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A Program Evaluation Of A Secondary Peer Tutoring Program

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A PROGRAM EVALUATION OF A SECONDARY PEER TUTORING PROGRAM

A Dissertation

Presented to the

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By

Charles C. Watson III

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A PROGRAM EVALUATION OF A SECONDARY PEER TUTORING PROGRAM

By

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Dedication

I dedicate this work to my loving wife Amy, my brilliant daughter Zoey, and my adorable young son Charlie. You keep me going through long nights, particularly when you refuse to sleep. May I always provide for you.

Thank you also very much to my parents and parents-in-law. My parents for providing me with the confidence to pursue a doctoral degree, and Amy's parents for providing me with the means to pursue it. I love you all very much, and am sure in time I will consider the arduous journey to have been worth it.

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A PROGRAM EVALUATION OF A SECONDARY PEER TUTORING PROGRAM

CHAPTER 1: INTRODUCTION

In 2002, the No Child Left Behind Act (2001) proclaimed by 2014 100% of all secondary students would graduate proficient in reading and mathematics. Although optimistic, six years after the target date the expectation for universal proficiency remains, but 100% proficiency has not been achieved. During the past two decades, American students' proficiency in reading and mathematics have only seen minor gains overall (National Assessment of Educational Progress, 2017). Some states, such as Massachusetts, Texas, and New Jersey, have enacted educational reforms and experienced an increase in student achievement, but far from all United States students are graduating at a globally competitive level (Stronge & Xu, 2017). In 2012, 20% of American students did not graduate from high school, and when compared to international testing standards, "In the 2012 PISA, among 34 OECD countries, the United States ranked 17th in reading, 21st in science, and 26th in mathematics" (Stronge & Xu, 2017, p. 106). At the same time, schools have faced significant pressure from parents, businesses, media, political leaders, and others to increase student proficiency while simultaneously receiving diminishing resources (Fowler, 2013). If the trends in domestic pressure without additional support continue, then schools must look for ways to do more with less to improve students' proficiency. One such strategy is supplemental peer tutoring, a frugal educational tool for improving student academic performance (Levin, Glass, & Meister, 1987), and the focus of this dissertation.

Background

  Peer tutoring is a form of remediation in which struggling students receive academic support from other students or community volunteers (Topping, 2011). Peer tutoring offers a unique opportunity for learning because tutees receive individual support from a peer rather than a professional. Receiving instruction from a peer's perspective resonates differently and may be key to some students' learning and increasing student confidence (Johnson, 2014). Moreover, peer tutoring has a strong reputation for effectiveness within educational research, as meta-analytic researchers have found peer tutoring to be an effective means of providing academic support (Cohen, Kulik, & Kulik, 1982; Hattie, 2009; Jun, Ramirez, & Cumming, 2010; Leung, 2014) and the perception of peer tutoring within educational communities is widely positive (Austin, 2008; Baker, Rieg, & Clendaniel, 2006; Fogarty & Wang, 1982; Johnson, 2014; Lloyd et al., 2015; Nisbett, 1999; Perisco, 1994; Schagrin, 2017).

  Quantitative influence of peer tutoring. According to meta-analytic researchers, over the past four decades peer tutoring has been found to make a positive academic influence upon tutees' learning (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014; Zeneli, Thurston, & Roseth, 2016). However, meta-analytic researchers have also noted there is a wide variance of effect sizes among studies (Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014), and therefore, a closer examination of how to operate a peer tutoring programs is necessary to provide remediation services efficiently and effectively.

  Qualitative influence of peer tutoring. In terms of stakeholder satisfaction, peer tutoring has been received favorably by tutors and tutees (Austin, 2008; Baker et al.,

2006; Fogarty & Wang, 1982; Goodlad & Hirst, 1989) as well as parents and teachers (Baker et al., 2006; Blanch, Duran, Flores, & Valdebenito, 2012; Fogarty & Wang, 1982; Grubbs, 2009). Tutees tend to have a positive opinion about peer tutoring due to tutors' rapid responsiveness, helpfulness, and individual attention (Goodlad & Hirst, 1989). Likewise, although participation requires a significant time investment tutors tend to have similarly positive attitudes about peer tutoring.

Researchers have identified numerous qualitative benefits to participation, such as satisfaction with helping others (Austin, 2008; Goodlad & Hirst, 1989; Grubbs, 2009), feeling more self-confident (Alrajhi & Aldhafri, 2015; Baiduri, 2017; Fogarty & Wang, 1982; Goodlad & Hirst, 1989), and appreciating a closer bond with their peers (Fogarty & Wang, 1982). Recognizing how peer tutoring is received by tutors and tutees is equally important as understanding the academic influence of tutees cannot occur without tutors to provide support.

Optimizing a peer tutoring program. When designing a peer tutoring program, many factors need to be considered, such as how to pair tutors and tutees (Baker et al., 2006), if peer tutoring should be held before (Grubbs, 2009), during (Schagrin, 2017), or after school (Baker et al., 2006), how involved a supervisor should be within a program (Feldman, Devin-Sheehan, & Allen, 1976; Topping, 1988; Zambrano & Gisbert, 2015), whether and how to train tutors (Feldman et al., 1976; Cohen et al., 1982; Merrett, 1994; Topping, 1988; Yawn, 2012), and how to ensure tutors and tutees participate (Grubbs, 2009; Johnson, 2014; Lynch, 1993; Schagrin, 2017). The variety of factors involved in peer tutoring makes creating a program complicated, a challenge further compounded by differing recommendations about how to best structure peer tutoring programs (Allen &

Chavkin, 2004; Cohen et al., 1982; Goodlad & Hirst, 1989; Grubbs, 2009; Merrett, 1994; Topping, 1988; Yawn, 2012), and therefore, this dissertation will examine the efficacy of a variety of factors. However, one area of peer tutoring without conflicting opinions is tutors and tutees benefit less from peer tutoring when they do not attend (Grubbs, 2009; Johnson, 2014; Schagrin, 2017), and so understand how to improve student attendance and why students may choose not to attend is critical for increasing student benefit and wisely appropriating school resources.

Peer Tutoring Program Background

The site used for this investigation into the influences of peer tutoring and how to optimize attendance was the peer tutoring program at Aesthetics and Robotics Governor's School (ARGS). As a governor's school, ARGS was a charter school designed to provide a specialized curriculum designed for gifted and talented learners. This secondary school was in a suburban area and served 369 students during the 2017 school year. The mission of the school was to provide advanced instruction in the arts and technology within a multi-cultural collaborative atmosphere for student growth. ARGS received students from 14 different school districts, wherein students must have completed an application and interview process to attend. The 2017 school demographics recorded students as 59% Caucasian, 36% African American, 3% Asian, 1.8% Bi-Racial, and 0.2% Hawaiian or Pacific Islander. In 2019, 4.12% of students received free and reduced-price lunch.

Description of the program. The ARGS peer tutoring program has operated since the 2011 school year. During the 2016 school year, I became the peer tutoring program supervisor.

