable by others, who see an individual taking specific actions to correct a behavior shortcoming. The final stage of the transtheoretical model of change is the maintenance stage. The maintenance stage occurs when individuals have implemented the needed behavior changes over a period of time and have taken necessary precautions to prevent a relapse. Individuals in the maintenance stage also become accustomed to the new behavior and recognize that the behavior changes have resulted in distinct benefits to

their life. The transtheoretical model of change lays the foundation for individuals who are ready to implement behavior changes.

Theory of Planned Behavior

The theory of planned behavior attempts to provide explanations for individual's behavior intentions in specific circumstances (Kautonen, Gelderen, & Fink, 2015). The theory of planned behavior involves an individual's behavior intent and how outcomes, risks, and benefits of the intended behavior impact the intentions (Kautonen et al., 2015). The most integral part of the theory comes from the motivation that an individual has, giving them the ability to change their behavior. The attitudes that an individual possesses includes the individual's perception of the end result of performing the behavior. In other words, the stronger the motivation a person possesses to perform a behavior, the more likely they are to follow through. In the classroom setting, the expected normal behavior is that enrolled students attend the class meetings for each course. By implementing the electronic attendance monitoring system, the researcher can rely on the theory of planned behavior and transtheoretical model of change enabling enrolled students to make a conscious decision as to whether or not their behavior needs to change. Further, the results of the electronic attendance monitoring system enable the researcher, through the incorporation of demographic variables, to identify at-risk individuals enrolled in future courses.

Similar to other universities' undergraduate student-attendance intervention programs, The University of Southern Mississippi's Student Success Initiative report focuses on increasing attendance by linking to the Freshman Attendance-Based Initiative (The University of Southern Mississippi, 2014; Wiley, 2013). Because of changes in

state funding from the Institutions of Higher Learning Board, The University of Southern Mississippi, like other institutions in the state, now focuses on new academic success endeavors. The consequences of not implementing strategic endeavors, such as the electronic attendance monitoring system, could include a lower level of funding from the state. Table 1 highlights the student graduation rates from the fall 2005 freshman cohort that was available the most recent data available prior to implementing the electronic attendance monitoring system. The descriptive statistics outline the necessity for change to occur when comparing the success of students to the statewide average.

Table 1

Fall 2005 Freshman Cohort Student Graduation Rates

Student Cohort	USM Average	Mississippi Average
First-time, full-time, Freshman Fall 2005	1,328 (100%)	1,009 (100%)
Graduating within 4 years (100% of normal time)	296 (22.3%)	271 (26.8%)
Graduating within 6 years (150% of normal time)	623 (46.9%)	502 (49.8%)
Graduating within 8 years (200% of normal time)	676 (50.9%)	537 (53.2%)

Note. Student Graduation Rates of Fall 2005 Freshman Cohort. Adapted from "Factbook 2014/2015 Retention" by The University of Southern Mississippi, 2015. From The University of Southern Mississippi Office of Institutional Research, 2015. Document available for public consumption.

Demographics, College Success, and Undergraduate Student Attendance

Demographics identify personal traits of participants and these traits also have the ability to influence academic success and, by proxy, student retention. Discovering traits that influence academic success provides the data to develop proper strategies to aid in retention of these students (Tharp, 1998). Following the student's grade point average, attendance, which promotes interaction in the classroom between faculty and students,

has been indicated to be the next highest factor in student academic performance (Sauers, McVay, & Deppa, 2005). Demographic factors affecting attendance are used in the present study and in past research. The present study examines the following undergraduate student demographic factors affecting attendance: gender, local residency, state residency, Greek Life organization affiliation, admission type, cumulative GPA, age, undergraduate year classification, ethnicity, current enrollment status, and the semester of course enrollment. In previous research (Altermatt, 2007; Behar, 2010; Borland & Howsen, 1998; Caldas, 1993; Chickering, 1974; Lamdin, 1996; Lowis & Castley, 2008; Newman-Ford et al., 2008; Romer, 1993; Stewart, Merrill, & Saluri, 1985; Stewart & Rue, 1983), these authors, focused on the importance of undergraduate student attendance with one of the attendance-based demographics previously mentioned. A shortcoming of their research lies with focusing on only one demographic factor at a time. Additionally, in the past, many researchers have observed undergraduate student attendance rates aggregated on the course or school-wide level but have not integrated this data with student demographic factors (Borland & Howsen, 1998; Caldas, 1993; Farsides & Woodfield, 2003; Lamdin, 1996; Romer, 1993; Woodfield, Jessop, & McMillan, 2006). Combining the demographic options can lead to developing proper strategies to improve academic success rates and to identify which types of student are less likely to graduate (Tharp, 1998). By analyzing student demographics, researchers may be able to identify patterns between the various demographic factors that affect academic success. The purpose of the present study is to determine the influence of an electronic attendance monitoring system on undergraduate student success.

Gender

Research shows differences in male and female academic success levels in higher education (Altermatt, 2007; Behar, 2010; Newman-Ford et al., 2008). The National Center for Educational Statistics (2005) reported that the percentage of women who have successfully pursued a bachelor's degree has increased from 61% in the 1970s to 71% in the 1990s. Conversely, the bachelor's degree attainment for men has stagnated at 61% since the 1970s (National Center for Educational Statistics, 2005). The gender divide continues to grow, with women outnumbering men attending post-secondary institutions (U.S. Census Bureau, 2006; U.S. Department of Education, 2016). According to the U.S. Census Bureau (2006), more women under the age of 45 have bachelor's degrees than men in the same age range. Further, research shows that gender influences students' academic success (Altermatt, 2007; Newman-Ford et al., 2008). Arredondo and Knight (2005) and Newman-Ford et al. (2008) found that gender played a role in students' decision to attend class. Research by Woodfield et al., (2006) found that men, especially men with higher GPAs, were more likely to be absent from class. In contrast, women were more likely to be present for class meetings (Woodfield et al., 2006). Previous research supports gender playing a role in academic success and attendance in the classroom (Adelman, 1999; Altermatt, 2007; Arredondo & Knight, 2005; Astin & Oseguera, 2005; Behar, 2010; Campbell & Fugua, 2008; Crisp, Horn, Dizinmo, & Barlow, 2013, Newman-Ford et al., 2008).

Local Residency

Through more than 20 years of research, Pascarella and Terenzini (1991) found that on-campus students tend to achieve higher academically. Pascarella and Terenzini

(2005) later reaffirmed their research, reporting that the retention of resident students remains consistently higher than that of commuter students. Research shows that students who do not live on campus are less committed academically (Chickering, 1974; Lowis & Castley, 2008; Stewart et al., 1985; Stewart & Rue, 1983). Students who live on campus make a higher investment in developing relationships that exist both outside of the classroom and in their residence halls (Lowis & Castley, 2008). Further, interactions with peers aid both student's academic success and their social integration into the campus community (Lakey & Cohen, 2000). By residing on campus, resident students have the opportunity to participate in more activities outside of the classroom, promoting interaction with other students and faculty (Pascarella & Terenzini, 2005). Stewart et al. (1985) and Stewart and Rue (1983) reported that commuting students are more easily disrupted, not only by not attending classes but also by withdrawing from school, thus making the withdrawal from college a less intrusive decision. Facilities that students live in during their college careers can have an impact on their academic success by motivating them to attend class (Lau, 2003). The on-campus residence facilities have support staff and other students that provide motivation to attend class and encourage academic success (Pascarella & Terenzini, 2005). By including local residency as a demographic factor, the data exposes whether on-campus or off-campus living leads to higher academic success in the courses participating in the electronic attendance monitoring system.

State Residency

In addition to local residency, the demographics include whether a student is a resident of Mississippi or is a non-resident student. Both local and state residency

information give valuable information when evaluating academic success (Arredondo & Knight, 2005). Previous research (Arredondo & Knight, 2005; Chimka et al., 2007) shows that state residency information relates to undergraduate student's decision to attend class. Students coming from out of state have lower academic success rates and college completion rates than students with in-state residence (Arredondo & Knight, 2005). Mentally, these students feel disconnected from past social support networks due to the distance of the students' residences from the institution (Chimka, Reed-Rhoads, & Barker, 2007). The attitudes of these students could affect their decision to attend class on any certain date.

Greek Life Organization Affiliation

The organizations that a student becomes involved with can also influence academic success (Berger & Braxton, 1998). Previous research has shown that students involved in at least one significant campus activity have higher rates of academic success and retention (American College Testing, 2010; Pascarella & Terenzini, 2005). Tinto (1993) states that the support networks formed through organizational membership positively influence a student's academic success. Kuykendall (2008) expanded upon Tinto's research by adding that students are more likely to succeed in college when they are involved in campus activities. Further, Astin (1984) stated that when students spend more time on campus, especially in the classroom, it is likely they interact with a wider array of campus entities, thus leading to increased academic success. Berger and Milem (1999) added that an undergraduate student's campus involvement leads to higher levels of academic success and that a student's involvement level can influence their decision to attend classes, due to their attachment to the university. At The University of Southern

Mississippi, all Greek Life organizations houses are on campus; thus, students who participate in a Greek Life organization shape a positive experience by having on-campus resident status (Pascarella & Terenzini, 2005).

Research has found that students who are involved with at least one major campus organization and have an elevated level of motivation are more successful than the general student body population (American College Testing, 2010). However, in a review of the literature, previous research has not measured the link between undergraduate student attendance rates and Greek affiliation. According to the Office of Institutional Research, the only consistent student involvement is in Greek Life organizations (M. Arrington, personal communication, 2015). Involving Greek Life membership as a demographic during the electronic attendance monitoring system could be strategic in providing additional data.

Admission Type

The admission type of students can also play a role in academic success (Noel et al., 1985). Examining the admission type of students is of interest in the present study because, in Mississippi, 15 two-year colleges offer similar campus amenities to four-year institutions, such as classes, training, residential facilities, and athletic team competitions (Mississippi Community College Board, 2016). The community college system presents students with local options to begin their education. Students have the choice to complete their associate degree or to transfer their desired number of credit hours to a four-year institution. Further, The University of Southern Mississippi has the highest number of transfer students of the eight publicly funded universities in Mississippi (M. Arrington, personal communication, 2015). The University of Southern Mississippi uses

the designation of freshman admit and transfer admit for student admittance applications (M. Arrington, personal communication, 2015). Yu, DiGangi, Jamnasch-Pennell, and Kaprolet (2010) found that students with transferred hours are more likely to demonstrate academic success, but there is a lack of research involving admission type and undergraduate student attendance rates. Thus, identifying whether or not there is a difference in the academic success rates and attendance rates of freshman admitted or transfer admitted students would yield usable data.

Cumulative Grade Point Average

Another demographic factor to examine for its influence during the present study includes a student's grade point average (GPA). GPA measures academic success at the end of every term or quarter (Great Schools Partnership, 2014). The GPA metric demonstrates a student's progress through school until graduation and provides the student with a snapshot of his or her academic achievement (Great Schools Partnership, 2014). The cumulative GPA is a summary of a student's achievement level, with all classes or courses figured into the metric. The GPA is one recognized metric for success. Many universities require students to maintain a minimum cumulative GPA to graduate. Further, the federal government relies on each university to determine a cumulative grade point average in determining a student's eligibility for financial aid (The University of Southern Mississippi, 2016). Singell and Waddell (2010) asserted that by using GPA information, administrators would be able to recognize potential academic achievement risks, allowing them to intervene as needed. Singell and Wadell's (2010) analysis shows a positive correlation between student retention, GPA, and academic success. Further, monitoring undergraduate student attendance is indicated to have a positive and

significant outcome on final course grades (Caldas, 1993; Farsides & Woodfield, 2003; Lamdin, 1996; Rau & Durand, 2000; Romer, 1993). One can infer that the higher a student's GPA, the higher the number of courses a student has successfully completed.

Age

Age can influence students' success rates in courses, as non-traditional students have a lower graduation rate than traditionally aged students (Markle, 2015). The present study could show that a difference exists between traditionally aged and non-traditionally aged students when it comes to academic success, as well as a difference in the academic success rates for traditional-aged and non-traditional-aged students, as noted in Pascarella and Terenzini's (1991) research. The quality and quantity of the interactions that occur between students, faculty, and staff affect students (Pascarella & Terenzini, 1991). Similarly, Astin (1984) stated that the social interactions students have on campus with faculty contribute to the development of skills. Tinto (1993, 2006) found that non-traditional students faced limitations through fewer on-campus interactions when compared to traditional-aged students. Markle's (2015) research found that there was no difference between non-traditional males and females in their academic success and graduation rates. Crede et al. (2010) found that students who were older attended class more often than students who are younger and that it factored into their end-of-course grades.

Undergraduate Year Classification

Undergraduate year classification describes a student using the established terms of freshman, sophomore, junior, or senior. The undergraduate year classifications are determined by the university, but the general standard across the country is that freshmen

have fewer than 30 successfully completed credit hours; sophomores have between 30 and 60 successfully completed credit hours; juniors have between 60 and 90 successfully completed credit hours; and seniors have more than 90 successfully completed credit hours (The University of Southern Mississippi, 2016). A successfully completed credit hour occurs when the student completes a course with a grade of A, B, or C, and sees those hours added to their cumulative total number of completed course hours. By including the undergraduate year classification demographic, the present study analyzes whether a student's decision about when to enroll in the participating courses makes a difference in academic success. In a review of the current literature, studies have not measured the interaction of different classification levels and attendance rates. In terms of academic success, Crede et al. (2010) found a significance between classification, undergraduate student attendance, and academic success. In addition, one can infer that as students matriculate through college, they are successful because they remain enrolled; students with unsatisfactory academic success frequently choose not to continue.

Ethnicity

Ethnicity is also an important demographic, as the present study aims to identify influences that affect academic success in the courses observed (Zea, Reisen, Beil, & Caplan, 1997). Rodgers (2013) found that in the United Kingdom, minority students were less likely to complete their degrees when compared to other students. Historically Black Colleges and Universities saw higher graduation rates among African-American students as compared to students at Predominately-White Institutions (Allen, Epps, & Haniff, 1991; Pascarella & Terenzini, 2005). Astin and Oseguera (2005) found that, overall, Whites and Asians were more likely to exhibit academic success as compared to

Blacks and Hispanics. Further, Pascarella and Terenzini (2005) found that minority students at Predominately-White Institutions felt isolated, which can be a factor that negatively affects students' success rates. For these students, one way to improve their academic success lies with establishing a peer culture and orientation toward minority issues (Pascarella & Terenzini, 1991). When considering ethnicity and residential status, research suggests that minorities, especially Black students, are more likely to flourish in a living-learning residential community than the White student majority (Pascarella & Terenzini, 2005; Rodgers 2013). Currently, research does not examine the undergraduate student attendance rates of different ethnicities; the research focuses only on academic success rates.

The University of Southern Mississippi is classified as a Predominately-White Institution (The Carnegie Classification of Institutions of Higher Education, 2016), but the student body is 27% Black (Institutions of Higher Learning Board, State of Mississippi, 2014). Because Black and White students comprise the majority of The University of Southern Mississippi's student body, there is not enough of a percentage to provide confident data analysis for other specific ethnicities. A third category represents the remaining ethnicities which include Asian, American Indian, Hispanic, Multi-Racial, Not Specified, and Pacific Islander. As such, this study uses three different categories for ethnicity: Black, White, and Other Ethnicity. The terms used to represent the ethnicities coincide with the terminology used at the university.

