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# The Impact of a Peer-Tutoring Model on the Academic Performance of Secondary Students

Bridgett Wolfe

*University of South Carolina*

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THE IMPACT OF A PEER-TUTORING MODEL ON THE ACADEMIC PERFORMANCE  
OF SECONDARY STUDENTS

by

Bridgett Wolfe

Bachelor of Science  
University of South Carolina, 2009

Master of Education  
University of South Carolina, 2010

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Submitted in Partial Fulfillment of the Requirements

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Accepted by:

Susan Schramm, Major Professor

Russell Conrath, Committee Member

Rhonda B. Jeffries, Committee Member

Kathleen Marshall, Committee Member

Cheryl L Addy, Vice Provost and Dean of the Graduate School

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## DEDICATION

This dissertation achievement is dedicated to my wonderful family who have always had my back and encouraged me on the hardest days. I can't express my appreciation and gratitude enough to my amazing husband, Josh Wolfe, who wiped the tears on the bad days and celebrated the achievements on the good days. Thank you for bringing me lunch at the Thomas Cooper Library on those full work and research days, telling me that I could this when I was ready to quit, and always giving me undying support and confidence. I also can't thank my parents, Mark and Carolyn Barefoot, enough for the love and support throughout this entire process. They never had any doubt that I could do this and have always believed in me. I would also be remiss if I didn't also dedicate this to my uncle, Keith Barefoot, who has helped keep me on track and encouraged me by letting me know constantly how proud my grandmother would be of me. Your words of encouragement were much appreciated.

## ACKNOWLEDGEMENTS

This dissertation would not have been possible without my amazing network of support at my school. My coworkers have laughed and cried with me throughout this entire process. Their words of support and encouragement were much needed and appreciated. I could always depend on them to lift me back up when I felt like I couldn't fall any lower and to help cover my classes on those days when I had more work to do than I thought I could manage. They have really showed that they are more than just coworkers, they are some of my best friends.

The sincerest gratitude must also be expressed to the professors who have helped guide me through this process as painlessly as possible. The faculty in the University of South Carolina's Curriculum and Instruction are truly amazing and I have learned more than I could have ever imagined and achieved so much because of their guidance. Dr. Schramm-Pate has been very patient and encouraging as I have worked through this program. This would not have been possible without her advice and wisdom.

## ABSTRACT

*The Impact of A Peer-Tutoring Model on the Academic Performance of Secondary Students* describes the impact of a peer-tutoring model in a secondary introductory computer science classroom, Information Technology Foundations (ITF), at a Midlands High School (MHS) (pseudonym), a suburban high school located in the Midlands region of South Carolina. The course is required for graduation and student-participants in the study were diverse in their ages and learning abilities. Matching one peer-tutor with five or six peer-tutees enabled student-participants to work through a Google Drive unit that was designed by the teacher-researcher. The research question: *What is the impact of a peer-tutoring model on a group of heterogeneous multi-aged high school students with diverse learning abilities?* drove the study. Action research methods were used to collect data with 17 students over a seven-week period in the Fall 2017 semester. Quantitative data in the form of a pre and post test and qualitative data in the form of semi-structured interviews, journals, and classroom observations were used to answer the research question. An action plan was designed to enable other teachers with heterogeneous, multi-aged groupings of students in their courses, to implement a peer-tutoring model for greater academic gains and student relationship building.

*Keywords: Action research, Computer science; Peer-tutoring; Secondary student achievement*

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# CHAPTER 1

## INTRODUCTION

### **Introduction**

Chapter One provides an introduction to the present dissertation in practice (DiP) that describes a peer-tutoring model that was implemented in Midlands High School (MHS) (pseudonym), a suburban high school in the Midlands region of South Carolina over seven-weeks in the fall of 2017. The identified problem of practice (PoP) for the present DiP involved peer-tutoring as a pedagogical strategy to improve students' academic performance in a required Information Technology Foundations (ITF) course with multi-age, heterogeneous students. ITF is a required computer science course for graduation and currently, the teacher-researcher is the only teacher who teaches the course.

### **Identifying the Problem of Practice**

The identified PoP for the present action research study was developed by me after reflection on prior experiences with the Google Drive unit in my ITF classes. After determining the specific “dilemmas or ‘felt difficulties’” (Dana & Yendel-Hoppey, 2014, p. 30) experienced by not only me, but also by the other teachers within their departments, it was noted that students struggle the most with the Google Drive unit in both learning the skills and keeping up with their work. It was also noted that the ITF

course contains students with a myriad of abilities to include: (1) students excelling in Advanced Placement (AP) courses, who tend to finish work early and become bored; (2) students served within self-contained classes, who struggle to learn the skills, require a large amount of one-on-one instruction, and struggle to complete their work; and (3) students served as English Language Learners (ESOL), who often struggle to understand English and thus, the instructions for projects. It is not that ESOL do not have the skills, it is that they are marginalized by the language barrier.

In addressing my diverse students' needs along with their struggles within the Google Drive unit, I determined that a peer-tutoring model might be a potential solution for my identified PoP.

I developed a peer-tutoring model, which enabled my 17 students to not only keep up better with their assignments, but to also learn the skills and increase their performance on the culminating post-test after peer-tutoring took place. Therefore, I seek to improve my pedagogical strategy in order to meet the needs of my diverse student population with learners of varying academic ability and computer skills. The present study was conducted in an ITF classroom with 17 student-participants who provided consent to participate in the study (Appendix A). Within this multi-aged, heterogeneous group the following students were included: 1. Students served under the District's "special education: guidelines (Appendix B); 2. students enrolled in advanced placement (AP) courses; and 3. students who are labeled as "English as Second or Other Language" (ESOL). Findings from the present study are organized into the following three major themes: *Students Taking Responsibility*; *Improved Student Learning*; and *Student Collaboration Strategies*.

## **Background of the Study**

In the past, I struggled to meet the diverse needs of my students in my ITF courses. After an investigation into the scholarly literature to seek an alternative pedagogy, I determined that peer-tutoring was a pedagogical technique that would enable me to better serve my multi-aged student population of diverse learning abilities. Therefore, the identified problem of practice for the present study involves the implementation of a peer-tutoring model, which I designed, and which had not been previously researched within the MHS. In order to carry out the research, I gained support from the school administration and consent from the student-participants' parents/guardians to participate in the seven-week data collection during the Google Drive unit in the ITF course during the fall 2017 semester.

## **Scholarly Research in Support of Peer Tutoring**

The diverse abilities of the student-participants in the present action research study on peer-tutoring was used to establish a peer-tutoring model for future peer-tutoring at MHS in my ITF course as well as within other courses with multi-age and diverse learning groupings. According to Goodlad (1998), peer-tutoring is seen as a way of enriching the educational experience for all students regardless of academic ability. Following Goodlad, I began researching pedagogical strategies that had been previously implemented with a similar demographic as my own and deemed peer-tutoring to be effective with multi-age and diverse student learners, some of whom are labeled "special education" and others of whom are labeled ESOL and others whom are labeled as

“advanced.” Topping and Ehly (1998) list several advantages to the incorporation of peer-tutoring including:

1. Complementing a direct teaching or independent study style which may already be taking place in a classroom;
2. Providing immediate and meaningful feedback to tutees;
3. Providing a means to compare and contrast answers and/or problems;
4. Encouraging team-work to address learning issues that arise amongst tutees;
5. The approachability of a “peer” for tutees versus a teacher; and
6. Peer-tutor can make the course content relational to the tutee in a fashion that is different from the teacher.

Nawaz & Reman (2017) specifically cite peer-tutoring as a “teaching strategy in which the class is organized in pairs of two students that may be of different abilities to act as tutor and tutee in the learning process [in order to] get maximum benefits from each other” (15). Based on the available research and previously conducted studies, I determined that a peer-tutoring model would best meet the needs of my heterogeneous group of student-participants within my ITF classroom at MHS for this DiP action research.

Peer-tutoring, as a pedagogical practice, can reduce stress on teachers who are expected to teach large groups of multi-age and diverse student learners. There are several methods that can be used to setup a peer-tutoring program in a high school classroom with a diverse student population in order to meet learning needs of heterogeneous groups. According to Boud, Cohen, and Sampson (2001) it is important to consider,

The context into which the peer learning practice is to be introduced, focusing on general goals and learning outcomes, ensuring congruence between the peer learning strategies and assessment tasks, and considering resource implications.

(22)

Boud et al (2001) recommend two types of peer-tutoring programs for high school classrooms. The first is a peer-tutoring program that focuses on life skills and often takes place outside of the classroom. The second is peer-tutoring program in which students focus on academics within the classroom. I chose the program within the classroom for the present action research. Boud, et al., (2001) discuss options:

These [tutoring models] range from the traditional proctor model, in which senior students tutor junior students, to the more innovative learning cells, in which students in the same year form partnerships to assist each other with both course content and personal concerns. Other models involve discussion seminars, private study groups, parrainage (a buddy system) or counseling, peer-assessment schemes, collaborative project or laboratory work, projects in different sized (cascading groups), workplace mentoring and community activities. (3)

Following Boud et al's recommendations, I assigned the tutoring groups amongst my students for the DiP research after administering a Pre-Test to ascertain their learning ability and knowledge of computer science (Appendix C). Based on the needs of the ITF class in which I collected data, I used a combination of Boud et al's peer-tutoring models for matching younger students with older students (who scored higher on the Pre-test).

## **Problem of Practice Statement**

The identified problem of practice (PoP) for the present DiP involved peer-tutoring as a pedagogical strategy in an Information Technology Foundations (ITF) course. ITF is a required computer science course for graduation at Midlands High School (MHS) (pseudonym) and currently I am the only teacher who teaches the course. Typically, because ITF is required, the academic abilities of the students are diverse as are their age and grade levels. The PoP for the present action study was developed after I reflected on the challenges present within my past ITF classrooms due to the diverse needs of my students and multi-age groupings after I researched solutions to the problem with innovations using peer-tutoring models that had been implemented in schools with similar population demographics as my own.

## **Research Question & Objective**

Based on the identified PoP, the research question for the present action research study is:

*What is the impact of a peer-tutoring model on a group of heterogeneous multi-aged high school students with diverse learning abilities?*

The goal of this action research study was to describe a peer-tutoring model used with 17 student-participants in an ITF classroom and provide insight to a different pedagogical approach that included peer-tutoring in order to better in meet the needs of heterogeneous groups of students in a computer science course. The findings of this study led to an Action Plan designed to assist teachers at MHS in implementing peer-tutoring. The action plan also includes suggestions for enabling peer-tutors to work collaboratively

with their peer-tutees in order to build community and stronger relationships amongst students.

### **Purpose Statement**

The primary purpose of the present action research study was to describe the implementation of a peer-tutoring model in a required computer science high school with a heterogeneous class of 17 students. The secondary purpose was to develop an Action Plan based on the findings of the research in order to enable other teachers with heterogeneous groups of students at MHS to implement a peer-tutoring model in their classrooms and to enable students to benefit from the community-building inherent within peer-tutoring.

### **Data Collection Strategy**

Quantitative data was collected using teacher-made pre-and post tests (Appendix A and Appendix B). Qualitative data was collected in the form of a journals (Appendix C), and semi-structured interviews (Appendix D).

### **Relationship of Peer-Tutoring to the Larger Theories on Schooling**

The present Action Research study is grounded in the broader educational theories of John Dewey's progressivism (1938) aligns with the present study that involves the use of group interaction and cooperative learning also known as in this study as "peer-tutoring." In my required ITF computer course, my student-participants worked together to find answers to the questions I posed to them in the Google Drive unit. They helped each other acquire the necessary skills and knowledge needed to complete

assignments in that Unit. As in Dewey's (1938) theory in his famous book, *Democracy & Education*, the students had a moral responsibility to work collaboratively for the good of the order. Following Dewey (1938), Jackson and Davis (2000) argue that it is crucial to help adolescents

[A]cquire durable self-esteem, flexible and inquiring habits of mind, reliable and relatively close human relationships, a sense of belonging in a valued group, and a sense of usefulness in some way beyond the self. (12)

My peer-tutoring model fit within Dewey's (1938) description of cooperative learning since my students, whether in the role of tutor or tutee, had a purpose and a niche in which they "fit" in my classroom during the course of this action research.

According to the Special Education Guide (2013) proponents of inclusion cite enhanced social interaction as a big benefit for students of all levels of ability because friendships that might otherwise be unimaginable can form and these bonds often allow kids to understand diversity at a deeper level. Peer-tutoring is a model of mentoring that can assist teachers who have multi-aged and special education students heterogeneously grouped in their required courses.

### **Action Research Methodology**

The present action study was conducted using an Action Research methodology. According to Mertler (2014), action research is:

Systematic inquiry conducted by teachers, administrators, counselors, or others with a vested interest in the teaching and learning process or operate, how they teach, and how their students learn. (4)

As both the researcher and practitioner in this research study, I had a vested interest in the results since I aimed to improve my instructional practice within my ITF classroom and promote a greater sense of community amongst my diverse student population in the course. I was interested in making my classroom and the curricular materials more accessible to all of my students, both tutor and tutee, while encouraging them to work collaboratively to help each other learn the material in order to pass the course and build community in my classroom.

My intention for the tutors was to enable them to develop strategies to be more productive members of society by teaching them how to serve as their peers and for the tutees to aspire to one day be peer-tutors to others. This triad of peer-to-peer mentoring requires students to learn interpersonal communication skills in order to be successful at communicating with each other, putting each other at ease, and helping each other learn the material while simultaneously creating a community within the classroom.

Action research methods are oriented so that some action or cycle of actions amongst organizational members is taken to address an identified problem of practice (PoP).

Following Herr and Anderson,(2005), I employed an Action Research methodology for the present study. I was required to first identify a particular problem of practice (PoP) in my classroom and then write a research question about the PoP and think about the purposes of the research. I first examined my former pedagogical practices and found that they were not meeting the diverse learning needs of my multi-aged students with varying learning abilities in my ITF course. I second identified a peer-

tutoring model to enable me to take “action” to improve my pedagogical practice in order to better teach and reach my diverse groupings of students in my ITF course.

The present study aligned with a list of five goals for action research developed by Herr & Anderson (2005) who wrote argue that action research creates a

[G]eneration of new knowledge, the achievement of action-oriented outcomes, the education of both researcher and participants, [and] results that are relevant to the local setting, a sound and appropriate research methodology. (55)

I also utilized Mertler (2014) to guide me through the action research process. Mertler argues that action research is a cyclical process that progresses through four stages:

1. The first stage is the “planning” stage. In this stage, I identified and limited a topic for the study, gathered relevant information, reviewed the related literature, and then developed an action research plan for the study.
2. During the second stage, the “acting” stage, I collected data via a pre-test and a post-test. Once all students completed the pre-test, I recorded the scores of all student-participants and assigned roles (of either tutor or tutee) based on the pretest scores. Students who received high scores on the pre-test were placed with students who scored lower. The student-participants then worked through a “Google Drive” unit for computer technology within a peer-tutoring group configuration. At the conclusion of the seven-week Google Drive unit, all student-participants took a teacher-made post-test. I analyzed the data using a *t-test* in the second stage of the study.
3. Once the data was gathered and analyzed, I transitioned to the third stage and began developing an action plan for future research; and

4. The fourth and final stage of the action research process is the “reflecting” stage (2014). Here, I shared the findings of the study with my student-participants and reflected with them to determine best practices for peer-tutoring (2014).

The student-participants assisted in developing the action plan for other teachers (please see Chapter Five of this DiP) by providing their feedback and perspective on the results. Action research aligns with the theoretical framework of the present study. Following John Dewey (1938), I placed an emphasis on the human experience of each of my students and I see the importance of what can be learned through experience. In this case, it is the “experience” of peer tutoring. Action research is the “tool” that I used to involve the students with each other so that I, as their teacher, could research my identified PoP and design a better pedagogical strategy to address the problem of meeting the needs of my heterogeneous group of learners in my ITF course. I was actively engaged in the research process and I plan to continue to engage in an action research process and to engage in self-reflection throughout my teaching career as a result of learning action research methods. This will continually lead to my growth as a professional curriculum leader.

### **Positionality**

In considering action research as the methodology in which to conduct the present action research study, I had to consider my position within the study itself. Herr and Anderson (2005) identify the researcher as both an insider and an outsider. The outsider works within an organization to conduct researcher and the insider is a stakeholder within the organization.

### **Significance of the Study**

The study has the potential to initiate a beneficial pedagogical change at MHS, the implementation of a school-wide peer-tutoring model for teachers with large heterogeneous groups of students. I developed a peer-tutoring model based on evidence grounded in scholarly literature.

### **Training the Peer-Tutors**

The peer-tutoring used to provide training for my peer-tutors for this action research in my ITF classroom is based on the suggestions of Edward Gordon (2005). He provides suggestions for enabling peer-tutors to work collaboratively with peer-tutees and I used his suggestions to enable the peer-tutors to be ready to help assist with the Google Drive unit over a seven-week period.

### **Findings of the Study**

Findings indicated not only an improvement in cooperative learning amongst the peer-tutoring groups but also an increase in peer accountability, an increase in responsibility (e.g., work completion) and a greater sense of community in the classroom as students collaborated with each other. The mutual benefits experienced by both tutors and tutees include an improvement in tutees academic achievement on a post-test (Appendix D) after experiencing my peer-tutoring model. Findings from the present study are organized into the following three major themes: *Students Taking Responsibility*; *Improved Student Learning*; and *Student Collaboration Strategies*.

## **Overview of the Study**

Chapter One is an introduction of this quantitative Action Research study describes the implementation of a peer-tutoring model in one high school computer science course in the Fall 2017 semester over a seven-week period.

Chapter Two of this dissertation contains the relevant literature regarding peer tutoring and grounds the present Action Research study.

Chapter Three provides a detailed account of the methodology for the quantitative study including details regarding the role of the researcher, the participants, the setting, the instruments and materials, the data collection, and the data analysis.

Chapter Four presents the findings and implications of the study, including the data collection strategy, analysis, coding, and data interpretation. It includes Findings from the present study and is organized into the following themes: Responsibility, Learning, and Collaboration.

Chapter Five presents the summary and conclusions of the study and details the Action Plan developed based on the research findings along with suggestions for future research.