The ARGS peer tutoring program provides academic support in any requested content area. During the 2011–2017 school years, support was held every weekday after school from 3:30–5:30. During the 2018 school year, the program expanded to also meeting during lunch on Mondays from 11:34–12:26. During the 2019 school year, peer tutoring expanded again to offer support during lunch Monday, Tuesday, and Thursday from 11:34–12:26 and after school every weekday from 3:30–5:00. During the 2016–2018 school years, students most frequently requested support in Geometry, Algebra II, Pre-Calculus, Biology, Chemistry, World History I, Spanish I, and Spanish II. Tutors and tutees are ARGS students from Grades 9–12. During the 2018 school year, 50 of the 52 tutors were upperclassmen and two were freshmen; of the 53 tutees, 27 were upperclassmen and 26 were freshmen. The program offered a mix of same-age and cross-age tutoring.

Rationale for investigation. There are several reasons for evaluating a peer tutoring program at a secondary governor's school. First, peer tutoring is recognized as effective overall by meta-analytic research (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014; Zeneli et al., 2016), but the effectiveness of programs at the individual level varies widely (Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014), and so more investigation into what causes programs to be effective is needed. Moreover, peer tutoring programs offered outside of class at the secondary level are uncommon (Schagrin, 2017), and the research site's quality of being a charter school added a unique element to results. Second, some details of what makes peer tutoring effective are disputed, such as the importance of tutor training (Cohen et al., 1982; Leung, 2014, Zeneli et al., 2016), optimal program duration

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(Cohen et al., 1982; Jun et al., 2010; Leung, 2014; Zeneli et al., 2016), or how to maintain tutor and tutee participation (Grubbs, 2009; Johnson, 2014; Lynch, 1993; Perisco, 1994; Schagrin, 2017; Yawn, 2012; Zuelke & Nelson, 2001). Third, although peer tutoring appears cost-effective when viewed from a fiscal perspective (Fitzgerald, 2001; Levin et al., 1987; Shanahan & Barr, 1995), the amount of time and coordination needed to implement peer tutoring can be problematic (Schagrin, 2017), and due to mitigating factors may not necessarily be more effective than other potential means of remediation (Lloyd et al., 2015).

Overview of the Evaluation Approach

This study had four goals. The first goal was to evaluate the effectiveness of a peer tutoring program with respect to student academic achievement, learning what influence stakeholders can expect from participation. The second goal was to learn how to optimize student attendance, maximizing the potential positive influence peer tutoring may have. The third goal was to gain a better understanding of participants' perspectives about the benefits and barriers to attendance, gaining insight into reasons for inconsistent attendance (Grubbs, 2009; Johnson, 2014; Lynch, 1993; Schagrin, 2017) and learning how to develop strategies to promote participation. The fourth goal was to contribute to the existing body of peer tutoring literature by examining the effectiveness of a peer tutoring program in a governor's school context, learning when the optimal time to offer peer tutoring may be, and gaining additional knowledge about how a program may be perceived by its participants.

Evaluation Framework

The ARGS peer tutoring program was evaluated using the context, input, process, product (CIPP) method of evaluation (Stufflebeam & Shinkfield, 2007). The evaluation of the peer tutoring program will seek to understand how factors affect a peer tutoring program and to learn how to modify various factors for program improvement.

During the fall of the 2019 school year, the ARGS peer tutoring program entered its 9th year of implementation and fourth year of implementation under the current supervisor. Because of the program's longevity, there are many contextual benefits to the ARGS peer tutoring program that not all schools or program supervisors may have. For example, the program had a positive reputation at the school, many tutors and tutees were prepared to participate entering the 2019 school year, and I, as supervisor, had experience operating a peer tutoring program. Challenges such as recruiting tutors, developing a sustainable program structure, coordinating tutees and tutors, and implementing tutor training were unlikely to interfere due to the program's reputation and supervisor's experience, eliminating many potential intervening variables. A logic model outlining the ARGS peer tutoring program and planned steps of research is provided in Figure 1 and each step is subsequently described in greater detail.

Evaluation of Peer Tutoring Program Logic Model

Context & Inputs

| Students, parents, and teachers request support. | → | Tutee enrolled in program. | → | Tutor and tutee scheduled to meet. | ← | Tutors trained and enrolled. | ← | Students volunteer to tutor. |

Processes

Tutor and tutee attend peer tutoring during lunch.

Tutor and tutee attend peer tutoring after school.

Red: Participant Impacts/Responsibilities
Blue: Supervisor Impacts/Responsibilities
Green: Other Impacts

Tutees' and non-tutees' quarter grades gathered.
Tutor and tutee satisfaction feedback through surveys.
Tutor perception of academic improvement gathered through surveys.
Attendance data gathered.
Tutor and tutees' feedback with respect to attendance gathered through surveys.

Product

| Understand how participating in peer tutoring will impact a tutee's grade in class. | More peer tutoring services will be made available at optimal times. Inefficient times will be discontinued. | Recognize areas of satisfaction participants acknowledge from attending. | Recognize barriers to attendance and areas of dissatisfaction. | Prompt additional research as warranted. |

| Prepare additional resources if program is not anticipated to address tutee needs. | Attendance in peer tutoring increases. Participants' frustration due to lack of attendance decreases. | Encourage participation for known qualitative benefits. | Create strategies to address attendance barriers and areas of dissatisfaction. | |

Goals

| #1 Evaluate academic impact. | #2 Optimize student attendance. | #3 Understand what participants perceive to be the benefits of participation and barriers to attendance. | #4 Contribute to existing literature. |

Figure 1. Program Evaluation Logic Model. A description of the research process from participant entry to data collection to analytic strategies to anticipated goals for this program evaluation.

Contexts and inputs. The participants, tutors and tutees, and the program supervisor represent the stakeholders directly participating in the ARGS peer tutoring program. Before the school year began, as supervisor I developed the structure for the peer tutoring program. During and sometimes before the school year began, parents, teachers, and students requested support. If tutoring was requested, tutees completed a tutoring request form to indicate what times they were available. The peer tutoring request form is available in Appendix A. All students seeking to volunteer as tutors must have completed a one-hour training session and a tutor availability form. The peer tutoring volunteer form is available in Appendix B. Once both tutors and tutees indicated what times they are available, they were paired at mutually convenient times and tutoring began.

During the 2016 school year, of the 377 students attending ARGS, 60 students participated as tutees and 62 as tutors. During the 2017 school year, of the 369 students attending, 60 students participated as tutees and 55 as tutors. During the 2018 school year, of the 362 students attending, 53 students participated as tutees and 52 as tutors. During the 2019 school year, of the 359 students attending, 59 students participated as tutees and as 48 tutors. On rare occasions a student received tutoring in one content area and provided support in another, meaning that the sets of tutors and tutees were not entirely unique.