Current Enrollment Status

To receive federal financial aid, students enrolled in college need to have at least a full-time course load—a minimum of 12 credit hours (Federal Student Aid, An Office

of the U.S. Department of Education, 2016). In addition, only full-time students receive the benefits of most university-based scholarships, such as out-of-state tuition waivers (E. Dornan, personal communication, 2016). Classifying a student as full- or part-time is an important factor of the present study because it determines whether there is a significant difference in academic success between the groups. Students who enroll in 12 credit hours or more a semester are classified as full-time, while students who are enrolled in less than 12 credit hours a semester are classified as part-time. Kuh, Cruce, Shoup, and Kinzie (2008) found that there is a significant difference in the academic success rates between these groups. Crede et al. (2010) found a difference in the undergraduate student attendance rates based on their course load. The Institutions of Higher Learning (IHL) Institutional Report (2014) states that only 66.8% of full-time students at The University of Southern Mississippi complete 24 credit hours in one academic year compared to the 70.5% average for the entire IHL system. The report additionally states that 37.9% of part-time students at The University of Southern Mississippi complete 12 credit hours within one academic year compared to the IHL system average of 44.3% (Board of Trustees of State Institutions of Higher Learning, 2014). Therefore, reviewing students' success rates in conjunction with attempted course credit hours provides additional relevant data for the present study.

University Designation

Universities receive different designations based upon the makeup of their campuses (The Carnegie Classification of Institutions of Higher Education, 2016). Some of these designations are commuter, residential, research, public, or private. Additionally, a university may have a classification type based upon the university's

history and ethnic makeup, leading to designations of a Predominately-White Institution or a Historically Black College or University (The Carnegie Classification of Institutions of Higher Education, 2016). If at least 25% of degree-seeking students live on campus or nearby, a university is primarily a residential institution (The Carnegie Classification of Institutions of Higher Education, 2016). The University of Southern Mississippi is classified as a primarily residential, predominately-White, research university. The University of Southern Mississippi's designation is an important factor to consider because the results may be generalizable to other institutions of a similar designation and ethnic makeup.

Chapter Summary

In summary, existing literature discusses the many characteristics that influence academic success through student retention. However, none of the previously mentioned research combines multiple undergraduate student demographic factors affecting attendance in the same study. The present study seeks to analyze the effects of an electronic attendance monitoring system at one institution, The University of Southern Mississippi, to provide usable data to enhance academic success. Through implementing the electronic attendance monitoring system, the study aims to uncover data that policy makers can use to influence the student body. In the end, the present study can serve as a resource allowing other universities to make informed decisions regarding electronic attendance monitoring systems.

In 2011, the majority of adults in the United States aged 25-34 did not have a bachelor's degree, and in the state of Mississippi, more than 71% did not have that level of education (Education Commission of the States, 2011; Organization of Economic Co-

operation and Development, 2014). Mississippi's eight publicly funded institutions of higher learning have an average six-year graduation rate of 50% (Institutions of Higher Learning Board, State of Mississippi, 2014). In response to years of lagging graduation rates, the Institutions of Higher Learning reconfigured the funding method to reward schools that focus on academic success, retention, and graduation (Institutions of Higher Learning Board, State of Mississippi, 2013). The present study combines demographics with data on undergraduate student attendance rates to discover traits that influence academic success.

CHAPTER III – RESEARCH DESIGN AND METHODOLOGY

This study seeks to determine the relationship between undergraduate student class attendance and academic success when employing an electronic attendance monitoring system. In the Spring 2015 Semester, The University of Southern Mississippi's Office of Institutional Research monitored undergraduate student attendance in certain course sections whose faculty voluntarily participated. While other universities such as The University of Mississippi, University of Glamorgan (United Kingdom), Loyola University of New Orleans, and The University of Northern Arizona have used formalized attendance-monitoring procedures, this study fills a gap in the research (Dicle & Levendis, 2013; Lopez-Bonilla & Lopez-Bonilla, 2015; Newman-Ford et al., 2008; Newsom, 2016; O'Connor, 2010). Unlike previous studies, the present study seeks to interpret the impact of an electronic attendance monitoring system on multiple undergraudate student demographic factors affecting attendance.

The researcher uses archival data from The University of Southern Mississippi in a quasi-experimental design (Goodwin, 2009; Shadish et al., 2002). The archival data request was made for student demographic information from the Spring 2015 Semester that, based on previous research studies, are important to attendance and academic success (Church, 2002; Shadish et al., 2002). Appendix B contains a pre-authorization letter approving the use of archival data from the organization. This chapter discusses the research objectives, the design, a description of the population, and sampling procedures. The methodology discusses the instrumentation, data collection procedures, validity and reliability, and data analysis. Finally, the study's limitations and chapter summary complete the chapter.

Research Objectives

The purpose of the present study is to determine the influence of an electronic attendance monitoring system on undergraduate student success. The link between college academic success and human capital development appears when one examines student development theory and human capital development principles. Four research objectives guide this study:

RO1 - Describe the literature-based undergraduate demographic factors, attendance rates, and academic success rates of the student sample.

RO2 - Compare academic success rates of students in the sections of courses using the electronic attendance monitoring system in the Spring 2015 Semester with the sections of courses that did not use the system.

RO3 - Determine the relationship between undergraduate attendance rates and academic success in courses using an electronic attendance monitoring system.

RO4 - Determine the relationship between the literature-based undergraduate demographic factors and attendance rates on student academic success in courses using an electronic attendance monitoring system.

Research Design

This study analyzes archival data using a quasi-experimental design due to lack of random assignment because the researcher was unable to assign subjects to specific groups (Field, 2013; Goodwin, 2009; Shadish et al., 2002; Trochim 2006). The researcher requested archival demographic data on the students enrolled in the course sections that participated in the electronic attendance monitoring system and for students enrolled in similar course sections that did not participate. The information includes the

following data: the number of students enrolled in each course, individual attendance rates, individual end-of-course grades, and undergraduate student demographic factors that relate to attendance and student success (gender, local residency, state of residency, Greek Life organization affiliation, admission type, cumulative GPA, age, undergraduate year classification, ethnicity, current enrollment status). Figure 3 illustrates the difference between sections of non-participating and participating courses and shows how the research objectives use the data.

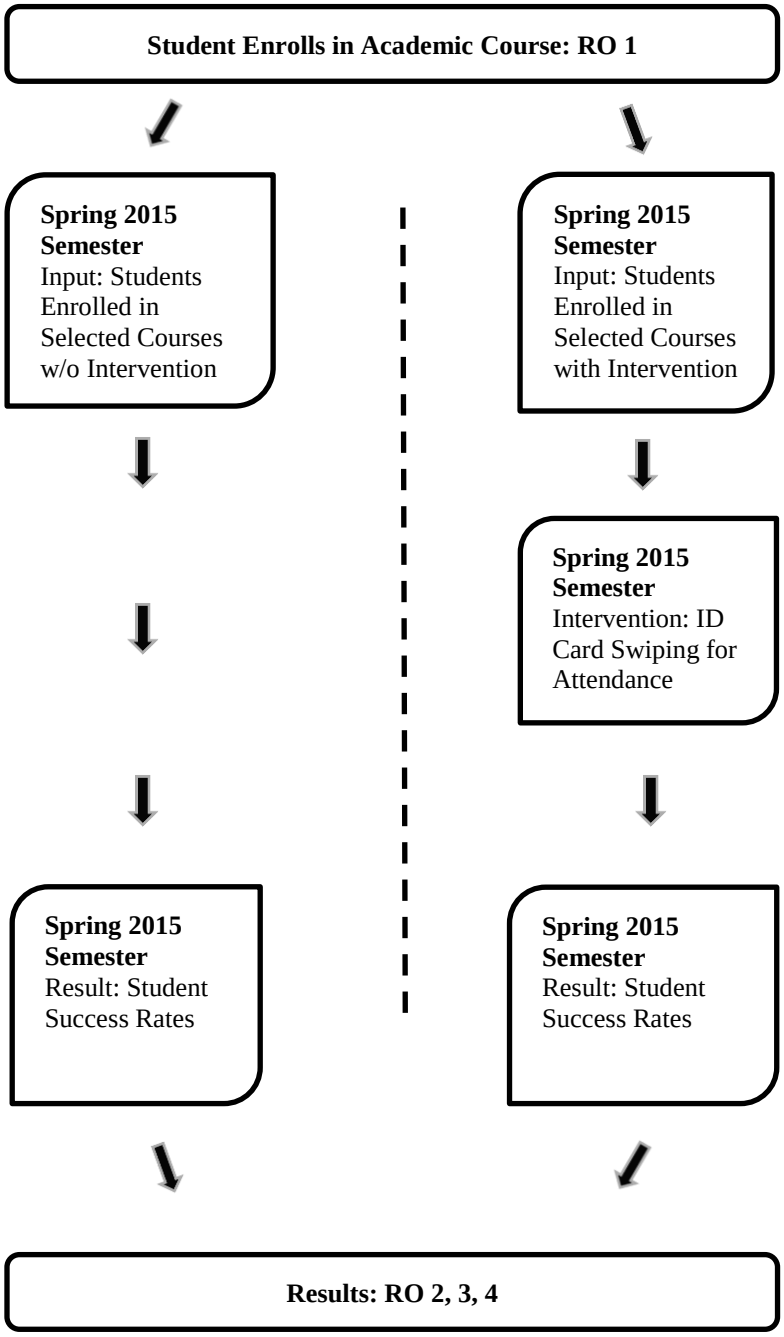

Figure 4. Research design of the current research project

Population and Sample

The present research study took place at The University of Southern Mississippi, where six out of ten undergraduate college students, who begin as freshman, do not graduate within four years (Institutions of Higher Learning Board, State of Mississippi, 2013). The University's Office of Institutional Research implemented an electronic attendance monitoring system during the Spring 2015 Semester. The researcher requested the data from that semester as well as academic success data and demographic factors of the population and sample.

The population for this study was undergraduate students enrolled during the Spring 2015 Semester at The University of Southern Mississippi. Additionally, the electronic attendance monitoring system took place in regular session course sections; no honors course sections, online course sections, offsite course sections, or abbreviated term course sections participated. The sample includes students from the course sections whose faculty voluntarily participated in the electronic attendance monitoring system and students in the course sections that did not participate. Because the study uses archival data, the opportunity to pre-select students for participation did not exist. The students choose the courses and section based on personal schedules and preferences. Because the students were not randomly assigned to any of the courses, no controls are present to ensure that the same demographics of students enroll in each course (Goodwin, 2009).

Previous Academic Success of Sample

The study compares data among students in the Spring 2015 Semester of the courses and sections using the electronic attendance monitoring system to data for students who were in similar courses and sections, but who did not use the electronic

attendance monitoring system. Three lecture-based courses voluntarily participating in the electronic attendance monitoring system and have comparable class sections that did not take part:

- History 101 (World Civilization I)
- History 102 (World Civilization II)
- Math 102 (Brief Applied Calculus)

Table 2 describes the relevant academic success summary data from the period of Fall 2009 to Fall 2014 (prior to implementing the electronic attendance monitoring system) for the courses that participated in the electronic attendance monitoring system. The table outlines how many students have taken the course during the Fall 2009 to Fall 2014 period and the academic success rates of the enrolled students.

Table 2

Academic Success in Electronic Attendance Monitoring System Participating Courses

		Success	Not Success		
Course Description	Total	C or Better *n* (%)	Less than C *n* (%)	Withdrew *n* (%)	DFW *n* (%)
History 101 World Civilization I	9,775	5,401 (54.6%)	3,992 (41.6%)	382 (3.9%)	4,374 (45.5%)
History 102 World Civilization II	8,184	5,090 (62.3%)	2,818 (34.4%)	276 (3.3%)	3,094 (37.7%)
Math 102 Brief Applied Calculus	1,772	1,038 (58.8%)	650 (36.7%)	84 (4.5%)	734 (41.2%)

Note. The total represents the total number of students enrolled in the course between the fall 2009 and fall 2014 semesters. The C or better column represents the number of students and the percentage of total students enrolled between the fall 2009 and fall 2014 semesters who achieved an academic grade of a C or better (A, B, or C). The Less than C column represents the number of students and the percentage of total students enrolled between the fall 2009 and fall 2014 semesters who achieved an academic grade of a C or better (D or F). The Withdrew column represents the number of students and the percentage of total students enrolled between the fall 2009 and fall 2014 semesters who withdrew from the course while attempting to complete it (the student did not complete the course and did not receive any course credit). The DFW column represents the combined number of students and the percentage of total students enrolled between the fall 2009 and fall 2014 semesters who achieved an academic grade of a D or F or if the student withdrew from the course. If the DFW rate is above 30% for six of the eight past semesters, the course is considered historically difficult.

Table 3 outlines the courses participating in the electronic attendance monitoring system and presents the number of participating and non-participating course sections during the Spring 2015 Semester.

Table 3

Electronic Attendance Monitoring System Participating Courses

Course Name	Total Sections (2015)	Electronic Attendance Monitoring System Sections (2015)
History 101 (World Civilization I)	3	2
History 102 (World Civilization II)	3	1
Math 102 (Brief Applied Calculus)	7	2

Sampling Process

Prior to implementing the electronic attendance monitoring system project, Institutional Research staff contacted certain faculty to solicit participation, explain benefits of participation, and the outcomes that could occur because of their participation (M. Arrington, personal communication, 2015). The participants were chosen based on the available academic success data from the Institutional Research office (M. Arrington, personal communication, 2015). Through their voluntary participation, the faculty for the course determined the students to participate in the electronic attendance monitoring system (M. Arrington, personal communication, 2015). Because of the recruitment style of the faculty for the electronic attendance monitoring system, the sampling process utilizes convenience sampling (Field, 2013; Shadish et al., 2002). Convenience sampling represents a type of non-probability sampling where the subjects are selected because of their accessibility (Field, 2013; Shadish et al., 2002).

Instrumentation

During the electronic attendance monitoring system trial, the Office of Institutional Research used the MagTek Model-21040145 SureSwipe Dual Head Triple Track Magnetic Stripe Card Reader with 6' universal serial bus (USB) Interface Cable, 60 in/s Swipe Speed, 5V, to collect data. The project used 10 identification card swipe machines to collect data. The card swipe machines accommodate a university identification card swiped facing any direction which prevented having to align the identification cards a certain way to capture their information. The Office of Institutional Research selected the MagTek card swipe machines for their compatibility with the current student identification cards (M. Arrington, personal communication, 2015). In addition, it meant students enrolled in the classes where the electronic attendance monitoring system occurred would not have to carry around an additional item to verify their attendance. The system offers the flexibility to manually input a student identification number. The staff members who collected the data would use the card swipe machines to track attendance and view the computer screen to ensure that the student identification card registered correctly (M. Arrington, personal communication, 2015). Using the MagTek card swipe machine presents an important difference from other universities because the system did not require the installation of expensive equipment, incorporation of new radio frequency identification detectors, or barcode scanners (M. Arrington, personal communication, 2015). Using the card swipe machine allowed for rapid data collection.

Data Collection

According to the director of the Office of Institutional Research, the project began with members of the Office of Institutional Research staff volunteering to ensure accurate data collection (M. Arrington, personal communication, 2015). The protocol developed by the Office of Institutional Research staff, and vetted through the faculty, stated that the seven staff members tasked with swiping identification cards would ensure card readers were available 15 minutes prior to the class beginning and remained there until five minutes after the class began (M. Arrington, personal communication, 2015). Data collectors were obligated to ensure that they had a full view of the computer screen to reduce errors. If a student forgot to bring their student identification card, the system allowed for the manual input of their numbers. All data, swiped and manually entered, was uploaded in the same file to the Institutional Research database. A byproduct of the electronic attendance monitoring system was that it created more time for instruction in the class, as the faculty did not need to collect attendance information prior to every class period, as compared with faculty who devoted time to record attendance themselves (M. Arrington, personal communication, 2015). There was a possibility that non-enrolled students could swipe into the monitored course, but the cross-referencing of the swiped data with the class roster ensured that non-enrolled students' information did not end up in the database.