## CHAPTER 2

### LITERATURE REVIEW

#### **Introduction**

The purpose of Chapter Two is to delineate the theoretical and historical perspectives related to the present action research study. The identified problem of practice (PoP) involves the use of peer-tutoring in a secondary-level computer science, Information Technology Foundation (ITF) course that is required for graduation and comprised of a heterogeneous group of learners.

This literature review provides a detailed account of research related to the use of peer-tutoring in secondary classrooms and its effects on the academic achievement of heterogeneously grouped diverse learners. Prior research in this field demonstrates that peer-tutoring models have positive benefits for both tutors and tutees including increased confidence with material, improved cooperative learning strategies, and improved academic performance (Abaoud, 2016; Nawaz & Rehman, 2017; Ruegg, et al., 2017).

#### **Problem of Practice Statement**

The identified problem of practice (PoP) for the present DiP involved peer-tutoring as a pedagogical strategy in an Information Technology Foundations (ITF) course. ITF is a required computer science course for graduation at Midlands High School (MHS) (pseudonym) and currently I am the only teacher who teaches the course. Typically, because ITF is required, the academic abilities of the students are diverse as

are their age and grade levels. The PoP for the present action study was developed after I reflected on the challenges present within my past ITF classrooms due to the diverse needs of my students and multi-age groupings after I researched solutions to the problem with innovations using peer-tutoring models that had been implemented in schools with similar population demographics as my own.

### **Research Question & Objective**

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The goal of this action research study was to describe a peer-tutoring model used with 17 student-participants in an ITF classroom and provide insight to a different pedagogical approach that included peer-tutoring in order to better in meet the needs of heterogeneous groups of students in a computer science course. The findings of this study led to an Action Plan designed to assist teachers at MHS in implementing peer-tutoring

### **Purpose Statement**

The primary purpose of the present action research study was to describe the implementation of a peer-tutoring model in a required computer science high school with a heterogeneous class of 17 students. The secondary purpose was to develop an Action Plan in order to enable other teachers to implement a peer-tutoring model in their classrooms and to enable students to benefit from community-building.

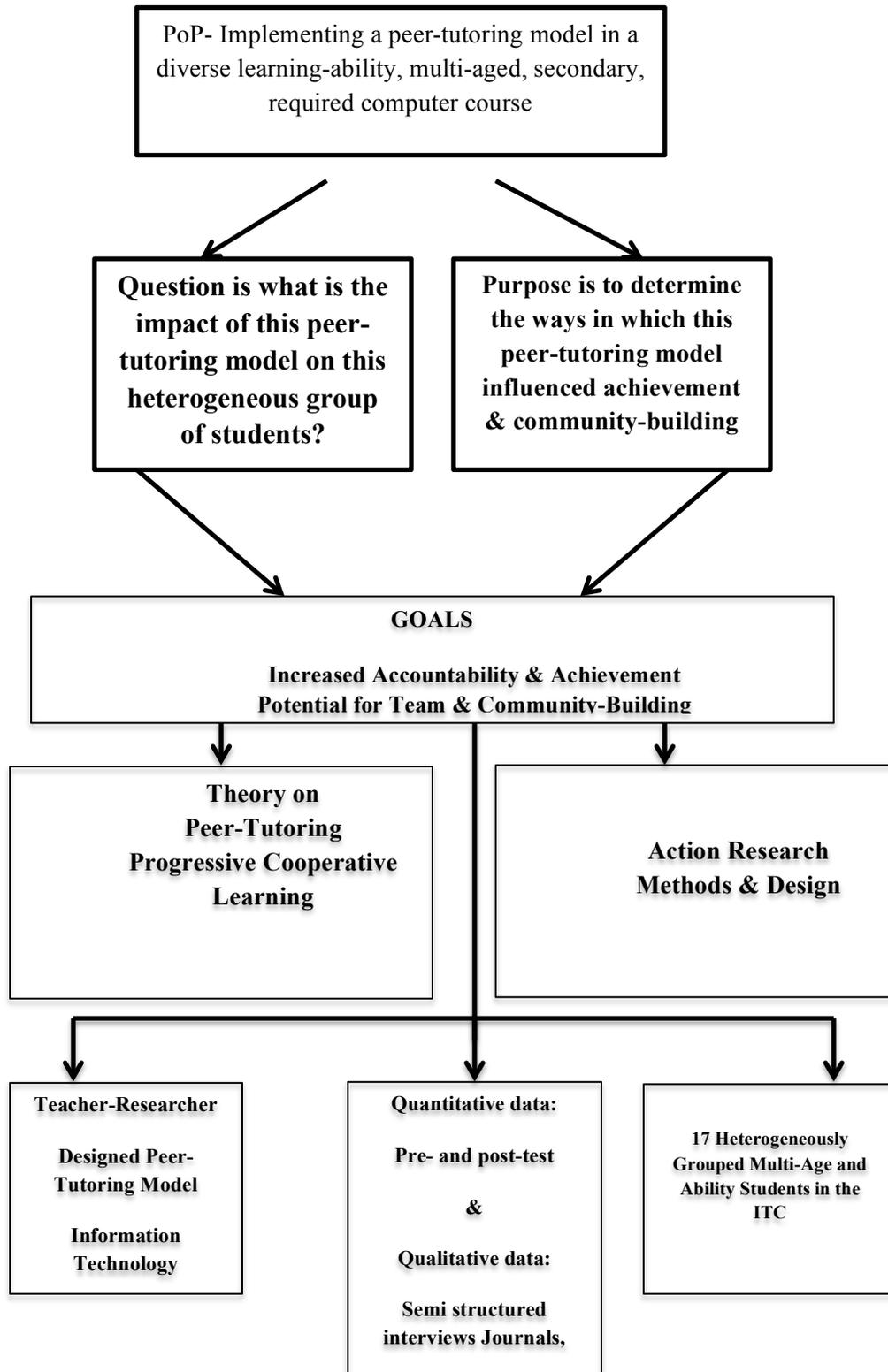


Figure 2.1. Conceptual Framework

## **Importance of the Literature Review**

The following literature review provided a historical and theoretical framework for the dissertation in practice (DiP) action research study. The literature review created a firm base on which to build the current research by citing previously conducted studies and the theoretical foundation upon which the research topic was founded. I began the research process by first discovering what prior research has been conducted and analyzing the findings of that research to determine what direction my action research needed to take in order for me to focus in on my specific research question (Mertler, 2014).

Analyzing the related literature provided examples of classroom applications, research questions, hypotheses, methods of data collection, and data analysis techniques (Johnson, 2008). By examining prior research design and its results, I described and created a peer-tutoring model in order to implement the model in my computer science classroom with a heterogenous group of 17 students in a more efficiently and effectively meet the needs of my diverse learners.

It is imperative for the action researcher to be aware of the difference of primary and secondary sources of information. According to Mertler (2014), a primary source is a direct account of original research written by the researcher. Examples of primary sources include dissertations, papers, and articles published in professional journals. Secondary sources on the other hand are secondhand accounts of previously conducted research. Secondary sources include summaries, compilations, analyses, or interpretations of primary information made by other individuals (2014). While an action research study literature review should focus on primary sources of information, including secondary

resources is acceptable and encouraged. The dissertation literature review is meant to review relevant literature, both primary and secondary sources, in order to frame the identified problem of practice (PoP) within action research methods and to describe the previously conducted research and its outcomes (Maxwell, 2006). The literature review is an integral part of an action research study and is designed to defend the researcher's reasoning behind the chosen research question and to guide the researcher in the development of their research methodology and design once the research question has been developed. (2006).

This literature review focuses on the research previously conducted on peer-tutoring and outlines for the reader the findings, which helped design an Action Plan for other teachers at MHS to implement peer-tutoring in their heterogeneous classrooms. The focus is on the use of peer tutoring with students of diverse academic abilities including advanced students, special education students, and ESOL students.

### **What is Peer Tutoring?**

Peer-tutoring is also known as peer-assisted learning, peer education, child-teach-child, mutual instruction, and partner learning. According to Falchikov (2001), early manifestations of peer-tutoring involved children acting as surrogate teachers whose aim was the transmission of knowledge. Topping (1996) described a contemporary view of peer-tutoring as “people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching” (6). A more vague definition simply has two or more people with specific roles known as tutor(s) and tutee(s). Forman and Cazden (1985) stated “that for peer tutoring to occur, there needs to

be a difference in knowledge between two individuals, so that the more knowledgeable individual can act as tutor to the less knowledgeable” (324).

For the purposes of this study, the definition of peer-tutoring for student achievement by Utley and Mortweet (1997) is used, “a class of practices and strategies that employ peers as one-on-one teachers to provide individualized instruction, practice, repetition, and clarification of concepts” (p. 9). In order to fully understand peer-tutoring, a definition of what is considered a ‘peer’ is needed. According to Onions (1978), a peer is “an equal in standing or rank, a matched companion” (Topping & Ehly, 1998, 1). However, Falchikov (2001) implies that the definition of ‘peer’ is dependent on individual contexts. In the past, a peer was considered to be a person of similar age and education level (Goldschmid & Goldschmid, 1976), but “the term ‘peer’ is now used to describe a variety of relationships in the context of teaching and learning, and the degree to which students are truly ‘peers’ varies across the range of possible peer tutoring applications (Falchikov, 2001, 1). For the purposes of this study, peers are considered to be students similar in age within the same classroom but with perhaps different ages and with different levels of knowledge of computer course content and ability.

### **Background of Peer-Tutoring**

The idea of peer-tutoring is not a novel concept. It can be traced all the way back to ancient Roman and Hindu schools which used mutual instruction by one pupil to another (Gordon, 2005). European schools began to utilize a peer tutoring system in the early 1800s which, depending on the country, referred to peer tutoring as ‘simultaneous instruction’, ‘decurions’, or the ‘monitorial system’ which all depended on the students assuming roles as tutor and tutee (Gordon, 2005).

Schooling in the United States have experienced a variety of educational levels present within one classroom but never so much as in the very early years of organized schooling when one teacher would be responsible for educating all students in a town with no separation of ages or levels (Spring, 2017). These early common school teachers employed a peer-tutoring model where the older students would tutor the younger students; therefore, the teacher could focus on the education of the older students and then feel a little less of the burden for the education of the younger students, this method of peer tutoring is actually referred to as cross-age tutoring (Goodlad & Hirst, 1989).

While there are many models for the use of peer-tutoring as there are definitions, Edward Gordon (2005) lists 6 key strategies that any successful peer tutoring program should implement.

1. Defining and planning a peer tutoring program- determining the specific curriculum goals and objectives that a teacher wishes to achieve
2. Training peer tutors- teaching students usable peer tutoring methods is essential for the program's success
3. Monitoring daily results- tutoring results can be determined using both formal and informal assessment tools, which can be used by both the teacher and the tutor
4. Assessing peer tutoring
5. Finding support for peer tutoring- once a teacher has decided to begin a classroom peer tutoring program, he or she will need support from three very different groups: the school's principal, the students, and the student's parents
6. Sustaining a peer tutoring program- within a school, peer tutoring, if properly introduced and maintained, can raise overall student classroom achievement

## **Benefits for Students**

### **Cost Benefits**

The benefits of the use of peer tutoring are innumerable. With the rising criticism of the American education system and the decline in the affordability and availability of resources to assist classroom teachers, the use of peer tutoring has been proven to be a cost-effective method to increasing student achievement in the classroom (Cohen, Kulik, and Kulik, 1982; Sharpley & Sharpley, 1981; Topping, 1996). Topping and Ehly (1998) found “strong evidence of cognitive gains for tutees and tutors and some evidence for improved attitudes and self-image (3). They also found that “training improved outcomes, structured procedures improved outcomes, and that same-age tutoring was as effective as cross-age tutoring” (3).

There is also argument today for the use of technology to increase student achievement, however, a study conducted by Levin, Glass, and Meister (1987) found that peer tutoring was four times more cost effective than computer assisted learning and was the best method; there is no doubt that technology has vastly improved but students still do not get the necessary collaboration skills as they would working with another student.

### **Social Benefits**

Another important benefit of peer-tutoring is the social benefit. Today’s world requires students to know how to communicate and cooperate as members of a team (Johnson & Johnson, 1983). The use of peer-tutoring naturally lends itself to teaching these necessary life skills because peer-tutoring encourages students learning to cooperate with one another and results in “greater positive feelings between children and higher self-esteem and empathy” (329). Peer tutoring is a way for students to learn how

to positively interact with others who are different than them (1983). “Politically, peer tutoring delegates the management of learning to the learners in a democratic way, seeks to empower students rather than de-skill them by dependency on imitation of a master culture, and might reduce student dissatisfaction and unrest” (Topping & Ehly, 1998, p.4).

### **Affective Domain Benefits**

While it is generally accepted and proven that students participating in a peer-tutoring program will learn to communicate and cooperate more effectively with other students, there are other affective benefits. The use of peer-tutoring has also been shown to improve student motivation and confidence (Falchikov, 2001). Peer tutoring is seen as being ‘humanly rewarding’ (Goodlad, 1979), meaning that peer-tutoring promotes a sense of purpose and provides for social bonding.

Students in the role of tutor develop a sense of ownership and pride towards their work as tutor and learn how to interact effectively with their tutees. Tutees also learn how to interact effectively with their tutors. While, peer-tutoring is not designed to take the place of a professional teacher, it is beneficial for students in the availability of a tutor leading to an immediacy of assistance. This leads to less frustration for the students and a decrease in behavior issues in the classroom (Topping & Ehly, 1998).

### **Students Served under Special Education IDEA**

With passage and reauthorization of the Individuals with Disabilities Education Act (IDEA) of 1997, it was stated that students served in Special Education should receive grade level instruction to the greatest extent possible. The *No Child Left Behind* Act (NCLB) (2002) affirmed IDEA and addressed the need for scientifically-based

instructional strategies designed to meet the educational needs of all students, including those served in Special Education.

In 2002, the President's Commission on Excellence in Special Education declared that students served in Special Education should be considered general education students first with no distinct line separating the two systems. The Commission noted that the current system "waits for a child to fail" (21) before trying to intervene. Okilwa and Shelby (2010) state that "well-implemented peer tutoring provides the additional instruction, practice, and support often needed by students with disabilities" (452).

IDEA also states that students served in a self-contained special education classroom should have instruction, to the greatest extent possible, in a general education classroom, which can be a non-core academic class. Previous studies have shown that students served under special education, have demonstrated positive effects from the use of peer-tutoring (Alzahrani & Leko, 2018; Abaoud, 2016; Okilwa and Shelby, 2010). The inclusion of students with disabilities in non-core subject areas such as art, physical education, and career and technology education (CATE) can lead to a stressful situation for teachers in large heterogeneously-grouped classes. Most teachers in these areas may not have specific training in working with students with mild to moderate to severe disabilities but they are expected to effectively teach and include them in their classes. Peer-tutoring can help alleviate some of this stress by allowing other students in the classroom to help assist those students who may be struggling because they are providing one-on-one instruction (Heron, 2003).

Heron (2003) conducted a meta-analysis of 12 studies that implemented peer-tutoring in specialized subject areas and the findings of the meta-analysis show positive

effects of peer-tutoring. The 12 studies that were reviewed were conducted in the core academic areas of language arts, mathematics, science, and social studies. Two of the 12 studies were conducted over multiple subject areas. Eight of the 12 studies were carried out in urban schools. The 12 studies included students from multiple disability areas such as learning disabilities, emotional disabilities, and mental retardation.

Okilwa and Shelby (2010) stated, “the effectiveness and benefits of peer tutoring transcend disability type. . . . all three populations (learning disabilities, emotional or behavioral disorders, and mental retardation) experience substantial academic improvement utilizing peer tutoring” (459). Peer-tutoring is a strategy teachers can employ to facilitate the inclusion of students with special needs in their classrooms (2010).

### **English Language Learners (ESOL) and Peer-Tutoring**

Today’s classrooms are becoming increasingly multilingual with the influx of immigrants from other countries. Each year at MHS, a large number of Hispanic students migrate to South Carolina. These English language learners (ESOL) students are often placed in classrooms without accommodations, which is not legal under IDEA.

According to Maitinger (2005)

Research shows that peer and community tutoring empower students in a way that straight classroom instruction cannot. Peer and community tutoring can be used to reinforce individual, as well as collective learning . . . It appears that even developmental learners have a great deal to gain from peer and/or community tutoring. In many cases, even the most reluctant developmental learners take charge of their learning and practically overnight become better learners. (3)

LeighAnne Lyttle (2011) studied the effects of peer-tutoring on English Language Learners (ESOL) and their acquisition of English language skills. Her study concluded that the use of peer-tutoring had a positive impact on the cognitive learning abilities of ESOL. She also noted that the use of peer-tutoring had a positive influence on the behaviors of ESOL students when they emulated the behaviors that are acceptable in American public schooling from observing their peer-tutors. Topping and Ehly (1998) wrote:

The interactive nature of peer tutoring is likely, therefore, to encourage natural language generation, social management skills, and the establishment of friendships, which are fundamental to the development of effective communication. (36)

### **Social Justice Issues**

The implementation of a peer-tutoring model in classrooms can help heterogeneously grouped students learn to interact with students of differing backgrounds. Peer-tutoring teaches students patience, acceptance, and empathy for others (Goodlad & Hirst, 1989). Historically marginalized groups of students such as students of color, female students, working-class poor students, and/or LGBTQ students can be placed in the role of peer-tutor which can give them a sense of empowerment and pride in their ability. Boud, Cohen, and Sampson (2001) identify two approaches to addressing ‘difference’ in peer tutoring. The first approach involves creating peer-tutoring activities that emphasize “student cooperation, working together, collaborative activities, mutuality and shared responsibility” (27). The issue of ‘difference’ is not directly introduced but is taught implicitly and interventions by teachers and staff are only necessary when issues

arise. The second approach explicitly introduces the concept of students' 'differences'. "In this approach, staff signal the importance of building on difference and confronting oppressive behavior" (Boud, Cohen, & Sampson, 2001, p. 27). The staff teaches students how to identify difference, how to build on it, how to confront oppressive behaviors, and how to work productively and intersectionally within racial, ethnic, sexual, or class differences.