Processes. Once tutoring began, tutees and tutors either met during lunch for up to 56 minutes or after school for at least one hour. Students usually met for assistance in one subject at a time, although in a few circumstances tutors and tutees met for longer sessions after school to receive assistance in multiple content areas, up to two hours prior

to the 2019 school year, and up to 90 minutes during the 2019 school year. If a tutor or

tutee was absent, a temporary pair might have been formed by an unpaired tutor or tutee

if the tutor could provide academic support in the topic the tutee requested. A trio of one

tutor and two tutees was also formed if one pair was studying the same topic as a lone

tutee with each member of the dyad's consent. On occasions when trios were formed,

only the original dyad pair was counted for attendance reliability purposes. Tutors were

given a log to sign at the end of their peer tutoring session to record the name of the tutee

given support, the date, the topic the student received time in, and the start and finish

time of their tutoring session. All logs of volunteer sessions are then checked and

initialed by the supervisor for accuracy. Tutors' time logs are maintained by the

supervisor, and a blank volunteer time log is available in Appendix C.

Product. There were four goals of investigating the ARGS peer tutoring program.

The first goal was to analyze the change in students' academic performance to identify to

what influence, if any, the ARGS peer tutoring program makes upon student learning.

The change in tutees' academic performance found by the evaluation were used to

calibrate the intensity of supplementary assistance needed. For example, if the average

grade change from participation in peer tutoring was an increase of 5 points and a student

had a 50 but needed at least a 60 to pass, additional supplemental services may be

recommended to ensure the student succeeds. Alternatively, if peer tutoring did not have

a significant positive influence, then modifications may be needed to be made to improve

the program. These changes would need to be re-evaluated for influence, and a dynamic

action research spiral would optimize the influence of the ARGS peer tutoring program.

The second goal was to optimize student attendance. If the evaluation of academic influence yielded a positive result, then ensuring students attend is warranted to increase opportunity for growth. If the evaluation of academic growth did not yield positive results, then attendance must still be examined to ensure poor attendance was not a significant contributor to the program's ineffectiveness.

The goals of optimizing student attendance were twofold. First, to expand opportunities when tutoring is most frequently requested. For example, if lunch tutoring is much more popular than after school, or vice-versa, then tutoring may be offered more often during lunch or after school as warranted. Second, to eliminate times when tutoring is not attended. Operating a peer tutoring program incurs a cost of time, energy, and money to operate. If students attend infrequently during a certain times, days, or time during the day, then such times can be removed to deter tutor and tutee frustration due to partner absenteeism and minimize administrative responsibilities.

The third goal was to analyze of tutees' and tutors' feedback about their perceptions of the benefits and challenges of participation. Participants' perceptions of the benefits of attending such as potentially increasing self-confidence (Topping, 1988) or social acceptance (Baker et al., 2006) rather than social stigma (Schagrin, 2017) can be advertised as additional benefits to participation. Participants' perceptions of the barriers of peer tutoring will identify areas for program improvement, and the frequency with which certain barriers are identified, such as insufficient advertisement (Schagrin, 2017) or conflicting agenda such as spending time with peers (Grubbs, 2009; Schagrin, 2017), will help understand the extent to which certain challenges may be an issue.

The fourth goal is to contribute to the diverse body of peer tutoring literature by providing evidence-based recommendations for schools. In my experience, developing a peer tutoring program was messy, and while in theory peer tutoring has the potential to be a frugal (Levin et al., 1987) and significantly beneficial academically intervention (Hattie 2009), the supervisor's methods of implementation are essential for effective service (Baker et al., 2006). Understanding what to expect in terms of academic change, students' perspectives, and when to schedule a peer tutoring program can provide a valuable blueprint of initial techniques when designing a program.

Evaluation Focus

The specific focus of this program evaluation was to analyze the quantitative influence of peer tutoring from a pragmatic perspective and qualitative influences of peer tutoring from the participants' perspective. If the qualitative feedback was consistent with quantitative attendance data, for example tutees' academic progress and feedback were both positive, then conclusions would be focused upon which variables helped influence academic performance, satisfaction, and attendance. If there was a disconnect between students' perceptions of satisfaction with peer tutoring and change in academic performance, or if there was a disconnect between the best time to participate in peer tutoring and student attendance data, then conclusions would focus upon why there was a difference between students' perception of support and evidence.

Evaluation Questions

This program evaluation was designed to evaluate five questions regarding student performance, satisfaction, and attendance. The first question was used to measure academic influence of peer tutoring upon tutees. The second and third questions were

used to measure when the optimal time to implement a peer tutoring program may be. The fourth and fifth questions were used to gather feedback from tutors' and tutees' perspectives about what students perceive as most beneficial about and most limiting to participation.

1. What is the academic influence of participation in peer tutoring upon tutees in the subjects tutees receive support?

2. When do tutors and tutees prefer to attend peer tutoring?

3. When do tutors and tutees most reliably attend peer tutoring?

4. What do tutors and tutees perceive to be the benefits of participation?

5. What do tutors and tutees perceive to be the barriers to participation?

Definition of Terms

A list of important terms used in this paper is provided below.

- *2019 School Year*: Unless specific times are referenced, school years are referenced by year's completion date. The 2019 school year would therefore be the fall of 2018 to spring of 2019.

- *Academic*: Of or relating to change in a student's content knowledge. In the context of this dissertation, academic change or influence was measured by change in grades.

- *Adult Tutoring*: Tutoring within which the tutor is an adult, such as a community volunteer.

- *Attend*: A tutor provides tutoring or a tutee receives tutoring during the planned meeting time for tutoring. The tutor does not necessarily have to provide tutoring to the tutee scheduled to meet during that time, nor the tutee receive tutoring from

the tutor scheduled to meet during that time, but a tutor-tutee pair met and tutoring occurred.

- *Cross-age Tutoring*: Tutoring within which the tutor is in a different grade level or more than a year older or younger than the tutee. Cross-age tutors are usually older than tutees and must be students either at the K-12 or university level.

- *Dyad*: A group of two. In the context of this analysis, a dyad will always refer to a pair of students involved in peer tutoring, one tutor and one tutee.

- *Excused Absence*: An absence by the tutor or tutee in which notification was communicated to the peer tutoring supervisor before the scheduled meeting.

- *Long-term change*: The change between a tutee's quarter grade during the quarter the tutee began tutoring and the tutees' quarter grade during the quarter the tutee leaves tutoring, assuming the tutee participated for at least three quarters.

- *Non-Tutee:* A student who was referred to the ARGS peer tutoring program as a result of failing at least one class during any of the first three quarters of the school year but chose not to attend.

- *Participant*: Tutor or tutee in the ARGS peer tutoring program.

- *Participant-Observer*: A supervisor role in which the supervisor oversees peer tutoring sessions and is available to answer questions related to tutoring topics upon request.

- *Peer Tutoring*: An instructional method in which one student or volunteer, the tutor, provides academic assistance to another student, the tutee. Unless otherwise indicated, peer tutoring for this research will only refer to supplemental tutoring

offered outside of regular instruction non-professional instructor to a student, not as an instructional strategy used during class by a teacher.