The staff members operated their location beginning 15 minutes prior to the class start time to five minutes after the class started (M. Arrington, personal communication, 2015). The presence of a person at the check-in sites ensured that the course could start on time and allowed for some members of the course to arrive late while still being

included in the figures collected. As the semester progressed, three student workers were hired to relieve some staff members of having to attend two or three classes to complete the project. For large classes (those with over 120 registered students) two people staffed the location to collect data to ensure quick entry to the classroom. On some days, only one staff member was present, but the difference in staff did not affect the quality of the data collected or starting time of the class (M. Arrington, personal communication, 2015).

Upon entering the university, students submit demographic data that updates as they matriculate (M. Arrington, personal communication, 2015). The researcher requested archived demographic information from students' online records supplied by the Office of Institutional Research. The accuracy of the data relies on the student's attention to detail. The university regularly updates some of the data, like undergraduate year classification, throughout the time that a student is enrolled. These records are accessible through the online record keeping software used by The University of Southern Mississippi, PeopleSoft. Faculty, staff, and students know the system as SOAR or Southern's Online Accessible Records.

Institutional Review Board

Upon completion of the dissertation proposal defense, the researcher submitted the research proposal to The University of Southern Mississippi's Office of Research Integrity's Institutional Review Board (IRB) for approval. The application includes a detailed explanation of the proposed research, ways to ensure the privacy of subjects, and how confidentiality of all the data would be maintained. The Institutional Review Board ensures that researchers take appropriate safeguards to protect any subjects involved, protect the data researchers use, and to ensure that the research complies with applicable

federal and institutional standards and guidelines (The University of Southern Mississippi, n.d.). The official approval from the Institutional Review Board is provided in Appendix C.

Data Request and Confidentiality of Data

The Office of Institutional Research granted approval to use the electronic attendance monitoring system data as evidenced in the approval letter found in Appendix B. To request the data, the researcher completed an Institutional Review Board (IRB) request. One of the most important parts of this data request is to ensure the confidentiality of the data. The researcher asked that the data not include student names or identification numbers to protect student confidentiality. To support confidentiality, the researcher requests that the data use the following identification method: Course Name-Section Number-Year-Roster Number (ex. HIS101;H001;2015;45). Further, each semicolon (;) represents separated data in Microsoft Excel in a different cell in the table so that it assists in the data analysis process. Labeling the data in this fashion allows for the analysis of data at a later point. Academic success metrics from the Spring 2015 Semester include the total number of students enrolled in each section and individual end-of-course grade. For the courses taking part in the Spring 2015 electronic attendance monitoring system, the researcher requested individual attendance rates (attended/max number of class meetings) and undergraduate demographic factors. The researcher requested that the demographic factors be coded as follows: Gender (Male/Female), local residency (On-Campus/Off-Campus), state of residency (Mississippi/Other), Greek Life organization affiliation (Yes/No), admission type (Freshman/Transfer), cumulative GPA at time of course enrollment (Below 2.5/2.5 and above), age at the time of course

enrollment, undergraduate year classification (Freshman, Sophomore, Junior, Senior), ethnicity (American Indian, Asian, Black, Hispanic, Multiracial, Not Specified, Pacific Islander, White), and current enrollment status (Part-Time, Full-Time) during the Spring 2015 Semester (Part-Time/Full-Time). Coding the undergraduate student attendance-based demographics in this fashion allows for the ease of analysis.

Data Analysis

Upon authorization from The University of Southern Mississippi's Institutional Review Board to proceed, the researcher requested the selected archival data from The University of Southern Mississippi Office of Institutional Research. The information was requested in a format that allows for a seamless transition to IBM's Statistical Package for the Social Sciences (SPSS) software Version 22, such as a Microsoft Excel file.

Table 4 illustrates the timetable for the occurrence of the data analysis. Once approved by the Institutional Review Board, the researcher submitted a data request. The researcher then utilized the next weeks to code the data in SPSS. Upon completion, the following timetable provided a timely guide.

Table 4

Data Analysis Timetable

Week	Task
Week Zero	Approval received from the Office of Research Integrity.
Weeks One - Three	Sent a request for archival data to the Office of Institutional Research.
Week Three	Upon receipt of archival data from the Office of Institutional Research, imported data into IBM's SPSS to run statistical analysis tests.

Table 4 (Continued)

Week	Task
Weeks Four - Seven	Analyzed data pertaining to *RO 1* - Describe the undergraduate demographic factors affecting attendance, academic success rates, and attendance rates of the student sample.
	Analyzed data pertaining to *RO 2* - academic success rates of students in the sections of courses using the electronic attendance monitoring system in the Spring 2015 Semester with the sections of courses that did not use the system.
	Analyzed data pertaining to *RO 3* - Determine the relationship between undergraduate attendance rates and academic success when using an electronic attendance monitoring system.
	Analyzed data pertaining to *RO 4* - Determine the relationship between the undergraduate demographic factors affecting attendance and attendance rates on student academic success when using an electronic attendance monitoring system
Weeks Eight - Ten	Completed established tables with report of results from SPSS and summarize results.

Data Analysis Plan

The following section outlines the data analysis plan and explains the different types of data used in the study. As previously outlined, the researcher requested the data upon IRB approval. The Office of Institutional Research provided data in three category types: nominal, ordinal, and ratio. Nominal data are labels for variables that have no numeric value (Field, 2013; Shadish et al., 2002). Ordinal data does have an order in the values, but the differences separating the values are unknown (Field, 2013; Shadish et al., 2002). Ratio-based data tells the researcher the exact value of the data points and has an absolute zero-based figure (Field, 2013; Shadish et al., 2002).

To analyze RO1, the researcher describes the demographics of the population and sample, student success rates, and undergraduate student attendance rates, using descriptive statistics. Tables and figures describe the data which include numbers, percentages, and histograms. Some tables show the differences in academic success rates between the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

Logistic regression was used to analyze RO2 and RO4. Logistic regression analysis allows the researcher to use the demographic variables as predictors to estimate the likelihood of an event to occur (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985). In this case, the event observed is the student's record of attendance in the classroom. Logistic regression also allows the researcher to analyze the impact of demographic variables on a student's decision to attend class (Peng & So, 2002). The researcher chose logistic regression because the student demographic data categories and subcategories for classes can accommodate dependent variables that are dichotomous, categorical, and allow for the use of dummy variables as the independent variable, something that linear regression testing cannot perform (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985). Additionally, Peng and So (2002) believe demographics must be analyzed to determine if one variable interacts with another as a risk factor affecting attendance and a logistic regression analysis examines the relationship. The continuous variable for Research Objective 2 is attendance rates. The dependent variable presents the academic success rates of the sample. The basic assumptions for logistic regressions are For logistic regression analysis some basic assumptions exist: (a) having a dichotomous dependent variable, (b) ensuring that each

grouping is unique meaning that there can be no crossover of data within a group, (c) large sample sizes are needed in order for the data to be robust, and (d) that a linear relationship does not exist between the independent and dependent variables (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985). Another assumption of the logistic regression is that the variables are measured accurately (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985). One item that may stand out due to accuracy is the presence of outliers. As such, major outliers in the data should be removed to prevent skewing the data (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985). A 95% confidence level ($p < .05$), was used in these tests.

Additionally, an odds ratio is reported in a logistic regression. The odds ratio statistic, e^B, provides an explanation describing the relationship between the independent and dependent variables (Field, 2009; Peng & So, 2002; Shadish et al., 2002; Statistic Solutions, 2013). The odds ratio describes the change in odds of being in a category of the dependent variable for every unit increase of any given variable in the logistic regression model output (Field, 2009; Peng & So, 2002; Shadish et al., 2002; Statistic Solutions, 2013). In logistic regressions, if the odds ratio is above 1, it shows the importance of the variable to academic success (Field, 2009; Peng & So, 2002; Statistic Solutions, 2013). Conversely, if the e^B figure is less than 1, it indicates that an inverse relationship exists (Field, 2009; Peng & So, 2002; Statistic Solutions, 2013). For a less than 1 e^B figure, as the independent variable increase, the less likely for the outcome to occur (Field, 2009; Statistic Solutions, 2013).

The researcher uses a point-biserial statistical test to evaluate Research Objective 3 and the supposition that students who attend have better academic success rates than students who do not (Field, 2009; Shadish et al., 2002). The point-biserial tests used a 95% confidence interval ($p < .05$) for all tests, which is the norm for all social science statistics (Field, 2009; Shadish et al., 2002). Point-biserial tests report a Pearson coefficient number in the output. The Pearson coefficient numbers can range from -1 to 1; where -1 represents a perfect negative relationship and 1 represents a perfect positive relationship (Field, 2009; Statistic Solutions, 2013). A perfect negative relationship means that there is an indirect relationship between the variables and as one variable increases the other variable will decrease (Field, 2009; Statistic Solutions, 2013). A perfect positive relationship means that there is a direct relationship between the variables and as one increases so does the other (Field, 2009). Cohen's standard segments correlations into distinct categories where .10 to .29 represents a weak association, .30 to .49 represents a moderate association, and .50 and above represents a strong association (Statistic Solutions, 2013). By squaring the Pearson coefficient number, researchers determine is the percentage of variability that one factor has on the other (Field, 2009; Statistic Solutions, 2013). Point-biserial tests have certain assumptions to ensure validity. Point-biserial tests must have one or two variables using ratio data, while the other variable is dichotomous (Field, 2009). Point-biserial testing does not use independent and dependent variables because it is a test comparing two variables to each other (Field, 2009). This research objective uses the point-biserial test to assess the importance of undergraduate student attendance on academic success.

Table 5 presents the data analysis plan for the present research project. The table is divided to illustrate the four research objectives. Table 5 also identifies the statistical tests used for each research objective, the data types, and, the independent and dependent variables.

Table 5

Data Analysis Plan

Research Objective	Statistical Test	Data Category	Variables
RO1 – Describe Student Demographics, Academic Success Rates, and Student Attendance Rates	Descriptive Statistics –	Nominal, Ordinal, Ratio	Frequencies and Percentages
RO2 – Difference in academic success when using electronic attendance monitoring	Logistic Regression	Nominal and Ratio	IV: Attendance-monitoring rates DV: Academic Success
RO3 – Attendance rates relationship to academic success in participating courses	Point-biserial correlation	Nominal and Ratio	Continuous Variable: Attendance-monitoring rates Dichotomous Variable: Academic Success
RO4 – Influence of Demographics and Attendance on Academic success	Logistic Regression	Nominal and Ratio	IV: Demographics, Continuous Variable: Attendance-monitoring rates DV: Academic Success

Note. The Demographic variables referenced in the research objectives are gender, local residence, state residence, Greek affiliation, admission type, cumulative GPA, age, classification, ethnicity, and enrollment status. Independent variable is represented as IV. Dependent variable is represented as DV.

Validity and Reliability

In any research study, validity and reliability are two key factors. Validity ensures the present research is appropriate, meaningful, and that the researcher's

conclusion can be useful (Fraenkel & Wallen, 2006). Additionally, validity breaks down into two subordinate subsets, internal and external validity, and determines if the requirements of the research methods are met (Shadish et al., 2002). External validity refers to whether or not the results and generalizations are applicable to a larger population (Fraenkel & Wallen, 2006; Shadish et al., 2002). External validity was controlled because the population involved all students from courses participating, and the sections that did not participate, in the electronic attendance monitoring system (Fraenkel & Wallen, 2006; Shadish et al., 2002). Internal validity is addressed because course sections that did not employ the electronic attendance monitoring system are in the data received and used as a control group (Fraenkel & Wallen, 2006; Shadish et al., 2002). By doing this, the researcher can control the presence of other reasons that may affect the outcomes of the tests (Fraenkel & Wallen, 2006; Shadish et al., 2002). Reliability defines the degree of dependability of the assessment tool (Fraenkel & Wallen, 2006; Shadish et al., 2002). The Office of Institutional Research organized the electronic attendance monitoring system and thus ensuring reliability of the data collection rested with their staff. Members of the office staff conducted training for all individuals tasked with collecting data (M. Arrington, personal communication, 2015). The protocol consisted of having a training session to demonstrate the proper collection procedures and a member of the staff being present to observe the person during the first day of swiping in their assigned course (M. Arrington, personal communication, 2015). The protocol established a system ensuring that individuals knew what to expect during their assigned times to swipe for a course and no issues arose to indicate a gap in reliability (M. Arrington, personal communication, 2015).

Chapter Summary

In summary, the present study seeks to determine the influence of an electronic attendance monitoring system on undergraduate student success. Chapter III presents information regarding research objectives, research design, population, sample, sampling process, instrumentation, data collection, research objectives, data analysis, and limitations of the study. This study utilizes a quasi-experimental design using archival data. Data was analyzed for the Spring 2015 Semester when the electronic attendance monitoring system was implemented. In Chapter III the methodology was described to include the chosen statistical tests determined by the research objectives. The data analysis occurred using IBM SPSS version 22 software. Chapter IV summarizes the results and analysis of the study.

CHAPTER IV – RESULTS

The present study determined the influence of an electronic attendance monitoring system on undergraduate student success. Chapter IV reports the results of the study's research objectives which determined the design of the study and the process for analyzing the data. This study utilizes a quasi-experimental design using archival data from an electronic attendance monitoring system implemented during the Spring 2015 Semester. The analysis for the study includes descriptive statistics, logistic regression, and a point-biserial correlation. The sample includes University of Southern Mississippi undergraduate students from the Spring 2015 course sections whose faculty voluntarily participated in the electronic attendance monitoring system.

Research Objective 1 – Describing demographics, attendance, and academic success rates

Research Objective 1 describes the demographic factors, attendance rates, and academic success rates of the student sample. Research Objective 1 uses descriptive statistics to provide a snapshot of the population and sample. Descriptive statistics provide quantitative data to researchers using simple tables, graphics, and summary data (Field, 2009; Shadish et al., 2002). The student demographics, academic success rates, and student attendance data were obtained from the Institutional Research Office.

Demographic Characteristics

The research-based demographic factors, tying both to academic success and attendance accountability, include gender, local residence, state residence, Greek affiliation, admit type, cumulative GPA, age, undergraduate classification, ethnicity, and enrollment status. The demographics in Table 6 describe the population and sample in the present study. During the Spring 2015 semester, the total number of students in the

sample is 1593, where 640 students were enrolled in sections of courses using the electronic attendance monitoring system and 953 students were enrolled in sections of courses that did not use monitor attendance. Table 6 presents the demographic information of students in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

Faculty volunteered to use the electronic attendance monitoring system and were not randomly selected. Student demographic information was collected as students applied for admission to the university and updated throughout a student's enrollment.

Table 6

Group Demographic Characteristic Comparison

Characteristics	Attendance Monitoring Number (%)	Non-Attendance Monitoring Number (%)
Gender		
Female	388 (60.6%)	610 (64.0%)
Male	252 (39.4%)	343 (36.0%)
Local Residence		
Commuter	257 (40.2%)	593 (62.2%)
Resident	383 (59.8%)	360 (37.8%)
State Residence		
In-State	466 (72.8%)	784 (82.3%)
Out-of-State	174 (27.2%)	169 (17.7%)
Greek Affiliation		
No	451 (70.5%)	770 (80.8%)
Yes	189 (29.5%)	183 (19.2%)

Table 6 (Continued)

Characteristics	Attendance Monitoring Number (%)	Non-Attendance Monitoring Number (%)
Admit Type		
Freshman	534 (83.4%)	590 (61.9%)
Transfer	106 (16.6%)	361 (37.9%)
Cumulative GPA		
Below 2.5	397 (62.0%)	470 (49.3%)
2.5 and Above	211 (33.0%)	373 (39.1%)
No Established GPA	32 (5.0%)	110 (11.5%)
Age		
Traditional (18-24)	609 (95.2%)	765 (80.3%)
Non-Traditional (>24)	31 (4.8%)	188 (19.7%)
Classification		
Underclassmen	521 (81.4%)	589 (61.8%)
Upperclassmen	119 (18.6%)	364 (38.2%)
Ethnicity		
American Indian	2 (0.3%)	6 (0.6%)
Asian	10 (1.6%)	16 (1.7%)
Black	230 (35.9%)	378 (39.7%)
Hispanic	27 (4.2%)	34 (3.6%)
Multiracial	14 (2.2%)	14 (1.5%)
Not Specified	1 (0.2%)	12 (1.3%)
Pacific Islander	1 (0.2%)	2 (0.2%)
White	355 (55.5%)	491 (51.5%)
Enrollment Status		
Part-Time	15 (2.3%)	82 (8.6%)
Full-Time	625 (97.7%)	871 (91.4%)

As students applied for admission, two gender choices were available, female or male. At the time, the university did not provide additional choices for gender identification. During the semester of study, the gender breakdown at the university level for the population was 63.2% female and 36.8% male. In the sections of courses that instituted the electronic attendance monitoring system, 60.6% (n = 388) were female and 39.4% (n = 252) were male, representing a 21.2% higher rate of females than males. The sections of courses that did not use the electronic attendance monitoring system was 64.0% (n = 610) female and 36.0% (n = 343) male.

