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The Effects of Synchronous Online Course Orientation on Student Attrition

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THE EFFECTS OF SYNCHRONOUS ONLINE COURSE ORIENTATION ON STUDENT ATTRITION

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DEDICATION

To my family, those that are still with me and those that I lost during or before the dissertation process. They were the ones that encouraged me to start this program and continue my education. They persistently provided encouragement, support, and sacrifices throughout this process.

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ABSTRACT

Online course offerings are becoming more abundant in post-secondary education; such is the case with science courses at Tidal Wave Technical College. Online courses bring many benefits to students including flexibility, convenience, and the ability to learn anywhere, anytime. However, despite these benefits many challenges are also associated with online course offerings including student attrition. Using a non-major biology course as the test model this research sought to trial one possible way to alleviate the problems associated with online learning by incorporating a synchronous online orientation. Data on student attrition, success, and perception was gathered to gain insight into the effects of using synchronous online course orientation. The data showed a significant difference between the withdrawal rates in the synchronous and asynchronous treatments. Additionally, student success (measured by student grades) was higher in the online sections when the synchronous online course orientation treatment. Finally, after implementation synchronous online orientation treatments and face-to-face courses showed no significant difference between withdrawal and student success rates. These findings will help incorporate ways to improve attrition rates and student success and help to increase the equivalency between online and face-to-face courses.

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List of Abbreviations

AA..... Associates of Arts

BIO 105..... Principles of Biology

D2L Desire2Learn

LMS ..... Learning Management System

PACE .....Program for Accelerated College Enrollment

SARA.....State Authorization Reciprocity Agreement

STEM..... Science, Technology, Engineering, and Math

TWTC .....Tidal Wave Technical College

CHAPTER 1

INTRODUCTION

As a science teacher, I seek to center my classes on student questions and finding explanations to those questions through experimentation. This enables my students to learn by digging deeper into how concepts can be applied to real world problems. Similarly, I consider problems that I face as an educator and seek to find solutions to these issues. The problems I face include teaching concepts in an online platform, student withdrawal rates, and incorporating application case studies that follow my students' interests. I have found that employing action research is a way to examine there problems, to support or to reject claims within specific parameters encountered in my classroom and institution.

Mertler (2014) characterizes action research "as research that is done by teachers for themselves" (p. 4). The educators are actively involved inside the classroom with the implementation of the research study. Educators are able to identify a problem and work toward finding possible solutions. This type of research enables educators to evolve their personal curriculum and apply knowledge into practice. Difficulties do unfortunately arise with action research because it is often challenging to conduct. Additionally, results are often tentative solutions to a specific problem set, providing the instructor with information to be more effective inside their school and classroom (Mertler, 2014). It is my belief that if an educator can identify a reoccurring problem within a school or classroom, the benefits of action research far outweigh those of traditional research. Action research enabled me

to focus on a specific problem within my classrooms and after conducting the research to find a possible solution to issues pertaining to my students and my particular institution.

Research Emphasis

One of the new problems that many of my colleagues and I face is the pressure to develop effective online courses. My research focused on determining if synchronous online course orientation experience might positively impact attrition rates of students in an online non-major biological science course.

Online course offerings, including science courses of all types, have grown exponentially over the past few years in the technical college system (Foster, 2003). Currently, my online courses contain multiple resources and assignments that allow students to learn and interact independently. "Asynchronous communication is defined as communication occurring through the use of email and discussion boards, with the instructor playing a larger role as facilitator between students" (Watts, 2016, p. 24). Students benefit from asynchronous learning due to its flexibility and convenience, which enables them to learn anywhere, anytime (Moody, 2004; Watts, 2016). However, asynchronous techniques do not enable simultaneous communication amongst students or between the instructor and students. Even with the added convenience of students learning on their own time, many students still feel removed from their learning environment and lack motivation (Boton & Gregory, 2015). The lack of personal interaction or physical interaction that is found within online courses could lead to students feeling detached from both peers and their instructor.

For my dissertation, I introduced a synchronous course orientation into my online non-major Principles of Biology courses (BIO 105) in order to address this current Problem

of Practice. All of the biological science courses offered at the college have both a traditional face-to-face option and an online option (e.g. hybrid or online). However, only four courses offer fully online alternatives (e.g. Principles of Biology, Basic Anatomy and Physiology, General Anatomy and Physiology, and Principles of Environmental Science) (Course Descriptions, n.d.). No matter the delivery, each biological science course includes both a laboratory and lecture portion, except for General Anatomy and Physiology which includes only a three-hour lecture credit. In all biological science courses, the lecture portion's goal is to provide in-depth explanations of concepts, including time for questions and discussions. The laboratory portion of the course provides exploratory learning using hands-on and visual representation of concepts.

At Tidal Wave Technical College (TWTC) (pseudonym) students in the associate in arts major (A.A.) are required to take either a transferable natural science or mathematics course, often fulfilled by BIO 105 (piloted face-to-face in spring of 2014). Previously, students enrolled in my online biological science courses at TWTC were required to complete an asynchronous course orientation and corresponding attendance quiz within the College's learning management system (LMS), Desire2Learn (D2L). By converting the orientation to the synchronous method, the hope was to increase initial student-to-instructor interaction, provide students an inquiry platform, and ease online navigation issues. Thereby, lowering student withdrawal rates and ultimately increasing student success and persistence.

Problem of Practice

Tidal Wave Technical College (TWTC), along with many two year colleges (Croxton, 2014; Fonolahi, Khan, & Jokhan, 2014; Garman & Good, 2012; Hachey,

Conway, & Wladis, 2013; Seiver & Troja, 2014; Wladis, Hachey, & Conway, 2013), has recently moved towards offering more science distance learning options, including four fully online courses. TWTC requires most diploma and degree seeking students to take at least one science course in order to satisfy core curriculum requirements. With the need to satisfy core requirements and the exponential increase in online courses, numerous researchers have focused on assessing unusually high attrition rates in online science, technology, engineering, and math courses (STEM) (Boton & Gregory, 2015; Wladis et al., 2013). High attrition rates in STEM courses have been an alarming issue due to the fact that "community colleges are playing a critical role in STEM fields; up to 40% of bachelor's and master's degree recipients in science, engineering and health initiate their studies at a community college" (Wladis et al., 2013, p. 66).

Theories currently suggest online learning has a higher attrition rate than that of a traditional counterpart (Boton & Gregory, 2015; Croxton, 2014; Fonolahi et al., 2014; Garman & Good, 2012; Hachey et al., 2013; Morris & Finnegan, 2008; Wladis et al., 2013). With high attrition rates plaguing online STEM courses, including those at TWTC, there is clearly a need for some type of course intervention. Thus far, little research has focused on explanations and solutions to these high student withdrawal rates in online courses, merely emphasizing the magnitude of the issue. The focus of my research was to acknowledge how integrating a synchronous online orientation affects student attrition in a biological science course at Tidal Wave Technical College.

As a teacher-researcher interested in quality education, even on the new frontier of online course work, I have particular interest in the persistence of students in courses, and

their success in biological sciences courses. For that reason, I have posed the following action research question as a way to continue to improve the courses I offer:

Research question. What impact does requiring synchronous online course orientation have on the attrition rate in an online biological science course?

Purpose of the Study

The purpose of this study was to assess the effect synchronous online course orientation has on attrition rates of online biological science courses. The hope was to initially familiarize each of the students enrolled in the course with course learning outcomes, the College's learning management system (LMS), and supplemental websites. The synchronous orientation served as a platform for students to gain instantaneous feedback as well as alleviate course navigation anxiety. This research provided further understanding of what enables individual students to persist and be successful in a non-majors biological science course which afforded the teacher-researcher the opportunity to further improve future courses.

Conceptual Framework

As internet usage increases and technology evolves, there has been an upsurge in distance education and virtual colleges (Croxton, 2014; Fonolahi et al., 2014; Garman & Good, 2012; Hachey et al., 2013; Seiver & Troja, 2014; Wladis et al., 2013). This has in turn allowed for colleges to offer more courses and to reach millions of students they would not otherwise have reached (Garman & Good, 2012). Wisconsin College was able to reach "over 8,000 students that we probably wouldn't be reaching otherwise" (Distance-Learning, 2004, p. 18). In fact, 97% of two-year colleges offer some type of online education due to the cost effectiveness and flexibility of courses. Additionally, 61% of all

community college students take online courses (Croxton, 2014; Fonolahi et al., 2014; Hachey et al., 2013; Seiver & Troja, 2014; Wladis et al., 2013). Undoubtedly, this is why Hachey et al. (2013) stated, "Students and institutions alike are embracing this instructional method" (p. 3).

Most subject areas are covered in distance education; however, there are select subject areas offered online that are more challenging in the online format, including: "science labs, math, nursing, and languages" (Garman & Good, 2012, p. 181). Colleges have tried to maintain the same rigor across distance education courses and the traditional course options, nonetheless, many times they have to give different assessments dependent on the type of course and delivery method (Fonolahi et al., 2014). McDaniels, Pfund, and Barnicle (2016) stated, "Online learning is impersonal, not rigorous, marked by learning distractions, not able to support group work, void of effective communication, and vulnerable to the health of the technologies needed to house such courses" (p. 2). Noticeably, course set-up and instructor materials have influenced students' viewpoint and overall course satisfaction.

There still exists "a lack of empirical investigation on community college online attrition, despite the fact that course and institutional management systems today are automatically collecting a wealth of data which are not being utilized but are readily available for study" (Hachey et al., 2013, pp. 1-2). This has caused a movement to evaluate course delivery methods (e.g. online, hybrid, or face-to-face) based on "measures such as persistence rates, goal attainment, retention, graduation, satisfaction, and successful course completion" (Garman & Good, 2012, p. 181). Upon reviewing numerous primary and secondary sources, theories currently stand that online learning has a higher attrition rate

than traditional face-to-face courses (Boton & Gregory, 2015; Croxton, 2014; Fonolahi et al., 2014; Garman & Good, 2012; Morris & Finnegan, 2008; Wladis et al., 2013).

I too, as a teacher-researcher, have seen these increased attrition rates in my online non-major biology course sections compared to those of the face-to-face sections. These drastic differences caused me to turn to prior research for possible causes of high online course attrition rates. I believe my students feel isolated and frustrated due to the lack of personal interaction initially with the instructor. This action research study proposed a possible solution to increasing the initial interaction with the instructor by incorporating an online synchronous orientation. The hope was to lower attrition rates in the teacher-researcher's online science courses and gain knowledge to share with the Distance Learning Institute at TWTC.

Synchronous learning. Synchronous learning "is defined as live streaming video and/or audio with instantaneous feedback" (Watts, 2016, p. 24) or learning involving "students and faculty members interacting with each other in real time, just as they would in a face-to-face course" (McDaniels et al., 2016, p. 3). Technological advancements have enabled online education to feel not so distant at times. Multiple live platforms (e.g. Skype, GoToMeeting, Facebook Live, D2L Virtual Classroom) facilitate synchronous learning and thus increase the ability of an instructor to interact with students in an online course setting. Integration of synchronous learning helped instructors to maintain the interactive integrity which occurs in a face-to-face environment and also facilitated communication in programs where distance collaboration was required (King et al., 2010).

Students reacted to synchronous learning positively due to its engaging nature, instantaneous feedback, and interaction with classmates (Watts, 2016). This type of online

learning encouraged students to interact with peers through immediate synchronous interaction which contributed to a higher quality online learning environment. However, with increasing live interactions, scheduling conflicts were caused which reduced convenience, flexibility, and overall course satisfaction. The teacher-researcher did not want to reduce the flexibility of her online courses. It was taken into account that many students work and have other daily obligations which may not allow them to complete schoolwork at a set time. For this reason, only the initial online course orientation was modified. This enabled students to still have the full flexibility of an online course, with the added benefit of synchronous instructor-to-student interaction.

Attrition rates. Garman and Good (2012) found online sections had a 4% higher attrition rate than the traditional sections. Similarly, Hachey et al. (2013) and Fonolahi et al. (2014) found online courses had a higher attrition rate than the traditional sections. Moreover, STEM courses were reported to have significantly higher attrition rates when compared to other course types (Hachey et al., 2013).

Boton and Gregory (2015) focused on minimizing attrition in six different countries by trying to find the underlying reason students are unsuccessful. "Researchers suggest that most online courses ignore the cultural and sub-cultural differences in learning behavior and fail to address the diversity of their learners" (Boton & Gregory, 2015, p. 64). This could also be true at TWTC which has an extremely diverse population of students (e.g. traditional students, international students, accelerated college enrollment students, early college students, and non-traditional students). Most online courses fail to initially recognize the diverse population of students due to the lack of physical interaction. The

cultural and learning differences need to be noted in student populations to increase equitability between online and face-to-face courses.

Moody (2004) reviewed online attrition rates and stated the most common reason individuals enroll in online courses was convenience. Many times, with this convenience, the students still ended up withdrawing from the course. Contributions to the attrition rates included lack of motivation, online pedagogy, and the learning management system used by the college (Boton & Gregory, 2015). This resulted in a rise in attrition rates and a "no win" situation for all involved. Much of the previous research has been focused on whether there are higher attrition rates in online sections (Boton & Gregory, 2015; Fonolahi et al., 2014; Garman & Good, 2012; Hachey et al., 2013; Moody, 2004). However, Moody (2004), stated the focus now needs to be on why attrition rates are high and what factors lead "distance learners to drop out and then to take appropriate preventive measures" (p. 206).

Online learning. Upon investigating prior literature, Kauffman (2015) found that a successful online student demonstrated greater "self-regulation skills, self-discipline, time management, organization, planning, self-evaluating, reflective/visual learning styles, and internal locus of control" (p. 7). These attributes were critical due to the fact that more responsibility was placed on students in an online setting. This increase in responsibility many times led to students feeling detached or isolated, with the lack of personal instructor interaction. Delahunty, Verenikina, and Jones (2014) identified isolation was a key indicator of whether a student participated. Additionally, finding a student's overall confidence in an online course was linked to isolation.

Due to the various issues associated with online learning, Kauffman (2015) chose to focus on which factors would increase student satisfaction in an online setting. Interestingly, Kauffman (2015) found students adapt their learning styles to online learning, and student satisfaction was dependent upon instructional factors and aspects of course design. For this reason, the teacher-researcher chose to enhance the present online course materials to include a synchronous online orientation to help students initially navigate in the course. Furthermore, during the synchronous online orientation the students were provided an outlet for questions during the online orientation and increased early involvement.