### **Implementation and Assessment of a Peer-Tutoring Model**

In order to create a successful peer-tutoring program, teachers must decide on a program model. While there a myriad of models, Goodlad (1998) recommends four stages: 1. Initiation; 2. Cultivation; 3. Transformation; and 4. Separation. Goodlad uses the terms mentor and protégé. In the initiation stage, the mentor and protégé are getting to know one another.

The specialness of the relationship emerges with the protégé realizing that he or she has been chosen by the mentor while the mentor recognizes the unique opportunity to connect and be valued by helping the protégé make meaning of his or her experiences. (Klopf & Harrison, 1982, p. 9)

The second stage is cultivation, in this stage the mentor spends time encouraging the protégé and builds on their strengths such as skills, talents, interests, etc. In the transformation stage, the protégé begins to take responsibility for their actions and their learning with support from the mentor.

In the final stage, separation, the protégé should have attained a sense of empowerment and should to work more independently, moving away from the mentor. In other words, the tutee has learned the material and is no longer in need of a tutor.

Tutors need specific training about their roles and expectations from the teacher and the teacher must also continually offer support for their student tutors (Goodlad, 1998). Recognition of the hard work of the tutors is critical to ensuring that tutors stay motivated and committed to their role. In order to evaluate the effectiveness of a tutor/tutee relationship, the teacher must “keep records of who did what, use rating scales for specific items, collect reflective anecdotes, and measure what is measurable” (249).

Edward Gordon (2005) provides several examples of assessment tools for the evaluation of a peer-tutoring program including session rating scales on how the session went with an area for comments. It is important to gather feedback from both the tutor and the tutee. Gordon (2005) lists the following four techniques for monitoring tutors:

1. Review the Tutor Diary that the tutors complete for each session. Check to see that it is consistent with what you are observing.
2. Provide a Tutor Guide that the tutors will use as job aid during each tutoring session. Let the tutors know that you will be observing these behaviors and evaluating them on accomplishing each tutoring task.
3. Also monitor other specific essential tutoring skills that had been introduced during tutor-training program. This will include a rating of each tutor’s personal attitude to the tutee and his or her dependability in carrying out the role of tutor.
4. An older student tutor may also provide valuable observations on how well the tutee is responding to their tutoring efforts. By completing this report, the tutor can sum up how their work has progressed and ask the teacher how to overcome roadblocks that were not covered in the initial tutor-training program. (49)

Gordon (2005) also states that a teacher can use the day-to-day measurement but also criterion based tests, pre-/postnormed tests, evaluation questionnaires, and portfolio assessments to evaluate the effectiveness of their peer-tutoring program.

In terms of the present action research study, my tutors were selected using their scores on the pre-test (Appendix C) at the beginning of the Google Drive unit (Appendix D) and I assessed the effectiveness of the tutoring groups using observations, semi-structured interviews with tutors and tutees, and journals. I made changes to groups, if needed, based on this data.

### **Challenges to Implementing Peer-Tutoring**

Edward Gordon (2005) lists several potential barriers to the use of peer-tutoring. The first barrier is that many people tend to think that only an adult can effectively impart knowledge to students. He writes:

Other objections include: too much time and effort to train tutors, tutor impatience, implications of tutor selection, academic subject suitability for peer tutoring, and lack of expertise on the tutors part. (p. 4)

I encountered tutor impatience only once or twice but my tutors were effective in that they had enough expertise to guide their tutees.

Another challenge identified by Boud, Cohen, and Sampson (2001) involving groups of students working together and these groups involve differences. Teaching students how to work with each other and appreciate rather than resent their differences can be a daunting task and teachers must decide how they would like to address issues that may arise before implementing a peer-tutoring program. I did not encounter this challenge in my study.

A teacher may also run into the problem of a tutor not having the mastery of material expected. While a teacher who is implementing peer tutoring should thoroughly vet their tutors for knowledge and suitability, there is the chance of a student getting by without the required mastery and then becomes unable to effectively teach their tutee. Teachers must constantly check their tutors for content mastery. Parents may also express a concern about a tutoring program, feeling that if their student is in the role of tutor and will miss their own classes to tutor or train, and then they may fall behind (Gordon, 2005, 25). In order to alleviate this concern I sent home permission forms for parents that thoroughly explained the study and allowed them the opportunity to express any concerns or deny their student's participation. I only had one parent that denied their student's participation.

### **Theoretical Framework of Peer-Tutoring**

The theoretical framework in which this study is based includes the socio cognitive theories of development developed by Lev Vygotsky (1978) and continued by Rogoff (1990) and her associates under the label of apprenticeship in thinking, along with the Jean Piaget (1980) concept of equilibration. Peer-tutoring also evolves from the concept of John Dewey and progressivism (1938).

### **Equilibration**

According to Jean Piaget, equilibration is

[A] process involving the reconciliation of conflict between prior and newly experienced beliefs. As such, equilibration implies that students should be provided with beliefs that differ from their existing ones, but which, by virtue of not being too advanced, can be related to these" (as cited in Topping & Ehly, 1998, 28).

According to Topping and Ehly (1998), a team of researchers known as Doise and Mungy conducted studies in the 1970s and the 1980s to affirm the claims made by Jean Piaget. They characterized cooperative learning in following ways:

1. Students work in teams toward the attainment of some superordinate goal;
2. Labor is divided between team members, such that each individual takes responsibility for a different subgoal; and
3. Individual contributions are pooled into a composite product to ensure that the goal is reached. (Topping & Ehly, 1998)

### **Socio cognitive Theories & Peer-Tutoring**

Peer-tutoring is firmly supported by Lev Vygotsky's (1978) theories regarding knowledge acquisition. Unlike Jean Piaget's theory, which focuses more on symmetrical, reciprocal relationships, Vygotsky's (1978) theories support more complimentary relationships. In this complimentary relationship, one participant, the tutor, is more knowledgeable in an area than their partner, the tutee (1978).

Numerous studies since then have shown the positive effect of peer-tutoring, and while some have shown little to no effect, none have shown a negative effect. In order to understand tutoring, an understanding Vygotsky's 'zone of proximal development' (ZPD) is helpful when designing a peer-tutoring model.

The ZPD defines the range of a child's ability, bounded at the lower end by the child's actual performance of a task unassisted, and at the upper end by the child's potential performance of a task under the guidance of someone more capable.(Fitch & Semb, 1993, 10)

Vygotsky (1978) also contended that through the process of social interaction through speech with peers. Tutoring, offers the tutee two specific advantages, the first being exposure to another person's way of thinking, processing, or organizing of a problem and the second being the immediacy of feedback on their own way of thinking, processing, or organization of a problem (Fitch & Semb, 1993).

### **Progressive Educational Theory & Peer-Tutoring**

John Dewey's progressive theory of education looks at school as a part of life as opposed to the traditional concept of education, which sees education as preparation for life (Peters, 2012). Peer-tutoring involves the interaction of peers, which is a part of students' daily lives. Progressive educators following Deweyian progressivism also believe that learners take an active, rather than passive, role in their education.

Through the use of peer tutors, both the tutor and tutee are actively involved in the educational process. Peters (2012) also states that a progressive view of education sees the community as an extension of the classroom and that knowledge is constructed through social interaction. Dewey believed that experiencing freedom and democracy through school would improve life for students (Cohen, 1999). Progressive theorists are proponents of using schooling to assist in solving social problems and enabling students to be life-long learner who connect socially for the good of the order.

### **Points Of View on Peer-Tutoring**

There are debates as to whether or not peer-tutoring has yet to qualify as an evidence-based strategy (EBS). A study conducted by Alzahrani & Leo (2018) examined multiple studies conducted on the effects of peer-tutoring on reading comprehension for students with disabilities. Their study reviewed 10 research studies and found that only

one met all 8 quality indicators as set forth by the Council for Exceptional Children (CEC, 2014). “More recent studies have been conducted, but many were excluded because they utilized a series of interventions or multicomponent interventions, both of which make determining the true effect of peer tutoring difficult” (Alzahrani & Leo, 2018, 14). They recommended that more studies take place within inclusive settings in order to be able to generalize the positive effects to students outside of the special education realm.

Multiple studies have been conducted that have identified a multitude of benefits of peer-tutoring for students across disciplines, ages, and ability levels. The study mentioned previously by Alzahrani & Leo (2018) which examined ten other studies on the effects of peer-tutoring indicated that while only one met all the quality indicators for the CEC, they all showed positive effects on reading comprehension for students with disabilities. A study conducted by Ansuategui & Miravet (2017) explored the emotional and cognitive effects of peer-tutoring among students at the secondary level. Their study also demonstrated statistically significant positive effects on not only the students’ performance in the classroom but also on their ability to interact with other students and on their confidence within the mathematics classroom. Ruegg, Sudo, Takeuchi, & Yuko (2017) studied the use of peer-tutoring at an Academic Achievement Center in Japan. This study was slightly different because students voluntarily went to the center to request tutoring, however, there were still many benefits cited including an increased awareness of self-directed learning for tutees.

## **Summaries of Literature on Peer-Tutoring**

The major themes prevalent throughout this action research study were responsibility, collaboration, and learning. The quantitative data gathered via the pre- and posttest, along with the qualitative data gathered via semi-structured student interviews and I journal aligned with the framework outlined in literature review presented in this chapter. The results of the pretest determined which students would serve in the role of tutor or tutee. Students who scored higher were asked to serve as tutors. In the class where the peer-tutoring model was implemented there were only three students who were served under Special Education and one student who was categorized as ESOL. The theories of social justice and the benefits experienced by historically underserved students, including those served in special education and ESOL, as well as the cost, affective, and social benefits experienced by advanced students in terms of community-building, demonstrate that peer-tutoring is a valid pedagogical practice for secondary students who both succeed and struggle in heterogeneously grouped classroom. This literature review supports the need for an Action Plan and recommendations provided by an Action Plan for peer-tutoring in required, heterogeneously-grouped courses. The Action Plan for MHS is delineated in Chapter Five of this DiP.

## **Themes in the Literature**

The present action research study sought to determine how the implementation of the peer-tutoring model affected the performance of all students in an introductory computer science classroom. It also sought to examine how the peer-tutoring model was affected by race, grade level, socioeconomic status, and academic level. Student-participants performed better academically and socially after participating in the peer-

tutoring model. A comparison of performance based on socioeconomic status was also conducted in this action research study and findings reflected those found in studies conducted by Topping, Thurston, McGavock, & Conlin (2012) which reported that students of low socioeconomic status performed better when participating in a peer-tutoring model. This same study also found that girls generally performed better in a peer-tutoring model, however, in the present study both girls and boys generally performed better.

### **Primary & Secondary Sources of Literature**

A variety of resources were found on the subject of peer tutoring and its historical context. There have been numerous studies conducted on peer tutoring. The primary sources which comprise the literature review in the present action research study were included based on their reliability and inclusion of their work in scholarly, peer-reviewed journals such as the *International Journal of Mathematical Education In Science And Technology*, *Reading and Writing Quarterly*, the *Journal of Education and Practice*, and *Educational Research*. There were also some secondary sources used in the form of books on topics related to peer-tutoring, collaborative learning, and learning theory.

Previous research studies serve to provide focus for the study and assist in the development of the research design. The books used also helped the participant-research to develop their own model of peer-tutoring in order to best meet the needs of the student-participants.

### **Conclusion to Chapter Two**

This chapter has provided a detailed overview of the pre-existing literature regarding peer tutoring. The literature was examined with the following themes in mind:

responsibility, inclusion, and learning. The previous research has demonstrated the validity of implementing peer tutoring in the secondary education classroom. With the increasing diversity of students within classrooms, there needs to be an evidence-based strategy that can be implemented by teachers. Students that have participated in a peer-tutoring model have shown gains in academic performance, self-confidence, and collaborative learning strategies. The results of this study will serve a unique niche in that it was conducted in an inclusive setting and in a course other than a core academic course such as science, English, math, or social studies. This study can be added to this field of literature to further support the use of peer tutoring at the secondary level with a diverse group of students.

## CHAPTER 3

### METHODOLOGY

#### **Introduction**

Chapter Three of the present action research study provides an explanation of the methodology, sample, setting, and data collection methods used to conduct the present action research for this dissertation in practice (DiP). The purpose of the present action research study was to determine the impact of using peer-tutoring on student performance in a required introductory computer course, Information Technology Foundation (ITF), at Midlands High School (MHS) (pseudonym). The identified problem of practice (PoP) involves the use of peer-tutoring in one heterogeneously grouped ITF classroom taught by the teacher-researcher that is required for graduation from MHS.

#### **Problem of Practice Statement**

The identified problem of practice (PoP) for the present DiP involved peer-tutoring as a pedagogical strategy in an Information Technology Foundations (ITF) course. ITF is a required computer science course for graduation at Midlands High School (MHS) (pseudonym) and currently I am the only teacher who teaches the course. Typically, because ITF is required, the academic abilities of the students are diverse as are their age and grade levels. The PoP for the present action study was developed after I reflected on the challenges present within my past ITF classrooms due to the diverse needs of my students and multi-age groupings after I researched solutions to the problem

with innovations using peer-tutoring models that had been implemented in schools with similar population demographics as my own.

### **Research Question & Objective**

Based on the identified PoP, the research question for the present action research study is:

*What is the impact of a peer-tutoring model on a group of heterogeneous multi-aged high school students with diverse learning abilities?*

The goal of this action research study was to describe a peer-tutoring model used with 17 student-participants in an ITF classroom and provide insight to a different pedagogical approach that included peer-tutoring in order to better in meet the needs of heterogeneous groups of students in a computer science course. The findings of this study led to an Action Plan designed to assist teachers at MHS in implementing peer-tutoring. The action plan also includes suggestions for enabling peer-tutors to work collaboratively with their peer-tutees in order to build community and stronger relationships amongst students.

### **Purpose Statement**

The primary purpose of the present action research study was to describe the implementation of a peer-tutoring model in a required computer science high school with a heterogeneous class of 17 students. The secondary purpose was to develop an Action Plan based on the findings of the research in order to enable other teachers with heterogeneous groups of students at MHS to implement a peer-tutoring model in their

classrooms and to enable students to benefit from the community-building inherent within peer-tutoring.

### **Action Research Paradigm**

The design of this study is a quantitative one-group pretest-posttest design polyangulated with qualitative data in the form of journals, semi-structured interviews, and classroom observations.

According to McKernan (1991), “The aim of action research, as opposed to much traditional or fundamental research, is to solve the immediate and pressing day-to-day problems of practitioners”. Herr & Anderson (2005) introduce several different traditional methods of conducting an action research study. The most appropriate method for the present action research study was practitioner or teacher-as-researcher research. This method was most appropriate for the study since I was an insider to the research and studied my own practice. I was an active participant in both the development and analysis of the study and also a participant within the classroom itself.

### **Teacher-Researcher**

As the primary stakeholder in this study, or an “insider”, I filled the role of both researcher and practitioner.

While action research shares some similarities with qualitative research, it is different in that research participants themselves are either in control of the research or are participants in the design and methodology of the research. (Herr & Anderson, 2005, 1)

Action research, as opposed to traditional research, views the researcher as an active participant in all aspects of a study because the researcher “wants to study their own contexts because they want the research to make a difference in their own setting” (2).

I designed, implemented, and analyzed all instruments used in the study and related the findings to my current teachings and practices employed in my classroom. McKernan (1991) states, “participants have critical-reflective ownership of the process and the results” (5), meaning that as the participant-researcher, the process and its findings are personal to me because they served to improve my teaching and the experiences of my students within my computer classroom.

### **Participants**

I conducted the study in an Information Technology Foundations (ITF) class that is a required class for graduation. Therefore, every student in the school must take the class. The class limit is 25 since there are only 25 computers in the class. Students are placed in this class based on where it will fit within their schedule; I was not involved in who was placed in the classes so the participant selection was based on convenience sampling. The student-participants were in the ITF class for one semester. As a result the class is multi-aged and diverse with student learners (e.g., ESOL, Special Education, Advanced Placement).

I randomly picked which ITF class would participate in the study. There were 17 student-participants in the chosen ITF class and parent permission slips were sent home in the first week of class (Appendix E). University of South Carolina IRB policy and procedure was also followed. There were 10 males and 7 females who participated; 1 student is Hispanic, 10 students are White, and 6 students are African American.

## Student Participants

Table 3.1. Demographic information of student-participants

	# of Student- Participants
Male	10
Female	7
White	10
African American	6
Hispanic	1
Low SES	6
High SES	11
Low Academic Level	7
High Academic Level	10

To ensure confidentiality and uphold the ethics of educational research, student-participants who were allowed to participate in the study were required to have parent permission, which was signed by both the parent and the student. By “obtaining permission from both parents and the students” (Mertler, 2014, 151), I was able to ensure that both parents and students were aware of what their participation in the study entailed. Student-participants were given pseudonyms in order to protect their identities when results and direct quotes were included in the findings. Since the findings would be shared with outsiders including other teachers, school administrators, and district personnel it was important to ensure students of the confidentiality of their information.

Through the use of pseudonyms, I was able to reassure students that they could be as honest as possible in their semi-structured interviews because their names would not be associated with their responses.

## **Setting**

Midlands High School is a public, suburban high school in the Midlands region of South Carolina. There are approximately 2,400 students enrolled at MHS. Based on data from the 2015-2016 school year report card, the demographic breakdown of MHS was approximately 53% White, 34% African American, 7% Hispanic, and 6% Other.

Approximately 61.9% of students at MHS qualified for free or reduced lunch (KidsCount, 2017). The gender breakdown of MHS is almost evenly split with 51% female and 49% male students (KidsCount, 2017). Specifically, the present action research study took place in one computer science class, Information Technology Foundations, chosen randomly between the two ITF classes taught by myself. Student-participants were placed in the ITF class by MHS's guidance counselors with no influence from me.

Student-participants took the Google Drive pretest in the first week of school. I then scored the pretests and placed students into peer-tutoring groups based on the scores and other student background data. During the second week of class, I conducted training for the tutors and tutees prior to the peer-tutoring model being implemented. Peer tutoring was used for the duration of the Google Drive unit, which was approximately 7 weeks. At the conclusion of the unit, student-participants took the posttest, which was the same as the pretest.