Each semester, students make an important choice regarding their desire to reside in on-campus housing or to reside off-campus and be a commuter student. Information regarding the residency designation for the university population was not available through an online search for the information nor was it provided through the request for archival data. Overall, the students enrolled in the sections of courses using the electronic attendance monitoring system had a makeup of 40.2% (n = 257) commuter students and 59.8% (n = 383) resident students. Comparatively, the demographics of students not in the sections of courses using the electronic monitoring system were made of 62.2% (n = 593) commuter students and 37.8% (n = 360) resident students.

Universities across the nation recruit students from both their home state and other states in the United States, as well as other countries. For the purposes of the study, students were categorized as either being in-state residents or out-of-state residents. The population of the university is made up of 65.0% in-state residents and 35.0% out-of-state residents. The sections of courses using the electronic attendance monitoring system had a state residence breakdown of 72.8% (n = 466) as in-state residents and 27.2% (n = 174)

as out-of-state residents. In the sections of courses that did not monitor attendance 82.3% (n = 784) were in-state residents and 17.7% were out-of-state residents.

The literature review presented research conducted regarding the success of students if they were involved in at least one major campus organization. In this study, the major campus organization selected was whether a student is involved in a fraternity or sorority. Information regarding the number of students university-wide involved in Greek Life is not available on the Institutional Research website, nor was it provided through the data request. However, in the sample, the number of students not involved in a Greek organization in the sections of courses using the electronic attendance monitoring system was 70.5% (n = 451) and the number of students who were in a Greek organization was 29.5% (n = 189). In the sections of courses that did not participate in the electronic attendance monitoring system the number of non-Greek affiliated students was 80.8% (n = 770) and the number affiliated with a Greek organization was 19.2% (n = 183).

As students are admitted to the university, they receive a classification as either a freshman admit, their first time in college, or a transfer admit, those students transferring credit from another institution. The University of Southern Mississippi publishes the number of new students each semester who fall into these categories, however, the figures are not available for the full university-wide population. The sections of courses that took part in the electronic attendance monitoring system had 83.4% (n = 534) freshman admit students and 16.6% (n = 106) transfer admit students. Comparatively, the sample included 61.9% (n = 590) freshman admit students and 37.9% (n = 361)

transfer admit students in the sections of courses that did not participate in the electronic attendance monitoring system.

As students progress through college, their academic success is recorded as a Cumulative GPA, another demographic factor used in this study. The GPA was recorded with three distinct categories, students who earn Below a 2.5 Cumulative GPA, students who achieve a 2.5 and Above, and students with no previous university grade point average. No figures are available to describe the student population for this demographic because the information is not published. In the sections of courses implemented the electronic attendance monitoring system, 62.0% (n = 397) of the students in the sample had a GPA below a 2.5, 33.0% (n = 211) had a GPA of 2.5 and above, and 5.0% (n = 32) were without any previous university GPA. In the sections of courses that did not take place in the electronic attendance monitoring system, 49.3% (n = 470) earned a GPA below a 2.5, 39.1% (n = 373) attained a GPA of 2.5 and above, and 11.5% (n = 110) were without any previous university GPA.

Colleges and universities find a wide age range of students in attendance pursuing a degree. Traditional aged students are defined as being between 18-24 years of age and those above 24 years of age are defined as non-traditional students. In all, the university population for this demographic at the time was 67.5% in the traditional age and 32.5% in the non-traditional age group. Sections of courses that used the electronic attendance monitoring system had a makeup of 95.2% (n = 609) traditional aged students and 4.8% (n = 31) non-traditional aged students. The sections of courses that did not use the electronic attendance monitoring had a breakdown of 80.3% (n = 765) traditional aged and 19.7% (n = 188) in the non-traditional category. The difference in the percentages

can be attributed to the courses that took part in the electronic attendance monitoring system and their place in the course sequencing for academic majors which is to enroll in these classes early in the undergraduate career.

As students progress through college, they are classified in one of four categories, freshman, sophomore, junior, or senior. The present study used two factors to classify students, underclass students which are freshman and sophomores, and upperclass students which are juniors and seniors. Altogether, the classification of the student body population for this demographic factor shows that 38.6% of the university-wide students are classified in the underclass category and 61.4% in the upperclass category. In the sections of courses that used the electronic attendance monitoring system, the makeup was 81.4% (n = 521) underclass students and 18.6% (n = 119) upperclass students. The sections of courses that did not use the electronic attendance monitoring system consisted of 61.8% (n = 589) underclass students and 38.2% (n = 364) upperclass students.

Students have the opportunity to select their ethnicity when applying for entrance into the university. During this process, individuals can select one of eight categories to describe their ethnicity which are American Indian, Asian, Black, Hispanic, Multiracial, Not Specified, Pacific Islander, or White. Due to the lack of numbers in each ethnicity category in the courses that used the electronic attendance monitoring system, some ethnicities had to be combined for the purposes of conducting the research. The ethnicity for the population was 62.9% in the White category, 27.2% in the Black category, and 9.9% in the combined other ethnicity category. The ethnicity of students in the sections of courses that used the electronic attendance monitoring system is 55.5% (n = 355) in the White category, 35.9% (n = 230) in the Black category, and 8.6% (n = 55) in the

combined other ethnicity category. The ethnicity of students in the sections of courses that did not use the electronic attendance monitoring system is 51.5% (n = 491) in the White category, 39.7% (n = 378) in the Black category, and 8.9% (n = 84) in the combined other ethnicity category.

Each semester, students are able to choose how many credit hours they wish to enroll as they select their classes. Full-time students must be enrolled in at least 12 credit hours while individuals below 12 credit hours are classified as part-time students. Overall, the enrollment status breakdown for the population was 11.9% part-time students and 88.1% full-time students. The breakdown in the sections of courses that used the electronic attendance monitoring system was 2.3% (n = 15) part-time students and 97.7% (n = 625) full-time students. This compared to 8.6% (n = 82) part-time students and 91.4% (n = 871) full-time students in the sections of courses that did not utilize the electronic attendance monitoring system.

Electronic Attendance Monitoring System Descriptive Results

Research Objective 1 also presents the data on the percentage of class times that students attended class. Research Objective 1 breaks down the data in two ways. Figure 5 presents the undergraduate student electronic attendance monitoring data combining all participating courses in one graphic. Figure 5 uses descriptive statistics to show the undergraduate student electronic attendance monitoring-data describing the attendance rates for the individual class sections for the sample. Figure 5 organizes the attendance data as follows: 0-20%, 20.1-40%, 40.1-60%, 60.1-80%, 80.1-90%, 90.1-95%, 95.1-99.99%, and 100%. The data provided by the Office of Institutional Research was in percentage of classes that the student attended. The percentage figures provide increased

flexibility of data usage as different course sections met on different days and for different durations. Therefore, having the total percentage of class attended provided an accurate way for the researcher to compare data between courses.

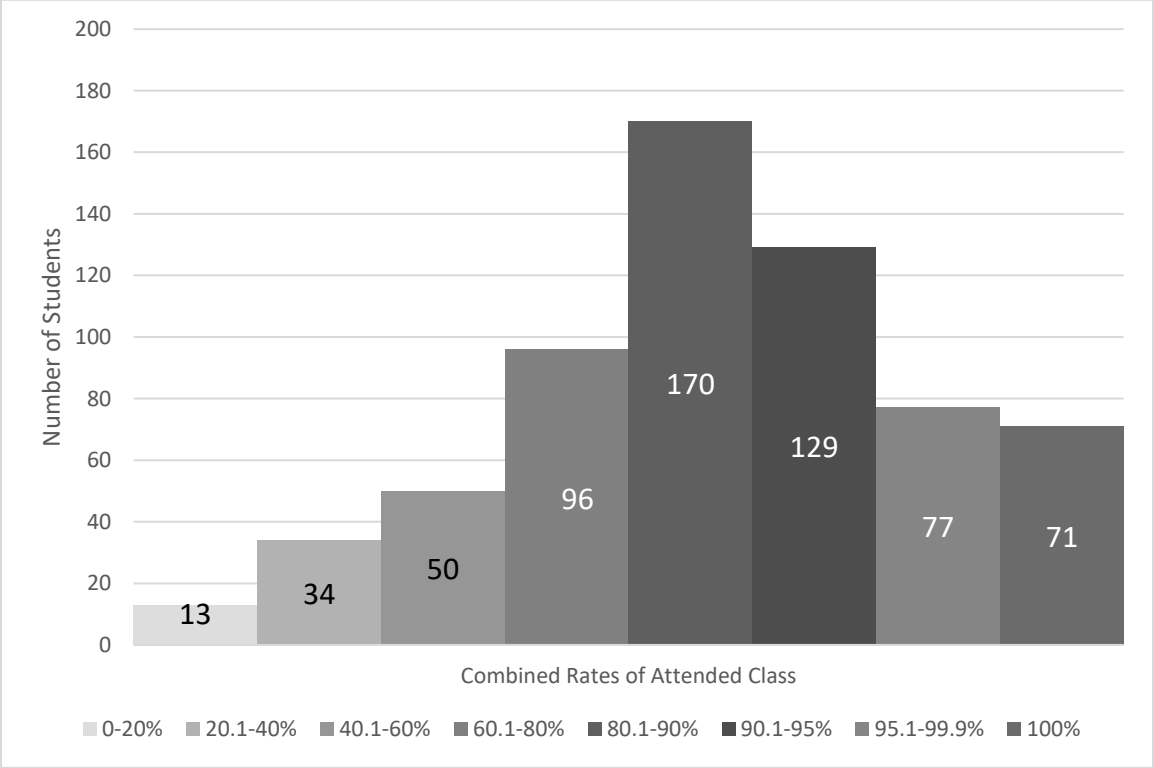

Figure 5. Combined Classroom Attendance Data

Through the usage of the electronic attendance monitoring system, the study provides data that has previously been unknown and unable to analyze for statistical testing. To note, each one of the histogram sections is not equal. The histograms used a system that separated the attendance rates in 20% increments. However, because the 80.1% to 100% range had the highest number of people, which was unknown until the data was received, this range was divided into four distinct categories to better illustrate the attendance figures. The results from Figure 5 show that of all the students involved in the electronic attendance monitoring system, 11.0% (n = 71) students attended class

meetings 100% of the time, 12.0% (*n* = 77) students attended 95.1 to 99.9% of class meetings, 20.2% (*n* = 129) of students were in class for 90.1 to 95% of full meeting time, 26.6% (*n* = 170) of students attended class between 80.1 to 90% of available course meetings, and 15.0% (*n* = 96) of students attended class 60.1 to 80% of class meeting time. This shows that 84.8% (*n* = 543) students attended class 60% or more of the time. In contrast, 15.2% (*n* = 97) students did not attend class over 60% of the time. That breakdown is 2.1% (*n* = 13) of students attended class 0 to 20% of the time, 5.3% (*n* = 34) were in class for 20.1 to 40% of class meetings, and 7.8% (*n* = 50) attended class 40.1 to 60% of the time.

Figure 6 uses descriptive statistics to show the undergraduate student electronic attendance monitoring-data describing the attendance rates for the individual class sections for the sample. Figure 6 organizes the attendance data as follows: 0-20%, 20.1-40%, 40.1-60%, 60.1-80%, 80.1-90%, 90.1-95%, 95.1-99.99%, and 100%.

The results from Figure 6 were broken down by course title enabling the illustration of attendance in specific courses involved in the electronic attendance monitoring system. In History 101, 6.7% (*n* = 19) students attended class meetings 100% of the time, 13.6% (*n* = 39) students attended 95.1 to 99.9% of class meetings, 17.2% (*n* = 49) of students were in class for 90.1 to 95% of full meeting time, 25.0% (*n* = 71) of students attended class between 80.1 to 90% of available course meetings, and 16.5% (*n* = 47) of students attended class 60.1 to 80% of class meeting time. This shows that 79.0% (*n* = 225) students attended class 60% or more of the time. In contrast, 21.0% (*n* = 60) students did not attend class over 60% of the time. That breakdown is 2.1% (*n* = 6)

of students attended class 0 to 20% of the time, 7.0% (n = 20) were in class for 20.1 to 40% of class meetings, and 11.9% (n = 34) attended class 40.1 to 60% of the time.

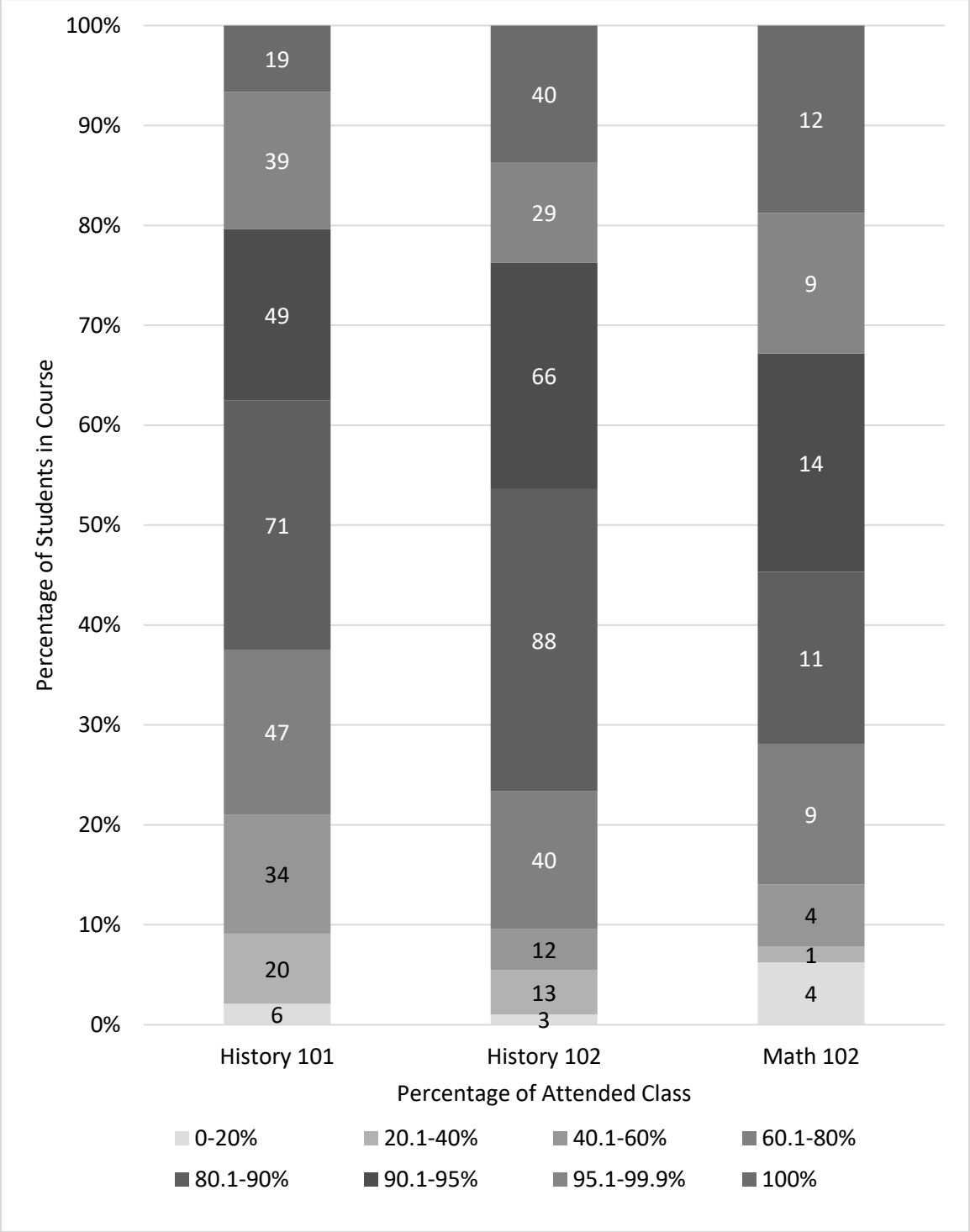

Figure 6. Individual Course Attendance Monitoring Data

In History 102, 13.7% (*n* = 40) students attended class meetings 100% of the time, 10.0% (*n* = 29) students attended 95.1 to 99.9% of class meetings, 22.7% (*n* = 66) of students were in class for 90.1 to 95% of full meeting time, 30.2% (*n* = 88) of students attended class between 80.1 to 90% of available course meetings, and 13.7% (*n* = 40) of students attended class 60.1 to 80% of class meeting time. This shows that 90.3% (*n* = 263) students attended class 60% or more of the time. In contrast, 9.7% (*n* = 28) students did not attend class over 60% of the time. That breakdown is 1.2% (*n* = 3) of students attended class 0 to 20% of the time, 4.4% (*n* = 13) were in class for 20.1 to 40% of class meetings, and 4.1% (*n* = 12) attended class 40.1 to 60% of the time.