Several studies have suggested an increase in resources for online students and increasing instructor-to-student interaction. Garman and Good (2012) proposed providing study materials, increasing personal interaction, and recommended students seek academic support to possibly increase final course grades and decrease attrition rates. Hachey et al. (2013) indicated increasing personal interaction and providing a wide variety of resources, in addition to offering student support could enable students to be more successful and lower attrition rates (Boton & Gregory, 2015). Many of the recommendations (e.g. wide variety of resources, student support, and academic support) made by Boton and Gregory (2015), Garman and Good (2012), and Hachey et al. (2013) took place in each of my BIO 105 online course sections each semester. These resources included training videos, lecture videos, online homework, online advising, instructor-to-student interaction, and peer to peer interaction.

Given factors described in the literature reviewed, there was clear evidence that a study investigating the effects of synchronous online course orientation was both timely

and necessary to address the initial needs of students. These needs must to be addressed individually when students enroll in an online course to prepare them with the highest quality possible. To acknowledge the best approach for an online course orientation and factors that contribute to attrition, prior research was consulted to organize the methodology used in this action research study.

Action Research Methodology

This next section describes the teacher-researcher and her background. Next the research site and the science courses offered at the college offers are detailed. The student-participants are also described, as well as protective measures taken for students' identities. A comprehensive list of research methods is also noted. Finally, potential weaknesses are indicated in this section.

Teacher-researcher. I, the teacher-researcher, am a faculty member of the Natural and Physical Sciences Department at TWTC. I have been with the college since 2010, where I began as an adjunct professor for three years and was then hired full-time as a TWTC professor. I have taught at the collegiate level at both a university and technical college. Currently, I have the title of Professor of Biology, and am a full-time faculty member. I obtained my Bachelor of Science in Biology from Erskine College (2008) and Master of Science in Coastal Marine and Wetland Studies from Coastal Carolina University (2010). I have taught many different courses at TWTC including Principles of Biology, Biological Sciences I, Biological Sciences II, and Basic Anatomy and Physiology.

I have been involved in the development of both hybrid and online course templates for the Natural and Physical Science department at TWTC. These templates created navigational consistency on Desire2Learn for online and hybrid biological science courses

at the college. I also co-developed the face-to-face BIO 105 piloted in spring 2014 and the online BIO 105 non-major Principles of Biology course for the college piloted in fall 2016. I am currently the only faculty member who teaches both the lecture and laboratory portions of the online BIO 105 course.

In my experience, teaching both online and face-to-face sections of BIO 105 for multiple semesters, I have seen trends in higher withdrawal rates in the online sections. Furthermore, I have noticed students typically withdraw within the first four to six weeks of the course. I hope to eliminate the want or need for students to withdraw from courses, especially science courses. As a science educator, I want to create equivalency amongst my courses, ensuring students' success. Students must receive the same content and rigor no matter the type of course delivery (i.e. face-to-face, hybrid, or online). This ensures students understand science conceptually and in real world application of the curricula. I believe developing and incorporating an initial required synchronous online orientation was timely and necessary to aid in the reduction of attrition rates in the online BIO 105 course sections.

Research site. The location of the study was Tidal Wave Technical College (pseudonym), a two-year public technical college founded in 1966 and located in northeastern South Carolina. The college offers "approximately 80 associate degrees, diplomas, and certificate programs" (Fast Facts, n.d., para. 1). TWTC enrolls over 9,800 students annually and employs 335 faculty (part-time and full-time) with a 21 to 1 student to teacher ratio (Fast Facts, n.d.).

Of the students enrolled, 97% are South Carolina residents and 84.4% receive financial aid. Over 62% of the college population is female. The current racial breakdown

of the college is: 71% White, 20.3% African American, 1.8% Hispanic, 0.7% Asian, and 6.2% other. Approximately 62.7% of the students are under 24 years old, 3.6% of the students are over 50 years old, and the average age of the college is 25.5 years old. Forty-three percent of students are full-time, students average a total of 9.7 credit hours attempted per semester, and the overall average GPA (grade point average) is 2.6 (Fast Facts, n.d.).

The college offers nine different biology courses; all include both a lecture and laboratory portion and are four credit hours except for General Anatomy and Physiology (Course Descriptions, n.d.). All of the courses are offered each semester (e.g. fall, spring, and summer) and have online or hybrid alternatives. Four of the biological science courses offer a fully online course, where students are not required to come to any of the three campuses. Development of these online courses began in 2016. The maximum enrollment capacity allowed in each online course section is 26.

Student-participants. Student-participants were enrolled in the courses at TWTC based upon individual major core requirements, style of course delivery (e.g. face-to-face, hybrid, or online), and preference of instructor. Student-participants were unable to be randomized into groups by the teacher-researcher. The BIO 105 course section in which the students enrolled themselves served as both their course type (i.e. online or face-to-face) and treatment type (i.e. synchronous or asynchronous).

The Family Educational Right to Privacy Act, otherwise known as FERPA, protects student's information from publication without their written consent (FERPA, n.d.). All students' identities (name and student identification numbers) remained anonymous for the purposes of this research. All standards and rules set forth by the institutional review board and the Distance Learning Institute of the college were followed throughout the study.

This research required individuals to agree to being included in the study via a survey given through D2L. The survey included a description of the study, the student's role in the study, and duration of the study. Early College and PACE student-participants (i.e. students under the age of eighteen) enrolled in the course sections were required to fill out and sign a parental consent form and assent form (Appendix B). Both the minor and the parent or legal guardian of the minor had to consent in order for the minor to be included in the study. Students over the age of 18 were only required to sign and consent to the informed consent form (Appendix A) in order to be included in the study.

Research Methods. This study was a quantitative study using quasi-experimental, nonequivalent groups, with a multiple controls design. Student withdrawal rate data was collected by TWTC Institutional Research from fall 2016 until spring 2018. The withdrawal percentages were averaged by term for both the face-to-face and the online course sections. The averages for the fall 2016, spring 2017, fall 2017, and spring 2018 served as the controls. This was due to enrollment variability by year and term. The control groups were given the traditional asynchronous online course orientation treatment and identified by term and year (e.g. spring 2017, fall 2017, and spring 2018). The data collected in both the fall 2018 and spring 2019 terms was from an online BIO 105 course that had been given the experimental treatment of synchronous online course orientation. In order to evaluate the difference between student attrition rates and the withdrawal percentages for both fall 2018 and spring 2019 (i.e. experimental variable), the data was run through an independent samples t-test to determine if a significant difference was present ($p < 0.05$). The independent variable in this study was the type of online orientation

(e.g. synchronous or asynchronous). The dependent variable was student withdrawal percentages by course section.

Attrition data was collected as well for each of the summer semesters the BIO 105 course was offered. These condensed ten-week semesters were only used as a comparison to see if the attrition trend was present across all semesters the course was offered. The summer data was not used to see if a significant difference was present because it is only an 11 week full-term rather than a 15 week full-term like spring and fall semesters. Finally, students in the spring 2019 BIO 105 online course received a survey and questionnaire to access their perception of the BIO 105 synchronous online course orientation.

Potential Weaknesses. Due to the small number of individuals per course section ($N \leq 26$), the sample size of student-participants per semester was much smaller than desired. Furthermore, withdrawal percentages included a limited number of student-participants who completed the required online orientation quiz for attendance verification purposes but did not complete any other course work for the first portion of the course resulting in the student's early withdrawal (W) from the course. Attendance verification is a federal mandate of the college for financial aid purposes. During this time period, students must establish contact with their professor. This verification period lasts "during the drop/add period of the semester" and failure to do so results in the student being dropped from the course (Getting Started, n.d., para. 9).

This action research only focused on one course at TWTC and utilizing more biological science courses, both major and non-major, would yield more generalizable results to TWTC online and hybrid courses. The teacher-researcher was the only instructor who taught all of the online BIO 105 course sections included in the study. Using only one

instructor controlled for instructor effect however created difficulty in attempting to make generalizations across the department or college.

Significance of the Study

Online education courses are not easier for instructors to construct; however, the provision of providing equitable access to education cannot be overlooked. Boton and Gregory (2015) stated, "It can be affirmed that lecturers' main challenge is not in how to structure their online courses, pedagogically, but the technicality of doing so" (p. 82). Furthermore, "The range of needs of a heterogeneous student body also argues for flexibility rather than uniformity in supporting students, which at the same time brings challenges for the notion of equity" (Tait, 2013, p.13). The need for equal access to education is critical, because education "provides real skill and knowledge essential for employment" (Tait, 2013, p. 6).

This expresses just how great "the responsibility for teachers to act and to think about what identities and what capabilities to function are being distributed" (Tait, 2013, p. 10). Colleges and schools "are places where identities are formed, where we learn to be as well as to know" (Tait, 2013, p. 9). Tidal Wave Technical College is committed to this, with its mission:

> to provide accessible, affordable, high-quality, comprehensive two-year collegiate education and workforce development; to provide a student centered environment and inspire lifelong learning; to promote learning through teaching excellence; to promote community service and embrace diversity; to promote economic growth; and to embrace technological innovation in instruction and workplace applications (Mission, Vision Values, n.d., para. 1).

As additional courses are added at TWTC and other colleges, there is a need to continually assess the course outcomes. Courses, no matter the delivery (e.g. traditional, hybrid, or online), must continually be adapted to maintain quality curriculum. Additionally, requiring faculty to provide proactive intervention, and requiring students to attend online orientation to have full access to materials and for attendance verification purposes, may help students be more successful (Garman & Good, 2012). The results of this study could possibly facilitate the evolution of online courses at TWTC and acknowledge the existing weaknesses in asynchronous online orientations. This research may also help identify which resources aid in students' persistence and where improvements must be made to help lower attrition rates in non-major biological science courses at a technical college.

Dissertation Overview

This first chapter presents the primary research question, research overview, and the statement of problem of practice. Also providing the conceptual framework of the action research, as well as, potential weaknesses, limitations of the study, and a glossary of terms. Recent pertinent literature on synchronous learning and online attrition rates are presented in chapter two. This literature review addresses advantages and disadvantages of using synchronous online learning. Furthermore, providing additional discourse into research background and supporting the research design. Chapter three offers an in-depth look into the quantitative research methodology. Additionally, describing the control, variables, and hypothesis of this study. The fourth chapter introduces the data collected and research findings. Also, interpretations of results found within the study are discussed. An entire overview of the study is presented in chapter five, as well as, suggestions for future research. Major points and immediate applications of this research is also conferred.

Key Definitions

The following section explores key concepts, terminology, and constructs surrounding the current Problem of Practice.

Attrition rate. The percentage of students who earned either a "W" or "WF" upon completion of the course. A "W" is given to those students who either withdrew themselves before the official withdrawal deadline or the students were withdrawn due to excessive absences (failure to attend). A "WF" designation is given to students who were making an "F" after the official withdrawal deadline and exceed the allotted number of absences. A "WF" is given to a student at the professor's discretion and does effect a student's GPA (Withdrawal, n.d.).

Distance learning institute. The name given to the organization at Tide Water Technical College containing programs and courses solely offered online. Additionally, providing resources, support and advisement for students (Distance Learning Institute, n.d.).

Early college students. Students which are enrolled in the Early College High School. This high school "blends high school and college" in a "small, personal learning environment" (Early College High School, n.d., para. 1).

Flex start courses. Course sections starting three weeks later in both the fall and spring semesters and end at the same time full-term course end. These courses run at a more accelerated pace and are twelve weeks in length. The material covered in flex start sections are the same amount of material as full-term courses (Fall and Flex start, n.d.).

Full-term courses. The course sections running the entire fifteen weeks of a fall or spring semester (Fall and Flex start, n.d.).

Hybrid courses. Course sections where the lecture portion is online and lecture assessments are given either online or students are required to come on campus to take the exams in the TWTC testing center. The laboratory portion of the class, as well as all lab assessments, occur on campus with either monthly or weekly scheduled meetings (Online/Internet/Hybrid Classes, n.d.).

Nontraditional student. Students who delay enrollment into college or attends college part-time (O'Lawrence, 2006).

Online courses. Course sections where both the lecture and laboratory portion are online. All assessments are given online and students are not required physically to come on campus (Online/Internet/Hybrid Classes, n.d.).

PACE students. Any high-school junior or senior in the Program for Accelerated College Enrollment. The program "enables qualified students to meet high-school graduation requirements while taking college credit courses" (PACE/Dual Enrollment Admissions, n.d., para. 1).

SARA. Also known as the State Authorization Reciprocity Agreement. This agreement enables students from 47 states in the United States to enroll in courses at Tide Water Technical College (Distance Learning Institute, n.d.).

Traditional courses. Course sections including an on-campus face-to-face schedule with a laboratory and lecture meeting. Students are required to come on campus for all assessments in both lecture and lab (McDaniels et al., 2016).

Conclusion

Prior to this study, I was uncertain about the effect introducing a synchronous online orientation would have on attrition rates in an online biological science course. This

research provided the Natural and Physical Sciences department at TWTC immediate targets for enhancing and improving the distance learning courses. Furthermore, acknowledging the effects of an initial intervention on student persistence and offering potential online course orientation adaptations could potentially improve student success. Applying immediate findings from this research could result in higher persistence and success rates in both hybrid and online courses at TWTC.

CHAPTER 2

LITERATURE REVIEW

According to Garman and Good (2012), North America has seen a 146.3 percent increase in internet usage from the year 2000 to 2010. The widespread use of both the internet and web-based applications are "drastically influencing the way in which people communicate and access information" (Garman & Good, 2012, p. 179). Both public and private institutions are responding to this surge of internet usage by offering numerous distance education options (Croxton, 2014; Hachey et al., 2013; Kauffman, 2015). This dramatic shift in higher education has been motivated by the consumer demand of online offerings and has caused many adult learners to pursue their educational goals (O'Lawrence, 2006; Seiver & Troja, 2014).

Presently, online learning has become one of the primary methods of teaching at both colleges and universities (Hachey et al., 2013). Wladis et al. (2013), stated 97 percent of community colleges offer online courses. Community colleges alone have a higher online enrollment than all other higher education combined (Hachey et al., 2013; Wladis et al., 2013). Additionally, with the exponential growth seen in online courses, community colleges have a vital mission in which every student has the potential to be successful and earn a degree (Wladis et al., 2013).

The development of online courses and conversion of traditional learning to online platforms has enabled higher education to become more widely accessible with numerous benefits for students. However, numerous challenges are associated with distance

education including student attrition, type of online communication, technological glitches, and the possible need for orientation (Boton & Gregory, 2015; Croxton, 2014; Garman & Good, 2012; Hachey et al., 2013; Wladis et al., 2013). This literature review explores current and previous research surrounding the benefits and challenges linked to distance learning in higher education.