- *Same-age Tutoring*: Tutoring within which both tutor and tutee are in the same grade level and within one year of age of one another.

- *Short-term Change*: The change between a tutee's quarter grade the quarter the tutee began tutoring and the tutee's subsequent quarter grade.

- *Tutee*: A student requesting assistance in a content area who receives assistance from a student or volunteer.

- *Tutor*: A student or volunteer experienced in a content area who provides academic assistance to a tutee.

- *Unexcused Absence*: An absence by the tutor or tutee in which notification was not communicated to the peer tutoring supervisor before the scheduled meeting.

CHAPTER 2: REVIEW OF RELATED LITERATURE

This investigation into a secondary governor's school peer tutoring program seeks to evaluate the academic influence, perceptions, and optimal attendance logistics of peer tutoring. However, before discussing the strategies implemented at ARGS, in this chapter I aim to reflect upon existing research about the academic influence, challenges to attendance, perceptions from stakeholders, and cost-effectiveness of peer tutoring. When choosing sources for analysis, specific criteria were used to ensure books, dissertations, master's theses, journal articles, and reports used were reliable. All studies or journal articles were peer-reviewed, and any studies located within books were traced to the original study. One non-peer-reviewed study, Mohan (1974), is included to illustrate how inclusion of non-peer-reviewed sources can skew statistics. Peer tutoring programs and meta-analyses including a composition of students with disabilities and students without disabilities were included (Bowman-Perrott et al., 2013; Yawn, 2012), but studies designed exclusively for students with disabilities were not. All tutees within studies were K-12 students.

Peer Tutoring

The term *peer tutoring* is defined as "people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching" (Topping, 2011, p. 322). Peer tutoring can be implemented in many forms, and likewise can be subdivided into four general categories: peer-assisted learning strategies, classwide peer tutoring, reciprocal peer tutoring, and cross-age tutoring (Holt, Walker, &

Sahni, 2012). Peer-assisted learning strategies occur during class by pairing upper ability level students with lower level students to provide lower level students with support (Fuchs & Fuchs, 2005; Jones, Ostojic, Menard, Picard, & Miller, 2016). Peer-assisted learning strategies are often used in classrooms for students with special needs and is intended to create dyads where tutors and tutees can work on a topic independently at their own speed (Fuchs & Fuchs, 2005). Classwide peer tutoring follows a similar model to peer-assisted learning by matching students of higher ability with student of lower ability during class, but instead of being paired with partners students are placed into groups with frequently rotating group members (Holt et al., 2012). Reciprocal peer tutoring is also used during class, but after forming dyads students take turns playing the role of tutor and tutee. Both tutor and tutee roles tend to be highly structured (Davis, Fantuzzo, & Ginsburg, 1995).

Cross-age peer tutoring is a means of support in which the tutor is a different age than the tutee and proficient in the content to be practiced (Fogarty & Wang, 1982). Cross-age tutoring is implemented as a supplemental educational service during or outside of class. Same-age tutoring is conducted in a manner equivalent to cross-age tutoring, except the tutor is the same age as the tutee (Austin, 2008). Cross-age and same-age supplemental peer tutoring will be the focus of this dissertation, and unless otherwise specified the term peer tutoring within this investigation refers to cross-age and same-age peer tutoring in a supplemental context.

History of Peer Tutoring

The first recorded peer tutoring in the research literature began formal implementation in 1753 under the supervision of superintendent Andrew Bell, who by

pairing younger student tutees with older student tutors for remediation noticed academic achievement and self-confidence increased for both tutees and tutors (Topping, 1988).

Peer tutoring has since expanded to include the provision of academic instruction from any non-professional instructor to student. Peer tutoring can involve students of the same age such as fifth-graders assisting other fifth-graders (Perisco, 1994), or students of different ages such as middle school students assisting elementary (Fogarty & Wang, 1982). Adults such as community volunteers assisting middle school students in a variety of topics has also been considered peer tutoring because the adult volunteers are not professional educators (Allen & Chavkin, 2004). Peer tutoring programs are implemented to improve academic achievement among students (Allen & Chavkin, 2004; Austin, 2008; Baker et al., 2006), although tutees often also cite increased confidence and social acceptance as benefits from participation (Austin, 2008; Baker et al., 2006; Blanch et al., 2012; Fogarty & Wang, 1982).

Meta-Analyses of the Influence of Peer Tutoring

Overall, peer tutoring meta-analytic researchers have consistently found peer tutoring to have a small to significant influence upon student learning (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014; Zeneli et al., 2016). A summary of the meta-analyses' effect sizes is provided in Table 1.

Table 1

Summary of Meta-Analytic Research Effect Sizes

Researchers	Effect Size for Difference in Achievement	Cross-age Tutoring	Math Tutoring	Duration: Effect Size	Tutor Training: Effect Size
Jun et al. (2010)	$d = .26$	$d = 1.05$		0–7 hr: $d = .24$ 8–15 hr: $d = .20$ >15 hr: $d = .66$	
Cohen et al. (1982)	$d = .33$	$d = .49$	$d = .60$	0–4 weeks: $d = .95$ 5–18 weeks: $d = .42$ 19–36 weeks: $d = .19$	Without: $d = .41$ With: $d = .36$
Leung et al. (2014)	$d = .39$	$d = .38$	$d = .34$	0–10 weeks: $d = .50$ >10 weeks: $d = .35$	Without: $d = .39$ With: $d = .38$
Zeneli et al. (2016)	$d = .42$ to $.51$	$d = .50$		0–6 weeks: $d = .63$ 7–12 weeks: $d = .56$ 13 weeks–1 year: $d = .76$ >1 year: $d = .14$	< 3 sessions: $d = .47$ $\geq$ 3 sessions $d = 1.57$
Hattie (2009)	$d = .55$				
Bowman-Perrott et al. (2013)	$d = .75$		$d = .86$		

Analysis of influences. Assuming an effect size of $d = 0.40$ represents a significant influence upon student learning (Hattie, 2009), several conclusions can be drawn based upon meta-analytic researchers' analyses. Academically, the influence of peer tutoring programs is inconsistent, varying from minor, $d = .26$ (Jun et al., 2010), to moderate, $d = .39$ (Leung, 2014), to large, $d = .75$ (Bowman-Perrott et al., 2013), only sometimes above Hattie's (2009) $d = .40$ metric for desirable academic influence. Both cross-age tutoring (Cohen et al., 1982; Jun et al., 2010; Zeneli et al., 2016) and tutoring in mathematics (Bowman-Perrott et al., 2013; Cohen et al., 1982) tended to have a higher effect size than the overall influence presented by earlier by their meta-analytic researchers (Bowman-Perrott et al., 2013; Cohen et al., 1982; Jun et al., 2010; Zeneli et al., 2016), and were often within Hattie's (2009) zone of desirable effects.