In Math 102, 18.6% (*n* = 12) students attended class meetings 100% of the time, 14.1% (*n* = 9) students attended 95.1 to 99.9% of class meetings, 21.8% (*n* = 14) of students were in class for 90.1 to 95% of full meeting time, 17.3% (*n* = 11) of students attended class between 80.1 to 90% of available course meetings, and 14.1% (*n* = 9) of students attended class 60.1 to 80% of class meeting time. This shows that 85.9% (*n* = 55) students attended class 60% or more of the time. In contrast, 14.1% (*n* = 9) students did not attend class over 60% of the time. That breakdown is 6.3% (*n* = 4) of students attended class 0 to 20% of the time, 1.5% (*n* = 1) were in class for 20.1 to 40% of class meetings, and 6.3% (*n* = 4) attended class 40.1 to 60% of the time.

One area of Figure 6 that stands out is in History 101, the number of people who were in the 40.1-60% range. Otherwise, the data shows that the percentage of student attending class less than 60% of the time is below 15%. The attendance range where the largest majority of students attended class is the 80.1-90% range for History 101 and History 102 but is 90.1-95% for Math 102. History 101 has a very low 100% attendance

percentage when compared to the other courses in the study. Appendix D presents an adapted view of Figure 6 in a table format.

Academic Success Rates

The final section of Research Objective 1 provides the summary information regarding academic success rates in the Spring 2015 Semester in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. Table 7 presents a breakdown of students, on a summary scale and categorized by each course, in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system during the Spring 2015 Semester.

Table 7

Breakdown of Students in Participating and Non-Participating Courses

Course	Attendance Monitoring (*n*)	Non-Attendance Monitoring (*n*)	Total
All Courses Combined	640	953	1593
History 101 World Civilization I	285	219	504
History 102 World Civilization II	291	540	831
Math 102 Brief Applied Calculus	64	194	258

Note. The table lists the courses that participated in the electronic attendance monitoring system. The table shows the number of students enrolled in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system as well as presents the total numbers in the categories.

Table 7 provides the breakdown of the number of students enrolled in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. In total, 640 students took part in course sections implementing the electronic attendance monitoring system, and 953 students were in the non-attendance monitoring course sections. The total number of students in the sample is

1593. Three courses participated in the electronic attendance monitoring system. The History 101 course had 285 students enrolled in the attendance monitoring while 219 students were in the course sections that did not participate in attendance monitoring. The enrollment for History 102 saw 291 students in the attendance monitoring course sections and 540 students in the non-attendance monitoring course sections. Math 102 had 64 students in the course sections that participated in the attendance monitoring and 194 students in the course sections that did not participate.

The total number of students for each course is different for a number of reasons. First, each course had different number of available course sections that could and did participate. Two of the three History 101 class sections participated in the study. One of the three class sections of History 102 participated in the study. Two of the seven class sections of Math 102 course participated. Second, the size of the enrollment cap on the class could have affected the number of students enrolled in each course section. For instance, the number of students allowed to register in a course section of Math 102 is lower than that of History 101 or History 102. Next, the number of course sections for each class and the classroom assigned for the class section to meet was out of control of the researcher as it is assigned at least two semesters prior to that semester. The classroom assigned for a course section dictates how many students can enroll in the class. Finally, faculty who voluntarily participated in the electronic attendance monitoring system controlled the number of available students for attendance monitoring.

Table 8 presents the academic success data combining all participants in the course sections in the Spring 2015 Semester. Table 8 presents the raw data of academic success rates, students who received an A, B, or C end-of-term grade in the sections of

courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

Table 8

Academic Success in Participating Courses: Monitored vs. Non-Monitored

Courses	Attendance Monitoring Number (%)	Non-Attendance Monitoring Number (%)
History 101 - World Civilization I	161 (56.5%)	80 (36.5%)
History 102 - World Civilization II	205 (70.4%)	258 (47.8%)
Math 102 - Brief Applied Calculus	41 (64.1%)	95 (49.0%)

Note. The table lists the courses that participated in the electronic attendance monitoring system. The table compares the combined academic success rates in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

Table 8 presents the end-of-term academic success data for the three courses that took part in the electronic attendance monitoring system as compared to the course sections that did not participate. While other factors could have influenced the academic success rates, they are not known at this time. However, the main difference between these course sections is the implementation of the electronic attendance monitoring system. The results show higher levels of academic success in the courses using the electronic attendance monitoring system. The results for History 101 indicate that 56.5% (n = 161) of students enrolled in the attendance monitored class sections were academically successful as compared to 36.5% (n = 80) in the class sections that did not participate. The data shows a 20.0% increase in academic success rates between the attendance monitoring and non-attendance monitoring classes when using an electronic attendance monitoring system. History 102 had the highest number of students in a class that participated in the electronic attendance monitoring system. History 102 saw a

70.4% (n = 205) rate of academic success in attendance monitored classes as opposed to 47.8% (n = 258) in the non-attendance monitored classes. This represents a 22.6% increase in the academic success rate between these classes. The results from Math 102 indicated an 25.1% increase in the academic success rates between the course sections. The course sections that used attendance monitoring had a 64.1% (n = 41) academic success rate versus 49.0% (n = 95) rate in the non-attendance monitoring classes.

The data has shown a difference in the academic success rates between the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. The end-of-term grades were provided by the Office of Institutional Research in an anonymous fashion and because of that, descriptive statistics can be used to see the actual differences in the end-of-term academic success grades. Tables 9, 10, and 11 compare the actual course grades for History 101, History 102, and Math 102 during the Spring 2015 Semester in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. Table 9 presents the information from History 101.

Table 9

Academic Success Course Data Comparison: History 101

	Success			Not Success		
Group	A	B	C	D	F	W
Attendance Monitored	24 (8.4%)	67 (23.5%)	70 (24.6%)	35 (12.3%)	57 (20.0%)	32 (11.2%)
Non-Attendance Monitored	13 (5.9%)	38 (17.4%)	29 (13.2%)	33 (15.1%)	71 (32.4%)	35 (16.0%)

Note. The table represents the total number of students enrolled in the course during the Spring 2015 semester and is separated into two categories, attendance monitored and non-attendance monitored. The attendance monitored category represents course sections that participated in the electronic attendance monitoring system and has 285 participants. Conversely, the non-attendance monitored category represents the sections of the course that did not participate in the electronic attendance monitoring system and has 265 participants total. The end-of-term grades of A, B, and C, are classified as "Success". The end-of-term grades of D, F, and W are classified as "Not Success.

Table 9 presents the academic success data of the sample and divides the data by attendance monitored," the class sections participating in the electronic attendance monitoring system, and non-attendance monitored," the class sections that did not take part. The data in Table 9 shows academic success in this course is greater in the class sections that implemented the electronic attendance monitoring system. As reported earlier, the students enrolled in the History 101 class sections that implemented the electronic attendance monitoring system had a 56.5% academic success rate as compared to 36.5% in the class sections that did not implement the system. Specifically, as compared to the courses that did not implement attendance monitoring, the courses that did monitor for attendance saw an increase of 2.5% in A grades, an increase of 6.1% of B grades, and an increase of 11.4% in C grades. Conversely, the data in the D, F, and W columns (Not Success), shows a reduction in the number of students who are in each column. The attendance monitored courses had a 2.8% drop in D grades, a 12.4% drop in F grades, and a 4.8% drop in the Withdrawal rate. The data shows a difference is present by implementing the electronic attendance monitoring system.

Table 10 presents the actual course grades for History 102 in the Spring 2015 Semester of the courses and sections using the electronic attendance monitoring system and courses that did not participate.

Table 10

Academic Success Course Data Comparison: History 102

	Success			Not Success		
Group	A	B	C	D	F	W
Attendance Monitored	44 (15.1%)	83 (28.5%)	78 (26.8%)	34 (11.7%)	39 (13.4%)	13 (4.5%)
Non-Attendance Monitored	42 (7.8%)	114 (21.1%)	102 (18.9%)	90 (16.7%)	147 (27.2%)	45 (8.3%)

Note. The table represents the total number of students enrolled in the course during the Spring 2015 semester and is separated into two categories, attendance monitored and non-attendance monitored. The attendance monitored category represents course sections that participated in the electronic attendance monitoring system and has 291 participants. Conversely, the non-attendance monitored category represents the sections of the course that did not participate in the electronic attendance monitoring system and has 540 participants total. The table includes the individual grades for students enrolled in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. The grades provided are A, B, C, D, F, and W. The end-of-term grades of A, B, and C, are classified as "Success". The end-of-term grades of D, F, and W are classified as "Not Success.

Table 10 presents the data, divided by attendance monitored, the class sections participating in the electronic attendance monitoring system, and non-attendance monitored", the class sections that did not take part. The data in Table 10 shows academic success in this course is greater in the class sections that implemented the electronic attendance monitoring system. The students enrolled in the class sections that implemented the electronic attendance monitoring system had a 70.4% academic success rate as compared to 47.8% in the class sections that did not implement the system. When comparing the courses implementing attendance monitoring to the ones that did not, a difference in the academic success grades is present. Increases in academic success were noted with an increase of 7.3% in A grades, a 7.4% increase of B grades, and a 7.9% increase in C grades. Additionally, a decrease is present in the grades classified as "Not Success". The results show a 5.0% decrease in D grades, a 13.8% decrease in F grades, and a 3.8% decrease in the Withdrawal rate. The percentage increases and decreases show that a difference in academic success rates is present through the implementation of

an electronic attendance monitoring system. Table 11 presents the actual course grades for Math 102 in the Spring 2015 Semester in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system.

Table 11

Academic Success Course Data Comparison: Math 102

	Success			Not Success		
Group	A	B	C	D	F	W
Attendance Monitored	13 (20.3%)	17 (26.6%)	11 (17.2%)	7 (10.9%)	7 (10.9%)	9 (14.1%)
Non-Attendance Monitored	38 (19.6%)	26 (13.4%)	31 (16.0%)	22 (11.3%)	27 (13.9%)	50 (25.8%)

Note. The table represents the total number of students enrolled in the course during the Spring 2015 semester and is separated into two categories, attendance monitored and non-attendance monitored. The attendance monitored category represents course sections that participated in the electronic attendance monitoring system and has 64 participants. Conversely, the non-attendance monitored category represents the sections of the course that did not participate in the electronic attendance monitoring system and has 194 participants total. The table includes the individual grades for students enrolled in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. The grades provided are A, B, C, D, F, and W. The end-of-term grades of A, B, and C, are classified as "Success". The end-of-term grades of D, F, and W are classified as "Not Success.

Table 11 presents the data, divided by attendance monitored, the class sections participating in the electronic attendance monitoring system, and non-attendance monitored, the class sections that did not take part. The data in Table 11 shows academic success in this course is greater in the class sections that implemented the electronic attendance monitoring system. The students enrolled in the class sections that implemented the electronic attendance monitoring system had a 64.1% academic success rate as compared to 49% in the class sections that did not implement the system. The data shows an increase of 0.7% in A grades, a 13.2% increase in B grades, and a 1.2% increase in C grades. Further, a decrease of 0.4% of D grades, a decrease of 3.0% of F grades, and a 11.7% decrease in the Withdrawal rate. In Math 102, having a 11.7% decrease in the Withdrawal rate is a major difference as more students remained enrolled

in the course until the end of the academic term. Appendix E through M presents additional tables that further report the outcomes of academic success comparing to the historical averages for the courses.

Research Objective 2 – Difference in academic success rates when using an electronic attendance monitoring system

Research Objective 2 determines if a difference in academic success rates exists in courses using an electronic attendance monitoring system. To analyze the data, the researcher used a logistic regression analysis to determine the significance between the summary data for the courses involved (Field, 2009; Gellman & Hill, 2007; Shadish et al., 2002; Wong & Mason, 1985).

Research Objective 2 tests for significance of students during the Spring 2015 Semester in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system, to determine whether electronic attendance monitoring affects academic success rates. Tables 12, 13, and 14 present the results of the statistical testing. In this testing, the independent variable is the rate of undergraduate student attendance for the sample and the dependent variable is the end-of-semester grade, which measures academic success. Using the IBM SPSS program, the researcher categorized the different course sections to provide statistical evidence of the impact of the electronic attendance monitoring system on each individual course.

Table 12

Attendance Monitoring Versus Non-Attendance Monitoring: History 101

Class Comparison	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Monitored vs. Non-Monitored	.814	19.485	.184	1	2.256	.000
Constant	-.552	15.497	.140	1	.576	.000

Note. Course refers to the specific course taking part in the electronic attendance monitoring system. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

Table 12 shows the results of a logistic regression using IBM's SPSS program to determine if the History 101 end-of-term academic success rates between the sections of courses that used the electronic attendance monitoring system versus sections of courses that did not was statistically significant. The results express the impact of implementing the electronic attendance monitoring system in this course. In the SPSS output, the Model chi-square statistic within the Omnibus Tests of Model Coefficients table. The results of the test, using a 95% confidence rate, was determined to be significant with the results of X^2 (1) = 19.485, $p < .001$. The Cox and Snell $R^2 = .039$ and the Nagelkerke $R^2 = .052$. The results indicate that the electronic attendance monitoring system made a statistically significant difference in the end-of-term academic success rates. The outcome was that students enrolled in the attendance monitored courses were 2.256 times more likely to receive an A, B, or C end-of-term grade than students who were in the non-attendance monitored classes. This statement applies to the students who were enrolled in these classes during the Spring 2015 Semester. In conclusion, the testing was significant, indicating that students enrolled in the attendance monitoring classes were more successful academically.