Problem of Practice

The number of online course offerings and development of online courses at community colleges is persistently rising. Previous out-reach methods at both universities and colleges have tried both correspondence and asynchronous courses. These methods have caused an exponential growth in distance learning. Current quantitative research has focused on equivalency of learning between online and traditional courses and assessing the high attrition rates associated with online courses. Research supports the equitability of learning amongst online and traditional courses. However, current theories regarding attrition indicate distance learning courses have a higher attrition rate than traditional courses (Boton & Gregory, 2015; Croxton, 2014; Fonolahi et al., 2014; Garman & Good, 2012; Hachey et al., 2013; Morris & Finnegan, 2008; Wladis et al., 2013). More specifically, as a whole STEM (Science, Technology, Engineering, and Math) courses have higher attrition rates than other disciplines, especially the introductory and lower level STEM courses (Wladis et al., 2013). Thus far, the majority of previous research has focused on if a problem with attrition exists amongst traditional and online courses, not explanations or possible solutions to this reoccurring problem.

Tidal Wave Technical College (TWTC) (pseudonym) is following suit by implementing numerous new online programs and frequently developing new online

courses. TWTC currently offers ten fully online degrees (Academic Degree, n.d.). These programs are available to students in 47 different states due to TWTC being an approved member of the State Authorization Reciprocity Agreement (SARA) (Distance Learning Institute, n.d.). Administrators and professors have seen a trend at TWTC of high online course withdrawal rates compared to the traditional face-to-face versions of the same course. For this reason, the focus of this action research study was to investigate possible solutions for the high attrition rates by examining the effects of a synchronous online orientation on student attrition rates in a non-major biological science course (BIO 105) at Tidal Wave Technical College. The teacher-researcher posed the following question for this action research: What impact does requiring synchronous online course orientation have on the attrition rate in an online biological science course?

Purpose of the Study

The purpose of this study was to fill in gaps between what is known about the high student attrition rates in online courses at community colleges and possible solutions to those attrition rates. This action research study developed an online course orientation enabling students to become acquainted with Tidal Wave Technical College's learning management system, course specific expectations, instructor information, and supplemental websites. To support students with instantaneous feedback the teacher-researcher incorporated a synchronous online orientation into each BIO 105 online course section. This enabled students to ask questions about the course and have a better understanding of course expectations prior to the College's drop/add date. This research acknowledged how a mandatory online course specific orientation effects student attrition rates in an online non-majors biological science course. This data afforded the teacher-

researcher with possible improvements for all online biological science course sections taught and possible generalizations to be made across other disciplines at TWTC.

Literature Review Purpose

A complex literature review defined by Machi and McEvoy (2016) is "a review that extends the work of the simple review to identify and define an unanswered question requiring new primary research" (p. 1). The purpose of this complex literature review was to acknowledge the current theories behind the challenges in distance learning, attrition rates in online courses, the types of communication used in online courses, and assesses the current need or want for online orientation. This literature review enabled me to grasp the current theories surrounding my dissertation. Additionally, it facilitated in the constructing of a written argument supporting my hypothesis from evidence found in previous research (Machi & McEvoy, 2016).

Literature review search. The first strategy for selecting articles to be included was to compile a list of key terms to prepare for a basic search across multiple peer reviewed journals and through multiple databases including ERIC, Google Scholar, and Education Source. The terms used for searching included: attrition, retention, synchronous communication, asynchronous communication, synchronous learning, asynchronous learning, orientation, online orientation, mandatory orientation, science course, biology course, community college, two-year college, college, university, and persistence. Each of the words or multiple words were coupled with synonyms for "online learning" (e.g. distance learning, distance education, online education, web-based learning, eLearning). Articles were excluded based on publication date filtering for articles published in the late 1990s and later. The next step was to compile the peer reviewed articles. Article abstracts

were read and irrelevant subject area articles were discarded. The reference lists of the relevant articles chosen were then searched for any further leads to other relevant key words or journal articles. Moreover, the peer reviewed articles chosen also represented an expansive range of literature across the globe.

Organization

This chapter includes an overview of the pertinent literature surrounding the action research question and current Problem of Practice. This section provides insight into former research on the subject matter related to the research question. The entire organization was centered on online learning, synchronous learning, and the benefits of orientation. The subsections begin with the broadest of the subject matter and end with the subjects detailing as to why this study was timely and necessary.

To begin, a discourse of the evolution of online learning was provided to understand historical perspectives and current research surrounding the Problem of Practice. Benefits and challenges of online learning were assembled in this section for justification of the action research. Furthermore, research theories about student attrition in distance learning were compiled. These theories included comparisons amongst online and traditional courses and author recommendations methods to increase persistence. The benefits, challenges, and researcher recommendations are conferred about both asynchronous and synchronous communication in an online classroom. The last section identifies current theories surrounding integrating an online orientation. Comparisons are further discussed with and without orientation, the type of communication during orientation, and providing discourse on the possible implementation of a mandatory online orientation. Finally, a summary and justification for the present action research study was provided to

acknowledge the connection amongst the literature and the teacher-researcher's Problem of Practice.

Online Learning

Higher education is embracing distance learning and increasing the number of online course offerings (Croxton, 2014, p. 314). According to Hachey et al. (2013), community colleges are one of the fastest growing segments of higher education since the late 1960s and are keeping up with societal demands by offering numerous online possibilities. Ninety-seven percent of all two-year institutions are offering online course options. Furthermore, at two-year institutions, at least 61 percent of students are taking online courses (Hachey et al., 2013). In 2012, thirty-two percent of all higher education students in the United States were taking at least one online course (Croxton, 2014). These numbers are expected to keep rising yearly, along with the number of course offerings. "It is clear that students and institutions alike are embracing this instructional method" (Hachey et al., 2013, p. 3).

Online courses have created new academic opportunities for students. Garman and Good (2012) found traditional students (i.e. between eighteen and twenty-five) were equally successful in both online and face-to-face environments. Further emphasizing the fact that more than 80 percent of the individuals which have taken online courses are non-traditional students (Garman & Good, 2012). Kauffman (2015) additionally stated "online learning has typically been the chosen method for working adults aged 25-50" (p. 1). Adult learners have been more inclined to take online courses because of the increased amount of flexibility. This enabled the individuals to balance work and family demands, as well as pursue a degree. Moreover, adult students enjoy not having to drive to campus and the

online technologies provided new opportunities for individuals to remain in their homes. Both traditional and nontraditional students found that distance learning was self-tailored and enabled them to learn at their own pace in a comfortable learning environment (O'Lawrence, 2006).

Most online courses were created due to the need to offer or convert a traditional face-to-face course into a distance learning course. McDaniels et al. (2016) established that adapting traditional curriculum into a face-to-face course could still yield a quality educational experience when quality was measured by participant satisfaction, confidence, learning, and sense of belonging. Croxton (2014) indicated student-to-instructor interactivity plays a key in student satisfaction and persistence in online learning. Engagement and balance of interactivity led to higher student satisfaction. Likewise, integrating students into online learning communities increased student persistence (Croxton, 2014).

Online learning has become increasingly popular due to technological advances, the flexibility of scheduling, and its alternative pathway to higher education (Alkhanak & Azmi, 2011; Kauffman, 2015; King et al., 2010). Distance education enables colleges to offer a wider range of programs to a greater quantity of students. Many individuals who once thought a degree was unobtainable due to the time constraints have the ability to now pursue a college education. An online environment seems to fit many individuals' lifestyles due to work and family obligations. Furthermore, online courses prevent the need for traveling to campus for face-to-face instruction and provides access to everyone, no matter their geographic location (Croxton, 2014; Garman & Good, 2012; Hachey et al., 2013).

Fonolahi et al. (2014) showed no significant difference between online and face-to-face course deliveries. Furthermore, the distributions for average course grades, average final exam grades, and average final course grade were found to be similar by delivery type and displayed no significant difference. This study also revealed passing rates between face-to-face and online courses were not significantly different. However, online students performed significantly higher in course work than face-to-face students. Likewise, Ünlü and Karataş (2016) discovered a statistically significant increase in academic achievement of middle school students in distance learning. Moreover, no significant differences were found amongst test scores and retention in an online learning environment and a traditional environment. Clearly showing students were able to be just as successful in an online learning environment, regardless of age or learning style (Kauffman, 2015).

Challenges of online learning. As noted, online courses have become increasingly popular, however, have numerous challenges. The most important challenge was maintaining educational equivalency amongst the traditional face-to-face courses and distance learning courses (Garman & Good, 2012). It is the responsibility of both the institution and the educator to ensure a quality education has been obtained and identical learning objectives were reached at the completion of a course, no matter the type of delivery. Secondly, the interaction of numerous social, emotional, and situational factors led to student failure and withdrawal (Morgan & Tam, 1999). O'Lawrence (2006) revealed adult learners found difficulties with the lack of self-discipline and time-management skills. Nontraditional students also were found to have issues with isolation, no matter the amount of online communication (O'Lawrence, 2006). Additionally, students were often unfamiliar and did not have much experience with the technology required for online

courses (Alkhanak & Azmi, 2011). The resources offered in an online course and at each institution in the face-to-face environment must be equitable and promote student success (Tait, 2013).

Multiple disciplines such as foreign languages, math, nursing, and science labs are more challenging to display when presented in an online format (Garman & Good, 2012). O'Lawrence (2006) asserted, "Some subjects are not taught effectively online" (p. 49). The diversity of online learners creates difficulties with regards to the types of learning style that were most successful in online learning environment (Kauffman, 2015). Students often perceived online courses differently than face-to-face courses. These perceptions led to misconceptions of the learning environment and unfavorable conditions leading to decreased persistence (Kauffman, 2015). Beckford (2015) suggested increasing student motivation in an online environment, in-turn increases student success and persistence within a course. Furthermore, Seiver and Troja (2014) found in an online environment, motivation was significantly related to student's age and cumulative GPA.

Finally, data obtained from a meta-analysis of hundreds of college's institutional research departments "found no significant difference between student learning online versus face-to-face, suggesting that online courses may provide students with access without compromising instruction quality" (Hachey et al., 2013, p. 5). However, all the institutional data was compiled from community colleges only, lacking external validity to both four-year institutions and graduate schools. Moreover, Kauffman (2015) indicated collegiate online courses have been found to be as effective as and comparable to the face-to-face counterpart. This research analyzed multiple online instructors and found that the layout of the online course and instructor presence facilitated student success, not the

specific instructor. Additionally, Collins (2000) showed non-major biology students in web-based courses did not perform as high as those with traditional correspondence. However, students in the online course sections were more satisfied than those in the other sections, even though the online sections did not achieve as high on performance assessments (Collins, 2000).

Student Attrition in Distance Learning

Attrition rate is the percentage of students who fail to complete an entire course due to self-withdrawal or withdrawal by the professor due to excessive absences (Withdrawal, n.d.). High student attrition rates have been one of the main focuses of distant learning research since online course offerings have become more popular in higher education. This section compares online attrition rates with attrition rates of traditional courses and further explores methods to increase persistence in online courses.

Comparing online and traditional course attrition rates. Garman and Good (2012) showed attrition rates among community college students were six percent higher in online sections of biological science courses. However, overall online course persistence at community colleges was seven to twenty percent lower than traditional on-campus instruction (Hachey et al., 2013). Online college attrition rates soared as high as fifty percent for some disciplines (Kauffman, 2015). Both Hachey et al. (2013) and Wladis et al. (2013) emphasized the strong correlation STEM courses at the collegiate level have with delivery type (i.e. online, face-to-face, hybrid). Elective STEM courses had a higher overall attrition rate when compared to STEM courses taken for major requirements. Additionally, both online and face-to-face STEM courses had a higher attrition rates than non-STEM courses (Wladis et al., 2013).

Hachey et al. (2013) and Wladis et al. (2013) found community college students enrolling in online courses had a higher GPA than those in face-to-face courses. Additionally, those students who had a GPA in the middle range bracket (2.0-3.5) were at a higher risk of dropping online courses. A significant positive correlation was shown with success and higher persistence rates if a student had prior online experience. Lack of experience in online courses caused students to have a considerably higher withdrawal rate, even when controlling course enrollment using student GPA. Furthermore, students taking online elective courses had a significantly higher attrition rate than online major requirement courses (Hachey et al., 2013; Wladis et al., 2013).

Sitzmann and Johnson (2012) established that age had a significant effect on the likelihood of a college student withdrawing. Both nontraditional and traditional students were offered the same training and resources through the institution. Traditional college students had an eight percent higher attrition rate than those of nontraditional students. (Sitzmann & Johnson, 2012). Haydarov, Moxley, and Anderson (2013) further supported these findings by concluding most individuals pursuing a master's degree (88 percent) dropout during the first three to four years of the programs. The face-to-face graduate programs had just a fifty percent retention rate, compared to that of the online graduate programs with over a 67 percent retention rate (Haydarov et al., 2013). Similarly, a common theme was seen in undergraduate students, who believed they were not prepared for the online course environment. These students failed to recognize they would never physically see an instructor and the course would consume a significant amount of time. Most online undergraduate students did not fault their instructor for their withdrawal (Clay, Rowland, & Packard, 2008).

Numerous studies came to the consensus that persistence in online courses was much lower than the traditional face-to-face courses (Croxton, 2014; Hachey et al., 2013; Moody, 2004; Robichaud, 2016). Croxton (2014) indicated both internal (e.g. motivation, isolation, and self-determination) and external issues (e.g. time constraints, finances, and family pressures) were the reason for the high attrition rates. An online college environment seemed to exacerbate any and all factors leading to students dropping a course (Wladis et al., 2013). Willging and Johnson (2004) found graduate students rarely had a single dominant reason for withdrawing from a course or program. Most students attributed dropping courses to personal issues, job-related reasons, program-related reasons, and technology-related reasons. The reasons for master's degree students withdrawing from courses were similar between traditional face-to-face courses and distance learning courses (Willging & Johnson, 2004).

Methods to increase online course persistence. Kauffamn (2015) emphasized most studies focused on the differences in attrition rates amongst the different types of course deliveries (e.g. traditional, hybrid, and online). Furthermore, Hachey et al. (2013) asserted previous research concentrated on the magnitude of the attrition rates in online courses and yet to focus on how to fix the persistent problem. Numerous difficulties and barriers affecting student attrition were within the power of the instructor and institution (Morgan & Tam, 1999). Instructors provided all the resources available to face-to-face students in the online environment as well, including timely feedback on assignments and communication (Kauffman, 2015). The positive online experiences within an institution must outweigh the negative factors in order to have any effect on persistence (Morgan & Tam, 1999).