## **Instrumentation and Materials**

The instruments and materials used in conducting the present action research study included a pre- and posttest, tutor journals, semi-structured interviews, and researcher journal. The quantitative data gathered from the pre- and posttest and the qualitative data gathered from the journals and the semi-structured interviews serve to answer the research question and help to determine what impact the peer-tutoring model had on student achievement. The following sections provide details on the tools used and how the data they provided were used in this study.

**Pre- and Post-test.** The quantitative data gathered for the study was obtained from the pre- and posttest. I developed the pre- and posttest after looking at the standards for the Google Drive unit and determining what skills needed to be tested. The teacher developed pre- and posttest was a production test where the students had to create a Google doc, sheet, and slideshow based on the skills learned throughout the Google drive unit. I tested the difference between the pre- and posttest means using a t-test.

## **Qualitative Data**

### **Journals**

I kept a journal that included both field notes and reflections as the study progressed. The field notes served to “caption action in the classroom” (Dana & Yendel-Hoppey, 2014, 92). I wanted to document what the student-participants were observed doing while using the peer-tutoring model and what discussions were taking place. I also used their journal to reflect on the research process regarding the progress of the peer-tutoring model.

## **Semi-Structured Interviews**

Although this study was a quantitative study, qualitative data was gathered in order to triangulate the findings. While I realize that they were in a “position of power” (Herr & Anderson, 2005, 42) over the students since they were also the teacher in the classroom, semi-structured interviews were used to gauge student perceptions of the peer-tutoring model and support data gathered from the post-test (See Appendices C & D).

This provided me the opportunity to “ask(s) several ‘base’ questions but also had the option of following up a given response with alternative, optional questions” (Mertler, 2014, 130). Questions were developed by myself so that certain aspects of the peer-tutoring model could be explored such as how groups were getting along, if changes should be made to the model, and benefits from using the peer-tutoring model.

I took student-participants out into the hall one by one to present the questions to ensure they were more comfortable answering honestly, particularly regarding how they thought that their groups were working together. Answers were recorded by myself via paper and pencil. Answers were then compiled and analyzed for common themes.

Semi-structured interviews took place at the mid-point of the unit and at the conclusion of the unit. A mid-point interview was conducted to ensure student-participants were engaged with the peer-tutoring model and determine if it was working successfully or if changes needed to be made for the continuation of the peer-tutoring model.

## **Peer-Tutor Training**

The student-participants who were chosen to serve as peer-tutors received training by me and that initial training took place before the peer-tutors were assigned their peer-tutees. This took approximately 45 minutes during class time and additional training occurred as needed, for example, when it was observed that there was a lack of communication between tutors and their tutees, I met with peer-tutors after class.

The training I provided was developed using the resources presented by Edward E. Gordon (2005) and included how to maintain records of the tutoring session in the form of the tutor journal where information was shared regarding tutee progress, content reviewed, assignments completed, concerns, and the importance of positive reinforcement with peer-tutees, and the difference between explaining, showing, and doing- meaning that peer-tutors are not there to do the work for the peer-tutees, but rather they are there to support, explain, demonstrate, and help peer-tutees complete the Google Drive unit accurately.

## **Action Research Trustworthiness or “Validity”**

Herr & Anderson (2005) developed a list of five goals for an action research study and their related criteria of trustworthiness. One of their goals is the achievement of action-oriented outcomes, which lends themselves to be evaluated using outcome validity. Outcome validity refers to whether or not the intended outcomes occur and lead to solutions regarding an identified problem of practice.

Outcome validity involves the researcher thinking more intensely about a problem and coming up with several possible solutions then implementing them in a systematic way to evaluate their effectiveness.

This ongoing evaluation of the solutions is characteristic of the cyclical nature of action research (2005). Process validity relates to the goals of a sound and appropriate research methodology and the generation of new knowledge. Process validity basically means that a researcher should design her study in such a way as to permit frequent reflection and evaluation of the method and instruments being used. It is meant to ensure that the process is not “superficial or flawed” (55).

It also asserts that the evidence being cited in a study is “valid.” Democratic validity refers to the goal that results are relevant to the local setting and means just that; the findings of a study should be applicable to the population in which they were attained. In my case, the findings of whether peer tutoring does or does not work for the population I teach, which is highly applicable to that population and will have an impact on their educational experience.

Another goal Herr & Anderson (2005) identified was the education of both researcher and participants. This can be measured using catalytic validity. Catalytic validity is the “degree to which the research process reorients, focuses, and energizes participants toward knowing reality in order to transform it” (Lather, 1986, 272). In my study, both my students and I were open to this “new way” of learning and teaching and we worked as a team to implement it.

The last validity criteria Herr & Anderson (2005) introduce is dialogic validity. Dialogic validity aligns with the goal of generating new knowledge and refers to using peers to evaluate and critique a study in order to improve it. In other words, it provides for open dialogue between colleagues with similar interests and may work in the same setting who can identify other reasons for achieving results.

“Validity of research data deals with the extent to which the data that have been collected accurately measure what they purport to measure” (Mertler, 2014, 137), the current research study collected quantitative data in the form of a pre- and post-test. Since I was an active participant in their study, it was important but also challenging to maintain “validity” or trustworthiness in the present action research study.

When compared to traditional research methods, action research is weak in the area of external validity in that the results are meant to be used for a specific population and are not meant to be generalizable to other populations as much traditional research is.

Ensuring that the instrument in the present action research study measured what it was intended to “measure” in the form of instrument “validity” was crucial since a pre- and post-test quantitative method of data collection was used as the primary data set to select the peer-tutors and the peer-tutees. In order for me to be able to draw correct conclusions about who should tutor and who should be tutored, my instrument needed to be designed so that it had a high level of instrument validity.

### **Positionality**

The Career and Technology Education (CATE) department is housed within MHS and offers courses such automotive tech, collision repair, cosmetology, and business and technology courses. The business courses offered include: accounting, personal finance, entrepreneurship, and business law. Technology courses include Information Technology Foundations (ITF), Google Apps, Computer Programming I and II, Image Editing I and II, Foundations of Animations, Advanced Animation, Digital Desktop Publishing, and Digital Multimedia.

The present action research study was conducted at MHS that currently offers nine advanced technology classes including Computer Programming. I currently teach all of the Computer Programming courses within the CATE Department and also serve as a Technology Integration Specialist at MHS. I also teach our introduction to computers class, Information Technology Foundations (ITF), which is a required class for graduation. I am a student in Curriculum Studies in the EdD Program at the University of South Carolina and the study represents my dissertation in practice (DiP) using action research methods where I work with my student-participants in my own ‘laboratory of practice’—my classroom.

Action research is different from traditional social science research. In my “position” as an insiders and as an outsider, I had a moral and ethical responsibility to teach all of my students while I conducted this research. I had to ensure accurate representation and reporting of the findings. I had to reflect on the data with my participants to ensure trustworthiness. “While it may be tempting at times, do not overextend your findings and do not report as conclusive findings that you cannot confirm with a high degree of certainty” (Efron & Ravid, 2013, 78). I was responsible for maintaining a high degree of ethical responsibility.

### **The Setting**

MHS currently operates on a 4x4 schedule with students spending 85 minutes in each of four classes a day with a 45-minute intervention period and a 30 minute lunch period. Students take four classes during the first semester and four classes during the second semester. Teachers teach three blocks a day with one planning period. MHS is a one-to-one technology school with each student receiving an Apple iPad tablet at the

beginning of the year. The study was conducted with students enrolled in the Information Technology Foundations (ITF) course taught in the Fall 2017 semester.

The school district for MHS is a suburban district in the midlands of South Carolina. There are five school districts in Lexington County, where my District is located and it is the third largest district in the County. There are nine elementary schools, four middle schools, two high schools, and one alternative school in my District. MHS is the larger of the two high schools in the District. According to the 2015, SC School Report Card, the District had 8,991 students and district poverty index is 75.6%.

According to the 2013 Report to Parents, MHS had an enrollment of 1,296 students with 54% White, 36% African American, 6% Hispanic, and 4% other. The annual “dropout” (i.e., students leaving school before graduation) rate at MHS in 2013 was 3.6%. The poverty index in 2013 was 72.6% (KidsCount, 2013).

There are currently, in 2017, 215 students considered “Special Education” and 60 students considered to be English Language Learners (ESOL). MHS is a Title I School (KidsCount, 2017). There are 88 teachers, 5 administrators, 1 nurse, 4 guidance counselors, 1 school resource officer, and 13 paraprofessionals that make up the faculty and staff (KidsCount, 2017). MHS currently offers dual enrollment with a local technical college so that students may enroll in both schools simultaneously. The foreign language courses currently offered include French, German, and Spanish. Advanced Placement (AP) courses are offered in chemistry, calculus, biology, psychology, human geography, and English.

## **Design of the Study**

According to Mertler (2014), there are multiple ways in which to conduct an action research study but all formats consist of four main processes: planning, acting, developing, and reflecting. My action research study will be designed within this model.

***Planning.*** During the planning phase of this action research study, I conducted a self-reflection of their instruction and their classroom in order to identify a problem of practice (PoP). Once a PoP was identified, I worked on developing a research question that would narrow the research focus. Also during the planning phase, I conducted a review of the related literature in order to determine if there was sufficient data and evidence to support the Problem of Practice (PoP) and research question. For the last step of the planning phase, I developed a research plan.

***Narrowing and Identifying a Topic.*** I teach two courses at MHS, Computer Programming and Information Technology Foundations (ITF). ITF is required class for graduation, therefore there are four teachers that teach this class (or Google Apps which also counts for the computer science credit) since every student in the school must take the course. This also means that students from all academic levels are included in the class from self-contained students, to meet their least restrictive environment, to students who perform at an above average level. The self-contained students may or may not have learning disabilities; they may also be self-contained due to behavior issues. There is also a population of students considered English Language Learners. There is discussion every semester among the four teachers that teach ITF about the self-contained students, student who functions below grade level, or English Language Learners and what their inclusion may mean for our classrooms in terms of the individualized instruction required

and accommodations they typically require. I conducted a literature review about inclusive practices and some ideas were not feasible for MHS, one such example was having a special education teacher in the classroom with the regular education teacher. This led to the consideration of the resources available- computers, books, instructional strategies, and students. Further research revealed the use of peer-to-peer teaching and peer-tutoring and its benefits not only in the inclusive classroom but in any type of classroom. “They [peers] are approachable and have insights into learning difficulties that even the most skilled teachers may lack” (Topping and Ehly, 1998, x). The discovery of this strategy and its benefit for students performing at all levels of the academic spectrum led to the development of the research question.

***Developing a Plan.*** The final step in the planning phase of an action research study is to develop a research plan. In this step, I outlined how they intended to conduct the study in order to answer the research question. After careful consideration, I chose a pre-experimental design using a one-group pretest-posttest design in which to conduct the study. In this type of study one group takes a pretest, is exposed to the treatment condition, takes a posttest, then the findings from the pre- and posttest are compared. The pre- and posttest was a performance task that was scored using a rubric. Results were analyzed to determine if the peer tutoring had an effect on student performance on the posttest. The pre-test scores assisted with the creation of the tutoring groups because I was able to see who already had an understanding of the material and who did not, thus allowing them to pair students accordingly.

***Ethical Considerations.*** The ethical considerations that must be made in an action research study are critical and is considered to be a primary responsibility of the

researcher. In order to ensure the study is ethically sound, I began with getting permission from my principal and department head to conduct the study in their classroom. Once that permission was granted I sought permission from the parents of my students for their participation in the study. In order to receive parental permission, I sent home a permission form, or a parental consent form, that will provide parents with the following information (Mertler, 2014):

1. A description of the research topic and the research study
2. A description of what participation will involve
3. An indication that participation is voluntary and that it can be terminated at any time without penalty
4. A guarantee of confidentiality
5. An offer to provide a summary of the findings to participants
6. A place for participants to sign and date the form

Once permission was obtained from all participants, I began the study.

There were still other ethical factors that had to be taken into consideration when conducting the study. I had to ensure confidentiality of student-participants. This was particularly important due to the fact that I based some student groups on student classifications such as Special Education and ESOL. In the research report, I ensured confidentiality of student information by assigning pseudonyms so that when I referenced them it could not be tied to the individual student-participant. When assigning student groups, I informed students that they would be assigned groups and peer-tutors and peer-tutees based on pre-test scores.

## **Differences between Action Research & Traditional Research**

*Acting.* The second phase of the action research cycle is the acting phase. In the acting phase the researcher implements their research plan and collects their data, then they begin the process of analyzing their data (Mertler, 2014). In this phase, I was able to analyze the effectiveness of the research design and determined if the research question was answered clearly or not. Once I collected the data, I used statistical analysis in the form of a *t-test* to determine the impact of implementing the peer-tutoring model on student scores from the pre- and posttest.

### **Data Collection**

When considering the type of data that needed to be collected, I determined that a quantitative set of data would be most appropriate in order to answer the research question and to get a baseline measurement of student skills. Students completed a pre-test in order for me to determine their level of ability with regards to their computer skills.

The pre-test was a performance-based test that I designed. My students had to create a project using Google Drive and they were scored using a detailed, teacher-created rubric. The pre-test was administered within the first of week of school and was the beginning of the study. Then once the Google Drive unit was concluded, I administered the post-test, which was identical to the pre-test, in order to determine if scores increased after the peer-tutors mentored the peer-tutees.

The Google Drive unit took approximately seven weeks to complete. Qualitative data was collected in the form of peer-tutor journals and a teacher-researcher journal

were kept throughout the data collection period along with classroom observations and semi-structured interviews with peer-tutors and peer-tutees in order to “polyangulate” (Mertler, 2014) the quantitative data set.

### **Data Analysis & Reflection**

Once I collected the data, the analysis of the data began. I used a quantitative method of data collection and used inferential statistics in the form of a *t-test* to analyze the test scores. “The goal of inferential statistics is to determine how likely a given statistical result is for an entire population based on a smaller subset or sample of that population” (Mertler, 2014, 174). There are different measures that can be taken using inferential statistics including independent measures *t-test*, repeated-measures *t-test*, analysis of variance and chi-square test (Mertler 2014). I used a repeated-measures *t-test* since “this test is appropriate for designs where students are pretested, exposed to some intervention, and then posttested” (Mertler, 2014, 176).

Tutor journals were kept by student-participants and by me throughout the data collection period. Semi-structured interviews were conducted with all student-participants at approximately the mid-point of the study and at the conclusion of the study. Tutor journal responses, as well as transcribed student-participant interviews conducted at the mid-point of the study were reviewed and analyzed to determine if changes should be made at that point in time. Research findings were organized by the themes of Responsibility, Collaboration, and Learning. These themes are discussed further in Chapter Four.

**Developing.** After the collection and analysis of my data, I moved into the third phase of the action research study. In the third phase, the developing phase, of an action

research study, I took what was learned from the study, reflected with the student-participants, and developed an action plan for the future implementation. The data showed that implementing a peer-tutoring component into the teaching repertoire had a positive impact on student-participants and their performance in the class, therefore the action plan involved looking at how the process can continue to improve in its implementation and use, and then how to implement a school-wide peer-tutoring model.

**Reflecting.** The final step in the action research process, as discussed by Mertler (2014), is the reflecting stage. It is within this stage that I reflected on all data collected with the student-participants. Due to the cyclical nature of action research, I and the student-participants sought to determine if there was a better way to conduct the study or a different method of implementing peer-tutoring that should be implemented in the next iteration of the peer-tutoring model. I reflected on the study as a teacher and a researcher to determine the effectiveness of the research design and how well it served to answer the research question. One purpose of action research is to help teachers perfect their teaching and improve their instructional strategies to benefit the teacher, their students, and their school as a whole. This process allowed I to take a critical stance towards their professional practice within their classroom and assisted in their development as a practitioner. The process also allowed for the opportunity to work with other stakeholders, including student-participants, fellow teachers, and administrators, and offered them the opportunity to share the findings of the study in order to assist the student population of MHS academically and socially.

### **Conclusion to Chapter Three**

An action research design was chosen for the present study on peer-tutoring in order to provide a means for me to reflect on my classroom practice using peer-tutoring that was based on theory from the scholarly literature on peer-tutoring. A quantitative design was chosen to collect data on students to determine the impact of the implementation of the peer-tutoring model on both the tutors and the tutees.

The quantitative data was gathered using a one-group pre- and posttest design (Mertler, 2014). To triangulate the findings from the t-test performed on the pre- and post-test data and to assist in providing a complete picture of the impact of peer-tutoring, semi-structured interviews and journals kept by the peer-tutors and me and were included in the data set. The findings were shared with all 17 of the student-participants, who reflected on the peer-tutoring model with me.

Once the student-participants had the chance to share and reflect on their thoughts and results of the study. I wrote these reflections and I share the findings in Chapter Four of this DiP. In Chapter Five there is a detailed Action Plan that describes how I will work with other teachers and the school administration in the creation of a school-wide peer-tutoring model for the 2018-2019 school year. This action research study continues to be an iterative process and I plan to continue to reflect on and adjust the peer-tutoring model to best meet the needs of students and teachers in the District.

## CHAPTER 4

### FINDINGS AND IMPLICATIONS

#### **Introduction**

The purpose of Chapter Four is to report the findings of the present action research study, which explored the impact of the peer-tutoring model, designed by the teacher-researcher, on student achievement in an introductory computer science course, “Information Technology Foundations” (ITF) at a suburban high school in the midlands region of South Carolina.

The identified problem of practice (PoP) involves the use of peer-tutoring in a secondary-level computer science, Information Technology Foundation (ITF) course that is required for graduation and comprised of a heterogeneous group of learners.

This Chapter provides a detailed account of findings and implications of the findings as they are related to the use of peer-tutoring in secondary classrooms and its effects on the academic achievement of heterogeneously grouped diverse learners. Prior research in this field demonstrates that peer-tutoring models have positive benefits for both tutors and tutees including increased confidence with material, improved cooperative learning strategies, and improved academic performance (Abaoud, 2016; Nawaz & Rehman, 2017; Ruegg, et al., 2017).