Table 13

Attendance Monitoring Versus Non-Attendance Monitoring: History 102

Class Comparison	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Monitored vs. Non-Monitored	.958	38.324	.155	1	2.605	.000
Constant	-.089	1.066	.086	1	.915	.302

Note. Course refers to the specific course taking part in the electronic attendance monitoring system. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

A Logistic Regression was conducted on the History 102 course to assess if the end-of-term academic success rates between the course sections that used the electronic attendance monitoring system versus courses that did not was significant. The SPSS output reports the Model chi-square statistic within the Omnibus Tests of Model Coefficients table. The test used a 95% confidence rate and the results determined a significant difference where X^2 (1) = 38.324, p < .001. The Cox and Snell R^2 = .047 and the Nagelkerke R^2 = .063. The results indicate that the electronic attendance monitoring system made a statistically significant difference in the end-of-term academic success rates. The outcome was that students enrolled in the attendance monitored courses were 2.605 times more likely to be academically successful than students who were in the courses that did not implement the electronic attendance monitoring system. This statement applies to the students enrolled in these classes during the Spring 2015 Semester. In conclusion, the testing was significant, indicating the impact of an electronic attendance monitoring system and that students enrolled in the attendance monitoring classes were more successful academically.

Table 14

Attendance Monitoring Versus Non-Attendance Monitoring: Math 102

Class Comparison	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Monitored vs. Non-Monitored	.619	4.334	.297	1	1.858	.037
Constant	-.041	.82	.144	1	.960	.774

Note. Course refers to the specific course taking part in the electronic attendance monitoring system. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

Similar to the other courses, a Logistic Regression analysis assessed if the end-of-term academic success rates for Math 102 were significantly different between the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. The Omnibus Tests of Model Coefficients used a 95% confidence rate and the results determined a significant difference between the classes where X^2 (1) = 4.334, $p < .001$. The Cox and Snell $R^2 = .017$ and the Nagelkerke $R^2 = .023$. The results indicate that the electronic attendance monitoring system made a significant difference in the end-of-term academic success rates. The outcome was that students enrolled in the attendance monitored courses were 1.858 times more likely to be academically successful than students who were in the courses that did not implement the electronic attendance monitoring system. This statement applies to the students enrolled in these classes during the Spring 2015 Semester. In conclusion, the testing was significant, indicating the impact of an electronic attendance monitoring system and that students enrolled in the attendance monitoring classes were more successful academically.

Research Objective 3 – Relationship between attendance rates and academic success

Research Objective 3 tested the relationship between undergraduate student attendance rates and academic success in courses using an electronic attendance monitoring system. The statistical testing used for this research objective is a point-biserial test. The point-biserial test measures item reliability (Field, 2009). Point-biserial tests assess the correlation of a dichotomous variable and a continuous variable (Field, 2009). For this test, the dichotomous variable is academic success, end-of-term grades of an A, B, or C, or not successful academically, end-of-term grades of a D, F, or W. The percentage of class that a student attended represents the continuous variable. In terms of the importance for this research objective, the point-biserial test allows the researcher to test whether the percentage classes that an undergraduate attended effects academic success.

In Table 15, reports the results of the point-biserial statistical test. The results present the information from running the point-biserial statistical test to determine the relationship between undergraduate student attendance rates and academic success. The information gathered from Research Objective 3 provides insight into the relationship between undergraduate student attendance rates and academic success when using an electronic attendance monitoring system.

Table 15

Correlation Between Attendance Rates and Academic Success

Course	Pearson Correlation	*Sig. (2-tailed)*	*N*
All Courses Combined	.560	<.001	1593
History 101 World Civilization I	.560	<.001	285
History 102 World Civilization II	.549	<.001	291
Math 102 Brief Applied Calculus	.540	.001	64

Table 15 presents the correlation between attendance rates and academic success. The point-biserial test was formatted to combine all of the classes together into one data set and allowed the courses to be split by the individual courses. Pearson coefficients can result in either positive or negative relationships between the two variables. The Pearson coefficient numbers can range from -1 to 1; where -1 represents a perfect negative relationship and 1 represents a perfect positive relationship (Field, 2009; Statistic Solutions, 2013). The Pearson coefficient number is squared to get the percentage of variability in academic success that is accounted for by attendance in the classroom (Field, 2009; Statistic Solutions, 2013). Stated another way, the stronger the correlation, the more variability is explained. The correlations in Table 15 assess the correlations for all courses, History 101, History 102, and Math 102. Each of the cases has a correlation number above .540 which according to Statistic Solutions (2013), represents a strong association between attendance and academic success.

The result of the test for the full sample indicated r (1593) = .560 p < .001 and the r value of .560 indicates a strong correlation between attendance and academic success. Further, by squaring the Pearson Correlation, we find that 31.4% of the variability in

academic success is related to attendance. Next, the data was separated in SPSS to assess the individual courses. In History 101, the result was r (285) = .560 p < .001, which according to Statistics Solutions (2013) indicates a strong correlation between attendance and academic success. In History 101, the results show that attendance accounts for a 31.4% variability in academic success. History 102, which had the largest sample size in the electronic attendance monitoring system, had a result of r (291) = .549 p < .001. This indicates that attendance accounts for a 30.1% variability in academic success. The results for Math 102 were very similar to the other courses but had a result of r (64) = .540 p = .001. This result indicates a 29.2% variability in academic success as it relates to attendance.

Research Objective 4 – Relationship between demographic factors and attendance rates on academic success rates

Research Objective 4 tested the relationship between the literature-based undergraduate demographic factors and attendance rates on student academic success in courses using an electronic attendance monitoring system. Research Objective 4 uses a logistic regression analysis, which is used to determine the interaction that the undergraduate student attendance rates and attendance based demographic factors have on the academic success grades.

The researcher uses dummy variables for ethnicity due to the presence of three distinct categories, White, Black, and other ethnicity. Due to the nature of the classes and the non-random assignment that occurs, the dummy variables are used to allow a breakdown of different ethnicities. The study uses three ethnicity categories because the White category was a large majority of the sample, but the Black ethnicity had above

35%. Each of the other ethnicities did not have a large enough percentage to allow for individual testing to occur.

Introduction to Research Objective 4

In total, 1,593 students enrolled in courses included in this study. The independent variables were attendance rates and demographic variables affecting attendance. Table 16 shows the identification coding that took place for the demographic variables.

Table 16

Logistic Regression Identification Coding Used in SPSS

Demographic Variable	0	1
Gender	Female	Male
Local Residence	Commuter	Resident
State Residence	In-State	Out-of-State
Greek Affiliation	No	Yes
Admit Type	Freshman	Transfer
Cumulative GPA	Below 2.50	2.5 and Above
Age	Traditional (18-24)	Non-Traditional (>24)
Classification	Underclass	Upperclass
Ethnicity	White	Black (1) Other Ethnicity (2)
Enrollment Status	Part-Time	Full-Time

Attendance was used in the logistic regression and calculated by using the percentage of attended class in the logistic regression. The researcher conducted a Logistic regression and IBM's SPSS program was used to determine if the full model of variables against the constant only model was statistically significant.

All Courses Combined

Table 17 presents data illustrating the interactions of the undergraduate student attendance figures, demographics, and academic success rates. Table 17 presents the, data using a Wald test to determine if the independent variables are significant (Field, 2009; Goodwin, 2009; Trochim, 2006). The variable(s) found not significant are deleted from the predictive equation, as they do not influence the results (Field, 2009; Goodwin, 2009; Trochim, 2006). Table 17 also highlights the logistic regression coefficient and odds ratio for each of the attendance based demographic variables. The researcher used a $p < .05$ criterion for the significance value.

Table 17

Demographic and Attendance Relationship on Academic Success – All Courses Combined

Demographic Variable	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Gender	-.366	2.174	.227	1	.694	.136
Local Residence	.424	6.995	.264	1	1.528	.141
State Residence	.104	.513	.280	1	1.110	.731
Greek Affiliation	.923	7.135	.308	1	2.518	.005
Admit Type	-.601	6.112	.351	1	.548	.123
Cumulative GPA	1.643	43.891	.248	1	5.171	.000
Age	1.594	9.324	.714	1	4.924	.026
Classification	.855	4.844	.388	1	2.350	.028
Ethnicity		9.324		2		.009
White (0)						
Black (1)	-907	9.222	.299	1	.404	.002
Other Ethnicity (2)	-.451	.960	.461	1	.637	.327
Enrollment Status	.472	.311	.846	1	1.603	.577
Attendance	.078	78.187	.009	1	1.081	.000
Constant	-7.726	43.527	1.171	1	.000	.000

Note. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

The SPSS output included the Model chi-square statistic within the Omnibus Tests of Model Coefficients table. The Omnibus test and Model chi-square statistic determines if the model is a significant fit (Field, 2009; Shadish et al., 2002; Statistic Solutions, 2013). To be considered a significant fit, the model must have a *p* value of

less than .05 and the results show significance where X^2 (11) = 312.172, p = .002. The SPSS generated classification table provides the overall percentage of correctly predicted cases (Field, 2009). The percentage for the null model was 63.6% which increased to 82.7% when using the full model data. The Hosmer and Lemeshow goodness-of-fit test indicates that the model is a good fit for the data, X^2 (11) = 8.701, p = .368 (Field, 2009; Shadish et al., 2002; Statistic Solutions, 2013).

Table 17 presents the results of the logistic regression. In the results, the study shows that of the demographic variables included in the analysis, Greek affiliation, Cumulative GPA, Age, Classification, Ethnicity – White, Ethnicity – Black, and Attendance are all significant with a p value less than .05. Because of finding significance in these variables, their odds ratio number is able to be used. For Greek affiliation, the students who were involved in Greek Life in this sample were found to be 2.518 times more successful than non-Greek Life students. Students with a Cumulative GPA of 2.5 and Above were 5.171 times more likely to be academically successful than students who had Below a 2.5 Cumulative GPA. Students who were of the Non-Traditional Age, Above 24 years old, were found to be 4.924 times more successful than Traditional Age students, 18-24 years old. In the Classification demographic, Upperclass students were 2.350 times more likely to be successful as compared to Underclass students. Ethnicity used dummy variables because the category had three different subsets to analyze. Because of this, the White category, which had the largest percentage of students, was used as the comparison group for ethnicity. The data used the White category as the comparison and significance was found in the Ethnicity-Black category. Because this result is inversely related to the White category, the results found that Black

students are 0.404 times less likely to be successful than White students. Attendance was found to be significant but used a continuous variable for assessment in the logistic regression. As such, for each 1% increase in attendance, the odds of a person being academically successful is 1.081 times more likely.

Gender, Local Residence, State Residence, Admit Type, and Enrollment Status were not found to have significance in the logistic regression. By not finding significance for these demographic variables, it means that the variable does not contribute to the outcome of academic success among the participants. These factors have been found in previous research to be important to academic success and attendance. But this previous research only analyzed one variable at a time as opposed to the current study which combined multiple demographic variables. The variables are not able to be removed from the equation as it will affect the significance of the other variables.

This section of Research Objective 4 details the results from the logistic regression analysis. The data provided shows no indications of any influential cases or outliers in the data. No evidence exists to suggest that the testing violated the assumptions of a logistic regression test. In conclusion, the testing was statistically significant.

History 101 Analysis

Next, Table, 18 shows the results of the logistic regression when the data is split for only the History 101 (World Civilization I) course. Also included in Table 18 are the logistic regression coefficient, Wald test, and odds ratio for each of the attendance based demographic variables. The researcher used a .05 criterion for the significance value.

Table 18

Demographic and Attendance Relationship on Academic Success – History 101

Demographic Variable	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Gender	-.636	3.008	.367	1	.529	.083
Local Residence	.189	.200	.422	1	1.208	.655
State Residence	.202	.216	.435	1	1.224	.642
Greek Affiliation	1.299	6.889	.495	1	3.665	.009
Admit Type	-.418	.461	.616	1	.658	.497
Cumulative GPA	1.263	12.092	.363	1	3.535	.001
Age	1.608	2.415	1.035	1	4.994	.120
Classification	.878	2.040	.615	1	2.407	.153
Ethnicity		1.099		2		.577
White (0)						
Black (1)	-.455	1.095	.425	1	.641	.295
Other Ethnicity (2)	-.420	.091	.644	1	.818	.763
Enrollment Status	-.855	.364	1.417	1	.425	.546
Attendance	.077	38.645	.012	1	1.080	.000
Constant	-5.990	11.917	1.735	1	.003	.001

Note. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

The Omnibus Tests of Model Coefficients table and Model chi-square statistic determines a significant fit as long as model has a *p* value of less than .05 (Field, 2009; Shadish et al., 2002; Statistic Solutions, 2013). The results show significance where X^2 (11) = 138.200, p = .001 (Field, 2009). The SPSS generated classification table provides the overall percentage of correctly predicted cases (Field, 2009). The percentage for the

null model was 56.5% which increased to 81.4% when using the full model data. The Hosmer and Lemeshow goodness-of-fit test indicates that the model is a good fit for the data, X^2 (11) = 7.336, p = .501.

Table 18 presents the results of the logistic regression. The study shows the demographic factors of Greek affiliation, Cumulative GPA, and Attendance were significant as their p value was less than .05. Since these variables were found to be significant, their odds ratio numbers are able to be used. In History 101, the study shows that Greek students are 3.665 times more likely to succeed than non-Greek students and students with a Cumulative GPA of 2.5 and above are 3.535 times more likely to succeed. Attendance used a continuous variable and as such, for every 1% increase in attendance, the odds of a person succeeding in the course was 1.080 times more likely to happen.

Gender, Local Residence, State Residence, Admit Type, Age, Classification, Ethnicity, and Enrollment Status were not found to have significance in the logistic regression. The lack of significance means that during this time, using this data, the variable does not contribute to the outcome of academic success. In previous research, individually, these variables have shown academic success and attendance. The variables are not able to be removed from the equation as it will affect the significance of the other variables.

This section of Research Objective 4 details the results from the logistic regression analysis. The data provided shows no indications of any influential cases or outliers in the data. No evidence exists to suggest that the testing violated the assumptions of a logistic regression test. In conclusion, the testing was statistically significant.

History 102 Analysis

Next, Table, 19 shows the results of the logistic regression for only the History 102 (World Civilization II) course. Also included in Table 19 are the logistic regression coefficient, Wald test, and odds ratio for each of the attendance based demographic variables. The researcher used a .05 criterion for the significance value.

Table 19

Demographic and Attendance Relationship on Academic Success – History 102

Demographic Variable	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Gender	-.034	.007	.410	1	.967	.934
Local Residence	.500	1.165	.463	1	1.649	.280
State Residence	-.007	.000	.486	1	.993	.988
Greek Affiliation	.484	.749	.559	1	1.623	.387
Admit Type	-.297	.192	.679	1	.743	.661
Cumulative GPA	1.946	22.434	.411	1	6.998	.000
Age	.024	.000	1.461	1	1.024	.987
Classification	2.081	8.217	.726	1	8.009	.004
Ethnicity		12.751		2		.002
White (0)						
Black (1)	-1.856	12.377	.528	1	.156	.000
Other Ethnicity (2)	-1.140	2.248	.760	1	.320	.134
Enrollment Status	.1.194	.436	1.808	1	3.2993	.509
Attendance	.087	27.876	.016	1	1.091	.000
Constant	-9.408	16.510	2.315	1	.000	.000

Note. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

The Omnibus Tests of Model Coefficients table and Model chi-square statistic determines a significant fit as long as model has a *p* value of less than .05 (Field, 2009; Shadish et al., 2002; Statistic Solutions, 2013). The results show significance where X^2 (11) = 146.756, p = .001 (Field, 2009). The SPSS generated classification table provides the overall percentage of correctly predicted cases (Field, 2009). The percentage for the null model was 56.5% which increased to 81.4% when using the full model data. The Hosmer and Lemeshow goodness-of-fit test indicates that the model is a good fit for the data, X^2 (11) = 4.004, p = .857.