Influence with respect to duration. There is no consensus upon the optimal duration of involvement in peer tutoring. One meta-analysis found increased duration was somewhat correlated with increased performance (Jun et al., 2010), two found student achievement declined with extended duration of participation (Cohen et al., 1982; Leung, 2014), and a fourth found no correlation between duration and performance (Zeneli et al., 2016). The lack of consistency between duration and performance suggests the quantity of time a tutee participates itself does not contribute to tutees' academic achievement as much as other variables.

Influence with respect to tutor training. There is no consensus upon the influence of training for peer tutors. Two meta-analyses found no significant difference between the influence of peer tutoring programs with or without peer tutor training (Cohen et al., 1982; Leung, 2014). Interestingly though, one meta-analysis found no

difference overall between the effect size of programs with and without peer tutor training but did find if programs had peer tutoring training, then programs with fewer weekly training sessions had a higher effect size, $d = .46$, than programs with more, $d = .26$ (Leung, 2014). A third meta-analysis found for pre-post research design studies there was a significantly higher effect size when tutors received at least three tutor training sessions compared when tutors received fewer (Zeneli et al., 2016). No meta-analytic researcher found implementing peer tutor training had a negative influence upon student learning (Cohen et al., 1982; Leung, 2014; Zeneli et al., 2016).

Limitations of meta-analytic research. The wide variance noted by meta-analytic researchers (Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014) is one likely rationale for why meta-analytic researchers have reached substantially different conclusions about the academic influence, influence of the duration of tutoring, and utility of tutor training, as different sources led to different conclusions. For example, Bowman-Perrott et al.'s (2016) analysis includes a mix of 23 studies involving students with disabilities and four studies involving students without whereas Jun et al. (2010) excluded all studies involving students with disabilities. Both Cohen et al. (1982) and Jun et al. (2010) noted some studies had unusually large effect sizes yet these studies were used to calculate overall effect size. For example, in Cohen et al.'s (1982) meta-analysis, one study, Mohan et al. (1974), was not peer-reviewed and had an effect size of $d = 2.30$. Likewise, the effect sizes of a sub-study included in Jun et al.'s (2010) analysis presented by Chi, Siler, Jeong, Yamacuchi, and Hausman (2001) had effect size of $d = 3.47$. The inclusion of non-peer reviewed studies in Cohen et al.'s (1982) analysis and studies with extremely high effect sizes in Jun et al.'s (2010) warrant skepticism about results.

Comparatively, Hattie's (2009) meta-analysis does not list the studies used in his analysis, complicating review. However, two meta-analyses used highly similar methods of analysis. Leung (2014) and Zeneli et al. (2016) listed all studies used and conducted research using similar restrictions: using only peer-reviewed studies and only studies where participants were students without disabilities while accounting for outliers. The results of their inquiry about the overall effectiveness of peer tutoring were very similar, $d = .39$ (Leung, 2014) and $d = .42$ (Zeneli et al., 2016).

Skepticism about quantitative reliability of peer tutoring. Quantitatively, the meta-analytic optimism surrounding peer tutoring programs warrants some skepticism because peer tutoring researchers have noted an unusually favorable record of either positive or neutral results (Cohen et al., 1982; Furst & Rosenshine, 1969; Topping, 1988). One hypothesis for peer tutoring's unusually high level of effectiveness is that programs with negative results are either rare or unpublished, a prospect suspected by Furst and Rosenshine (1969). They noted "We had some real difficulties in locating reports which we knew had been issued and which included negative findings. For some reason or another, these were 'unavailable' from funding agencies" (pp. 36–37). Furst and Rosenshine's suspicions were later echoed by Topping (1988), who during inquiry was unable to find a single study reporting negative effects. Previous meta-analytic researchers have referenced studies with negative results, such as Cohen et al.'s (1982) meta-analysis which included a few studies with detrimental influence, yet the names of ineffective studies were not included, complicating further analysis. A more recent meta-analysis lists 16 of 72 studies, 22%, as having minor negative effects (Leung, 2014), indicating at least in recent decades negative results are being published and recognized.

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If there has been an overreporting of positive outcomes for peer tutoring, such means there may have been an abundance of peer tutoring programs considered to be effective while not necessarily having sufficient quantitative evidence to justify conclusions. Therefore, and so to understand what aspects correlate with effective or ineffective programs, a deeper probe into case-studies is warranted.

Case-Study Analyses of the Influence of Peer Tutoring

Like the positive trend in academic influence meta-analytic research found upon tutee achievement (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014; Zeneli et al., 2016), case-studies reveal a peer tutoring usually has a positive academic influence and the perception of peer tutoring is highly favorable among participants (Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982; Johnson, 2014; Lloyd et al., 2015; Nisbett, 1999; Perisco, 1994; Schagrin, 2017). However, as was noted by meta-analytic researchers, there is a wide variance in the effectiveness among studies for cross-age peer tutoring (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Jun et al., 2010; Leung, 2014; Zeneli et al., 2016). To investigate what program elements contribute to the success or failure of a peer tutoring program, a spectrum of case-studies with positive, neutral, and negative academic influences was investigated; a summary of the case-studies analyzed, including their academic influences and other key program elements, is provided in Table 2.

Table 2

Overview of Various Key Peer Tutoring Program Elements

Researchers	Program Size	Tutor Training	Timing and Duration	Academic Influence
Allen & Chavkin (2004)	256 students (6th and 8th grade) 31 AmeriCorps volunteers (tutors) Implemented in multiple schools	Yes, 5 days	Variable, some students met after and some met during school At least 1 hr/week for up to 61 hr Data grouped from 0–13.25 and 13.25–61 hr	Significant positive change, higher for students participating 13.25–61 hr
Austin (2008)	5 lower ability 5th graders (tutees) 5 high ability 5th graders (tutors)	Yes	Met during enrichment period or free period on Fridays 30 min once/week for 8 weeks 4 hr total	Significant positive change
Baker et al. (2006)	85 3rd–6th graders (tutees) Unspecified number of university students (tutors)	Yes	Students met after school 90 min once/week for 20 weeks 30 hr total	Significant positive change
Fogarty & Wang (1982)	18 K–5 students (tutees) 12 6th–8th graders (tutors)	Yes, three 30–min sessions	Tutoring provided in a project room or quiet corner 30 min 2 times/week for 8 weeks 8 hr total	Significant positive change
Grubbs (2009)	Over 100 6th–8th graders (tutees) 7th–8th graders (tutors)	Yes, brief	Tutoring provided before school 20 min every day all year Variable participation, most students fewer than 2 hours	Researcher considered the change significant, but students' grades only increased 0.1 points. No evidence provided to suggest change was statistically significant.
Klingbeil, Moeyaert, Archer, Chimboza, & Zwolski (2017)	5 2nd–3rd graders (tutees) 4 3rd graders (tutors)	Yes, three to four 20-min sessions	Tutoring provided in an unused classroom at an unspecified time 8–25 10-minute sessions either every day or every other day	Mixed results, a significant positive change in word recognition but no notable change in oral reading ability