Hachey et al. (2013) proposed college students need to be restricted to enrollment in online courses by grade point average. Russo-Gleicher (2014) and Tait (2013) also suggested a screening process, including implementing a recruitment program for potential online students. "High attrition rates in online classes may be due to a lack of preparation to learn and participate online" (Seiver & Troja, 2014, p. 93). Wladis et al. (2013) asserted that numerous factors, not just final grades, proposed major, and GPA impacted student persistence in an online course. Furthermore, basic computer proficiency seemed to be an indicator of student success and persistence in online college courses (Hachey et al., 2013). Kauffman (2015) suggested that one of the key indicators of both student success and persistence was a student's emotional intelligence. Gauging emotional intelligence before registration in online courses could possibly predict a student's overall success, performance, and persistence in an online college course (Kauffman, 2015; Wladis et al., 2013).

Kauffman (2015) found that student satisfaction was related to the amount of student-to-student and student-to-instructor interaction. Increased interaction promoted a sense of community within an online course and increases in student motivation. Students had higher satisfaction with online courses when they were structured, interactive, relevant, and instructor facilitated (Kauffman, 2015). Rockinson-Szapkiw et al. (2016) noted the amount of online teaching presence showed to be the most significant factor effecting student performance in a distance learning environment. In addition to interaction, an interactive instructional design facilitated student participation and made students feel connected to their peers and instructor (Seiver & Troja, 2014).

Every online course needs to be designed to include clear instructor expectations and an organized layout for ease of navigation. "Students prefer online classes that are well organized, easy to use, and contain visual elements and graphics to help them keep their attention" (Seiver & Troja, 2014, p. 91). Institution provided support for faculty teaching online courses and students taking online courses may further help improve student persistence rates (Russo-Gleicher, 2014). Likewise, early intervention and comprehensive online advisement could possibly increase online retention rates (Clay et al., 2008).

Hachey et al. (2013) indicated that "there is no consensus yet on the best method of evaluating student readiness for online learning" (p. 7). However, the integration of these research-based recommendations have the potential of increasing student retention rates in online courses at any academic level. Implementing any of these recommendations into action research studies facilitates the understanding amongst course delivery methods and has the possibility of further enabling the equivalence of online and traditional courses. Ultimately, decreasing attrition rates will lead to the progression of online courses and generate access to a quality education no matter the individual's location and disposition.

Communication in an Online Environment

Online communication has been achieved through either an asynchronous or synchronous method. For both methods, the instructor chooses which technology would be best based on the technological capabilities of both the college and students alike. To date, much of the research on online communication has focused on the differences amongst synchronous and asynchronous learning in an online environment (Emmanouilidou et al. 2012; Khodaparast & Ghafournia, 2015; Lietuzau & Mann, 2009;

Malinovski et al., 2014; Rockinson-Szapkiw et al., 2016; Skylar, 2009; Watts, 2016). Both types of communication play a key part in keeping students connected, learning content, and providing satisfaction in an online environment (Watts, 2016).

Delahunty et al. (2014) reviewed articles from all over the world assessing the role interaction played in an online learning environment. Through the literature review, it was concluded that interaction plays a fundamental role in identity formation, community building, and learning. Socio-emotional challenges were significantly related to participation levels, isolation, motivation, satisfaction, and learning. Moreover, online learners needed numerous opportunities for engagement within a course in order to develop social identities. The degree of the instructor's interaction and presence played a crucial role in the learning process, by managing student's identity formation and a sense of belonging (Delahunty et al., 2014). This section explores the effects of asynchronous communication in an online environment. It also examines the benefits and challenges of synchronous learning, and further compares the effectiveness of both synchronous and asynchronous teaching.

Asynchronous learning. Watts (2016) asserted in both four-year and two-year colleges asynchronous learning has been the major form of online course communication and interaction. Asynchronous learning provides a flexible learning environment and enables students to learn on their own time, at any time during the day (Skylar, 2009). This type of learning "is facilitated by media which support work relation among learners and with the instructor, even when they cannot be on-line at the same time, allowing teachers to combine education with work, family and other commitments" (Emmanouilidou et al., 2012, p. 194).

Students and instructors interacting in an asynchronous method were separated by time and space (Malinovski et al., 2014). In an asynchronous learning environment "more responsibility is placed on the learner" (Kauffman, 2015, p. 7). Supporting the argument in which asynchronous interactions worked best with group work and if the work required some type of reflection (Watts, 2016). Skylar (2009) further supported this theory by stating both student collaboration and discussions were enhanced by using flexible asynchronous communication enabling students more time for preparation and responses.

Typically, in an online course, asynchronous instructional methods have been used as the primary delivery format whether it be to supplement a face-to-face course section or to teach an online course in its entirety. Of the institutions teaching and offering online courses, 92 percent of those courses were taught in an asynchronous format (Skylar, 2009). Widely used methods of asynchronous instruction at institutions include e-mail only correspondence, prerecorded one-way videos, one-way audio transmissions (e.g., podcasting), streaming media, discussions boards, and social media (Malinovski et al., 2014; Skylar, 2009). Of these methods, ninety percent of all institutions use prerecorded videos as the primary instructional method for online course communication (Skylar, 2009).

Skylar (2009) embedded collaborative activities into an asynchronous platform and found that college students reacted positively, stating it "provided a sense of community" (p. 70). Malinovski et al. (2014) showed asynchronous learning increased high school student's quality of experience in online courses. Further stating asynchronous learning increased a student's ability to process information, generally enabling student's responses

to be more refined and thoughtful than synchronous learning (Emmanouilidou et al., 2012; Malinovski et al., 2014).

Synchronous learning. Synchronous communication occurs when learning takes place in real time. An effective synchronous environment facilitates participation and is continuously developed (Jones & Gallen, 2016). Real-time interaction provides students with a sense of community within a once perceived as isolated environment. This feeling of belonging encourages peer-to-peer interaction and promotes student participation (King et al., 2010). McDaniels et al. (2016) explored the conversion of graduate level face-to-face courses into synchronous online courses. The graduate and post-doctoral students who took these courses, highly rated the synchronous online courses and had positive feelings towards the online learning environment. Additionally, these students experienced an inclusive learning atmosphere and felt comfortable participating in class (McDaniels et al., 2016).

In a synchronous environment both interaction and interactivity increased and thus a sense of community, identity formation and sense of belonging were also increased (Delahunty et al., 2014). Interactivity is defined by Croxton (2014) as "either asynchronous or synchronous opportunities for communication between student-student, student-instructor, and student-content" (p. 315). However, interaction focuses on the amount of student-to-student and student-to-professor correspondence (Kauffman, 2015). In addition to both interaction and interactivity needed in a synchronous learning environment, undergraduate college students preferred a formal online learning atmosphere to be the most effective and beneficial to learning (Jones & Gallen, 2016). Lietuzau and Mann (2009) further supported the usefulness of synchronous communication

by stating doctoral students learned more through synchronous instruction, and scores were higher in course sections including web based synchronous instruction.

Through technological advancements, synchronous communication has become more similar to a face-to-face setting (Watts, 2016). Various methods were used to integrate synchronous communication in an online classroom setting including video conferencing, online chatting, and live streaming. Lietuzau and Mann (2009) showed doctoral students and instructors enjoyed a synchronous learning environment due to the integration of one-on-one and group web-conferencing sessions. Furthermore, emphasizing the fact that distance learning instructors considered web and video conferencing an improvement to an online learning environment due to an increased amount of interaction. As interaction increased in an online classroom, students' desire to participate in online activities and discussions also increased (Lietuzau & Mann, 2009). These synchronous tools benefited students by enhancing group projects, socializing, planning activities, and discussions (Watts, 2016).

Online communication comparisons. Upon comparing student performance and satisfaction between synchronous and asynchronous communication, Skylar (2009) found over 70 percent of the college students preferred the synchronous web-conferencing lectures. Furthermore, 87.8 percent of students felt that participating increased their understanding of course lecture materials. The synchronous environment enabled over 80 percent of students to perform better on a weekly basis. Moreover, the synchronous treatment showed a significant difference in computer literacy skills over the course of the semester (Skylar, 2009).

Upon the integration of synchronous online methods into a normally face-to-face introductory college course, Francesucci and Foster (2013) saw no significant difference in student assessment. The course sections containing a virtual, interactive, real-time, instructor-led synchronous classroom had significant increases in student participation, interest, and attention. However, student engagement was not significantly different between the face-to-face and synchronous online course sections (Francesucci & Foster, 2013). Boton and Gregory (2015) further supported an increase in student satisfaction in an online course across six different countries and six different universities via the use of multimedia, lecturer's constant online presence, and challenging online activities.

McBrien, Jones, and Cheng (2009) found upon incorporating a synchronous online platform into both graduate and undergraduate online course sections, students felt a decrease feeling of distance. The types of asynchronous communication used increased the amount of social interaction and participation of all students, including reluctant and unwilling participants. Students continually reported how the online courses provided convenience and flexibility. However, with added convenience of online courses, McBrien et al. (2009) suggested three main problems exist with synchronous online learning. Synchronous methods have the ability to cause confusion at times if too many applications (e.g., audio, typed chat, and PowerPoints) are occurring simultaneously. Moreover, the types of technology used could possibly decrease the amount of verbal communication amongst individuals within the course, thus reducing the educational experience. Finally, technological glitches and computer compatibility issues may interrupt course instruction at times during synchronous online interaction (McBrien et al., 2009).

Due to the effectiveness of synchronous learning and the flexibility of asynchronous learning, Khodaparast and Ghafournia (2015) chose to integrate both synchronous and asynchronous assignments into one online course. Both types of communication in a college second-level reading comprehension course revealed significantly higher vocabulary achievement than just the synchronous or asynchronous method alone (Knodaparast & Ghafournia, 2015). Emmonouilidou et al. (2012) further compared asynchronous and synchronous methods in a training program for physical educators and found no significant difference in knowledge between the two delivery methods. However, significant differences existed amongst the two groups for content knowledge (Emmonouilidou et al., 2012).

Data has yet to support one type of online communication being more beneficial than the other (Watts, 2016). Francesucci and Foster (2013) found no significant differences in student engagement in a college marketing course between asynchronous and synchronous environments. Furthermore, Emmanouilidou et al. (2012) saw no significant difference between pre-test and post-test improvement in educators between synchronous and asynchronous in-service courses. Both types of communication supported intellectual participation and enabled the retention of new information (Emmanouilidou et al., 2012). Quality of course design and quantity of instructor presence of the asynchronous or synchronous course seemed to be the largest indicator of whether or not students persisted in an online course (Watts, 2016). It was for these reasons my dissertation focused on the integration of a singular synchronous event in order for students to understand the course design and LMS features.

Integrating Online Orientation

Orientation is meant to provide students with personalized guidance and to make students "aware of the entry skills that will be necessary for them to be successful" (Beckford, 2015, p. 43). Typically, orientations are specific to either an institution or course. Orientations delivered by institutions provide students guidance as to the resources and services available to them. Course specific orientations are provided by a specific instructor and provide students with what they need to know to be successful in the course (e.g. course resources, learning management system navigation, and companion website navigation). Orientations can be implemented in various ways either on-campus in a face-to-face environment or off-campus via synchronous or asynchronous communication methods. This section compares courses with and without course orientation, analyzes the advantages and disadvantages of synchronous and asynchronous orientations, and provides discourse on implementing mandatory orientation in courses.

Comparisons with and without orientation. Though attrition rates have been high in online courses, they are used to help promote student success and retention (Beckford, 2015; Robichaud, 2016). Gilmore and Lyons (2012) implemented an eight-hour blended online and face-to-face orientation program to improve retention in a nursing program. The students were required to attend a four-hour online portion before attending a four-hour face-to-face on-campus session. Each portion contained support services and an in-depth overview of the nursing program. Incorporating both navigation and support services into the orientation increased student satisfaction to over 98 % higher than other cohorts prior to the orientation sessions. Beckford (2015) found online course orientation increased student success due to reviewing expectations and requirements prior to the start

of the course. Additionally, attrition rates dropped from twenty percent to less than one percent upon the orientation's implementation (Gilmore & Lyons, 2012).

Bose (2011) found that a face-to-face college orientation helped substantially towards training students for specific job duties. However, students suggested offering a more problem based orientation than lecture based to further prepare students for possible problems that may arise (Bose, 2011). No matter the type of orientation (e.g., online or face-to-face), it must be comprehensive to be effective. Clay et al. (2008) implemented an online orientation and found that including advisement, navigation, and resources helped reduce attrition. King et al. (2010) suggested instructors need to provide students with a tutorial and possible practice session with software to help reduce technological issues.

Without orientation students were unaware of support services present at an institution. Additionally, orientations enabled students to review course specific resources and tips for proper netiquette to lessen conflict and misunderstanding within the course (King et al., 2010). Boton and Gregory (2015) showed that student satisfaction and success with a college's learning management system (LMS) can be increased by providing formal online training of the LMS for both students and instructors.

Synchronous orientation verses asynchronous orientation. Rockinson-Szapkiw et al. (2016) found using different types of programs, applications, and other forms of technology caused students to have different attitudes and perceptions of both synchronous and asynchronous platforms. The quality of student experience has been shown to be higher during asynchronous learning (Malinovski et al., 2014). Furthermore, technical performance was lower during synchronous videoconferencing sessions. During this research, high school students experienced technical issues during synchronous learning

and grew frustrated with these technical glitches. Additionally, variables such as: ease of use, content, attitude, and motivation were strongly correlated with learning type (e.g., synchronous learning or asynchronous learning) (Malinovski et al., 2014).

No matter the delivery platform, orientation should prepare students and be specific for the course or institution (Jones, 2013). Anderson and May (2010) concluded more library skills needed to be incorporated into initial student training for better use of online and specific college's resources. Taylor, Dunn, and Winn (2015) found that a synchronous interactive video orientation decreased adult student withdrawal rates. Moreover, nontraditional students favorably received the orientation and saw it as extremely informative. The higher-level courses had a statistically significant positive change in withdrawal rate of adult students. Results also showed a positive correlation between the use of an online orientation video and improvements in student success. The withdrawal rate dropped significantly with the implementation of an online interactive video orientation in eighty percent of the courses studied (Taylor et al., 2015). McBrien et al. (2009) further supported the need of online training for college students and stated it needs to be in a synchronous platform in order to be most effective.

Implementing mandatory orientation. Orientations may need to be mandatory before enrolling in the courses or prior to the start date, in order to see differences in retention. Robichaud (2016) advised there is no correct way in organizing orientation as long as it is tailored to the individual college or course. Russo-Gleicher (2014) suggested colleges create a mandatory orientation program for students prior to enrolling in online courses. Moody (2004) further stressed the need of early intervention for technology related issues and to decrease online course attrition rates.