Table 19 presents the results of the logistic regression. The analysis shows which demographic factors have significance, which are Cumulative GPA, Classification, Ethnicity, and Attendance as their *p* value is less than .05. Because these variables are significant, their odds ratio numbers are able to be used. The results indicate that students with a Cumulative GPA of 2.5 and Above are 6.998 times more likely to be academically successful than students with Below 2.5 GPA. Upperclass students are 8.009 times more likely to succeed in History 102 as compared to Underclass students. Because Ethnicity has three subset categories, dummy variables had to be used to analyze the data. The comparison category was White students and the analysis found significance in both the comparison and Black subsets. Black students were found to be .156 times less likely to be successful academically than the comparison group. The reason for this is because the significance is inversely related to the comparison group. Attendance used a continuous variable in the analysis and as such for each 1% increase in attendance rates, a student was 1.091 times more likely to succeed academically.

Gender, Local Residence, State Residence, Greek Affiliation, Admit Type, Age, and Enrollment Status were not found to have significance in the logistic regression. These variables do not contribute to the outcome of the logistic regression analysis because they lack significance. The variables are not able to be removed from the equation as it will affect the significance of the other variables.

This section of Research Objective 4 details the results from the logistic regression analysis. The data provided shows no indications of any influential cases or outliers in the data. No evidence exists to suggest that the testing violated the assumptions of a logistic regression test. In conclusion, the testing was statistically significant.

Math 102 Analysis

Next, Table, 20 shows the results of the logistic regression for only the Math 102 (Brief Applied Calculus) course. Also included in Table 20 are the logistic regression coefficient, Wald test, and odds ratio for each of the attendance based demographic variables. The researcher used a .05 criterion for the significance value.

Table 20

Demographic and Attendance Relationship on Academic Success – Math 102

Demographic Variable	B	*Wald*	*SE*	*df*	e^B	*Sig.*
Gender	-2.514	2.257	1.713	1	.076	.133
Local Residence	1.955	1.298	1.716	1	7.063	.255
State Residence	1.933	1.119	1.827	1	6.098	.290
Greek Affiliation	1.702	1.163	1.578	1	5.484	.281
Admit Type	-2.830	1.837	2.088	1	.059	.175
Cumulative GPA	6.150	5.597	2.600	1	468.920	.018
Age	4.637	3.082	2.641	1	103.224	.079
Classification	2.882	1.471	2.376	1	17.856	.225
Ethnicity		.292		2		.864
White (0)						
Black (1)	-.224	.0152	1.826	1	1.199	.902
Other Ethnicity (2)	2.632	.282	4.959	1	113.905	.596
Enrollment Status	.058	.001	2.128	1	1.060	.978
Attendance	.174	3.882	.088	1	11.189	.049
Constant	-18.260	4.107	9.010	1	.000	.043

Note. The logistic coefficient (β) helps determine the direction of the relationship (positive or negative) based upon the numeric value (positive or negative). The Wald chi square statistic assesses the significance to coefficients, measuring the ratio of the square of the regression coefficient to the square of the standard error of the coefficient. S.E. stands for Standard Error and is calculated by taking the standard deviation divided by the square root of the sample size; the Standard Error measures the accuracy of comparing a statistic to a population. The df refers to the Degrees of Freedom and stands for the number of values in the final calculation of the statistic that are free to vary without violating any constraints. The e^B symbol represents the odds ratio and is an alternative value given to interpret the coefficient. S*ig* represents the significance or *p* value using a 95% confidence interval where results less than .05 are found to be considered significant.

The Omnibus Tests of Model Coefficients table and Model chi-square statistic determines a significant fit as long as model has a *p* value of less than .05 (Field, 2009; Shadish et al., 2002; Statistic Solutions, 2013). The results show significance where X^2 (11) = 44.644, p = .001). The SPSS classification table provides the overall percentage of correctly predicted cases (Field, 2009; Statistic Solutions, 2013). The percentage for the

null model was 64.1% which increased to 85.9% when using the full model data. The Hosmer and Lemeshow goodness-of-fit test indicates that the model is a good fit for the data, X^2 (11) = 2.510, p = .961. Included in Table 20 are figures that show the importance of the demographic variables.

Table 20 presents the results of the logistic regression. The analysis shows only two areas of the logistic regression analysis have significance, Cumulative GPA and Attendance. The logistic regression output shows that students with a Cumulative GPA of 2.5 and Above are 468.920 times more likely to be academically successful than students with Below 2.5 GPA. Attendance used a continuous variable in the analysis and as such for each 1% increase in attendance rates, a student was 11.189 times more likely to succeed academically.

Gender, Local Residence, State Residence, Greek Affiliation, Admit Type, Age, Classification, Ethnicity, and Enrollment Status were not found to have significance in the logistic regression. With the data for this sample, these variables are not shown to contribute to the overall logistic regression analysis. Removing these variables would adjust the outcome of the analysis and must not occur.

Research Objective 4 details the results from the logistic regression analysis. The data provided shows no indications of any influential cases or outliers in the data. No evidence exists to suggest the testing violated the assumptions of a logistic regression test. The results showed that the testing was statistically significant.

Chapter Summary

The analysis indicates that when using the electronic attendance monitoring system, a positive relationship between attendance and academic success exists.

Furthermore, the findings present information on specific demographic variables affecting attendance that shows significance in the courses participating in the electronic attendance monitoring system. For each of the courses participating in the electronic attendance monitoring system, attendance was found to impact academic success rates in a statistically significant fashion. In Chapter V, the researcher presents the final summary, conclusions, and recommendations of this study. Chapter V also includes the limitations of the study and recommendations for further research.

CHAPTER V – CONCLUSIONS

Generally, poor college student attendance is due to a lack of accountability, which enables a low rate of attendance, while also limiting interactions between faculty and students (Jones, Crandall, Vogler, & Robinson, 2013). Nationally, and in the state of Mississippi, a skill gap is present in the workforce and one factor affecting this gap is the low level of undergraduate degree completion (Altonji et al., 2012; Kaplan, 2017; National Center for Education Statistics, 2017; Swanson & Holton, 2009; White House, Office of the Press Secretary,2009). Automated accountability tools, like the electronic attendance monitoring system, can assist in increasing interaction between faculty and students, greater academic success, and increased graduation rates (Borland & Howsen, 1998). During this time, undergraduate students develop workplace skills that contribute to the human capital needs of society (Blackwell, Bowes, Harvey, Hesketh, & Knight, 2001; Noel et al., 1985; Pascarella & Terenzini, 1991; Robertson et al., 2017).

The purpose of the present study is to determine the influence of an electronic attendance monitoring system on undergraduate student success. Specifically, the study assesses if an electronic attendance monitoring system affects student academic success. The findings and conclusions drawn from the research are discussed throughout Chapter V, followed by recommendations and suggestions for policy, practice, and future research.

Findings, Conclusions, and Recommendations

The findings, conclusions, and recommendations outlined in the following sections relate to the analysis from the analysis in Chapter 4 and the problem of the present research. All research objectives were examined through the study and as a result

of the analysis, certain outcomes were expected and in line with previous literature. However, the analysis revealed results contradicting the literature providing additional insight into the role of the electronic attendance monitoring system on academic success. The findings, conclusions, and recommendations result from the data analysis.

Finding 1: Academic success rates increased with attendance monitoring

The results of this study show that students enrolled in the sections of courses using the electronic attendance monitoring system were more successful academically than the sections of courses that did not use the system. In each of the three courses, History 101, History 102, and Math 102, a significant difference exists when comparing the sections of courses that used the electronic attendance monitoring system to the sections of courses that did not use the electronic attendance monitoring system. The results indicate that implementing an electronic attendance monitoring system can increase academic success for undergraduate students. These results may not always be the outcome, but for this study, they were.

Conclusions

The findings of this study align with and support previous research that promotes undergraduate student attendance accountability as a way to increase academic success rates (Kuh et al., 2008; Moore, 2003; Noel et al., 1985). The lack of accountability through attendance monitoring in classes can be detrimental to the learning aspirations of students. While the lack of attendance accountability allows freedom of choice for students to attend class, attendance monitoring systems promote attendance while students experience learning atmospheres with multiple distractions (Gump, 2006; Longhurst, 1999). Other universities have implemented electronic attendance monitoring

systems, but the results of their endeavors have not been published (Dicle & Levendis, 2013; Neman-Ford et al., 2008; Newsom, 2016; O'Connor, 2010). The present study suggests the impact of implementing attendance accountability systems. While the present study finds its basis in literature, the difference from the literature is the sample participants and the difference in location. The present study replicates the underlying notion that the presence of electronic attendance monitoring systems provides a way to promote accountability among students.

Recommendations

Universities must implement systems aimed at promoting attendance accountability. The following recommendations are predicated on the implementing a system similar to the electronic attendance monitoring system used in this study. First, universities can design outreach programs focused on students who are not attending class. These programs may occur through a campus retention office, residence life office, Greek Life office, or other major university departments that have large numbers of student involvement. Next, by implementing an attendance accountability procedure similar to the electronic attendance monitoring system, the opportunity exists for faculty to communicate to students directly regarding their lack of attendance. Communication originating from the faculty can lead to greater engagement between students and faculty. Last, through the proper identification of student involvement in a student's online records, the opportunity exists for a faculty or staff member that the student knows, for example through their on-campus involvement in co-curricular activities, to communicate with them. Through all of these outreach options, the opportunity exists to communicate the need for a behavior change to occur. Regardless of the method, higher education

institutions, already suffering from low retention and graduation rates, should provide accountability structures that promote attendance which boosts undergraduate student academic success.

Finding 2: Academic success increases as attendance increases

The results of the study indicate a positive relationship exists between attendance and academic success. While other factors may impact academic success, this study focused on the ability of attendance accountability to affect all students enrolled in the sections of courses using the electronic attendance monitoring system while comparing the outcomes to the sections of courses that did not use the system.

Conclusions

Previous research supports the importance of class attendance for academic success. Students who do not attend class regularly may become disengaged with the topic and lose the connection to the faculty member and the topic material (Blackwell et al., 2001; Noel et al., 1985; Pascarella & Terenzini, 1991; Robertson et al., 2017). Multiple reasons exist for students missing classes, but the most frequently stated reasons include sickness, peer pressure, parental influence, work commitments, conflicts with extracurricular activities, and the difficulty of their academic major (Longhurst, 1999). The results for this finding shows a link between attendance and academic success in the sample used during the present study.

Recommendations

The results of this study demonstrate the impact of electronic attendance monitoring systems to address the lack of attendance accountablity in the classroom. Strategies to assist students who do not attend class regularly be implemented. These

strategies can include the adoption of a university-wide attendance policy, implementation of an electronic attendance monitoring system in courses with low academic success rates, and marketing focused on the importance of classroom attendance on academic success rates. Implementing attendance accountability programs to promote academic success, especially in historically difficult courses, needs to occur at universities. Additionally, the collection of data by the Office of Institutional Research included the presence of an individual at the entrance to the classroom. Universities should make all attempts to incorporate a person-to-person contact when collecting the data when implementing the research study.

Finding 3: Courses are unique; Demographics correlate with academic success differently in combined or individual data sets, while attendance remains important throughout

In the request for data, The Office of Institutional Research identified the enrolled course for each student. The data request included the demographic information of the students. The data was analyzed in two distinct combinations; first analyzing all of the data combining all courses in one data set and second analyzing each course using separate data sets. The results of this research show the importance of certain demographic factors to academic success. In the all courses combined data set, the demographic factors of ethnicity, classification, age, cumulative GPA, and Greek affiliation positively affected academic success of students using electronic attendance monitoring systems. In History 101, the demographic factors of cumulative GPA, and Greek affiliation have a positive effect on the academic success of students using electronic attendance monitoring systems. In History 102, a positive effect exists among

the demographic factors of ethnicity, classification, and cumulative GPA on the academic success of students using electronic attendance monitoring systems. In Math 102, a positive effect is found between academic success and the demographic factor of cumulative GPA of students using electronic attendance monitoring systems. By combining the data all together and also separating the data by course, the analysis reveals information regarding the importance of different factors on undergraduate student success depending on the those included in the sample analysis. A significant relationship between attendance and academic success remains present throughout the analysis of the data, both combined and individually.

Conclusions

Previous research has shown that each of the demographic factors chosen for analysis made a difference in attendance rates and academic success rates (Altermatt, 2007; Arredondo & Knight, 2005; Behar, 2010; Borland & Howsen, 1998; Caldas, 1993; Chickering, 1974; Chimka et al., 2007; Lamdin, 1996; Lowis & Castley, 2008; Newman-Ford et al., 2008; Romer, 1993; Stewart et al., 1985; Stewart & Rue, 1983; Yu et al., 2010). However, the results of the present study, depending on if the combined data set is used or if the data is separated by course, differs with the literature for some of the demographic factors. Individually each class is unique and obtained different results for each of the demographic factors. To explain the differences between previous literature and the present results, differences exist in the population and sample, the types of courses observed, the university where the study took place, and class size variations. The most effective strategies that promote attendance accountability and academic success involve implementing multiple strategies that recognize each course, class

section, and the uniqueness of students enrolled; what works for one course or class section may not be successful in another course or class section.

The data analysis included the ability to determine factors from a combined data set and from individual course specific data sets. The analysis allowed the researcher to determine factors that remain constant and significant throughout the data sets for this sample. Of the students utilizing the electronic attendance monitoring system, the demographic factor of cumulative GPA effected academic success of students throughout the analysis, regardless of analyzing the combined data or the course specific data. A focus can be placed on cumulative GPA to lead students to academic success. Further, in the sample combining all courses, the demographic factors of attendance, ethnicity, classification, age, cumulative GPA, and Greek affiliation showed significance. The results from the larger sample allow for a larger generalization to occur as compared to the results from the individual courses. With the ability to include the largest amount of students possible in the combined sample, outreach can occur to students using the data.

In the analysis of the data associated with this study, the importance of attendance to academic success is demonstrated through the significance levels and agrees with previous literature (Stanca, 2004; Thomas & Higbee, 2000; Vidler, 1980). Finding 2 surmises that the more a student attends class, the higher their academic grades will be at the end of the term. In the analysis for Finding 3, attendance and the demographic factors were analyzed concurrently, and the results show the significance of attendance to the end of term academic success of students. The present study allows the researcher to provide information illustrating that by using an electronic attendance monitoring system, different courses achieve different results. Further, the present study shows the

uniqueness of the demographic factors of each student, but allows for the analysis of multiple demographic factors at one time.

Recommendations

Faculty, staff, and students need to know why the electronic attendance monitoring system is needed and to explain the results of the program. The academic success of students is closely related to their ability to persist through to graduation. Allowing stakeholders to use the data from the program allows individuals the opportunity to make decisions to support their academic success.

An additional recommendation is for institutions to implement programs to assist students who have a low cumulative GPA. Programs designed to assist students with a low cumulative GPA support student retention and academic success (Singell & Wadell, 2010). Some examples of these programs are academic department organized tutoring programs and academically focused skill building programs organized through the campus retention office. Implementing this recommendation can assist students in developing academic success skills needed to be successful in courses.

Another recommendation is for universities to look for undetected bias in the curriculum for courses that could adversely affect different ethnic groups. Ethnicity is shown to have significance in academic success when all the data is combined, but the significance is different for the three categories of ethnicity in the analysis. Examining for the presence of undetected bias serves as a tactic for universities to promote academic success through the adaptation to the needs of students, while still promoting the academic rigor needed to achieve a degree. Additionally, the data analysis demonstrates that certain demographic factors contribute to a student's academic success. The

information allows for the opportunity for outreach to occur to students in these demographics. Furthermore, officials can seek to determine the underlying factors that make students successful when they do have certain demographic factors.

A final recommendation lies with finding ways to utilize technology to assist students that cannot attend class. Many different conflicts can occur affecting a student's ability to attend, but little is done to ensure that the student doesn't miss out on the pertinent information for the course. Universities should implement technological aids, such as audio and video recordings, that assist students who are unable to attend class to promote dissemination of information.