Lloyd et al. (2015)	1,370 7th graders (tutees) 1,366 9th graders (tutors) Implemented in 10 schools	Yes, four 20-min sessions	Time set aside during school 20 min/week for 16 weeks 5 hr and 20 min total	No significant change
Nisbett (1999)	72 3rd graders (tutees) 76 6th graders (tutors) Implemented in 2 schools	Yes, two 45-min sessions	Unspecified time of implementation 15 min 4 times/week for 6 weeks 6 hr total	No significant change
Novotni (1985)	57 9th graders within 4 classes (tutees) 12th graders (tutors)	Yes, 10 sessions during a 2-day workshop	Tutoring provided in counseling office at unspecified time during school day 44 min 3 times/week all year Unspecified total time	No significant change in one class Minor negative change in another
Perisco (1994)	13 6th graders (tutees) 13 6th graders (tutors)	Yes; wished for more training	Students met before school 20 min 3 times/week for 41 sessions Varied due to poor attendance	No significant change
Rothman & Henderson (2011)	43 8th graders (tutees) 11 teachers (tutors) Professional support rather than peer tutoring	Yes	Students met after school 90 min 2 times/week for 16 weeks 48 hr total	Significant positive change
Schagrin (2017)	300 9th and 10th graders (tutees) 73 10th – 12th graders (tutors)	Yes, two to three half-day trainings	During lunch 25 min 2 times/week all year 50–179 min or 180+ min	Moderate to high positive change
Yawn (2012)	4 6th graders (tutees) 4 7th graders (tutors)	Yes, four 30-min sessions	During class in a separate room 30 min 5 times/week for 3 weeks 10.5 hr total	Significant positive change
Zuelke & Nelson (2016)	Up to 290 3rd – 12th graders/year (tutees) University students (tutors) Implemented in 8 schools the 1st and 2nd years, 4 schools the 3rd year, and 2 the 4th year Tutors received minor financial compensation	Unspecified, varied between schools	Unspecified, varied between schools	Minor negative change

When peer tutoring was offered. One of the strengths of peer tutoring is programs can be implemented at any time mutually convenient to supervisors, tutors, and tutees (Feldman et al., 1976), increasing the availability of support beyond when teachers are available (Johnson, 2014; Merrett, 1994). For this review, potential time frames were sorted into one of three categories: before school (Grubbs, 2009; Perisco, 1994); during school (Austin, 2008; Fogarty & Wang, 1982; Lloyd et al., 2015; Novotni, 1985; Schagrin, 2017; Yawn, 2012); and after school (Allen & Chavkin, 2004; Baker et al., 2006). The various benefits and challenges accompanying each time frame are explored.

Before school. Two middle school peer tutoring programs offered support in the morning between 8:05 and 8:25 (Grubbs, 2009; Perisco, 1994). In one study, tutoring was offered three times per week and tutees' grades only increased by three hundredths of a percent more than students not participating in peer tutoring (Perisco, 1994). In the second program, peer tutoring was offered daily and tutees' grades increased by a tenth of a percent (Grubbs, 2009). Although teachers in both middle school peer tutoring programs saw the opportunity for peer tutoring to be very effective, both researchers noted there were significant challenges due to late tutor or tutee arrivals and absences, and recommended peer tutoring be held at a different time during the day (Grubbs, 2009; Persico, 1994).

After school. Two after-school peer tutoring programs (Allen & Chavkin, 2004; Baker et al., 2006) found greater success. In one program offering tutoring both during and after school, 31 AmeriCorps volunteers tutored a group of 230 at-risk middle school students in math and reading (Allen & Chavkin, 2004). Tutoring was arranged by tutors at a mutually convenient time for tutors and tutees, and the results of tutoring were

broken into two groups based upon time. Of the at-risk students who received 0–13.25 hours of tutoring, 60.8% passed, or 45 out of 74. Of the at-risk students who received 14–61 hours of tutoring 80.1% passed, or 125 of 156. In a second program in its ninth year of operation, college student volunteers provided tutoring for 85 students in Grades 3–6 for 10 weeks in the fall and 10 weeks in the spring at four schools (Baker et al., 2006). Tutors and tutees met one a week for 90 minutes, began their tutoring sessions in math with a snack for 15 minutes, worked on homework for 30–45 minutes, and used the remaining time for less structured review games. Researchers noted the snack time was useful for students to decompress and including snack time tutees received 30 hours of support. During its ninth year of operation, 86% of participants involved academically improved, 5% stayed the same, and 11% decreased in academic proficiency.

Comparing before and after-school programs. At first glance, Allen and Chavkin's (2004) and Baker et al.'s (2006) after-school programs appear to confirm Grubbs's (2009) and Perisco's (1994) conclusions that peer tutoring programs not held before school are more effective. However, making such an inference is difficult due to the striking differences between the morning (Grubbs, 2009; Perisco, 1994) and after-school (Allen & Chavkin, 2004; Baker et al., 2006) programs. For example, the after-school peer tutoring programs (Allen & Chavkin, 2004; Baker et al., 2006) had a few significant advantages compared to Grubbs (2009) and Perisco (1994). First, the tutors in after-school studies were either university students (Baker et al., 2006) or adults (Allen & Chavkin, 2004) and either had extensive peer tutor training (Allen & Chavkin, 2004), or were studying mathematics or primary education in graduate school (Baker et al., 2006), suggesting the tutor participants had a much stronger academic background. Second,

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tutees in the after-school programs met for substantially more time, 30 hours in one study

(Baker et al., 2006) and over 13 hours in the other (Allen & Chavkin, 2004), compared to

the majority of students who met for fewer than two hours in Grubbs' (2009) study and

highly irregular attendance noted in Perisco's (1994). Third, both Grubbs' (2009) and

Perisco's (1994) programs were researched during the first year of their implementation,

whereas the peer tutoring program in Allen and Chavkin's (2004) analysis was part of a

larger dropout prevention initiative and the peer tutoring program in Baker et al.'s (2006)

analysis was in its ninth year of implementation. After-school peer tutoring programs

may indeed be more effective than programs before school, but additional evidence is

needed to confirm which time is more effective.

  During school. Six peer tutoring programs operating during school had a mix of

positive (Austin, 2008; Fogarty & Wang, 1982; Schagrin, 2017; Yawn, 2012) and neutral

(Lloyd et al., 2015; Novotni, 1985) results. Two programs were held during class time

(Fogarty & Wang, 1982; Yawn, 2012); one program was held during lunch (Schagrin,

2017); and three programs were held during an enrichment period (Austin, 2008; Lloyd et

al., 2015; Novotni, 1985).