## **Problem of Practice Statement**

The identified problem of practice (PoP) for the present DiP involved peer-tutoring as a pedagogical strategy in an Information Technology Foundations (ITF) course. ITF is a required computer science course for graduation at Midlands High School (MHS) (pseudonym) and currently I am the only teacher who teaches the course. Typically, because ITF is required, the academic abilities of the students are diverse as are their age and grade levels. The PoP for the present action study was developed after I reflected on the challenges present within my past ITF classrooms due to the diverse needs of my students and multi-age groupings after I researched solutions to the problem with innovations using peer-tutoring models that had been implemented in schools with similar population demographics as my own.

## **Research Question & Objective**

Based on the identified PoP, the research question for the present action research study is:

*What is the impact of a peer-tutoring model on a group of heterogeneous multi-aged high school students with diverse learning abilities?*

The goal of this action research study was to describe a peer-tutoring model used with 17 student-participants in an ITF classroom and provide insight to a different pedagogical approach that included peer-tutoring in order to better in meet the needs of heterogeneous groups of students in a computer science course. The findings of this study led to an Action Plan designed to assist teachers at MHS in implementing peer-tutoring. The action plan also includes suggestions for enabling peer-tutors to work collaboratively

with their peer-tutees in order to build community and stronger relationships amongst students.

### **Purpose Statement**

The primary purpose of the present action research study was to describe the implementation of a peer-tutoring model in a required computer science high school with a heterogeneous class of 17 students. The secondary purpose was to develop an Action Plan based on the findings of the research in order to enable other teachers with heterogeneous groups of students at MHS to implement a peer-tutoring model in their classrooms and to enable students to benefit from the community-building inherent within peer-tutoring.

### **Data Collection**

Student-participants were given a pretest (see Appendix A) prior to the implementation of the peer-tutoring model. The pre-test helped me to determine which role each student would be assigned, tutor or tutee, for the Google Drive unit. The peer-tutoring model was implemented for the seven-week Google Drive unit. At the conclusion of the Google Drive unit, students were given a post-test to determine the impact of the peer-tutoring model on student achievement. In addition to the data gathered from the pre- and post-tests, I gathered field notes, tutors and tutees completed journals at the conclusion of each day they met with me and worked with me and with their tutees. Semi-structured interviews were conducted at both the mid-point of the unit and at the conclusion of the unit (see Appendix X) in an effort to “polyangulate” the quantitative data (Mertler, 2014). Once all of the data were collected, I completed a

summative data analysis in order to determine what effect the peer-tutoring model had on student achievement and student experience within the Google Drive unit.

### **Identifying the Problem of Practice**

The identified Problem of Practice (PoP) for the present action research study was developed by me after reflection on prior experiences with the Google Drive unit in my Information Technology Foundations (ITF) classes. After determining the specific “dilemmas or ‘felt difficulties’” (Dana & Yendel-Hoppey, 2014, p. 30) experienced by not only me, but also by the other teachers within their departments, it was noted that students struggle the most with the Google Drive unit in both learning the skills and keeping up with their work. It was also noted that the ITF course contains students with a myriad of abilities to include: (1) students excelling in Advanced Placement (AP) courses, who tend to finish work early and become bored; (2) students served within self-contained classes, who struggle to learn the skills, require a large amount of one-on-one instruction, and struggle to complete their work; and (3) students served as English Language Learners (ESOL), who struggle to understand the skills and instructions for projects.

In addressing these diverse students and their diverse learning needs along with the struggles experienced by students within the Google Drive unit, I determined that a peer-tutoring model might be a potential solution for this problem. I developed a peer-tutoring model, which enabled my 17 students to not only keep up better with their assignments, but to also learn the skills and increase their performance on the culminating post-test after peer-tutoring took place.

## **Data Collection Strategy**

**Quantitative Data.** The diverse learners in the course were required to create a Google Doc, a Google Sheet, and a Google Slides presentation for the teacher-developed pretest. The diverse learners were given a copy of the rubric in order to know exactly what was expected. The diverse learners took the pre-test prior to being assigned a role as either a tutor or a tutee in the peer-tutoring model at the beginning of the Google Drive unit (see Appendix A). The teacher-developed pre- and posttest (Appendix X and Appendix X).

Diverse student-participants who took the pre- and post-test were each assigned a pseudonym to represent them in order to maintain confidentiality. Consent forms were sent home at the beginning of the school year (Appendix X) and only students whose forms were returned participated and were included in the data set (Appendix X).

### **Qualitative Data**

***Semi-structured Interviews.*** I conducted semi-structured interviews with the student-participants at both the mid-point of the unit and at the conclusion of the unit. I spoke with both tutors and tutees. The mid-unit interviews served to assist me in determining what, if any, changes should be made to increase the effectiveness of the peer-tutoring model and to determine student perceptions of my peer-tutoring model.

Interviews conducted at the conclusion of the study were used to determine the effectiveness of the peer-tutoring model, to determine the positive or negative experiences of student-participants with the model, and to provide the students the

opportunity to reflect on the peer-tutoring model and to share their suggestions for improving the model in future implementations.

**Data Journals.** Throughout the present action research study, I kept a working data journal. I observed both the tutors and tutees, which were aware of the observations. I altered the method of observations depending on the class, for example, at some points a class as a whole was observed, while at other points I sat with particular groups to observe their interactions. I recorded their observations and reflections in their data journal. I shared my observations with the peer-tutors or peer-tutees.. For example, Group Four which consisted of Larry, a ninth- grade White male, and Rodney, a ninth- grade African American male, were observed to be “off task” several times during a class observation. Therefore, I sat with this group to determine why they were so frequently “off-task” and asked them what they could do to increase their time “on-task.” After meeting with this group, their time “on-task” was observed to increase.

The journal kept by me was on a clipboard with dated paper and blank spaces to record thoughts, feelings, etc., along with a log section for field notes pages (see Appendix X) with observations recorded daily by me. For example: An entry made on Day Two of the study reads “reassign Group Five.” Peer-tutor diary entries were completed and given back to me each day. Communication was a problem for some Groups. I recorded specific observations regarding tutee/tutor interactions, what work was being completed by the tutees with their tutor assistance, and my general thoughts and reflections of the peer-tutoring model.

For example: The following observation was recorded on Day Three of the study, “Group Six- the peer-tutee appears to be helping the peer-tutor more than vice versa, I informed students that this was designed to be a mutually beneficial situation. This lead to community building and team-building and reduced the hierarchy some students may have felt being the tutee. In other words, both tutor and tutee were helping each other in different ways than I had predicted.

### **Tutor Journals**

In order to provide a confidential way for peer-tutors to communicate to me their concerns and to share what work was being completed with their peer-tutees, the peer-tutors were required to complete a daily tutor journal (see Appendix X). The incentive to do this work included Talon Cards (a reward system designed by the MHS) and a pizza party at the conclusion of the study.

I designed the tutor journal following a template created by Gordon (2005). The tutor journal was helpful in several respects. For example, Larry who was tutoring Rodney indicated on one tutoring session that he was having a hard time keeping Rodney “on-task” with the Google Drive unit because Rodney was frequently on his phone. Even though I would circulate the room, Rodney was never observed by me to have his phone out, which is a school rule. However, after reading this in Larry’s journal, I was able to address Rodney’s phone use and pay particular attention to him in future sessions to prevent a recurrence. I did this confidentially so that it did not appear that Larry was being a tattle tale and thus be resented by Rodney. Without the tutor journal, this phone use may have continued to be a problem, which would have affected both Larry’s ability

to effectively tutor Rodney and Rodney's ability to effectively use class time and remain on task. It was a careful balancing act to maintain peer-tutor confidentiality and to maintain trust between the peer-tutor and the peer-tutee.

### **Ongoing Analysis and Reflection**

Throughout the Google Drive unit, I kept a working data journal, which was used to record observations of my peer-tutoring model. Based on these observations I constantly analyzed the interactions of the various tutoring groups to determine if changes needed to be made. Changes included switching tutors/tutees if there were conflicts that could not be mediated and/or additional training for tutors as needed. I also kept a lookout for ineffective behaviors amongst the tutoring groups including but not limited to "bickering, demeaning comments, exclusion, or academic freeloading" (Gordon, 2005, p. xv). If these behaviors were observed, I met with the group to resolve conflict and improve future behaviors.

During the first part of the peer-tutoring model where students were working on Google Docs, I noticed that when the pairs first started working together there was little communication between the groups. During the tutor-training day, I instructed the tutors to get to know their tutees to foster communication but it did not work as well as intended. Based on these observations, I found a few communication exercises to do with the student-participants to include a get to know you exercise where the students had to write down 3 facts about themselves, two of which were true and one was false. They had to share with their partner and the partner had to guess which was false. This not only

encouraged communication but also allowed the groups to get to know each other a little better.

Another observation showed which groups were not working very well together so I met with the groups briefly to see what was going on. It was determined that they had not yet gotten comfortable working with each other but after speaking with them and helping to open the lines of communication, they started working better together.

Through the tutor journal that tutors had to complete each time they worked with their tutee, one tutor shared that their tutee was not getting his work done because he was constantly playing on his phone. This was something I needed to know because he sits in the far front corner of the room where he is a little hidden by the other computers so I could not see that he had his phone out and phones are an automatic write up. However, since this was brought to their attention via the tutor diary I was able to watch him more closely to ensure he kept his phone away.

I also noticed that when tutors were absent, the tutees were less likely to remain on task. It helped to prove a benefit of the peer tutoring model- that having a tutor holds both the tutee and tutor more accountable for their work. They are responsible to more than just the teacher now because they have to show their partner that they are working. This is something I had already shared in their department because some of the other teachers are struggling with students getting their work turned in so the accountability that was noticed taking place in my class could help other teachers to get their students working. The other teachers were also complaining about the diverse learners in their classroom and how they could not find a suitable pace so that the learners were all

working at a similar pace so I shared how this would be the perfect environment for peer-tutoring where the higher level students could be paired with the lower level students.

A challenge I experienced was student attendance. Several groups had to be rearranged due to new students, expulsions, and absenteeism. It was fortunate that these issues occurred early in the unit and attendance became more consistent so that both partners were in attendance regularly. Another challenge that occurred at first was tutors were struggling to effectively assist their tutees which led to sub-par work being submitted by tutees. I shared this observation with the tutors via a meeting at the beginning of class one day so that they could work together to come up with a solution. It was decided by the group that, since both tutors and tutees were working on the same assignments, tutors would start checking tutee work before it was submitted to look for discrepancies between their work and their tutee's work. If a discrepancy was found, they were to look back at the project instructions together to determine who made the correct change and then fix their project. It could be that the tutor missed a direction and the tutee made the correct change and vice versa. By not assuming that the tutee made a mistake it helped to build confidence in the tutee that they could also help their tutor sometimes.

I also conducted interviews with both tutors and tutees at the mid-point of the Google Drive unit to determine student-participants' feelings towards the process. The students also gave feedback regarding changes they felt might help the process be more effective or if they felt they needed additional training on how to be a more effective tutor. These two strategies allowed for ongoing reflection and modification of the Peer-Tutoring Model.

## **Reflective Stance**

One of the biggest challenges that I faced early in the course of the present action research data collection was student-participant absenteeism and student-participant withdrawal from my classroom where data collection was taking place. Having tutors or tutees frequently absent made conducting peer-tutoring sessions difficult leaving gaps in the data. To combat this challenge, some changes were made. First, I changed the pairings so that the students who were frequently absent were paired with other students who were frequently absent. This allowed the pairs to have partners who were present every day and only one group was affected by absenteeism. Second, I decided to change how the grouping was done from peer-tutoring pairs to peer-tutoring groups of four to five students with one student being considered the 'leader'. The leader was determined based on attendance, interpersonal skills, and skills demonstrated thus far with using Google Drive. The four leaders that were chosen to lead their groups had not missed any days or very few days (1-2), worked well with their former partners by keeping them on task and willingly demonstrating how to use their skills, and had high averages thus far in the Google Drive unit. In changing the grouping, this all but eliminated the effect of absenteeism on the group as a whole. I provided a service to enable the frequently absent student-participants to have peer-tutored assistance when they returned to school by asking a tutor to work with them during our schools e-block time. E-block is a time provided during the school day for students to work on missing assignments, which occurs right before lunch. Tutors who met with absent students during this time were rewarded by receiving a 'Talon Card'. Talon Cards can be used by students in exchange

for food from the canteen or other special activities that take place throughout the school year.

Another challenge encountered was the ineffective method of teaching the tutors how to establish good communication with their tutees in the beginning. Although training was provided for the tutors prior to the peer-tutoring sessions, during the data-collection period the pairs struggled to communicate with one another. In order to address the communication issue, I had the pairs engage in some communication exercises, to assist in establishing open lines of communication between each other. The exercises chosen were pulled from Education World's website after conducting a search for communication exercises for high school students. The first exercise was called two truths and a lie, where each student had to write down two statements about themselves that were true and one statement that was false. They had to share their three sentences with their partner who then had to guess which statement was the lie. Another exercise had the students trace the hand of their partner and then they had to write one question on each finger of the hand. The students then answered the questions posed by their partner on their traced hand. After participating in these activities, the students started to communicate more openly with each other and appeared to be more relaxed with each other.

After a few tutoring sessions had occurred, I realized that perhaps the training session provided prior to the sessions was not as effective and informative as intended. To determine if students are learning the skills being taught, they complete smaller projects independently following whole group instructions by the teacher on the specific skills. However, it was noted that the tutees work was not reflecting the level of skill I

had hoped for them to accomplish with their tutors. I knew that my tutors were knowledgeable because they were doing very well on their own assignments. I met with the tutors at the beginning of class one day to share their concern with them and allowed them to have input on how to remedy this situation. As a group they decided that they would start looking over their tutees work before the tutees submitted it for grading. This way they could check that the tutees understood the skills they were to practicing and could perform them well.

I also began to think about how to redesign the training sessions for tutors for future implementations of the peer-tutoring model. I learned from the mistakes made in this first iteration of the peer-tutoring model and decided that better information and training on how to effectively communicate with your partner and/or group needed to be included. I will also be able to share the observations from this first experience with the tutors so they can work together to develop strategies for assisting tutees in accurate completion of their work, remaining on-task, and how to handle tutee absenteeism.

### **Data Analysis**

This action research study was a quantitative study that examined pretest and posttest data (See Appendix A). The exam data consisted of a test score comparison between the pretest and posttest, which determined gain scores for the Google Drive unit. The pre- and posttest were created by I and consisted of a performance task graded via rubric. 20 students enrolled in the ITF course took the pretest; however, only 17 students comprised the data set due to withdrawal, absenteeism, and denial of participation in the study. Classroom instruction and peer tutoring culminated after approximately 7 weeks when

the students took the posttest, and data analysis began. The average pretest score for the class was 30.9 points out of a possible 290 points. The average posttest score for the class was 194 for a net gain of 163.1 points. The mean pre- and posttest scores for the class as whole are provided in Table 4.1. I disaggregated the pre- and posttest mean scores by gender, race, and socioeconomic status, those results are shown in the associated tables. I performed a repeated-measures *t*-test between pre- and posttest scores to determine if the differences were statistically significant. A repeated-measures *t*-test was appropriate for this study because, “the repeated-measures *t*-test compares two measures taken on the same individuals . . . students are pretested, exposed to some intervention, and then posttested” (Mertler, 2014, p. 176).

I alone analyzed the data, recorded the interview responses, and calculated the means, net change, and *t*-test results. I subtracted the pretest score from the posttest score to determine the net change for each participant. Since all student-participants increased their scores, the net change was determined to be a net gain. To determine pretest mean scores for the class as a whole, I averaged the pretest score for each participant then repeated this process for the posttest mean score. The null hypothesis for the *t*-test was that the net change between the pre- and posttest would be zero for each student-participant. The alternative hypothesis was that the net change between pre- and posttest scores would be greater than zero for each student-participant. The results of the *t*-test are included in Table 4.2. I conducted additional *t*-tests for the disaggregated groups as displayed in the associated table. The results of the *t*-tests indicated that student-participants had a statistically significant increase from their pretest to their posttest scores.

The qualitative data were comprised of field notes taken by I, tutor journals kept by student-participants throughout the Google Drive unit, and semi-structured interviews conducted at the mid-point of the unit and again at the conclusion of the unit. The qualitative data was input into NVivo software to assist in the analysis of repeated or common words and/or phrases. I also worked through the transcripts of student interviews and color-coded them based on the following emergent themes: responsibility, collaboration, and learning. The results of the data analysis for both the quantitative data and the qualitative data were shared via a class discussion with the student participants.

### **Coding**

During the data analysis, the following common themes emerged amongst the tutor journals, I journal, and the student-participant semi-structured interviews: responsibility, collaboration, and learning. I used a color-coding scheme to assist in coding the data along with the NVivo software program to identify common words and phrases. Initially, the following common phrases emerged: work completion rate, working with others, helping others, increased learning of skills, and engagement with material. I conducted a class discussion on these phrases in order to pare down the emergent themes. The class as a whole, along with me, identified the following three primary themes: responsibility, collaboration, and learning. Explanations and evidence for each of these themes are presented in this section.

**Responsibility.** Goodlad and Hirst (1989) confirm that a benefit for tutors is that they have a greater sense of responsibility because they are now responsible for another student. Topping and Ehly (1998) also indicate that peer tutoring leads to increased

engagement for tutors and tutees, leading to increased achievement. In previous semesters, the amount of missing work for students was usually a concern because some students had a really hard time keeping up with the assignments. However, in having someone else to hold them more accountable for the work, whether tutor or tutee, students worked harder to complete and turn in assignments on time. At the end of the unit, only 3 students had missing assignments, and those were due to absences, not an inability to keep up or inability to focus on the task. With regards to increased responsibility, George, an eleventh-grade White, male student stated, “Having someone there gave me the help I needed to get my work done, otherwise I wouldn’t be able to complete it”. George was paired with a really good tutor, Suzie, an eleventh-grade White female that was able to keep him focused in class and assist with getting his work turned in on time. Several students indicated that having someone else work with them increased their ability to focus on their work, which led to higher work completion rates.