Implications for Human Capital Development

This study is important to three different audiences: the State, the institution, and the individual. On a state level, improving attendance and graduation rates can positively impact the state's education level leading to increased economic prosperity among its citizens (Adelman, 1999). Systemic change needs to occur in universities, which are complex organizations, to witness success in improving the academic success, retention, and graduation metrics. Research, over the past four decades, links the level of student involvement or engagement with the more positive impact a student receives in the areas of academic and workplace skill development (American College Testing, 2010; Bean & Metzeler, 1985; Berger & Braxton, 1998; Gerdes & Mallinckrodt, 1994; Harrison, 2006; Lowis & Castley, 2008; Pascarella & Terenzini, 2005; Tinto, 1993). States, including Mississippi, have implemented laws linking higher education funding to academic success, retention, and graduation data points (Institutions of Higher Learning Board, State of Mississippi, 2013). On an institution level, recruitment and retention are key

aspects that affect a university's student population. As student populations evolve, institutions should implement innovative measures to promote and support student success (Noel et al., 1985; The University of Southern Mississippi, 2014). Research indicates identifying students at risk of dropping out, especially freshman, is the most efficient way to boost retention and graduation rates, thus promoting academic success (Reason, 2003). Institutions would be shortsighted to not implement interventions to positively impact academic success (Mitchell et al., 2014; Quinton, 2016; Swanson & Holton, 2009). From an individual standpoint, implementing attendance accountability systems could be one way to assist students in achieving higher levels of education and the development of workplace skills during college. The use of attendance monitoring could increase performance in classes and graduation rates leading to more prepared students for the workforce. In the state of Mississippi, only 29% of citizens have an education level at or above an Associate's degree (Education Commission of the States 2011). However, individuals who attain bachelor's degree earn $300 more each week than those that do not have a degree and experience a lower unemployment rate (Altonji et al., 2012; National Center for Educational Statistics, 2005). As the education level of a citizenry increases, so does the economic stability of the local economy. But, most importantly, the increase in education level assists the individual in meeting the qualifications for additional career opportunities.

Limitations

Researchers recognize limitations exist for all research. Limitations define the parameters of a researcher's scope of analysis (Roberts, 2010). Several limitations exist in the present study. First, the study analyzes data from only one institution, The

University of Southern Mississippi, and studies only one of two campuses, the Hattiesburg campus. The selection of the institution occurred due to its convenience and record in the areas of retention and graduation rates. Another limitation of the study is that the electronic attendance monitoring system was conducted for only one semester. The research did not control for other interventions that might have occurred during the time of the study, such as increased emphasis on study sessions or availability of university-provided tutoring, among other possible interventions during the Spring 2015 Semester. The difference in enrolled students each semester may affect overall academic success rates and influence the role demographics play on academic success rates. Having a diverse student population for a course can assist in generalizing the study to the university population and beyond. The study does not account for faculty-enforced attendance policies. Undergraduate student attendance policies could be viewed as having a non-effect on students' success, as the policies have been in place for multiple semesters prior to the electronic attendance monitoring system and may not have influenced academic success rates.

Recommendations for Further Research

Opportunities arise for future research based upon the results, limitations, and constraints of the research. Several suggestions for future research related to the topic of electronic attendance monitoring systems follow:

- Implementation of a longitudinal study over multiple semesters. The study could provide greater insight to promote academic success.
- Expand the research to a variety of other institutions. By doing this, generalization of the research to a greater population could occur.

- Evaluate other literature-based demographic factors such as financial aid status, first generation college student, academic major, academic college, ACT/SAT score, incoming GPA, and disability accommodations.
- Assess if a difference occurs in active attendance monitoring versus passive attendance monitoring in attendance rates and academic success rates.
- Determine ways to assess and monitor attendance in online only classes.

The areas for future research serve as recommendations for individuals interested in implementing strategies to promote undergraduate student success. These additional research areas could provide valuable information to universities, students, their families, policy makers, and peer institutions.

Discussion

This quasi-experimental study using archival data allowed the researcher to gather information about implementing an electronic attendance monitoring system. While previous research was conducted on the topic, the study allowed for the researcher to gain knowledge of a specific sample, at one point in time, at one university. Recent advances in technology allow for better integration of systems to assist students in academic success measures and add accountability in cost effective ways not addressed previously by academic institutions.

The present study compared three courses with sections that implemented the electronic attendance monitoring system and sections that did not. The findings showed that a significant difference occurs in end-of-term grades and that the more a student attends class, the better their academic success rate. Additionally, by analyzing demographics simultaneously, information is available on the impact of certain

demographic factors. The results show the likelihood of academic success when concurrently analyzing multiple demographic factors and attendance rates.

Entire university communities are engaged in finding ways to impact retention and graduation rates. This study could help fill a gap in their knowledge and understanding about attendance accountability. The results of this program should be shared with faculty, staff, and students to explain why electronic attendance monitoring is needed and explaining the results of the program.

Achieving academic success results from a combination of tactics, with each tactic designed to assist certain members of the population. Attendance monitoring is not *the* solution, but one solution. Nevertheless, the adoption of an electronic attendance monitoring system can address attendance accountability issues in courses identified by institutions through internal data analysis. The electronic attendance monitoring system positively impacted the end-of-term grades of students in the sample. Increasing the end-of-term grades of students is only one way to assist in retaining students and removing barriers in an effort to boost graduation rates. Further, by taking steps to improve attendance in the classroom, the development of workplace skills can occur as students progress through college.

Summary

The purpose of this research was to determine the influence of an electronic attendance monitoring system on undergraduate student success. Promoting student development through interactions between faculty and students increases academic success during the collegiate years and sets up a critical base for the future success of individuals (Astin, 1993). This establishes a link between collegiate academic success

and human capital development. Four research objectives guided the research and focused on the impact of an electronic attendance monitoring system on academic success.

The study examined these research objectives using the data provided through The Universityof Southern Mississippi's Office of Institutional Research on the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. Appropriate measures to determine external factors that could have impacted the research were identified, but which occurred naturally during the system's implementation. The study found a significant difference between the academic success rates in the sections of courses using the electronic attendance monitoring system and the sections of courses that did not use the system. Further, the study identified demographic factors that play a part in undergraduate student academic success.

Attaining higher levels of education assists individuals with finding gainful employment and leads to ecnomic stability (Bureau of Labor Statistics, 2015). With the everchanging landscape of higher education, colleges and universities should implement interventions designed to support undergraduate academic success and interaction with faculty as they develop human capital (Institutions of Higher Learning Board, State of Mississippi, 2013; Mitchell et al., 2014; Quinton, 2016). Implementing attendance accountability measures, such as an electronic attendance monitoring system, represents one stragety to positively impact academic success in college. Electornic attendance monitoring provides a viable way to assist students and promote academic success.

APPENDIX A – Use of table permission

RE: Graph Usage

Amy Skinner <askinner@ecs.org>

Mon 4/3/2017 8:53 AM

To:Charles Childress <charles.childress@usm.edu>;

No problem. Permission granted. Please cite us as the source is all I ask!
Good luck!

Amy Skinner
Director of Communications
Education Commission of the States
303.299.3609 I askinner@ecs.org
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From: Charles Childress [mailto:charles.childress@usm.edu]
Sent: Thursday, March 30, 2017 7:11 AM
To: Amy Skinner <askinner@ecs.org>
Subject: Graph Usage

Good Morning,

My name is Charles Childress and I am a current Doctoral Candidate in the University of Southern Mississippi's Human Capital Development Program. I am currently in the research proposal stage of my Dissertation and am seeking permission to use the charts and graphs in the attached document. Please let me know if you need further information or if permission can be granted.

Thanks in advance.

Charles F. Childress, III

APPENDIX B – Institutional research pre-approval

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL RESEARCH
118 College Drive #5167 | Hattiesburg, MS 39406-0001
Phone: 601.266.4059 | Fax: 601.266.4062 | www.usm.edu/ir IR@usm.edu

DATE: September 19, 2017

TO: Charles Childress
Human Capital Development PhD Candidate

FROM: Michelle Arrington, PhD
Associate Provost for Institutional Research
The University of Southern Mississippi

RE: Permission for Use of Data

Permission has been granted to Mr. Charles Childress to utilize the attendance tracking data collected the spring of 2015 semester at The University of Southern Mississippi expressly for his dissertation project.

A copy of the dissertation project IRB approval letter must be submitted to Institutional Research before the data will be supplied.

Signature: Michelle Arrington

APPENDIX C – Institutional review board approval letter

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
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NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 17120701
PROJECT TITLE: The Influence of an Electronic Attendance Monitoring System on Student Success
PROJECT TYPE: Doctoral Dissertation
RESEARCHER(S): Charles Felix Childress, III
COLLEGE/DIVISION: College of Science and Technology
DEPARTMENT: Human Capital Development
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 12/12/2017 to 12/11/2018
Lawrence A. Hosman, Ph.D.
Institutional Review Board

APPENDIX D – Attendance rates for all courses

Appendix D presents the electronic attendance monitoring data between the courses as found in Figure 6 which has been adapted into this table for the purposes of discussion.

Table A1.

Attendance Rates for All Courses Adapted from Figure 6

Attendance Rate	History 101 World Civilization I *n* (%)	History 102 World Civilization II *n* (%)	Math 102 Brief Applied Calculus *n* (%)
0-20%	6 (2.1%)	3 (1.2%)	4 (6.3%)
20.1-40%	20 (7.0%)	13 (4.4%)	1 (1.5%)
40.1-60%	34 (11.9%)	12 (4.1%)	4 (6.3%)
60.1-80%	47 (16.5%)	40 (13.7%)	9 (14.1%)
80.1-90%	71 (25.0%)	88 (30.2%)	11 (17.3%)
90.1-95%	49 (17.2%)	66 (22.7%)	14 (21.8%)
95.1-99.9%	39 (13.6%)	29 (10.0%)	9 (14.1%)
100%	19 (6.7%)	40 (13.7%)	12 (18.6%)

APPENDIX E – Academic success outcomes

The tables included in Appendix E present comparison tables presenting the results from the Spring 2015 Semester of the classes that participated in the electronic attendance monitoring system, classes that did not participate, and the historical average for that class from fall 2009 through fall 2014.

Table A2.

History 101 Academic Success Outcomes

History 101 World Civilization I	Success Rate	Not-Success Rate	Withdrawal Rate
Participating Class Sections	56.5%	43.5%	11.2%
Non-Participating Class Sections	36.5%	63.5%	16.0%
Historical Average	54.6%	45.5%	3.9%

Table A3.

History 102 Academic Success Outcomes

History 102 World Civilization II	Success Rate	Not-Success Rate	Withdrawal Rate
Participating Class Sections	70.4%	29.6%	4.5%
Non-Participating Class Sections	47.8%	52.2%	8.3%
Historical Average	62.3%	37.7%	3.3%

Table A4.

Math 102 Academic Success Outcomes

Math 102 Brief Applied Calculus	Success Rate	Not-Success Rate	Withdrawal Rate
Participating Class Sections	64.1%	35.9%	14.4%
Non-Participating Class Sections	49.0%	51.0%	25.8%
Historical Average	58.8%	41.2%	4.5%

APPENDIX F – Electronic attendance monitoring system gender comparison results

The table in Appendix F presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A5.

Comparison of Gender Results

Gender	Success *n* (%)	Not Success *n* (%)
Monitored		
Female	259 (66.8%)	129 (33.2%)
Male	148 (58.7%)	104 (41.3%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Female	292 (47.9%)	318 (52.1%)
Male	141 (41.1%)	202 (58.9%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX G – Electronic attendance monitoring system local residence comparison

The table in Appendix G presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A6.

Comparison of Local Residence Results

Local Residence	Success *n* (%)	Not Success *n* (%)
Monitored		
Commuter	135 (52.5%)	122 (47.5%)
Resident	272 (71.0%)	111 (29.0%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Commuter	258 (43.5%)	335 (56.5%)
Resident	175 (48.6%)	185 (51.4%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX H – Electronic attendance monitoring system state residence comparison

The table in Appendix H presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A7.

Comparison of State Residence Results

State Residence	Success *n* (%)	Not Success *n* (%)
Monitored		
In-State	279 (59.9%)	187 (40.1%)
Out-of-State	128 (73.6%)	46 (26.4%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
In-State	341 (43.5%)	443 (56.5%)
Out-of-State	92 (54.4%)	77 (45.6%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX I – Electronic attendance monitoring system Greek life affiliation comparison

The table in Appendix I presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A8.

Comparison of Greek Life Affiliation Results

Greek Affiliation	Success *n* (%)	Not Success *n* (%)
Monitored		
No	258 (57.2%)	193 (42.8%)
Yes	149 (78.8%)	40 (21.2%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
No	328 (42.6%)	442 (57.4%)
Yes	105 (57.4%)	78 (42.6%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX J – Electronic attendance monitoring system admit type comparison

The table in Appendix J presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A9.

Comparison of Admission Type Results

Admit Type	Success *n* (%)	Not Success *n* (%)
Monitored		
Freshman	355 (66.5%)	179 (33.5%)
Transfer	52 (49.1%)	54 (50.9%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Freshman	290 (49.2%)	300 (50.8%)
Transfer	143 (39.4%)	220 (60.6%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX K – Electronic attendance monitoring system cumulative GPA comparison

The table in Appendix K presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A10.

Comparison of Cumulative GPA Results

Cumulative GPA	Success *n* (%)	Not Success *n* (%)
Monitored		
Below 2.50	67 (31.8%)	144 (68.2%)
2.50 and Above	329 (82.9%)	68 (17.1%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Below 2.50	102 (27.3%)	271 (72.7%)
2.50 and Above	284 (60.4%)	186 (39.6%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX L – Electronic attendance monitoring system age comparison

The table in Appendix L presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A11.

Comparison of Age Results

Age	Success *n* (%)	Not Success *n* (%)
Monitored		
Traditional (18-24)	386 (63.4%)	223 (36.6%)
Non-Traditional (>24)	21 (67.7%)	10 (32.3%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Traditional (18-24)	353 (46.1%)	412 (53.9%)
Non-Traditional (>24)	80 (42.6%)	108 (57.4%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX M – Electronic attendance monitoring system classification comparison

The table in Appendix M presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A12.

Comparison of Classification Results

Classification	Success *n* (%)	Not Success *n* (%)
Monitored		
Underclass	336 (64.5%)	185 (35.5%)
Upperclass	71 (59.7%)	48 (40.3%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Underclass	290 (49.2%)	299 (50.8%)
Upperclass	143 (39.3%)	221 (60.7%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX N – Electronic attendance monitoring system ethnicity comparison

The table in Appendix N presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A13.

Comparison of Ethnicity Results

Ethnicity	Success *n* (%)	Not Success *n* (%)
Monitored		
White	264 (74.4%)	91 (25.6%)
Black	111 (48.3%)	119 (51.7%)
Other Ethnicity	32 (58.1%)	23 (41.8%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
White	256 (52.1%)	(47.9%)
Black	134 (35.4%)	244 (64.6%)
Other Ethnicity	43 (53.0%)	41 (47.0%)
Total	433 (45.4%)	520 (54.6%)

APPENDIX O – Electronic attendance monitoring system enrollment status comparison

The table in Appendix O presents a comparison of academic success rates for one demographic factor showing the impact the electronic attendance monitoring system has on academic success.

Table A14.

Comparison of Enrollment Status Results

Enrollment Status	Success *n* (%)	Not Success *n* (%)
Monitored		
Part-Time	6 (40.0%)	9 (60.0%)
Full-Time	401 (64.2%)	224 (35.8%)
Total	407 (63.6%)	233 (36.4%)
Not Monitored		
Part-Time	40 (48.8%)	42 (51.2%)
Full-Time	393 (45.1%)	478 (54.9%)
Total	433 (45.4%)	520 (54.6%)

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