  During class. In two similar programs held during class, one at the elementary

level (Fogarty & Wang, 1982) and one middle (Yawn, 2012), peer tutors received similar

durations of training, three 30-minute sessions in one (Fogarty & Wang, 1982) and four

30-minute sessions in the other (Yawn, 2012). Tutees in both programs met for similar

lengths of time, twice a week for a total of 8 hours in one (Fogarty & Wang, 1982) and

three times a week for a total of 10.5 hours in the other (Yawn, 2012). Both programs

showed similar significantly positive academic gains (Fogarty & Wang, 1982; Yawn,

2012). In one program, tutees account for the program's effectiveness because of the tutors' benevolent demeanor and ability to work at the tutees' pace, while supervising teachers likewise accounted for the program's effectiveness because tutors were able to provide one-on-one intervention (Fogarty & Wang, 1982).

During lunch. In one peer tutoring program held exclusively during lunch, tutors received continuous training twice a week during lunch for 25 minutes and tutor–tutee dyads met for highly variable durations (Schagrin, 2017). Tutees who participated 50–179 minutes improved by an average of 6.24 points and tutees who participated at least three hours improved an average of 7.88 points in their various classes, all of which were considered statistically significant. Additionally, on average Geometry tutees had a notably high gain of 10.52 points. By comparison students who did not participate improved 1.24 points on average.

During enrichment. In two peer tutoring programs held during enrichment periods, one at the elementary school level (Austin, 2008) and one middle (Lloyd et al., 2015), tutors received an unspecified amount of training in one study (Austin, 2008) and four 20-minute sessions in the other (Lloyd et al., 2015), an amount of training comparable to tutors in both Fogarty and Wang's (1982) and Yawn's (2012) research. Tutees in both peer tutoring programs met for similar lengths of time, over 8 weeks for 30 minutes a week for a total of four hours in one (Austin, 2008), and over 16 weeks for 20 minutes once a week for a total of 5 hours and 20 minutes in the other (Lloyd et al., 2015). The tutees who met for 30 minutes once a week showed significant positive academic gains (Austin, 2008). Like the tutees in Fogarty and Wang's (1982) analysis,

tutees in Austin's (2008) peer tutoring program attributed the effectiveness of the program to the individual attention tutors were able to give.

The program that met for a much longer period of 16 weeks showed no statically significant progress (Lloyd et al., 2015). Lloyd et al.'s study was considerably larger than most, involving 2,736 students at 10 different schools, and identified numerous challenges during operation. First, though initially teachers and students reported they enjoyed the novelty of peer tutoring, they felt the program became stale with extended use. Lloyd et al.'s example illustrates a theoretical limitation identified by Feldman et al. (1976), who noted meeting for too long may lead to apathy rather than improvement:

> Most investigators hold the implicit view that the longer the peer tutoring program, the more positive the effects will be… It is quite conceivable that after a certain amount of time with the same partner, both the tutor and tutee will become bored…and tutoring will have negative effects. (p. 242)

Second, teachers identified the duration of the program, 20 minutes per session, as insufficient for both reading and writing, and noted even only five more minutes support would have been much more effective. Meeting for a longer period of time would also have satisfied a recommendation identified by Wasik (1998), who recommends effective peer tutoring sessions must be consistent and intense. The program studied by Lloyd et al. (2015) certainly met consistently, twice per week, but perhaps not intensely enough based upon teacher feedback. The third challenge identified was that teachers noticed personality clashes between some pairs of tutors and tutees, a highly unusual challenge in peer tutoring literature. One potential reason for personality conflicts is because all Year 7 and Year 9 students were required to participate. Tutors and tutees were paired by

matching the top Year 7 student in a class as a tutee with the top Year 9 student in a class during the same period, second best Year 7 student in a class with second best Year 9 student during the same period as tutor, and so forth with trios being formed when there were an uneven number of tutees and tutors. Johnson (2014) noted tutees are much more likely to be willing to learn when tutoring is not mandatory, and all student participants in Lloyd et al.'s (2015) study were required to participate rather than volunteering as seen in other programs (Austin, 2008; Fogarty & Wang, 1982; Klingbeil et al., 2017; Novotni, 1985; Schagrin, 2017; Yawn, 2012).

In one final peer tutoring program at the high school level held during a math skills enrichment period, students met for 44 minutes three times per week throughout the school year (Novotni, 1985). Tutors received a significant amount of training over 10 training sessions during a two-day workshop, and although tutees in the peer tutoring program showed significant academic progress as measured by a t-test, the tutees' gain from peer tutoring showed no significant difference compared to a control group taught by a math skills specialist (Novotni, 1985).

General conclusions. There are a few notable takeaways from the influences of peer tutoring programs established during the day. First, a peer tutoring program held at any point during the day, during class, during an enrichment period, or during lunch, has the potential to be effective (Austin, 2008; Fogarty & Wang, 1982; Schagrin, 2017; Yawn, 2012). Second, as seen by meta-analytic researchers (Bowman-Perrott et al., 2013; Cohen et al., 1982; Jun et al., 2010), longer programs do not implicitly lead to more effective programs. Quantitatively, tutees in Lloyd et al.'s (2015) peer tutoring program met for a longer duration than comparable enrichment programs such as Austin's (2008)

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or Novotni's (1985) yet had significantly less admirable results. Third, aside from not meeting before school (Grubbs, 2009; Persico, 1994), there does not appear to be an ideal time for tutors and tutees to meet, and both during and after-school programs will carry unique challenges. One disadvantage of implementing a peer tutoring program during class is the loss of class time. Peer tutoring program may conflict with students' regularly scheduled math program by staff (Fogarty & Wang, 1982), or other methods of remediation may be considered more effective (Lloyd et al., 2015). Two disadvantages of implementing a peer tutoring program outside of class are the potential lack of transportation (Topping, 1988) and ensuring students are motivated to attend, as tutees may choose not to receive additional instruction (Grubbs, 2009).

Challenges identified in case-study research. Supervising a peer tutoring program and having teachers log data about the program's progress can be very taxing for teachers. Lloyd et al.'s (2015) program was larger than most others, and such coordination put an undue amount of stress upon teachers who were required to supervise. A similar challenge was noted by Schagrin (2017), during whose research the local union brought a grievance due to the increased workload two teachers received as a result of managing a peer tutoring program, causing the program coordinator to redistribute supervision to six teachers. Additional challenges in scale were seen by Zuelke and Nelson (2016) who initially implemented a peer tutoring program at eight schools, then after the second year scaled down to four, and in the fourth year to two schools due to coordination challenges. Large programs can succeed though. For example, since its inception in 1975, The Pimlico Connection has provided 8,600

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secondary tutees with over 17,000 hours of remediation over the course of 13 years (Goodlad & Hirst, 1989).