An online orientation should provide students a greater overall online experience and reduce attrition rates for institutions (Jones & Gallen, 2016). When mandatory online orientation was implemented in college courses, students appeared to be better prepared for the online environment. In order to ensure students understood the college's LMS and student computers were configured correctly, common issues were discussed in the online orientations. Feedback from students showed over ninety percent of students felt as though the orientation was helpful with preparing for the use and navigation of the college's learning management system. Likewise, ninety percent of students felt confident to very confident their computer was configured properly for online courses. Eighty-seven percent of students felt as though they had a personal understanding of what it took to be successful in online courses. Implementing a mandatory online orientation improved retention by nearly eight percent (Jones, 2013).

Conclusion

This literature review aimed to establish the theoretical framework and introduce key constructs in the proposed Problem of Practice and subsequent action research. The usage of the internet and number of online course offerings at community colleges, both have increased at an exponential rate (Croxton, 2014; Fonolahi et al., 2014; Garman & Good, 2012; Hachey et al., 2013; Seiver & Troja, 2014; Wladis et al., 2013). With the added convenience and flexibility of online courses, numerous challenges arise for both students and instructors alike (Garman & Good, 2012; Kauffman, 2015; Morgan & Tam, 1999; O'Lawrence, 2006).

A current consensus exists amongst researchers in which high student attrition rates plague online courses. The attrition rates sometimes soared nearly fifty percent higher than

its traditional face-to-face counterpart. Persistence rates in STEM courses were much lower than other online courses in other disciplines (Hachey et al., 2013, Wladis et al., 2013). Currently, most community colleges do not have a screening process for enrolling students in online courses. Furthermore, little research has focused on the implementation of possible solutions to increase persistence rates in online courses at community colleges and what changes lead to resolutions of this reoccurring issue (Hachey et al., 2013; Kauffman, 2015; Rockinson-Szapkiw et al., 2016; Wladis et al., 2013).

Synchronous online learning has shown to enhance the online learning environment, facilitate participation, encourage interaction, create an inclusive environment, and decrease the feeling of distance (Francesucci and Foster, 2013; Jones & Gallen, 2016; King et al., 2010; McBrien et al., 2009; McDaniels et al., 2016). Online college students have performed higher in synchronous course sections and over eighty percent of students felt they performed better in a synchronous environment as opposed to an asynchronous environment (Lietuzau & Mann, 2009; Skylar, 2009). Moreover, a synchronous online environment facilitated interaction and interactivity, both of which have been shown to increase student satisfaction and success (Croxton, 2014; Delahunty et al., 2014; Kauffman, 2015).

Program and course specific orientations have been used to promote success and improve retention in course sections and integrate proactive advisement in programs (Beckford, 2015; Robichaud, 2016). Programs implementing orientations have seen attrition rates drop almost twenty percent after piloting a comprehensive orientation (Gilmore & Lyons, 2012). Both synchronous and asynchronous orientations appear to bring both benefits and complications for online college students. No matter the delivery

type (i.e., synchronous or asynchronous) online orientation enabled students formal training, promoted student success, eased online navigational problems, and increased the quality of a student's online experience (Boton and Gregory, 2013; Jones & Gallen, 2016; Malinovski et al., 2014).

Due to the high attrition rates seen across multiple disciplines, especially STEM courses at TWTC, this research intended to acknowledge if a correlation existed amongst a mandatory synchronous online orientation and student attrition rates in an online non-major biological science course. Similar to prior research discussed, this study was a quantitative action research study, with a quasi-experimental non-equivalent multiple control groups design.

The data collected from fall 2018 and spring 2019 compared student attrition rates in course sections with a course specific synchronous online orientation to those of prior course sections (e.g. fall 2016 through spring 2018) which included a course specific asynchronous online orientation. Further investigating factors to decrease student attrition in online courses at TWTC and explore the possible benefits and complexities of course specific synchronous mandatory course orientation when implemented.

CHAPTER 3

METHODOLOGY

In online courses, instructors struggle to diminish the communication gap experienced by students. This gap is physical, but it can also be psychological as students many times feel isolated in an online environment (Watts, 2016). Mediated interaction, whether it be synchronous or asynchronous, amongst students, has been shown to lessen the corporeal distance and increase engagement (Malinovski et al., 2014). As engagement increased, "Course outcomes, such as learning, grades, and satisfaction, tend to also improve" (Watts, 2016, p. 28). Both synchronous and asynchronous learning styles led to higher student course satisfaction as long as instructors continually interacted and communicated (King et al., 2010). Nevertheless, most studies have only focused on the effects and benefits of asynchronous online learning (Malinovski et al., 2014).

This dissertation focuses on the differences and effects of synchronous online course orientation and the traditional asynchronous orientation. The hope was that through synchronous online learning, students would feel more welcomed by the instructor and have a greater inclination to participate.

> Synchronous distance learning solutions provide real time teacher-student interaction while closely resembling a face-to-face educational environment. The synchronous communication is performed online via video/audio conferencing, instant messaging, real-time collaboration applications, and so on, while live interaction with the teacher and immediate feedback support the traditional

> pedagogies and different innovative methods for effective teaching and learning (Malinovski et al., 2014, p. 92).

This led to achieving "the same sense of community afforded in face-to-face classrooms" (McDaniels et al., 2016, p. 16). I too believe integrating synchronous learning into my online BIO 105 course will promote student-to-instructor interaction and make the students feel more welcomed in the course. Additionally, students will be more inclined to communicate with the instructor, knowing the instructor wants them to be successful in the course.

Technological Advancements

Synchronous online learning is quickly expanding even though as a whole many "colleges and universities, government agencies, and for-profit and nonprofit corporations turn to asynchronous online learning" (McDaniels et al., 2016, p. 18). As more opportunities arise and technology advances, instructors continue to integrate new techniques, further evolving distance learning. These changes reward both the students and instructors, especially as interaction increases, courses imitate the traditional face-to-face counterpart.

McDaniels et al. (2016) notes "Despite the rapid changes in technology and connectivity, synchronous classes require strong, continuous high-speed connections" (p. 18). Consistent high-speed connections are not guaranteed in all environments, even though our society has a high dependency on technology. "Variability of student computers and internet access can lead to a "higher than expected number of unforeseen technology issues early on in the course" (King et al., 2010, p. 141). The technology requirements in each online course need to be communicated to the students in order to

have a quality synchronous learning experience. Students may become frustrated with various forms of technology, which may cause them to not absorb the concepts as rapidly (Watts, 2016). As technological advancements occur, as educators we must acknowledge the computer requirements for students to be successful and what methods benefit them in an online learning setting.

Online course orientation. As Tidal Wave Technical College (TWTC) moves toward offering a wider variety of online courses, an emphasis has been placed on continuity amongst courses. Enabling course continuity has increased student satisfaction amongst courses and departments. However, the need for initial individual course instructor intervention still exists. Most instructor resources presently, including the teacher-researcher's course materials, are asynchronous. Asynchronous learning precipitates its own problems when students must navigate through unfamiliar programs and independently learn a college's learning management system.

Pan and Sullivan (2005) suggested technical training of streaming programs and online learning platforms need to be provided. Instructors do not need to assume students are proficient or familiar with the software needed for each course. McBrien et al. (2009) recommended initial synchronous course and software training before classes begin. With the wide range of individuals enrolled at a technical college, the hope is to catalyze navigation of course materials, learning management systems, and supplemental websites; whether it be through synchronous or asynchronous online course orientation. Ultimately, the orientation needs to "focus on the student's experience to increase achievement" (Malinovski et al., 2014).

Research Focus

The action research question for this dissertation was: what impact does requiring synchronous online course orientation have on the attrition rate in an online biological science course? The purpose of this study was to examine the introduction of online synchronous course orientation and its relation to course attrition in a non-major biological science course at TWTC. The teacher-researcher collected and analyzed data from TWTC Institutional Research. The synchronous online orientation was conducted at the beginning of both fall 2018 and spring 2019 in online BIO 105 course sections. Additionally, surveys and questionnaires were distributed to the students in BIO 105 online course for spring 2019. The teacher-researcher believed that adapting the current asynchronous online orientation into synchronous orientation would lead to lower withdrawal rates. This will aid in the recognition of factors that affect student persistence in biological science courses and perhaps improve the quality of future online course offerings at TWTC.

Research Design

Using Mertler's (2014) action research organization this quantitative research study was a quasi-experimental non-equivalent multiple control groups design. A quantitative study was used to look thoroughly at the variances between synchronous and asynchronous learning; and further examine the relationship of student attrition rates with the type of online course orientation. The data was collected through a survey, questionnaire, and withdrawal rates retrieved by the teacher-researcher from TWTC Instructional Research.

The research was a quasi-experimental design due to the inability to randomize student-participants into course sections for treatments. Multiple control groups were used to increase internal validity due to the variability amongst terms. The control groups

consisted of prior BIO 105 online course sections which utilized asynchronous online course orientation. The null hypothesis for this dissertation was there will be no difference between synchronous and asynchronous orientation in terms of student attrition rates. The alternative hypothesis for this experiment was the experimental group that participated in the synchronous orientation treatment will have a lower student attrition rate than the asynchronous orientation treatment groups.

Research objectives. The first objective of this study was to describe the average withdrawal percentage by term and its corresponding variation, or lack thereof, for asynchronous online orientation. Secondly, synchronous online orientation was introduced in the fall 2018 and spring 2019 terms, and average withdrawal percentages were then assessed. The last objective related student withdrawal percentage (i.e. attrition rate) between the asynchronous and synchronous online orientation measured by p-values, which were determined through a series of independent sample t-tests.

Data collection. The location of this research took place at Tidal Wave Technical College (pseudonym), located in northeastern South Carolina. The action research methodology investigated the manipulation of existing required asynchronous online course orientation. The teacher-researcher proposed that providing student-participants an initial question and discussion platform (i.e. synchronous online orientation) for instantaneous feedback through a "web meeting" would decrease initial course frustration, ease navigation, and increase persistence of students.

Both the synchronous and asynchronous course orientations were introduced during the first week (i.e. drop/add week) of a full-term fifteen-week BIO 105 course sections. The asynchronous orientation included a recorded PowerPoint with voice over

using Screencast-O-Matic. The Screencast-O-Matic program enabled the teacher-researcher to demonstrate programs, communicate course objectives, and visually present the college's learning management system (D2L). Asynchronous communication of the online orientation enabled the students to complete the initial training at their leisure during the drop/add period of the college.

For the synchronous online orientation, GoToMeeting was chosen for fall 2018 and D2L Virtual Classroom was chosen from spring 2019. Both of these allow technological versatility and the ability for student-participants to watch or interact from their smartphone, Mac, PC, or tablet (GoToMeeting, 2016). The synchronous orientation was adapted from the existing required asynchronous online BIO 105 orientation and personalized for each course section and time offered. The synchronous orientation included the navigation of D2L, simulated laboratory, supplemental materials, course content, course instructional package, and instructor information. The orientation was offered three times during the drop/add week of fall 2018 and spring 2019. No individuals who dropped the course during the drop/add period were included in the withdrawal totals or percentages for either the treatment or the control group within the study. The drop/add period only consisted of the first week in each semester and if the student did not contact the professor or complete the attendance verification quiz they were withdrawn from the course.

To collect data, withdrawal percentages were collected through the TWTC Institutional Research for fall 2016 through spring 2018 for online full-term spring and fall sections. Withdrawal percentages for each term were averaged by term for the asynchronous online orientation. Withdrawal percentages were also collected during the

fall 2018 and spring 2019 and averaged by term. All participants who do not consent for inclusion in the study were not included in the Likert scale responses and the open-ended responses. In addition to the attrition rates collected during the spring 2019 term, a questionnaire and survey was distributed to students enrolled in the online BIO 105 sections. The lack of involvement in the questionnaire portion did not impact a student's grade, analogous to their participation in this study. The questionnaire (Appendix C) used a Likert scale, providing further student perceptions after the synchronous online course orientation. This was distributed in the tenth week of the course and distributed through the College's LMS (D2L). This questionnaire did not have an initial comparison in the research study and was simply used as a tool to analyze the feelings of student-participants preparedness for the course. It consisted of open-ended questions and several questions to be answered using a Likert scale to understand student perception of the course and enabled the teacher-researcher to further gather student thoughts.

Variables. The independent variable in this research study was the type of online course orientation delivery (e.g. synchronous or asynchronous). The dependent variable, student withdrawal percentages, was categorized by orientation delivery type (i.e. treatment) and term. A maximum of only two online course sections were offered each semester at TWTC. Twenty-six individuals were the maximum enrollment in each section for each online section and twenty individuals for the face-to-face sections. Prior asynchronous orientation treatment course sections in BIO 105, from fall 2016 to summer 2018, were averaged by term and compared to the withdrawal percentage averages from fall 2018 and spring 2010.

The standardized variables included using only full-term fifteen-week spring and fall course sections for both the treatment groups. Flex start (i.e. twelve-week courses) and summer courses (i.e. ten-week courses) were not included in the study in order to further control internal validity, and allow only generalizations to be made amongst fall and spring terms. Both the flex start and summer courses contain a shorter length of time for the drop/add period (i.e. time period for online orientation), shorter course instruction time, and shorter student withdrawal period. The flex start and the summer course data were presented just not included in the analysis of data. Extraneous variables found throughout this study included but were not limited to: student-participant demographics and characteristics (e.g. race, gender, GPA, terms completed, and number of online courses completed), student-participant accessibility to technology, student-participant internet access, and natural disasters (e.g. hurricanes, floods, and ice storms) that may change student internet access or technology access. These variables were noted by the teacher-researcher during data analysis.

Data analysis. The analysis occurred in the spring 2019 semester. Data collected tested the alternative hypothesis that stated increasing initial student interaction and extensive course navigation training by introducing a synchronous online course orientation would decrease student attrition rates in a non-majors biological science course. Five independent sample t-tests were conducted in order to compare the face-to-face to online course success percentages. The t-tests conducted for withdrawal percentages include: face-to-face to online withdrawal percentages fall 2016 to spring 2018, asynchronous to synchronous withdrawal percentages, and face-to-face to online withdrawal percentages fall 2016 to spring 2019. The t-tests conducted for success

percentages include: face-to-face to online success percentages fall 2016 to spring 2018 and face-to-face to online success percentages fall 2016 to spring 2019. Alpha (α) or the chosen significant difference value was set as the threshold value of 0.05 for each of the independent sample t-test. This enabled the teacher-researcher to accept either the null or alternative hypothesis with 95 percent certainty. If the p-value was greater than 0.05, then no significant difference exists between the attrition rate by treatment type (e.g. synchronous and asynchronous), and the null hypothesis would be accepted. However, if the p-value was less than 0.05, the attrition rates between treatments significantly differed and the alternative hypothesis would be supported.