**Collaboration.** When I first starting designing the peer-tutoring model, it was understood that collaboration would take place naturally as tutors worked with their tutees. However, I did not realize how much the student-participants would enjoy having the opportunity to work with a peer. This also leads to a more cooperative learning environment for students (Gordon, 2005). Topping and Ehly (1998) also state that peer tutoring “provide[s] a functional context for students to learn to work collaboratively with others toward a common instructional goal” (p. 50). The students, for the most part, appeared to enjoy working together and made statements such as:

1. “I learned the new stuff better and got to talk to different people”
2. “I learned what the best ways to help people are”

3. "I learned new ways to help people and they taught me new things"
4. "I feel it was great working with someone your age so you can figure things out together"

However, some students did have some suggestions when it came to collaboration. Suzie, an eleventh-grade white female, made the suggestion that I should place people according to how well they work with people. I brought this up in the class discussion when we were reflecting on the process and many students agreed with that statement. Shelby, a tenth-grade African American student, suggested adding in more socializing into the lessons somehow. This surprised me coming from Shelby because she is a very timid and shy student. When I implement the peer-tutoring model again next semester I am planning on having students engage in additional communication activities, hopefully addressing this suggestion. I did have one student, Suzie, who was paired with George, (described previously) who stated that, "It didn't work well when the tutee did not want to work on their work or listen". Suzie did have a more difficult partner in George because George does like to socialize and play around but overall, she did an excellent job of helping him get back on task and complete his work.

**Learning.** Gordon (2005) identified the learning of academic skills and gaining a deeper understanding of subject areas as two of the main benefits of peer tutoring. With regards to the role of tutor, Gordon (2005) states that, "to teach is to learn twice". The tutors were selected because they demonstrated prior knowledge with Google Drive on the pretest. In teaching or reinforcing skills with their tutees, the tutors are increasing their own retention of the skills. When asked by I during the semi-structured interviews about their perceptions of the peer-tutoring process, the following student responses included the following:

1. “When I did not know how to do something, I can ask them [their tutor]”
2. “I feel it was great learning from your peers instead of from a teacher”
3. “I learned a lot from my tutor”
4. “I thought it was good because there’s a lot of things people couldn’t understand and we helped each other”
5. “I learned new stuff better”
6. “I got the help I needed to finish my work”

These statements indicate that overall students were learning from the peer-tutoring model and enjoyed being to learn from their peers. In discussion, students continued to agree that having someone immediately available to teach or reinforce skills was highly beneficial. Students also discussed how having a tutor would assist them in getting caught up if they got behind in class or if they missed a day. The student-participants did not have any negative comments about their learning during the peer-tutoring process.

## **Data Interpretation**

### **Quantitative Data**

*Pre- and posttest data.* Prior to the beginning of the unit, I administered a pre-test to determine what, if any, skills the student already had using Google Drive and this data also served as the basis for assigning the peer-tutoring groups. Students attending middle school A tended to score higher due to the fact that they had a Google Applications class in middle school. These students were grouped with students from middle school B because very few of those students had any experience using Google Drive. At the conclusion of the Google Drive unit, the student-participants completed the posttest.

Table 4.1. Pre- and posttest results for the class

	Pretest Mean (SD)	Posttest Mean (SD)	Net Change	P-value	<i>t</i> -test result
Class	30.9 (41.1)	194 (81.9)	+163.1	<0.0001	3.9

Table 4.2. Pre- and posttest scores disaggregated by gender, race, socioeconomic status (SES), and academic level.

Category	Sample Size	Pretest Mean (SD)	Posttest Mean (SD)	Net Change	P-value	<i>t</i> -test result
Male	10	23 (28.3)	237.7 (36.2)	+214.7	<0.0001	14.4
Female	7	67.7 (57.2)	131.6 (90.1)	+63.9	0.0327	2.4
White	10	41(46.9)	231.8(48.2)	+190.8	<0.0001	9.0
Non-White	7	16.4(28.1)	140(92.9)	+123.6	0.0056	3.3702
SES- Low	6	23.2(27.9)	163.7(74.7)	+140.5	0.0015	4.3
SES- High	11	35.1(47.5)	210.5(84.2)	+175.4	<0.0001	6.0
High Academic	10	36.4(49.2)	191.4(93.3)	+155	<0.0001	5.0
Low Academic	7	39.3(27.2)	197.7(69.4)	+158.4	0.0001	5.6

*Note.* Low socioeconomic status (SES) students were those who receive free or reduced lunch. High academic students are defined as those who are in AP/Honors classes and Low academic students are defined as those who are in CP/Special Education/Foundations classes. [www.statcrunch.com](http://www.statcrunch.com) was used to calculate p-values.

**Gender.** Female students scored higher on the Google Drive pretest but did not demonstrate similar gains as the male students (see Table 4.2) on the posttest. The data

shows that male students made greater gains in the Google Drive unit using the peer-tutoring model. The  $p$  value ( $p < 0.01$ ) for both males and females indicates that the gain by both genders was statistically significant. Mertler (2014) states, “If  $p < \alpha$ , the difference is statistically significant...the alpha level ( $\alpha$ ) is typically set at 0.05 in educational research studies” (p. 176).

**Non-White Students.** In analyzing this data, I grouped the one Hispanic student with the African American students to make up the non-white students (see Table 4.2). When the Hispanic student is grouped with the African American students, the  $p$ -value changes to 0.0056. Again, this change is statistically significant when compared to the alpha level  $\alpha$ . Overall, the Non-White students did not score as well on the pretest as the White students. However, the Non-White students did make statistically significant gains on the posttest.

**Socioeconomic Status.** Students of both SES levels, made statistically significant gains between the pre- and posttests. However, students of low SES, made slightly lower gains than did the students of high SES. This may be attributable to the lack of interaction with technology at home if they are not able to afford computers, therefore leading to less experience with using technology.

**Academic Level.** As expected students with a higher academic level, showed a slightly higher gain between pre- and posttest scores. However, both groups made statistically significant gains. Students categorized as higher academic level are those taking AP and honors level classes. Students categorized as lower academic level are those in Foundations level, College Prep (CP), or Special Education classes.

Each of these subgroups- gender, race, SES backgrounds, and academic level, made significant gains between the pretest and posttest when the peer-tutoring model was utilized as an instructional strategy in the Google Drive unit.

Table 4.3. Pre- and posttest data by initial role

Role	Sample Size	Pretest Mean (SD)	Posttest Mean (SD)	Net Change	P-value	t-test result
Tutor	8	64(38.1)	224(50.8)	+160	<0.0001	7.1291
Tutee	9	1.2(2.4)	167.1(97.1)	+165.9	<0.0001	5.12

**Role.** Both tutors and tutees, as assigned in the initial iteration of the study, made significant gains between the pretest and posttest. Tutees made a larger net change than tutors but still did not score as high as tutors on the posttest. Overall, the progress made by both tutors and tutees is statistically significant.

### Qualitative Data

**Field Notes and observations.** After the pretest was scored, I placed students into pairs based on their scores. On the first day of peer tutoring, after conducted training for both tutors and tutees, I observed that the groups were not going as well as I had intended. I determined that I needed to also have the pairs engage in communication exercises to improve their comfort levels with each other and open their lines of communication. As the Google Drive unit progressed, I noted a significant problem with absenteeism therefore I reassigned the peer-tutoring pairs into groups of 4-5 students, realizing that this shifts slightly from the peer-tutoring model to a more cooperative

learning group model. My observer comments also noted that students were doing a much better job of getting their classwork assignments turned in on time, indicating that peer-tutoring groups led to increased accountability for the students. My notes also indicated higher scores on classwork and projects, which may be attributable to having a tutor available to ask questions and receive immediate feedback, as opposed to using the teacher as their only source of assistance. One theme that emerged from the field notes was accountability, which will be discussed in the coding section of Chapter Four.

### **Semi-structured Interviews**

*Mid-Unit semi-structured interviews.* At the mid-point of the Google Drive unit, I conducted very short, semi-structured interviews with each tutor and tutee. Most tutors and tutees indicated a positive attitude regarding the peer-tutoring model. I was able to make a few changes after considering the feedback given during the interviews. For example, two groups who were seated beside each other indicated that their tutees spent too much time talking to each other so I rearranged their seating based on this feedback to alleviate this problem. Another student indicated that it was sometimes difficult for her to remember her role as a tutor and walk her tutee through how to solve a problem instead of just doing it for her. One tutee, an African-American female, indicated that having a tutor has really helped her because she didn't have any experience with Google Drive so it was "good to have a person to help me". Two themes that emerged from the mid-point interviews was student responsibility and learning, which will be discussed in the Coding section of chapter 4.

*End of Unit semi-structured interviews.* At the conclusion of the Google Drive unit and the use of the peer-tutoring model, I once again conducted semi-structured interviews with the tutors and tutees to determine their perceptions of the peer-tutoring model and to determine if there were any suggestions they had for improving the peer-tutoring model. The student-participants had some valuable insights into their experience with the peer-tutoring model. An overarching theme that emerged from the students was their enjoyment of being able to collaborate with other students; this will be expanded upon in the Coding section. Overall, their experiences were positive but they did have some suggestions for me to improve the model. Many students indicated that they did not like the transition from tutoring pairs to tutoring groups. John, a 9<sup>th</sup> grade White student, stated, “The group tutoring didn’t work well because there was only one tutor so we all had to ask him questions, so I think [the most] in [a] group should be 3”. Another student, Monica, a 9<sup>th</sup> grade African American female, stated, “Some of my group mates didn’t like being in a group with me”. However, in the mid-unit interview, Monica indicated that she enjoyed working with her tutor but her tutor actually moved right before I changed from tutoring pairs to groups so she hadn’t interacted much with those whose group she was put in. She was also put into a group with all males, so in the future I need to be more aware of the feelings experienced by those that may be considered ‘outsiders’ if I choose to do groups again. By outsiders I mean one female in an all male group, vice versa, one African American in a group of White students, vice versa, or one upperclassmen in a group of freshman. These feelings of being an ‘outsider’ to the group could negatively affect students’ achievement and experience in the classroom. However,

other students stated that they liked the group tutoring because if the tutor was not able to answer their question, they had another person right there they could ask.

***Tutor Journals.*** Throughout the Google Drive unit, when students were engaged in the peer-tutoring model, the tutors were asked to keep a tutor journal. Tutors were asked to record what skills they assisted their tutees with and to indicate if there were any struggles I needed to be made aware of. For the most part the tutees did a good job of keeping up with their journals. This was meant to be a confidential way in which the tutors could communicate with me and to help keep the groups on task. The tutors were also able to make me aware of any problems they encountered so that I could speak to tutees if necessary. A few examples of feedback I received included, “He was trying to sleep”, “He knew how insert and format a table, and stayed on top of his work today”, “I had to show her how to set page margins”, and “He had his phone out a lot today”. With this feedback I could address any behavior issues that I may not have been aware of otherwise. The tutor journals were turned in to me everyday so that I could gauge group progress and then redistributed the next time the groups met.

### **Qualitative Analysis**

After analyzing the qualitative data from I’s journal, the tutor journals, and the semi-structured interviewed, it can be stated that the students had a positive experience overall with the peer-tutoring model which led to an increase in student achievement in the Google Drive unit. The reflection with the students allowed I to work on redesigning the peer-tutoring model to increase its effectiveness for the student-participants and make it easier for the tutors to understand their roles and interact with the tutees. For example,

conducting communication exercises on the day tutors are assigned tutees to avoid gaps in instruction due to the discomfort experienced by tutors and tutees, closing the lines of communication. Also, exercises on conducting additional training with tutors on strategies to engage their tutees with their work and how to address off-task behaviors such as talking, not listening, disengagement with the assignments, or phone use.

### **Answering the Research Question**

All data examined in this chapter was collected with the goal of answering the research question: What is the impact of a peer- tutoring model on a group of heterogeneously and multi-aged group of high school students' in an introductory "Information Technology Foundations" course? The peer-tutoring model was designed by me. To answer this question, I followed a quantitative design as outlined by Mertler (2014).

### **Answer to the Research Question**

The primary purpose of this action research study was to explore the impact of the peer-tutoring model on student achievement in an introductory computer science course, Information Technology Foundations. Pre- and Posttest data were gathered in conjunction with journals and semi-structured interviews from the student-participants in order to triangulate the data (Mertler, 2014). Analysis of the quantitative and qualitative data reveals that the peer-tutoring model had a positive impact on student achievement on the Google Drive unit in an introductory computer science course. By the end of the research period, the mean (out of 290) was 194 on a teacher designed production based posttest. This was up from 30.9 on the pretest at the beginning of the

study. The semi-structured interviews conducted at both the mid-point of the unit and at the conclusion of the unit indicated positive experiences by the student-participants. The research journal kept by I further suggested that students were engaged in the peer-tutoring model.

Skills learned by the students during the peer-tutoring model will assist in preparing students for the diverse, multicultural world in which we live. Collaboration is a key skill students learned and practiced while working with their tutors and tutees in this unit, and a primary benefit of peer-tutoring (Gordon, 2005; Goodlad & Hirst, 1989; Topping & Ehly, 1998). As indicated by the students in our class discussion after the interviews were conducted, their favorite part was getting to work with and help each other. While there were two students who had something negative to say about the experience, overall the students had positive feelings about peer tutoring and made some suggestions for improving it next semester. Peer-tutoring also led to increased student responsibility, which included accountability for getting their work turned in on time and ensuring accuracy with their work, another known benefit of peer-tutoring (Goodlad & Hirst, 1989).

### **New Possibilities**

Action research is, at its core, a reflective process. At the conclusion of a data collection and analysis cycle, I found new possibilities for the future implementation of the peer-tutoring model. In the next implementation of the peer-tutoring model, I will provide additional training for tutors so that they can be even more effective when working with their tutors. I will also follow the advice of one of the student-participants

who requested that tutees also be required to maintain a journal just like the tutors. This way if there is something the tutees need to share with the teacher, they will have a way to do so if they do not feel comfortable approaching the teacher.

The research findings also indicate that the peer-tutoring model can be effectively generalized to the remainder of the school due to the makeup of the population of student-participants present in the Information Technology Foundations (ITF) course. Most classes at this suburban high school are not quite as diverse as the ITF course, however, the courses within the 'elective' category are and therefore the model could be highly beneficial for these teachers. The student-participants could be used as resources for both teachers and students who are interested in implementing the peer-tutoring model.

#### **Conclusion to Chapter Four**

I's Information Technology Foundations class in which the peer-tutoring model was implemented was comprised of 17 student-participants with diverse learning needs and I. The Google Drive unit in which the peer-tutoring model was implemented was chosen due to the observed challenge of this unit for students in previous semesters. I has concluded that the peer-tutoring model has a positive impact on student achievement based on the quantitative and qualitative data gathered in this action research study. The quantitative data was used to answer the research question: What is the impact of a peer-tutoring model on a group of heterogeneously and multi-aged group of high school students' in an introductory "Information Technology Foundations" course? In addition, in an effort to polyangulate the findings, I conducted semi-structured interviews

at both the mid-point of the unit and at the conclusion of the unit and also required student-participants who served as tutors to maintain a journal of their interactions with their tutees. Emergent themes were uncovered when analyzing the qualitative data: responsibility, collaboration, and learning. The results presented in Chapter Four are utilized in Chapter Five to create and discuss an action plan with the student-participant

## CHAPTER 5

### CONCLUSION AND ACTION PLAN

#### **Introduction**

The purpose of Chapter Five is to present the summary, conclusions, and action plan of the present action research study. The identified problem of practice (PoP) for this dissertation in practice (DiP) involved peer-tutoring as a pedagogical strategy in an Information Technology Foundations (ITF) course. ITF is a required computer science course for graduation at Midlands High School (MHS) (pseudonym) and I am both the teacher-researcher and the only teacher who taught the course in fall 2017 when this research was carried out. Generally, because ITF is required, the academic abilities of my students are diverse as are their age and grade levels. Therefore, PoP for the present action study was developed after I reflected on the challenges present within my past ITF classrooms due to heterogeneous groupings and large class sizes. The primary purpose of the present action research study was to describe the implementation of a peer-tutoring model in a required computer science high school with a heterogeneous class of 17 students. The secondary purpose was to develop an Action Plan based on the findings of the research in order to enable other teachers with heterogeneous groups of students at MHS to implement a peer-tutoring model in their classrooms and to enable students to benefit from the community-building inherent within peer-tutoring

## Research Question & Objective

Based on the identified PoP and the purpose of the study, the research question for the present action research study is:

*What is the impact of a peer-tutoring model on a group of heterogeneous multi-aged high school students with diverse learning abilities?*

The goal of this action research study was to describe a peer-tutoring model used with 17 student-participants in an ITF classroom and provide insight to a different pedagogical approach that included peer-tutoring in order to better in meet the needs of heterogeneous groups of students in a computer science course. The findings of this study led to an Action Plan designed to assist teachers at MHS in implementing peer-tutoring. The action plan also includes suggestions for enabling peer-tutors to work collaboratively with their peer-tutees in order to build community and stronger relationships amongst students.

I developed a peer-tutoring model, which enabled my 17 students to not only keep up better with their assignments, but to also learn the skills and increase their performance on the culminating post-test after peer-tutoring took place. The present study was conducted in an ITF classroom with 17 student-participants who provided consent to participate in the study (Appendix A). Within this multi-aged, heterogeneous group the following students were included: 1. Students served under the District's "special education: guidelines (Appendix B); 2. students enrolled in advanced placement (AP) courses; and 3. students who are labeled as "English as Second or Other Language" (ESOL). Findings from the present study are organized into the following three major

themes: *Students Taking Responsibility*; *Improved Student Learning*; and *Student Collaboration Strategies*.

The present action research study took place at MHS, a suburban high school located in the midlands region of South Carolina. There are approximately 2,400 students enrolled at MHS. Based on data from the 2015-2016 school year report card, the demographic breakdown of MHS was approximately 53% Caucasian, 34% African American, 7% Hispanic, and 6% Other. Approximately 61.9% of students at MHS qualified for free or reduced lunch. The gender breakdown of MHS is almost evenly split with 51% female and 49% male students.

I designed and developed the pre- and post-test for the Google Drive unit based on skills to be taught throughout the unit (See Appendix X). I administered the pre-test during the first week of class, prior to the beginning of the Google Drive unit. The posttest was administered at the conclusion of the seven-week Google Drive unit during the fall of 2017. I tested the difference between the pre- and post-test means using a *t-test*.