Moreover, other withdrawal percentages for each of the summer semesters of BIO 105 were compared to all the spring and fall semester. These numbers were only used to indicate if attrition trends were persistent across all semesters of the course, not to indicate if a significant difference was present. Finally, survey and questionnaire answers were analyzed to see if there is a common student perception of the course.

Validity. In order to maintain internal validity and eliminate confounding variables from affecting variable relationships, a larger sample size (i.e. all course section per term) was used for each of the control groups and experimental group. Furthermore, averaging the course sections controlled for unpredictability of student-participants within course sections for both number of students enrolled and student characteristics (e.g. race, gender, and socioeconomic status). All prior asynchronous online orientation sections were utilized as control groups to account for variability and inconsistencies amongst full-term spring and fall semesters. Threats that remain to internal validity were: students may be retaking the course from a prior semester (history effects), inability to randomize students

into sections and create equivalent groups (non-probability sample), and also possible behavioral oscillations which may occur in an online course (participant reactivity).

Ethical Considerations

In order to protect the student's privacy, unless given consent by the student, all student information remained unpublished. No student identities were disclosed and students remained anonymous for the purposes of this research. All standards and rules set forth by the institutional review board and the Distance Learning Institute of the college were followed throughout the study. To verify student consent, individuals were required to electronically sign an informed consent form (Appendix A) for statistics to be included in the study. The form describes the study, as well as their role in the study (Mertler, 2014). Early College and PACE student-participants (i.e. students under the age of eighteen) enrolled in the course sections were required to fill out and sign a parental consent form and an assent form (Appendix B). Both the minor and the parent or legal guardian of the minor must have provided consent in order for the minor to be included in the study.

Conclusion

Through a quantitative quasi-experimental multiple control groups design, the teacher-researcher investigated the differences in asynchronous and synchronous online course orientation in a non-majors biological science course. This experimental design tested the alternative hypothesis of this dissertation: synchronous online orientation will have a lower attrition rate than that of the traditional asynchronous orientation method. This was examined by running the asynchronous and synchronous average percentage withdrawal rates through a series of independent t-tests, with an alpha value set at 0.05. The p-values indicated by the independent t-tests determined if a significant difference was

present between the two treatments (i.e. synchronous and asynchronous). Results of this study could possibly lead to the integration of diverse technology and adaptation of existing online biological science course materials at TWTC.

CHAPTER 4

PRESENTATION AND ANALYSIS OF RESEARCH FINDINGS

This chapter presents a brief overview of the proposed problem of practice and research question. Additionally, a complete description of the intervention strategy given in both fall 2018 and spring 2019 is introduced. The research findings will then be presented along with supporting visual representations of the data collected. The teacher-researcher will then interpret the data and analyses presented.

Overview of the Study

New online courses are continually being developed and integrated into college curriculum due to the increased demand (Foster, 2003). This high demand for new online courses as well as more sections of online courses also exists at Tidal Wave Technical College (TWTC). This two-year College is located on the eastern coast of South Carolina and is the location of this action research study. This study was conducted in order to address the current high attrition problem plaguing the online science courses at TWTC. The online science courses have much higher withdrawal rates than that of their traditional face-to-face counterparts.

Upon reviewing previous literature pertaining to synchronous online learning and online course orientations the teacher-researcher proposed the manipulation of the existing asynchronous required online course orientation. This led to the following research question: What impact does requiring synchronous online course orientation have on the attrition rate in an online biological science course?

The current online course orientation was presented in an asynchronous fashion and was required for students to complete during the drop/add period (i.e. first week) of each semester. Upon converting the asynchronous to synchronous orientation, students had the ability to have instantaneous feedback to questions and concerns. Subsequently easing the students' anxiety associated with taking an online science course. Furthermore, the teacher-researcher anticipated after implementing a synchronous online course orientation that student withdrawal percentages would decrease, and the withdrawal percentages would be similar to that of the face-to-face BIO 105 course sections.

Description of the Intervention Strategy

This quantitative research study was organized into a quasi-experimental non-equivalent multiple control groups design (Mertler, 2014). This study examined the variances between synchronous and asynchronous learning, to better understand the attrition rates between online and face-to-face courses at TWTC. The existing asynchronous online orientation was not used for the experimental treatments. Rather a synchronous online orientation (i.e. experimental treatment) was one component required for students to verify attendance during the drop/add week of the online biological science course.

The data were collected through a Likert scale survey, an open-ended questionnaire, and data retrieved from TWTC Institutional Research. The experiment was categorized as a quasi-experimental design because of the teacher-researcher's inability to randomize student-participants into course sections for online orientation treatments. The treatments (i.e. synchronous online orientation and asynchronous online orientation) were introduced during the first week of the course during a full fifteen-week term of the BIO 105 online

course sections. The asynchronous online orientation was given to the sections of the fall 2016, spring 2017, summer 2017, fall 2017, spring 2018, and summer 2018 semesters. Each of these semesters served as the multiple controls to compare the two synchronous online orientation semesters (i.e. fall 2018 and spring 2019).

Both the synchronous and asynchronous online course orientations included reviewing: course expectations, course calendar, navigation of the College's LMS, attendance for the course, instruction information, and navigation of supplemental websites. The asynchronous orientation included a voiceover PowerPoint created by the teacher-researcher and recorded in Screencast-O-Matic. This video was offered the entire week of drop/add. The synchronous online course orientation was adapted from the existing asynchronous orientation and offered three times during both fall 2018 and spring 2019 semester. These dates were given the first date of the course and included morning, afternoon, and night time meetings. Two different platforms were used for the online orientation, for fall 2018 GoToMeeting was used and for spring 2019 D2L Virtual Classroom was utilized.

The withdrawal and success totals by term were obtained by the teacher-researcher from TWTC Institutional Research in March of 2019. The totals were compiled as percentages in order to not allow for more face-to-face courses being offered to skew the withdrawal rate or success rate data. Only individuals who consented to having their responses used in the study were recorded in both the Likert scale survey and the open-ended questionnaire. The consent form, survey, and questionnaire were distributed on the eighth week electronically via the College's LMS (i.e. D2L). All individuals enrolled in

both the face-to-face and online BIO 105 courses were included in the percent withdrawal and percent success amounts for each term.

Research Findings

This section details the findings for both withdrawal and student success. The withdrawal percentages are noted by term and shown in both figures and tables. The comparison of success by treatment (e.g. synchronous and asynchronous) type are also indicated and displayed. Finally, all p-values will be presented in order to denote significance of the t-tests.

Withdrawal percentage by term. Only full-term fifteen-week courses were included in the withdrawal percentage by term for both online and face-to-face BIO 105 courses. The online course sections had a higher withdrawal percentage for each of the fall and spring semesters included. These trends can be seen in Table 4.1 and Figure 4.1.

Table 4.1.
Total Student Withdrawal Percentage in BIO 105 by Semester

Term	Online	Face-to-Face
Fall 2016	22%	0%
Spring 2017	29%	13%
Fall 2017	27%	14%
Spring 2018	24%	5%

Note: Percentages include all individuals enrolled in course type for each semester included ($p = 0.012$).

When including only the fall 2016, spring 2017, fall 2017, and spring 2018 to see if a difference existed between the online and face-to-face course withdrawal percentages the t-test showed a p-value of 0.012, showing a significant difference does exist (see Figure

4.1) between the online and face-to-face course sections of BIO 105 before the synchronous online course orientation was implemented.

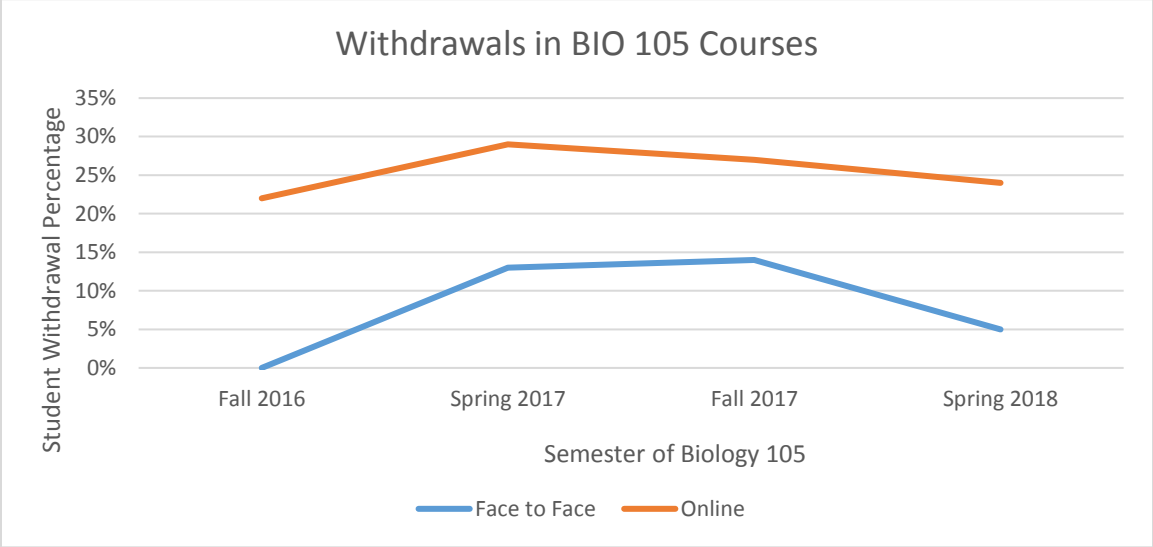

Figure 4.1. Comparison of Online and Face-to-Face Student Withdrawal Percentages by Semester for BIO 105 ($p = 0.012$).

Upon implementation of the synchronous online orientation in fall 2018 and spring 2019 the withdrawal percentages decreased in the online course sections (see Table 4.2). The average percentage for the asynchronous online orientation was 25.5 percent and after synchronous online orientation was implemented in fall 2018 and spring 2019 the average withdrawal percentage was 9 percent. This is a 35% withdrawal difference between the control and experimental treatments. Additionally, when comparing the online and face-to-face course sections for fall 2018 and spring 2019 the t-test showed no significant difference ($p = 0.19$) between the withdrawal percentages.

Each semester prior to the fall 2018 and spring 2019 semesters the asynchronous online course orientation was used to introduce students to the course. For this reason, all past semesters of the online BIO 105 course sections were used as a comparison between synchronous and asynchronous withdrawal percentages. The synchronous online

orientation semesters were grouped (i.e. fall 2018 and spring 2019) and the asynchronous online orientation semesters were grouped (i.e. fall 2016, spring 2017, summer 2017, fall 2017, spring 2018, and summer 2018).

Table 4.2.
Online and Face-to-Face Withdrawal Percentages by Semester

Term	Online	Face-to-Face
Fall 2016	22%	0%
Spring 2017	29%	13%
Fall 2017	27%	14%
Spring 2018	24%	5%
Fall 2018	10%	6%
Spring 2019	8%	5%

Note: Percentages include all individuals enrolled in course type for each semester included ($p = 0.19$).

An internal group t-test was used to assess the variance in averages for the face-to-face sections. This was to determine if a difference existed within the group before comparing between groups (i.e. face-to-face and online sections). For the internal group t-test $p=0.64$. This means no significant difference existed within the withdrawal percentage averages for the face-to-face sections.

When both summer semesters for the asynchronous online course orientation were included, the withdrawal percentage average decreased from 25.5% to 22.5%. The trend seems to show a much lower withdrawal percentage in the summer semesters than the fall and spring semesters. However, when compiling and comparing all asynchronous orientation course withdrawals to synchronous orientation course withdrawals showed a p-

value of 0.001. This indicates that there was a significant difference between the asynchronous and synchronous treatments, even including both summer 2017 and summer 2018 withdrawal data. The decreased withdrawal percentages for both of the synchronous online course orientation semesters can be noted in Figure 4.3.

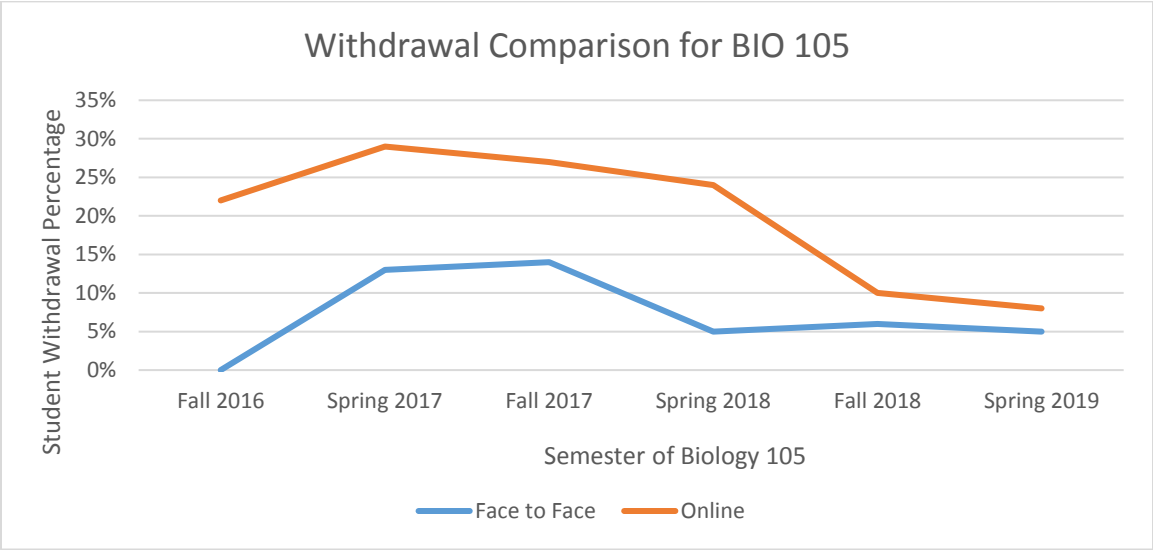

Figure 4.2. Comparison of online and face-to-face student withdrawal percentages by semester for BIO 105 including fall 2018 and spring 2019 when synchronous online orientation was implemented in the online course sections (p=0.19).

Comparison of success by treatment type. Data was examined by term using TWTC Institutional Research data. Success at TWTC means that the student made a *C* or better in the course which is a 70% or above. This was used because a *C* or above is transferable and is used as a prerequisite for other biological science courses at the college. Throughout all of the semesters the asynchronous online course orientation was offered in the online course sections the success percentage was less than the face-to-face course sections (Figure 4.4 and Table 4.3). Upon running a t-test between the student success percentages by type of course (i.e. face-to-face and online) the p-value was 0.003. The p-value indicated a significant difference existed between student success in the face-to-face

and online BIO 105 course sections. In other words, students who attended face-to-face courses had a significantly higher percentage of students who received a C or better.

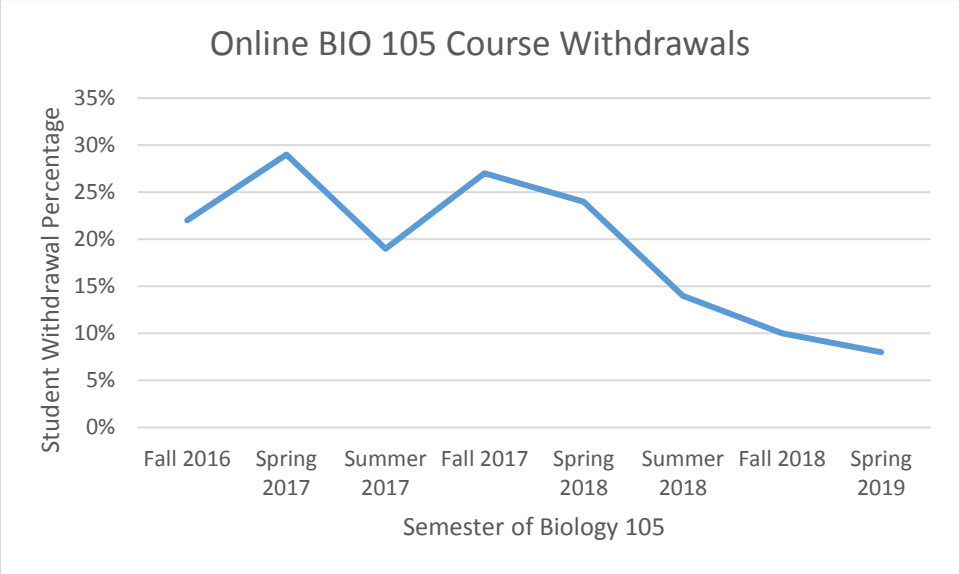

Figure 4.3. Online student withdrawal percentages by semester for BIO 105 including fall 2018 and spring 2019 when synchronous online orientation was implemented.

After implementing the synchronous online course orientation in fall 2018 and spring 2019 the student success percentages increased in the online course sections making them more comparable to the face-to-face success percentages. When analyzing to see if a difference existed between the online and the face-to-face course sections in the fall 2018 and spring 2019 terms the p-value was 0.68. This showed that the difference between the online and the face-to-face courses no longer existed when the synchronous online course orientation was applied. Furthermore, one semester (e.g. fall 2018) showed higher success percentages in the online course format than the traditional face-to-face counterpart (see Figure 4.5 and Table 4.4).

An internal group t-test was again used to evaluate the variance of student success average for the face-to-face sections. This test was used to determine if a difference existed within the group before comparing between groups (i.e. face-to-face and online sections).

For the internal group t-test p=0.13. This p-value indicates no significant difference existed within student success percentage averages for the face-to-face sections.

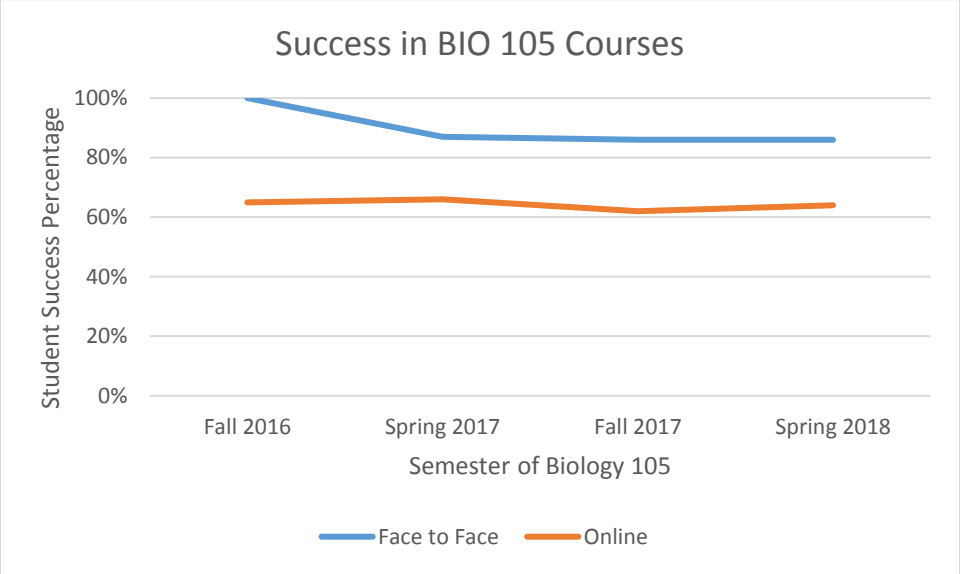

Figure 4.4. Comparison of student success percentages by semester for BIO 105 (p = 0.003).

Analysis of Data Based on Research Question

This action research study addressed the research question regarding whether requiring synchronous online course orientation would have an effect on the attrition rate in an online biological science course. The null hypothesis was there would be no difference between the online orientation treatments in terms of student attrition rates. The alternative hypothesis was there would be lower student withdrawal rate in the synchronous online orientation treatment. Numerous t-tests were run in order to find if a difference existed in the courses between the synchronous and asynchronous treatments. Additionally, students were given a brief Likert-type scale survey and questionnaire to access student's feelings towards the online course orientation. Only students who electronically signed the consent form were included in the comments and Likert-type scale survey averages.

Table 4.3.
Total Student Success Percentage in BIO by Semester

Term	Online	Face-to-Face
Fall 2016	65%	100%
Spring 2017	66%	87%
Fall 2017	62%	86%
Spring 2018	64%	86%

Note: Percentages include all individuals enrolled in course type for each semester included ($p = 0.003$).

Table 4.4.
Online and Face-to-Face Student Success Percentage by Semester

Term	Online	Face-to-Face
Fall 2016	65%	100%
Spring 2017	66%	87%
Fall 2017	62%	86%
Spring 2018	64%	86%
Fall 2018	72%	69%
Spring 2019	73%	84%

Note: Percentages include all individuals enrolled in course type for each semester included ($p = 0.19$).

A significant difference was found between synchronous and asynchronous online course orientation using both fall 2018 and spring 2019 semesters. The p-value was 0.001 indicating with 95% confidence that a difference exists between the synchronous and asynchronous orientation types based on student withdrawal percentages. Furthermore,

most of the students (82%) who agreed for their comments to be included in the study (N = 11) had positive views of the online course orientation and its content. Only students enrolled in the spring 2019 semester were asked to complete the survey and questionnaire.

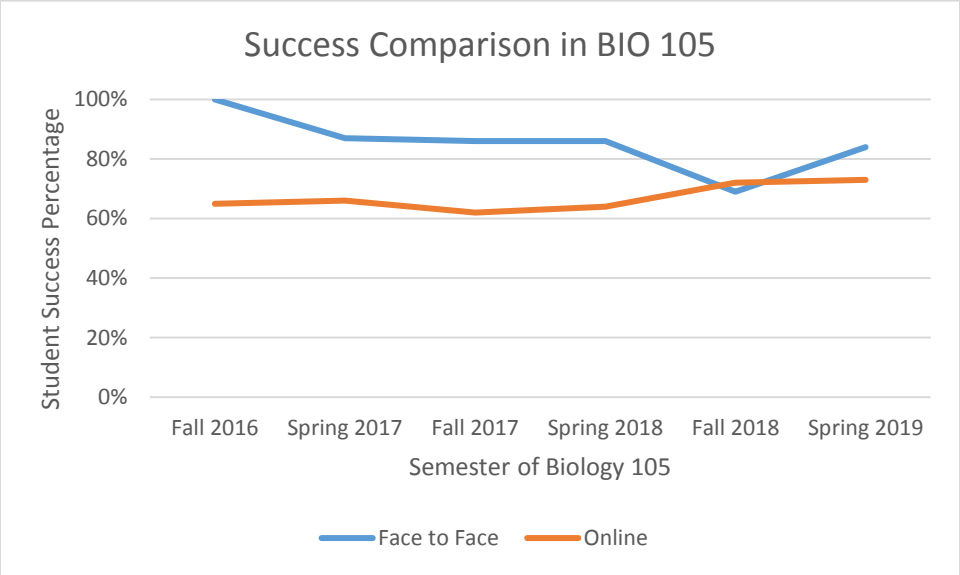

Figure 4.5. Comparison of student success percentages by semester for BIO 105 including fall 2018 and spring 2019 when synchronous online orientation was implemented in the online course sections.

When students were asked if the online orientation was beneficial, 91% of the individuals agreed or strongly agreed the synchronous online orientation was beneficial. Only 45% of students agreed that they did take advantage of asking questions during the synchronous course orientation. A little over half of the students (55%) agreed that the course orientation was given at a time and day that was acceptable for them to attend. When asked if the online orientation helped with navigating the course and course materials, 82% of individuals agreed or strongly agreed navigation was helped by participating in the synchronous online orientation. Again 82% of students agreed or strongly agreed the synchronous online orientation encouraged them to ask questions about

coursework or other concerns. Finally, 73% of students agreed or strongly agreed they would take another online course if it contained a synchronous online course orientation.

Students were asked "Did completing the online orientation prevent any anxiety with taking an online course? Please explain your answer." Many students (64%) had positive answers. Some notable answers include "Yes, it encouraged (me) to reach out to my professor if I had questions because she insured us she would always answer us back," and "Yes, after the orientation I knew what was expected of me and was easier hearing it from a person than looking through D2L trying to find the class expectations." Additionally, students stated it did not prevent their anxiety; however they were able to grasp how the class was going to be handled. Finally one individual stated "I have taken online courses before but never an online science course so this was a blessing to me because it explained to me how to navigate the course and showed that the professor genuinely cared about our questions and about helping us correctly progress through the course."

When asked if improvements need to be made to the synchronous online course orientation or if it should be left out, 64% of students said no improvements needed to be made and one student even said the orientation was "fast and simple." A student did state the synchronous online course orientation should be left out entirely but later in the questionnaire said they had numerous technological issues getting into the D2L Virtual Classroom. Similarly, 64% of students said that the synchronous online course orientation gave them an advantage in the course, including two students who responded, "I knew what to expect more so yes" and "It helped." One student did state that they had too many technological problems and missed the majority of the online orientation.

When asked "What was the greatest challenge you faced during or with the online orientation?," most students (64%) stated that they did not have any issues with the online orientation. One student further explained by stating "Honestly I didn't face any challenges with the orientation whenever the professor joined it automatically joined me into the group. It was pretty basic and simple to use." Of the students that did have issues all of them were technological issues. Student responses include "getting into the virtual classroom," "connection issues," "technology issues," and having to download foxfire to join the orientation. One student said that they did not face any challenges and "thought it was a great way to meet our professor and to understand how the semester was going to go."

Lastly the students were asked if completing the synchronous online course orientation prevented any anxiety with taking the online course and further asked them to explain their thoughts. Students responded that the orientation "made the instructor more relatable" and "encouraged (me) to reach out to my professor if I had questions because she assured us she would always answer us back." Additionally, "Yes, after the orientation I knew what was expected of me and was easier hearing it from a person than looking through D2L trying to find the class expectations" and "Yes, it relieved me that my teach was very involved unlike the last online class I took." Finally, one of the most notable responses the student stated "I have taken online courses before but never an online science course so this was a blessing to me because it explained to me how to navigate the course and showed that the professor genuinely cared about our questions and about helping us correctly progress through the course."

Conclusion

The introduction of the synchronous online course orientation showed a significant difference between the withdrawal rates in the synchronous and asynchronous treatments. Student success was also found to be significantly different between the online course sections with the synchronous treatment and the asynchronous treatment. The data showed the possible equivalency between the synchronous treatments and the traditional face-to-face. A discourse regarding the significance of these findings is included in Chapter 5, as well as the next steps for these research findings.

CHAPTER 5

DISCUSSION AND ACTION PLAN

This study aimed to combat the attrition problem plaguing online courses in technical colleges. This action research study focused on adapting an existing asynchronous online orientation to a synchronous method. Chapter five provides the reader with an overview of the study as well as presenting research findings. The data will be discussed along with interpretations of the findings. A discourse will take place about the implications of this action research study and future plans for these findings. A description of the action researcher will be provided and finally the limitations for this research will be conferred.

Overview of the Study

This action research study intended to acknowledge if synchronous online course orientation facilitated reducing attrition rates at TWTC. As the teacher-researcher, I investigated the differences in asynchronous and synchronous online course orientation in a non-majors biological science course. I converted the existing asynchronous online course orientation into a synchronous delivery during the GoToMeeting and D2L Virtual Classroom applications. The synchronous treatments were incorporated in both fall 2018 and spring 2019 BIO 105 online course sections. Both student success rates and withdrawal rates were collected in the online and face-to-face BIO 105 courses.

Additional data, from past semesters, was retrieved from the College's Institutional Research. The hope was to ease navigation and enable students to obtain instantaneous

feedback if questions arise during the synchronous orientation. Withdrawal rates from multiple BIO 105 course sections were collected and used. The data collected by the teacher-researcher further aided in ensuring high quality education is continually offered by both instructors and the institution. Ultimately, the aim of this research was to determine if implementing a synchronous online course orientation impacts student success and withdrawal rates at TWTC. This action research intends on answering the following research question: what impact does requiring synchronous online course orientation have on the attrition rate in an online biological science course?

Interpretation of the Research Findings

The data previously mentioned in chapter four will be discussed again in this chapter in greater detail. Discourse will take place on both the withdrawal rates and success rates of students in online and face-to-face courses. The significant differences will be noted, as well as the interpretations of these differences. Finally, this section will determine if the implementation of the synchronous online course orientation impacted student success and withdrawal rates at TWTC.

Withdrawal Rates. Based on the findings, before the synchronous online course orientation was applied, withdrawal rates for BIO 105 were significantly different between online and face-to-face course sections ($p=0.012$). Showing a difference of withdrawal rates existed between face-to-face and online courses from fall 2016 to spring 2018.

Upon implementing the synchronous online course orientation in both the fall 2018 and spring 2019 semester the withdrawal rates between online and face-to-face BIO 105 courses were much similar. The t-test showed no significant difference between the withdrawal rate in face-to-face course sections and the online course sections with the

synchronous online orientation (p=0.19). The lack of significant difference indicates the similarity between online and face-to-face course withdrawal rates when the synchronous online orientation was implemented.