The quantitative data from the pre- and post-test were used to answer the research question. Additionally, the results were disaggregated by race, gender, socioeconomic status, and academic level. I used field notes (see Appendix X) to record observations of both individual students and groups throughout the peer-tutoring implementation, as well as personal thoughts and perceptions of the overall effectiveness of the model. Student interviews (See Appendices X and X) were conducted at both the mid-point and the conclusion of the Google Drive unit to determine student perceptions of the peer-tutoring model. The student interviews were coded to determine common themes. This qualitative

data was used to “polyangulate” (Mertler, 2014) the quantitative data. At the conclusion of the post-test and the end of unit interviews, I worked with the student-participants in the development of an action plan.

## **Results**

All of the student-participants increased their scores from the pre- to post-test. The average pretest score for the class was 30.9 points out of a possible 290 points and the average posttest score was 194 points for a net gain of 163.1 points. The results of the t-test indicated statistically significant growth from the pretest mean score to the post-test mean score for this group of student-participants. After studying the results, I identified four distinct findings: (1) students held each other more accountable; (2) completion of assignments increased; (3) posttest scores increased for both tutors and tutees; and (4) cooperative learning skills increased among heterogeneous groups of students.

The increase of scores from the pre- to the post-test provided evidence of the increase in comprehension and retention of skills for the population of diverse learners in the PDT class when participating in the peer-tutoring model. The student-participants made comments during and after the Google Drive unit the indicated their preference of the peer-tutoring model over individual instruction and practice. Historically marginalized groups, such as females and African Americans, demonstrated increased confidence and ability to use the technology in their peer-tutoring groups.

## **Key Questions**

While the findings of the present action research study demonstrated a positive correlation between the peer-tutoring model and student achievement in the classroom,

key questions emerged from the findings and the interpretation of the findings. The most prominent question that arose was the feasibility of a school-wide cooperative learning model in the form of peer tutoring? Would students be interested in serving as tutors? What would motivate them to become tutors? Along those same lines, would students identified as being in need of tutoring be open to becoming a tutee of a peer? What would be the best method of training tutors? These were large-scale questions that arose for I at the conclusion of the study and after the analysis of the results.

With regards to classroom implementation of the peer-tutoring model, the following key questions arose. How can I, as the teacher, become the lead learner in the classroom and model effective mentoring behaviors for students? Also, how can I encourage the students who have already successfully participated in the peer-tutoring model to continue engaging in team-building and peer relationships that continue to enhance the learning of the subject matter? Can they take the skills they have been taught in the computer science classroom peer-tutoring model and use those skills in their other classes, in other words, can they effectively generalize their tutoring skills to other subjects?

### **Action Researcher Positionality**

The role of participant-researcher is considered both an insider and an outsider role. According to Mertler (2014), “In order for teachers to be effective, they must become active participants in their classrooms as well as active observers of the learning process; they must analyze and interpret classroom information- that has been collected in a systematic manner- and then use that information as the basis for future planning and

decision making” (p. 13). Inside the research setting, I served as the sole teacher inside the classroom. I was responsible for not only implementing the research plan but also for ensuring students are mastering the presented content. I was responsible for both data collection as part of the research process and for planning the daily lessons in which the research would be conducted. I had to maintain this dual ‘insider/outsider’ role throughout the research process.

This ‘insider/outsider’ role presented personal challenges. As an educator, I want my students to be successful and as a researcher I want my research to assist my students in being successful. I had to ensure that I was observing what was actually taking place when my students were interacting with their peer-tutoring groups and not what I was hoping would take place. For example, when I realized that my students were struggling to communicate with each other as tutors/tutees, I had to step back and figure out a better way to teach communication skills. As a researcher, I wasn’t happy that my first attempt at teaching communication was not successful but as an educator I knew I had re-teach because I was not successful the first time. There were also times when I stop myself from undermining the peer-tutoring process. As educators, we strive to answer student questions but for this action research I had to remind students that they had a tutor to help them with questions so I had to step back, which was difficult at times. However, as the research process progressed, the students became more comfortable with the peer-tutoring process and I could step back into an observer role rather than a teacher role.

The development of an Action Plan for this study is appropriate due to the success of the class in which it was implemented. The assistant principals with whom I have already shared the findings with are both excited and interested in furthering the use of

the peer-tutoring model in our school. Peer-tutoring also fits within the AVID focus our school introduced this year so I will be working with the AVID instructor in developing a school-wide peer-tutoring model.

### **Developing an Action Plan**

The findings of the present action research study suggest a positive correlation between the peer-tutoring model and student achievement. Findings demonstrated an increase in student accountability, work completion rates, posttest scores, and cooperative learning skills. In reflecting with the student-participants, plans for future implementations of the model were discussed. Student-participants indicated positive experiences with their partners for the most part but some students felt that the roles of tutor and tutee should have been reversed. A more reliable method of determining roles needs to be developed rather than depending mostly on a pre-test. The student-participants in the tutee role also indicated a need for a tutee diary, similar to that for the tutor, in order to share concerns, questions, and reflections with the teacher.

After reflecting with the student-participants, I then met with two different assistant principals to share and reflect on results. The first assistant principal serves in the Assistant Principal of Instruction (API) role and was very interested in the results of the study and asked I to share their results with their department. The second assistant principal serves as an Assistant Principal of Discipline and asked I to serve as a member of a team that will work to implement a school-wide peer-tutoring program. I has built relationships with school leaders which has led to a trust in assisting with instructional

decisions being made on behalf of the school, i.e., implementing a school-wide peer-tutoring model.

### **The Action Plan**

Based on the findings of this action research study, the peer-tutoring model was deemed successful for a heterogeneous group of student-participants. This group was fairly representative of the school population with students of varying academic abilities, races, genders, and ages. This Action Plan provides a suggested course of action for the school-wide implementation of a peer-tutoring model at MHS. Our school became an Advancement Via Individual Determination (AVID) school this year. One mission of AVID aligns with peer-tutoring and, while I was not aware of AVID when the focus of this action research study was chosen, it will be instrumental in advocating the school-wide implementation of the peer-tutoring model.

### **Action Plan Timeline**

I shared the findings with two assistant principals, the Assistant Principal for Instruction (API) and the principal of MHS, along with their department. In order to be as effective with implementation as possible, a team was formed to begin the process of developing and beginning a peer-tutoring program. MHS became an AVID school this year and the AVID framework also contains a peer-tutoring component. This Action Plan will align with the new AVID model implemented by the school, prepare tutors within AVID, and recruit tutors within AVID. According to AVID.org,

Tutorials and tutors play a vital role in the AVID Elective class, while also benefiting other content-area classes in a school. As a key component to the

collaboration portion of the AVID System, tutorials are a time and place where students come with complex questions from any content class and get guiding support to confront tough problems and solve them within their own means.

Using their knowledge and experience, AVID-trained tutors are able to conduct collaborative tutorials that lead to increased student participation and success.

Trained tutors are able to create an environment where students feel comfortable asking the questions that they might be embarrassed to ask in their content-area classrooms. (p. 3)

In conjunction with the AVID instructor and the MHS principal, I began developing a plan to implement peer tutoring on a school-wide basis. Initially, the findings were shared with my department and some of the teachers have expressed interest in implementing the peer-tutoring model, however, since teachers outside of my department have also expressed interest it was decided that a school-wide model would work best for our school. The team as a whole will be responsible for training tutors and selecting tutees. In the initial meeting with the team, I shared their findings and discussed the implications. The principal had some ideas about expanding the peer-tutoring model and incorporating a digital aspect with regards to tutor/tutee journals.

The first stage of implementation will occur in March 2018, on an initial volunteer basis. A Google Sheet will be shared with seniors first to invite them to sign up in an area in which they excel in order to serve as a tutor to an underclassman who may be struggling in their chosen area of expertise. Juniors will also be included to gauge interest and in order to establish some tutors to begin the 2018-2019 school year. The team will determine a method of testing tutors to ensure they actually do have accurate,

sufficient knowledge in the area in which they signed up for before asking them to serve as a tutor. If it is determined that they meet the qualifications to serve as a tutor, they will undergo training in how to interact with and teach their assigned tutee. This training will take place with I since they have more experience in this area. The training will be modeled after what I did with her student-participants. However, the training will be more structured than what was previously done by I with their small group of tutors. Since the tutors will be used in various content areas and there will be more tutors to train, the training will focus more on effective means of interacting with their tutees, how to manage behavior, identification of learning objectives to be covered in the session, and a more detailed account of what took place in the session since I may or may not be available to conduct observations.

Once the tutors have signed up, have qualified, and have been trained they will be assigned a tutee. Tutees will be identified by their teachers via a Google Sheet that will be shared by a member of the team. At that time, projected mid-May 2018, the tutor/tutee pairs/groups will meet with a member of the team, either the AVID instructor or I, to determine a time and place that works for all parties involved to begin the peer-tutoring process. A member of the team will check in with the peer-tutoring groups weekly to determine progress and assist in any complications that may arise. Since this a new process for the school, there will inevitably be challenges that will need to be addressed in a timely manner. Peer-tutoring groups will remain in place for the remainder of the semester as long as they are being deemed effective. If a peer-tutoring group is determined to be ineffective, the team will meet with the group to determine what changes need to be made. Both tutors and tutees will keep electronic journals that will be

shared with both I and the AVID instructor to document what content is being discussed and if any concerns arise.

A peer-tutoring program will not require any additional funding in the beginning, our most important and needed resources will be the students themselves. In order for the peer-tutoring model to be successful, it will be critical to recruit students to serve as tutors, particularly since in the beginning it will be implemented on a voluntary basis. Many of our brightest seniors have earned “free periods” where they can come to school late or leave school early. However, we will need to find a way of motivating these students to arrive on time or stay later to work with their tutees. This will be a challenge for the team.

The team also discussed what can be done for the 2018-2019 school year since we don't have a lot of time left in the current semester and this is a change we would like to carry forth in future school years. The principal suggested opening up the tutor sign ups for current juniors so we already have a pool of willing students to serve as tutors next year. These juniors may not receive tutees this year but they will receive the training and will observe tutoring groups that form this year so they can see how the groups should work for next year and share any ideas for their improvement. The Principal would also like to extend the peer-tutoring model to include not only peer-to-peer, same age tutoring but also cross-age tutoring where tutors from the high school will travel to middle or elementary schools to assist with students there. This will shift the model slightly from a peer-tutoring model to a more cooperative learning group model. They will have to receive slightly different training as well in order to work effectively with the younger children. When I send out the tutor sign up to juniors, they will have the option to

indicate whether or not they would be willing to work with same age peers, younger students, or both. Tutors who travel to another school will have to receive parent permission in order to leave campus. Another topic that was discussed in the meeting with team members was scheduling for next year. The Principal really wants to see this work so she proposed building in time within the school day for tutors to work with their tutee or group in order to avoid pulling students from their classes to receive tutoring. Since this is a decision that must be made by administration she will be presenting this idea to her team that will decide how the schedule will be arranged for next school year. If a scheduling change is not made, the peer-tutoring team will have to work with teachers to determine when students can be pulled for tutoring.

### **Facilitating Educational Change**

The implementation of a peer-tutoring model has vast potential to create positive educational change within our school if implemented correctly. It can serve to not only enhance the lives of students but also assist teachers and administrators in ensuring the academic success of all students. The goal of this quantitative action research study was to study the effects of a peer-tutoring model in a secondary computer science classroom which has traditionally been a class of heterogeneously grouped students, perhaps more reflective of the diverse study body than any core subject in the school. At the conclusion of the study, the participant-research along with the student-participants determined numerous positive benefits of the peer-tutoring model. The fact that our school became an AVID site this school year will assist in the implementation of the school-wide peer-tutoring model. Avid.org details a recommended schedule for the implementation of the AVID framework and step 5 states, “The site team plan indicates that the school will

expand the use of AVID tutors school-wide through peer tutoring efforts...” (Swanson & Gira, 19). The present action research fits seamlessly within this framework and I will assist the AVID site team with the implementation of the school-wide peer-tutoring program using experience and feedback from the student-participants. I can use the findings from the study to help recruit and retain tutors in the program by using the tutor feedback to assist in designing a model that will address concerns from student-participants and make the model more tutor friendly thus encouraging their participation.

Student-participants benefited in multiple ways from the present action research study including increased posttest scores, increased work completion, decreased time waiting for assistance if confusion occurred, and increased cooperative learning skills since they had to learn to communicate with each other in respectful and meaningful ways. At the conclusion of the Google Drive Unit in which the peer-tutoring model was implemented, the student-participants actually requested to continue working with their tutoring groups. Many indicated that it was nice to have someone there to help them immediately and they were more comfortable interacting with a peer rather than a teacher. These experiences could benefit a wide variety of students at Midlands High School.

Although there are numerous positive benefits to peer tutoring, there are challenges as well. The first, and most important, being the lack of interested tutors. In the beginning, the only motivating factors for students will be Talon cards (reward cards students can use in exchange for food, restroom passes, early leave passes, etc.), the ability to put tutoring on a resume or application for college, and a desire to help others. Students today tend to be more interested in extrinsic motivation so when we first

implement peer-tutoring there may be not much extrinsic motivation until we determine the best motivation factor for students. It will also be difficult to work with teachers' schedules as to the best time to pull students for tutoring. Core teachers in subjects such as English and Math with high-stakes tests at the end of the semester may be highly reluctant to allow students to leave for tutoring and elective teachers cannot be expected to constantly allow the students to leave their classes for tutoring. The team in charge of the peer-tutoring model will have to determine the best way to meet both the time constraints of the teachers and the needs of the tutees. As with any change in the educational setting there will be teachers who will challenge the benefits of implementing peer-tutoring and the team will have to have data to back up their arguments for the use of peer-tutoring, including the data provided by I. The team will also need to provide support based on educational theory in order to garner support from the principal and district superintendent if push back from parents occurs.

By implementing a school-wide peer-tutoring model, we are enabling our students to become advocates for them. If a student is struggling in a course, the student or the teacher can request a peer-tutor. This assists the teacher by providing an extra resource for support for the student and allows the student to get assistance from a peer, which may be less intimidating than receiving or requesting assistance from a teacher. Students also have the opportunity to build relationships with students they may not have had the chance to interact with previously if not for the peer-tutoring experience allowing students to help each other leads towards a more cooperative learning environment and community.

## Summary of Research Findings

As an action research study this research has the overall purpose to improve a pedagogical approach to teaching a heterogeneous group of student by answering the question, *What is the impact of a peer-tutoring model on a group of heterogeneously and multi-aged group of high school students' in an introductory "Information Technology Foundations" course?* The findings indicate that students experienced many benefits of the peer-tutoring model including: 1. Peer Accountability; 2. Classwork Completion Strategies; 3. Mutual Benefits of Peer-Tutoring; and 4. Cooperative Learning Strategies. To continue the development of the peer-tutoring model and expand its impact to the school as whole an Action Plan was developed to aid in its implementation. The Action Plan provides a tentative timeline for the school-wide implementation of the peer-tutoring model along with the creation of a team of stakeholders to assist in the development and implementation of an effective model.

To assist in the implementation of a school-wide peer-tutoring model, the students who have already participated in the model in I's classroom can share their experiences with both faculty and students to help validate the effectiveness of the model. They can also assist in the training of the new tutors since they have first-hand experience with the model. They can share their experiences and insights into such topics as how to work with a non-cooperative tutee, how to seek help when needed, and how to build positive, effective lines of communication with your tutee. I will also continue to serve as lead learner within their classroom by modeling effective tutoring behaviors.

Action research studies serve to assist practitioners in facilitating educational change in order to improve the learning outcomes for students. Practitioners engage in a systematic, cyclical, and reflective process with the intention of immediately implementing a pedagogical change to enhance the educational experience of their students. This action research study was conducted with the goal of implementing a peer-tutoring model to assist students in increasing their achievement within a computer science classroom. The participant-research implemented the peer-tutoring model while engaging in reflection on its effectiveness to determine if changes should be made to the model. If needed changes were identified, I made the change then began the observation/reflection process again exemplifying the cyclical nature of action research. The intention of this research is to increase implementation of a pedagogical practice that can positively influence students' achievement in the classroom. The action plan developed as a result of this study outlines the method by which a school-wide peer-tutoring model can be implemented at MHS.

### **Suggestions for Future Research**

This quantitative action research study sought to determine what effects, if any, a peer-tutoring model would have when implemented in a secondary computer science classroom within a suburban high school in the midlands region of South Carolina. While many positive effects were noted within I's classroom, in order to be able to generalize the findings to the school as a whole, a school-wide peer-tutoring model should be implemented and studied. According to the AVID model, a site team would need to be created and the team will work on the implementation of the school-wide peer-tutoring

model. “The site’s administrators, especially the principal, are active members of the site team...the school features multiple AVID elective teachers...” (Swanson, 18-19).

While studying the effects of a school-wide peer-tutoring model, another aspect that may need to be studied would be the additional workload on teachers. This model is designed to teach students how to assist peers in the learning process which is intended to not only provide innumerable benefits for the tutees but also for the teachers. However, the teachers will also need to see the benefit of the peer-tutoring model and be committed to its effective implementation, which could possibly mean more work on the teachers in the beginning stages of the peer-tutoring model. A study should also be conducted on how much strain teachers are currently under and how much more or less strain would be added when the school-wide peer-tutoring model is implemented. If the strain is determined to be significant, it may have an effect on the teacher’s willingness to participate in the peer-tutoring model, i.e., letting students go for tutoring, providing support to tutors if/when needed, etc. Teacher support will be important for school-wide implementation.