Furthermore, the average withdrawal percentage was 25.5 percent for those online course sections using the asynchronous online orientation. The online course section with the synchronous orientation treatment averaged nine percent. Basing these percentages on the normal course enrollment for the online course sections (e.g. 26 students) this is a difference in around seven individuals for the asynchronous treatment and two individuals for the synchronous treatment withdrawing per semester. This is a huge difference when looking at each course section with 26 total students enrolled. Even when the summer semesters were coupled with the full-term fall and spring semesters the average was a 22.5% withdrawal rate. This is still around six individuals withdrawing a semester no matter how condensed the term.

Additionally, comparing all semesters of the asynchronous treatment to the synchronous online course orientation for the online course sections a significant difference was seen (p=0.001). This included both summer 2017 and summer 2018, the only times when BIO 105 had been offered online in the summer. Six past semesters (both full 15 week term and summer 10 week term) were used as the control treatment to be compared with the synchronous treatments. A decreased withdrawal percentage was noted in both the fall 2018 and spring 2019 semesters when the synchronous online course orientation was implemented. The fall 2018 and spring 2019 semesters were the only semesters with a withdrawal percentage at or under ten percent. The introduction of the synchronous

online course orientation may possibly be responsible for making the withdrawal rates similar in the face-to-face and online courses.

Success Rates. Student success was also assessed by the treatment type. Student success was defined by the College's Institutional Research and in this study as a 70% or above. Face-to-face and online course sections were compared based on student success and a significant difference was found between the delivery type. Comparing the face-to-face and online success rates of students between fall 2016 to spring 2018 a significant difference was found ($p=0.003$). This significant difference showed that success rates between online and face-to-face BIO 105 courses are different. Additionally, the online success rates were never above 66 percent. The online success rates had a lower range with only four percent variance between the four semesters. The average success percentage for online students was 64.25% or 17 individuals a semester with full enrollment. However, the face-to-face courses had a fourteen percent variance between the four semesters ranging from 86 percent all the way to 100 percent success. The average for the face-to-face course success was 89.75% or 23 individuals a semester with full enrollment.

Upon the synchronous orientation implementation in fall 2018 and spring 2019, no significant difference was seen between the face-to-face and online course sections. This showed implementing the synchronous online course orientation made student success more equivalent to face-to-face course sections. The online courses showed a jump to 72 percent and 73 percent success rate, increasing the success rate of online students an average of eight percent. The fall 2018 semester face-to-face course success rate was much lower than any of the other semesters, however the significant difference in online and

face-to-face courses can be seen with or without the fall 2018 outlier. The rise in success rates for the online course sections could possibly be attributed to the implementation of synchronous online orientation.

Implications of the Action Research Study

Since a significant difference was found amongst the two treatment types (i.e., synchronous delivery and asynchronous delivery), then synchronous online orientation will be implemented into all of the teacher-researcher's online and hybrid course sections. My goal is to ultimately include more synchronous learning opportunities in my courses to help increase student success and decrease attrition. The teacher-researcher will integrate synchronous learning sessions about assignments due throughout the semester. Dependent on the ease of using the synchronous learning opportunities the teacher-researcher may incorporate tutoring for her online and hybrid courses. By integrating more synchronous learning opportunities and posting recordings of these sessions for students unable to attend during scheduled times, the hope is to eradicate the differences in the teacher-researcher's student success and withdrawal rates between online and face-to-face courses.

Action Plan and Suggestions for Future Research

A significant difference was found between implementing a synchronous online orientation and that of the prior asynchronous method. The action plan set forth by the teacher-researcher will be to first meet with the director of the Distance Learning Institute at TWTC. This meeting will be used to discuss all findings from this action research study. Additionally, the chair of the Natural and Physical Science Department at TWTC will be notified of the effects of implementing a synchronous online orientation in a non-majors course. Contacting both the chair of the Natural and Physical Science department and the

director of the Distance Learning Institute will enable all online instructors at the College to be aware of these action research findings.

Results of this study will be presented in a professional development session at TWTC so the teacher-researcher can share findings with her colleagues. Furthermore, the digitally collected student reactions will be shared in a faculty roundtable at TWTC in order to further improve the required online course orientation. Presently, all course sections are required to implement some type of course specific orientation, the questionnaire will be able to provide feedback on potential improvements to current asynchronous orientations. A discourse will also take place, on the challenges and benefits of using both GoToMeeting and the D2L Virtual Classroom synchronous platform for synchronous learning opportunities at TWTC.

Sharing the findings of this study at the College and with the director of the Distance Learning Institute will possibly lead to the integration of diverse technology and increased synchronous learning in online courses. Future research, including the incorporation of more synchronous online orientations in online and hybrid courses, could lead to the adaptation of existing required online orientation and course specific materials at TWTC. Additionally, creating a required synchronous online orientation for all online STEM courses and possibly all hybrid and online course sections at TWTC. This study aims to generate equivalency between both the online and face-to-face student success and withdrawal percentages at TWTC.

Description of the Action Researcher as a Curriculum Leader

Educational leadership must be proactive and integrate "the interaction of environment, followers, and the leader" (Valle, 2001, p. 120). This enables individuals to

have key roles and share values in order to perform work together within the school. Having a single goal within a school will lead to transformations, both within the school, and within the school's community (Valle, 2001). Additionally, school administration and leaders have "a commitment to administer to the needs of a school by serving its purpose … and by acting as a guardian to protect the institutional integrity of the school" (Sergiovanni, 2007, p. 300). The role of administration, as well as educators, cannot be overlooked as the positive implications of effective leadership. As long as each individual, no matter the academic level, strives to reach the core vision of the school, a positive school community will be established (Sergiovanni, 2007). As educators and administrators strive to adapt to their surroundings, in turn so does their curriculum. These changes, and commitment to a better education, are facilitated through individuals participating in action research.

For curriculum leadership and curriculum to stay current, continuous improvement must occur within each institution. Faculty, staff, and student concerns must be acknowledged and addressed. Likewise, administration must recognize what support systems need to be in place for both students and faculty members (Greene, 2011). These changes are implemented many times by action research inside specific classrooms to solve existing concerns. Gardner (2013) states, "No individual has all the skills – and certainly not the time – to carry out all the complex tasks" (p. 26). One educator is unable to address all their concerns for their students and how the curriculum is presented, however when several individuals implement multiple action research studies, positive change is able to occur within an institution. It is through trial and error and directly addressing concerns inside the classroom, that curriculum is able to progress and stay current.

As a leader at my institution, I want to implement change within my classroom and institution, and positively progress within my discipline. As a TWTC faculty member, in the Natural and Physical Science Department, I serve on numerous committees at the college and within my department. I strive to improve my individual knowledge as well as offer a quality education to each individual entering my classroom. I do this by implementing new techniques within the classroom environment and offering a wider variety of courses. In the past five years, I have developed and taught multiple online courses and have noticed reoccurring issues with the online courses. Some of the main problems existing for online students is navigating the learning management system, learning how to use the companion websites, and understanding the expectations of the course.

Due to several problems existing with my online courses, I chose to implement an action research study at TWTC. As a science educator, I want to not only remain current in the field of science, but also keep up to date with the continuously advancing technological aspect of online learning. I strive for equivalency between my online and face-to-face courses. Online courses are going to continue to grow as technology continues to advance. My hope is to retain the rigor in my online curriculum while continuing to integrate new technology in my online courses, thus promoting student persistence and success at TWTC.

Limitations of the Action Research Study

The sample size for the synchronous online orientation treatments were much smaller than desired. The total number of synchronous treatment and asynchronous treatment course sections was not equivalent. The student success percentages included

only students who completed the course with a 69.5% or above. At TWTC only the students who complete the course with a 69.5% or greater are considered successful, however students that do complete the course with a 59.5% to a 69.4% are still able to use the hours towards graduating as long as the course does not need to be used as a prerequisite for another biological science course. Additionally, student withdrawal rate percentages included some students who did not complete attendance activities for three weeks, which do not have to be consecutive. Withdrawal percentages also included some individuals who completed the attendance verification quiz but did not complete any other coursework.

The survey and questionnaire were only included in the spring 2019 online course section and only one course section was offered during the spring 2019 semester. Two online course sections were offered in the fall 2018 semester. Only eleven participants agreed to have their responses included in the study. In the fall 2018 semester GoToMeeting was used for the synchronous online course orientation and for spring 2019 D2L Virtual Classroom was used. The two different platforms were used due to the pilot of the Virtual Classroom and the meetings ability to be integrated into the LMS of the College. The differences between the online orientation deliveries are unknown.

This research only included course sections of BIO 105, which is a non-major biological science course. There are only a limited number of course sections offered each semester of online and face-to-face BIO 105 course sections. Furthermore, BIO 105 is one of only two biological science courses offered both online and face-to-face. Unfortunately, only including BIO 105 makes the findings of this study hard to generalize to other courses at TWTC. Additionally, only the teacher-researcher taught BIO 105; for this reason other

comparisons or generalizations across the Natural and Physical Science department may be difficult.

Finally, due to the compressed amount of time for data collection in spring of 2019 the withdrawal percentages and success percentages were not collected at the end of the semester. The percentages were collected in the middle of the term (8 weeks into the semester). Therefore, the percentages included in the study may have increased or decreased by the end of the semester. This mid-semester data collection occurred for both the online and face-to-face course sections taught by the teacher-researcher. Including data from the end of each semester except for spring of 2019 may have skewed percentages.

Conclusion

This study afforded the teacher-researcher to understand the impact incorporating a synchronous online orientation had on both student success and withdrawal rates. The hypothesis, synchronous online orientation will have a lower attrition rate than that of the traditional orientation method, was supported. It was found that synchronous online orientation aided in increasing student success and decreasing student withdrawal in the online course sections. This study has led the teacher-researcher to target the incorporation of synchronous online orientation as the first key factor in attaining face-to-face and online course attrition rate equivalency.

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APPENDIX A

INFORMED CONSENT FORM

Principle Investigator: Rachel C. Fowler
Email: Rachel.Fowler@hgtc.edu
Phone: 843-349-3641
Project Title: The Effects of Synchronous Online Course Orientation on Attrition

Greetings!

You are invited to participate in a research study at Horry Georgetown Technical College in your Biology 105, Principles of Biology course spring of 2019. This form details the purpose of the study, as well as a description of your involvement and rights as a participant.

The purpose of this study is to look at how an orientation when the instructor and enrolled students are able to interact simultaneously affects withdrawal rates of online students. The results will acknowledge the benefits of simultaneous interaction with the professors in an online course orientation. This research could possibly further identify components that could aid in the future adaptation and improvement of online courses.

Your participation in this study does not require any extra time. All you need to do is participate in one of the offered online Biology 105 course orientation during the drop/add week and ask questions if you have any. During the fifth week of the course a short seven questionnaire will be distributed for you to fill out and turn in on your feelings about the course orientation.

You have no obligation to participate in the study and not participating will in no way impact your grade. Your name and all other identifying information will remain anonymous during this study and after the study is completed. Please feel free to contact me anytime during this study if you have any concerns or decide to withdraw from this study during the semester. If you have any questions please contact me directly by email or phone before signing this form.

I **AGREE** **DO NOT AGREE** (circle one) to participate in this research study.

Participant's Name (please print):_____ Date:__ _____

Participant's Signature:_____ _____

APPENDIX B

PARENTAL CONSENT FORM AND ASSENT FORM

Principle Investigator: Rachel C. Fowler
Email: Rachel.Fowler@hgtc.edu
Phone: 843-349-3641
Project Title: The Effects of Synchronous Online Course Orientation on Attrition

Greetings!

Your child has been invited to participate in a research study at Horry Georgetown Technical College in your Biology 105, Principles of Biology course spring of 2019. This form details the purpose of the study, as well as a description of your child's involvement and rights as a participant.

The purpose of this study is to look at how an orientation when the instructor and enrolled students are able to interact simultaneously affects withdrawal rates of online students. The results will acknowledge the benefits of simultaneous interaction with the professors in an online course orientation. This research could possibly further identify components that could aid in the future adaptation and improvement of online courses.

Your child's participation in this study does not require any extra time. All they will need to do is participate in one of the offered online Biology 105 course orientation during the drop/add week and ask questions if he or she has any. During the fifth week of the course a short seven questionnaire will be distributed for them to complete and turn in on their feelings about the course orientation.

Your child has no obligation to participate in the study and not participating will not impact their grade in any way. Your child's name and all other identifying information will remain anonymous during this study and after the study is completed. Please feel free to contact me anytime during this study if you or your child has any concerns or decides to withdraw from this study during the semester. If you have any questions please contact me directly by email or phone before signing this form.

I **AGREE** **DO NOT AGREE** for my child to participate in this research study.

Child's Name (please print):________

Child's Signature: _____ Date:_____

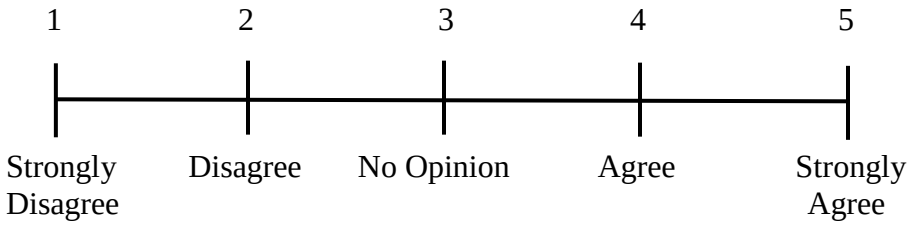
Parent or Legal Guardian's Name (printed):_____

Signature of Parent or Guardian:_____ Date:_____

APPENDIX C

QUESTIONNAIRE

Please indicate the answer to each of the questions by using the 1 to 5 Likert scale. All answers will anonymous, will not affect your overall course grade, and will only be used for research purposes.



1. Your course orientation was given in a format allowing to ask questions and enabled you to receive instantaneous feedback, in your opinion did this online orientation benefit you?	**1 2 3 4 5**
2. Did you take advantage of asking questions during the course orientation?	**1 2 3 4 5**
3. Do you believe that the course orientation was given at a time and day that was acceptable for you to attend?	**1 2 3 4 5**
4. Did the orientation enable you to access course materials and supplemental materials easier and give you a better understanding of navigating the course?	**1 2 3 4 5**
5. In your opinion did this initial interaction with your professor encourage you to ask questions about coursework or any other concerns?	**1 2 3 4 5**
6. Would you be more likely to take another course if you knew it contained this type of online course orientation?	**1 2 3 4 5**

7. Are there any improvements you could suggest to either include in future online orientations or leave out entirely?

8. Did the online orientation give you an advantage in this online course?

9. What was the greatest challenge you faced during or with the online orientation?

10. Did completing the online orientation prevent any anxiety with taking an online course? Please explain your answer.