### **Conclusion to Chapter Five**

The data collected through this action research study indicated that there are multiple benefits for students when the peer-tutoring model was implemented in I’s classroom. Students were not only able to increase their retention of the presented material but they were also able to increase their work completion rate, gained valuable interpersonal communication skills, and learned the value in a peer-tutoring model. The identified problem of practice for this action research study involved the creation of a

new pedagogical practice designed to meet the needs of a heterogeneous group of students. Following the suggestions of Edward Gordon (2005), I developed a peer-tutoring model designed to meet the diverse needs of students present in an introductory computer science classroom at Midlands High School, a suburban high school in the midlands region of South Carolina. Peer-tutoring groups were created based on the scores on a teacher created pretest and background information on students. The students participated in the peer-tutoring model during the Google Drive unit since this unit has historically been challenging for students. At the conclusion of the study, I developed an Action Plan in conjunction with the student-participants to continue the peer-tutoring model and improve the model for its future use. The Action Plan also detailed the creation of a team at Midlands High School to assist in the school-wide implementation of the peer-tutoring model. This study and the future plan for the peer-tutoring model focus on improving learning outcomes for diverse groups of students while improving cooperative learning skills and student accountability.

## REFERENCES

- Abaoud, A.A. (2016). Implementation of peer tutoring strategies in teaching students with ADHD: Teachers' attitudes in Saudi education. *Journal of Education and Practice*, 7(30), 52-59. Retrieved from ERIC database. (EJ1118899)
- Alzahrani, T. & Leko, M. (2018). The Effects of Peer Tutoring on the Reading Comprehension Performance of Secondary Students With Disabilities: A Systematic Review. *Reading & Writing Quarterly*, 34, 1-17, DOI: 10.1080/10573569.2017.1302372
- Ansuategui, F.J.A. & Miravet, L.M. (2017). Emotional and cognitive effects of peer tutoring among secondary school mathematics students. *International Journal of mathematical education in science and technology*, 48(8), 1185-1205. <https://doi.org/10.1080/10020739X.2017.1342284>
- AVID. AVID tutorials and AVID tutors. Retrieved from <http://www.avid.org/curriculum.ashx>
- Baitinger, K. (2005). Engaging adult learners in the writing/ESL classroom. *College Quarterly*, 8(1)
- Bell, L.A. (2013). Theoretical foundations. In M. Adams, W. Blumenfeld, C. Castañeda, H. Hackman, M. Peters, & X. Zúñiga (Eds.), *Readings for diversity and social justice* (3rd ed., 310–315). New York, NY: Routledge.
- Boud, D., Cohen, R., & Sampson, J., (2001). *Peer learning in higher education: Learning from and with each other*. Sterling, VA: Stylus Publishing, Inc.

- Cohen, L. (1999). *Philosophical perspectives in education*. Retrieved January 21, 2017, from <http://oregonstate.edu/instruct/ed416/PP3.html>
- Council for Exceptional Children Standards for Evidence-Based Practices in Special Education. (2014). Arlington, VA: Council for Exceptional Children.
- Herr, K. & Anderson, G.L. (2005). *The action research dissertation*. Thousand Oaks, CA: Sage Publications, Inc.
- Efron, S.E. & Ravid, R. (2013). *Action research in education: A practical guide*. New York: The Guilford Press.
- Falchikov, N. (2001). *Learning together: Peer tutoring in higher education*. London: Routledge.
- Fitch, M. A. & Semb, G. B. (1993). *The ASK model of peer tutoring: Theory and research*. San Diego, CA: Navy Personnel Research and Development Center.
- Goldschmid, B. & Goldschmid, M.L. (1976). Peer teaching in higher education: A review. *Higher Education*, 5, 9-33.
- Goodlad, S. (1998). *Mentoring and tutoring by students*. Stirling, VA: Kogan Page Limited.
- Gordon E.E. (2005). *Peer tutoring: A teacher's resource guide*. Lanham, MD: Scarecrow Education.
- Heron, T.E., Welsch, R.G., & Goddard, Y.L. ( 2003). Applications of tutoring systems in specialized subject areas. *Remedial and Special Education*, 24, 288-3000.
- Jackson, A.W. & Davis, G.A. (2000). *Turning points 2000: Educating adolescents in the 21st century*. New York, NY: Carnegie Corporation of New York.
- Johnson, A.P. (2008). *A short guide to action research* (3<sup>rd</sup> ed.). Boston: Allyn & Bacon.

- Johnson, R.T. & Johnson, D.W. (1983). Effects of co-operative, competitive, and individualistic learning experiences on social development. *Exceptional Children*, 49(4), 323-329.
- Klopf, G. & Harrison, J. (1982). *Mentoring*. New York: The Center for Leadership Development.
- Lather, P. (1986). *Issues of validity in openly ideological research: Between a rock and a hard place*. *Interchange*, 17, 63–84.
- Levine, H.M., Glass, G.V. and Meister, G.R. (1987). A cost-effectiveness analysis of computer assisted instruction. *Evaluation Review* 11(1), 50-72.
- Lyttle, L.A. (2011). *Do peer tutors help teach ESOL students to learn English as a second language more successfully?* Retrieved from ERIC database. (ED518172)
- Maxwell, J. A. (2006). Literature reviews of, and for, educational research: A commentary on Boote and Beile's "Scholars Before Researchers." *Educational Researcher*, 35, 25-30. DOI: 10.3102/0013189X035009028
- McKernan, J. (1991). *Curriculum action research: A handbook of methods and resources for the reflective practitioner*. New York: St. Martin's Press.
- Mertler, C. A. (2014). *Action research: Improving schools and empowering educators*. Thousand Oaks, CA.: Sage Publications, Inc.
- Nawaz, A. & Rehman, Z.U. (2017). Strategy of peer tutoring and students success in mathematics: An analysis. *Journal of Research and Reflection in Education* 11(1), 15-30.

- Okilwa, N. S. A., & Shelby, L. (2010). The effects of peer tutoring on academic performance of students with disabilities in grades 6 through 12: A synthesis of the literature. *Remedial and Special Education, 31*(6), 450-463.  
DOI: [10.1177/0741932509355991](https://doi.org/10.1177/0741932509355991)
- Peters, R. G. (2012). *Differences between traditional and progressive education*. Retrieved from <http://www.wingraschool.org/who/progressive.htm>
- Pilgrim, D. (2000). *What was Jim Crow*. Retrieved January 20, 2017, from <http://www.ferris.edu/jimcrow/what.htm>
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social contexts*. New York: Oxford University Press.
- Ruegg, R., Sudo, T., Takeuchi, H., & Yuko. (2017). Peer tutoring: Active and collaborative learning in practice. *SiSAL Journal, 8*, 255-267.
- Special Education Guide. (2014). *What's inclusion: Theory and practice*. Retrieved from <http://www.specialeducationguide.com/pre-k-12/inclusion/whats-inclusion-theory-and-practice/>
- Topping, K. J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education, 32*(3), 321-345.
- Topping, K. & Ehly, S. (1998). *Peer-assisted learning*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Topping, K. J., Thurston, A., McGavock, K., & Conlin, N. (2012). Outcomes and Process in Reading Tutoring. *Educational Research, 54*(3), 239-258.
- Washburne, C. (1952). *What is progressive education? A book for parents and others*. New York: The John Day Company.

## APPENDIX A

### GOOGLE DRIVE TEST

#### **Google Docs Part One (worth 60 points)**

You have always wanted to open your own hamburger and hot dog restaurant. You will serve 5 varieties of hamburgers, 3 varieties of hot dogs, 3 sides, 5 flavors of ice cream with 6 varieties of toppings and 3 different drink selections. You are to create the following three documents for your restaurant. You may use the internet to do your research. Do not copy directly from the internet!!!

1. **Title your new Google Doc: Test Menu** Create your menu on one page. Make sure you include all of your menu items with prices. Use one font of your choice. Your font sizes may vary except in your menu items. Be creative and use at least 2 shapes. Also include your restaurant name, address, hours of operation (closed on Sunday), and website/facebook address. Include at least two pictures on your menu- you may CREATE a restaurant logo as one of your pictures.

**Rubric for Google Docs**

Skill	Met	Somewhat Met	Not Met	Score Earned
Create a Google Doc and Title it	2- Able to create a Google doc and title it	1- Was able to create a Google Doc but didn't title it	0- Could not create a Google Doc and could not title it	
Menu Items	50- Included all 25 items required and prices	40-25- Included all menu items but did not include prices or only included 15-24 menu items	0- Included less than 15 menu items	
Font Style	2- Only one, legible font was used	1- only one font style was used but was illegible	0- multiple font styles were used	
Font Size	2- All menu items were in one font size		0- menu items were in multiple font sizes	
Shapes	2- two shapes were included	1- only one shape was included	0- no shapes were included	
Pages	2- Menu is on one page		0- menu is longer	

## GOOGLE DRIVE TEST

### **Google Sheets Part Two (106 points)**

Create a Google Sheets and Title it: Test Schedule

You will be creating a schedule for your employees. You will have 18 total employees and there are two shifts daily.

You will have a sheet tab titled Employee Information on which you will create a chart that will include your employee names, addresses, phone numbers, position title, and pay rate.

You will have six sheet tabs titled with the days of the week. Each day will have two shifts with 2 cooks, 1 manager, and 4 waiters/waitresses. You will need to rotate your schedule each day so that the same people are not working the same shifts everyday. You will include in your chart on each day the shift times for each employee, employee name, and their role.

You will have one last sheet tab on which you will enter the sales for each day, use the information below. Create a chart that will display your sales and format the cells as currency. Once the data has been entered insert a column chart that will display your sales. Customization: Chart title- Weekly Sales for 4/18, Horizontal and Vertical Axis Titles, and Make the column colors different (make sure your days of the week are represented somehow- either on the horizontal axis or as a legend)

Sales for the week: Monday- 540.34, Tuesday- 836.98, Wednesday- 1654.40, Thursday- 827.73, Friday- 1836.28, and Saturday- 2748.63

### Rubric for Google Sheets

Skill	Met	Somewhat Met	Not Met	Score Earned
Create a Google Sheet and Title it	2- Able to create a Google Sheet and title it	1- Was able to create a Google Sheet but didn't title it	0- Could not create a Google Sheet and could not title it	
Sheets	8- Able to create and rename all sheet tabs	4- Created all sheets but did not rename sheet tabs or only created 4-7 sheets	0- Did not create any new sheets	
Employee Information	36- Had all 18 employees and included all necessary information	18- Only had 12-17 employees with necessary information	0- Had less than 12 employees listed with necessary information or Had all 18 employees but did not include all necessary information or	
Daily Shifts	40- had a schedule for all 6 days with 2 shifts each day and had necessary staff for each shift	20-30 Had missing information (ie, missing days, missing shifts for 2 or more days, did not have necessary staff for 2 or more days)	0- Did not include shifts for any day and did not include any staff for shifts	
Table for Sales	5- Included a table for sales for everyday		0- did not include a table for sales	
Formatting of sales table	5- Formatted the sales as currency		0- did not format sales	

	with 2 decimals and \$ sign			
Column Chart	5- Inserted a chart to display sales		0- did not insert a chart	
Column Chart customization	5- All customization was done	1-4 Only some parts were customized	0- No customization was done	

## GOOGLE DRIVE TEST

### **Google Slides Part Three (worth 124 points)**

3. You are creating a Google Slides presentation to share with your new employees at your restaurant. Use the information from the menu, shifts, and memo docs created previously.

1. Create a new Google Slides and title your new Slides- **Slides Test**
2. Pick a theme other than simple light or simple dark (4 points)
3. Include the following in your slideshow
  - a. Restaurant name, address, hours of operation, and website address (9 points)
  - b. Each menu item (hamburgers, hot dogs, sides, and ice cream) with a description and price (1 on each slide) (7 points each for 16 slides = 112 points)
  - c. A slide with a table that gives the first day schedule for the employees (9 points)
  - d. Include a picture and a shape on each slide
  - e. Apply a mask to each picture, it does not matter what shape mask you use but use at least two different shapes
  - f. Apply animation to pictures
4. Apply at least 5 different transitions to slides (5 points)
5. You should have at least 19 slides

**Rubric for Google Slides Part**

<b>Slide #</b>	<b>Info Included</b>	<b>Description</b>	<b>Price</b>	<b>Picture</b>	<b>Mask</b>	<b>Animation</b>	<b>Shape</b>
1	Restaurant Info (5 pts)	n/a	n/a				
2	Menu Item 1						
3	Menu Item 2						
4	Menu Item 3						
5	Menu Item 4						
6	Menu Item 5						
7	Menu Item 6						
8	Menu Item 7						
9	Menu Item 8						
10	Menu Item 9						
11	Menu Item 10						
12	Menu Item 11						
13	Menu Item 12						
14	Menu Item 13						
15	Menu Item 14						
16	Menu Item 15						
17	Menu Item 16						
18	Table (5 pts)	n/a	n/a				
<b>At least 5 transitions used (5 pts)</b>							
<b>Theme other than simple light or simple dark (5 pts)</b>							

APPENDIX B

TUTOR JOURNAL

Tutor: \_\_\_\_\_

Tutee: \_\_\_\_\_

Date	Time Period	Tutoring Activity	Results	Comments

(Gordon, 2005, p. 16)

## APPENDIX C

### MID-UNIT INTERVIEW QUESTIONS

1. How are you feeling about the Peer-Tutoring Model so far?

Do you feel comfortable with the amount of training you have received as a tutor or do you feel that more training is needed?

2. Are there changes that you feel need to be made so that you can be more effective as a tutor?

3. Is your tutee cooperating with you?

### MID-UNIT INTERVIEW QUESTIONS FOR TUTEES

1. How are you feeling about the Peer-Tutoring Model so far?

Is your relationship with your tutor going well?

2. Are there any changes that you feel need to be made so that you are more comfortable working with your tutor?

## APPENDIX D

### END OF UNIT INTERVIEW QUESTIONS

1. How did you feel the process of peer tutoring worked overall?
2. What recommendations would you give me if I were to use the Peer-Tutoring Model in another class and in the future?
3. What worked well in the process? Did you perceive any benefits from it?
4. What didn't work well? How can it be improved?

## APPENDIX E

### UNIVERSITY OF SOUTH CAROLINA CONSENT FORM

#### **The Impact of Peer Tutoring on Student Performance: An Action Research Study**

##### **PURPOSE AND BACKGROUND:**

You are being asked to allow your student to volunteer for a research study conducted by Bridgett Wolfe. I am a graduate student in the Department of Education at the University of South Carolina. The purpose of this study is to determine the impact, if any, of implementing a peer-tutoring model in the required computer class at Airport High School in West Columbia, South Carolina. The specific purpose is to determine if the implementation of a peer-tutoring program will increase student achievement in the classroom. I want to discover if the use of a peer-tutoring program can increase the performance of students in the computer classroom and meet the needs of the individual student more effectively. Students are being asked to participate in this study because they are a student registered in Mrs. Wolfe's Information Technology Foundations class. This study is being done at Airport High School and will involve approximately 50 volunteers. This form explains what the student will be asked to do, if you decide to allow your student to participate in this study. Please read it carefully and feel free to ask questions before you make a decision about participating.

##### **PROCEDURES:**

If you agree to allow your student to be in this study, the following will happen:

1. Students will complete a pre-test using Google Drive.
2. I will determine in which class to implement the peer-tutoring model.
3. The researcher will assign peer tutors/tutees based on pretest scores.
4. The peer tutors will work with their tutees throughout the Google Drive unit, approximately 7 weeks.
5. At the conclusion of the 7 weeks, the students will take a posttest to determine what, if any, impact the use of peer tutors had on retention and mastery of the Google Drive.
6. The students that participated in the peer-tutoring will be asked to anonymously complete a perception survey.

**DURATION:**

Participation in the study will take about 1.5 hours per day over a period of 7 weeks.

**RISKS/DISCOMFORTS:****Peer Tutoring Groups:**

The class that is chosen to participate in the peer-tutoring model will be assigned a tutor/tutee. They will work together to learn the material. If there are conflicts between tutor/tutee the teacher will work with the pair to resolve them. If they persist, new tutors/tutees will be assigned.

**Randomization:**

The teacher will determine one class in which to implement the peer-tutoring model. While the teacher instruction will be the same, only one class of students will receive the roles of peer tutor or tutee.

**BENEFITS:**

Your student may benefit from participating in this study by receiving additional assistance from a peer tutor, which may increase retention and mastery or they may be assigned a tutee, which may increase student confidence and help to reinforce material.

**ALTERNATIVES:**

If you choose to not allow your student to participate in this study, your student's grade will be in no way negatively affected

**CONFIDENTIALITY OF RECORDS:**

Unless required by law, information that is obtained in connection with this research study will remain confidential. Any information disclosed would be with your express written permission. Study information will be securely stored in locked files and on password-protected computers. Results of this research study may be published or presented at seminars; however, the report(s) or presentation(s) will not include your student's name or other identifying information about your student.

**VOLUNTARY PARTICIPATION:**

Participation in this research study is voluntary. You are free not to allow your student to participate, or to stop participating at any time, for any reason without negative consequences. In the event that you do withdraw your student from this study, the information your student may have already provided will be kept in a confidential manner. If you wish to withdraw your student from the study, please call or email the principal investigator listed on this form.

If I have any more questions about my student's participation in this study, I am to contact Bridgett Wolfe at 803-822-5600 x406 or email [bwolfe@lex2.org](mailto:bwolfe@lex2.org).

Please indicate below if you are willing/unwilling to allow your student to participate. Then please have your student sign as well. Thank you

<p>YES.</p> <p>As a <u>parent/guardian</u>, I understand the study and give my consent for my student's pretest/posttest scores to be analyzed and included in the study and for my student's participation in an anonymous perception survey.</p>	<p>NO.</p> <p>As a <u>parent/guardian</u>, I understand the study and do not give my consent for my student's pretest/posttest scores to be analyzed and included in the study or for my student's participation in an anonymous perception survey.</p>
<p>Parent Name:</p> <p>Parent Signature:</p>	<p>Parent Name:</p> <p>Parent Signature:</p>

<p>YES.</p> <p>As a <u>student</u>, I understand the study and give my assent for my pretest/posttest scores to be analyzed and included in the study and for my participation in an anonymous perception survey.</p>	<p>NO.</p> <p>As a <u>student</u>, I understand the study and do not give my assent for my pretest/posttest scores to be analyzed and included in the study or for my participation in an anonymous perception survey.</p>
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Student Name:	Student Name:
Student Signature:	Student Signature:

APPENDIX F

FIELD NOTES PAGE

<u>Observation Information</u>	<u>Observations</u>	<u>Observer Notes/Comments</u>
Observation #: Block #: Date: Peer Tutoring? Y N Group #:		