Capacity for high-quality remediation. Novotni's (1985) analysis reported the academic influence of peer tutoring was not statistically significant when compared to a control group receiving support from a math specialist. This is an interesting comparison because such suggests peer tutoring has the ability to offer the same level of academic support as a math specialist in the same academic context. Another comparable parallel between the effectiveness peer tutoring and professional tutoring can be seen by comparing the effectiveness of Allen and Chavkin (2004) and Baker et al.'s (2006) investigations with a similar after-school tutoring program in which tutors were professional educators rather than peers (Rothman & Henderson, 2011). In a professional after-school tutoring program, 11 teachers tutored a group of 43 at-risk middle school students in language arts and mathematics twice a week for 90 minutes (Rothman & Henderson, 2011). Tutees received a total of 48 hours of tutoring, the attendance rate was 90%, and students' positive changes in academic proficiency was comparable to that of Allen and Chavkin (2004) and Baker et al. (2006). Novotni's (1985) results and the comparison between Allen and Chavkin's (2004) and Baker et al.'s (2006) programs with Rothman & Henderson (2011) illustrate peer tutoring has the potential to be as effective as professional tutoring, reinforcing the need to understand how to optimize a peer tutoring to produce such gains.

Perception versus reality of peer-tutor training. Researchers have a few recommendations for how to make peer tutor training more effective. First, training should be structured, and should at minimum provide a review of the basic skills in the

material to be tutored (Fogarty & Wang, 1982; Johnson, 2014; Wasik, 1998). In addition to having a basic competency in material to be taught, training should emphasize relationship building between tutors and tutees (Novotni, 1985), and after the initial tutoring training, tutors should receive continuous training throughout the year for tutors to ask questions and for teachers to provide feedback (Grubbs, 2009; Perisco, 1994; Schagrin, 2017; Wasik, 1998).

The case-study researchers reviewed in this investigation almost unanimously considered peer tutor training to be effective (Allen & Chavkin, 2004; Baker et al., 2006; Fogarty & Wang, 1982; Grubbs, 2009; Lloyd et al., 2015; Nisbett, 1999; Novotni, 1985; Perisco, 1994; Schagrin, 2017). However, when examining program effectiveness, meta-analytic researchers did not find peer tutor training to be essential to effective program operation (Cohen et al., 1982; Leung, 2014). Cohen et al. (1982) found no difference in effectiveness between programs with and without peer tutor training, and Leung (2014) found programs with training sessions less than 45 minutes, tended to have a more positive influence than others with extensive training. Similarly, though perceived positive, among case-studies the amount of tutor training does not appear to have a consistent correlation with a program's effectiveness. Effective peer tutoring programs have had days of tutor training (Allen & Chavkin, 2004) but programs with multiple days of training have not necessarily shown statistically significant gains (Novotni, 1985). Programs with fewer than two hours of tutor training have been effective (Fogarty & Wang, 1982; Grubbs, 2009; Schagrin, 2017), but also ineffective as well (Lloyd et al., 2015; Nisbett, 1999).

The difference between perceived effectiveness of peer tutor training by case-study researchers (Allen & Chavkin, 2004; Baker et al., 2006; Fogarty & Wang, 1982; Grubbs, 2009; Lloyd et al., 2015; Nisbett, 1999; Novotni, 1985; Perisco, 1994; Schagrin, 2017) and calculated effectiveness by meta-analytic researchers (Cohen et al., 1982; Leung, 2014) presents a problem. If there is juxtaposition between when is thought to be effective and what evidence shows is effective, then peer tutoring may not be as promising a means of academic support as anticipated. Therefore, more analysis of the difference between the perception and reality of the influence of peer tutoring is needed to test if other areas show similar discontinuity.

Perception of Peer Tutoring

Whereas the scale of the academic influence of peer tutoring varies significantly between studies (Bowman-Perrott et al., 2013; Cohen et al., 1982; Hattie, 2009; Leung, 2014; Zeneli et al., 2016), the perception of the effectiveness of peer tutoring is overwhelmingly positive (Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982; Johnson, 2014; Lloyd et al., 2015; Nisbett, 1999; Perisco, 1994; Schagrin, 2017). Participants' overwhelmingly positive perception of peer tutoring leads to some discrepancy when comparing participants' optimism to participants' attendance as may be seen in Table 3.

Table 3

Overview of Participants' Perceptions of Programs and Academic Influence

Researchers	Perception	Academic Influence
Austin (2008)	9/10 participants felt "great," 1 unchanged	Significant positive change
Baker et al. (2006)	Very positive perception from teachers and tutees	Significant positive change
Blanch et al. (2012)	223 tutees received support from family members; tutees and family felt satisfied with the program	Significant positive change
Fogarty & Wang (1982)	Mostly positive feedback from 18 tutees Mostly positive feedback from 12 tutors Very positive feedback from teachers	Significant positive change
Goodlad & Hirst (1989)	None described	None described
Grubbs (2009)	Students and teachers considered the program to have a positive impact	Small positive change
Johnson (2014)	Tutors gained patience and an opportunity to practice Feedback from 6 of 7 tutees was positive; tutees noted less stress when working with a peer tutor compared to a teacher, preferred 1-on-1 to group support, and enjoyed working with different tutors	None described
Klingbeil et al. (2017)	Researchers anticipated peer tutoring would have positive a positive impact and the positive impact could be transferred to adults as well	Significant positive change for word comprehension; no change for oral reading fluency
Lloyd et al. (2015)	Senior leaders felt the program improved teachers' skill Some senior leaders considered peer tutoring to be less effective for tutees than other remediations Teachers felt tutees had improved their relationships and confidence	No significant change
Nisbett (1999)	16 of 72 results were polarized, very positive or very negative Overwhelmingly stakeholders thought it would have a positive impact	No significant change
Novotni (1985)	No significant difference in attitude towards math	No significant change in one class; minor negative change in another
Perisco (1994)	7 of 13 of students saw a positive change in confidence, 6 of 13 in cooperation, and 7 of 13 in getting cooperation (other opinions were neutral) Teachers considered 8 of 13, 9 of 13, and 9 of 13 in respective categories	No significant change
Schagrin (2017)	77% of tutors perceived the program as effective, 5% disagreed, and 18% were neutral 60% of tutees perceived the program as effective, 13% disagreed, and 27% were neutral 75% of teachers perceived the program as effective, 14% disagreed, and 11% were neutral Many tutees felt more comfortable working with a tutee than working with a teacher	Moderate to high positive change

| Zuelke & Nelson (2016) | Program seen as low priority by officials
Frustration due to poor coordination
Continued despite challenges with help of political influence from local leaders | Minor negative change |

Perceived benefits of peer tutoring. In most case-studies examined, participants' positive perception of program effectiveness matched the study's measured positive academic impact (Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982; Johnson, 2014; Perisco, 1994; Schagrin, 2017). In a few cases though, overall positive perceptions of peer tutoring were favorable even if a study had a neutral academic impact (Lloyd et al., 2015; Nisbett, 1999), and in one program with a negative impact across multiple schools peer tutoring was maintained for years because of the program's anticipated positive impact on student learning (Zuelke & Nelson, 2016).

The beneficial influence of peer tutoring can be implemented on a larger scale, such as in one situation when beginning in 1975, a peer tutoring research project, The Pimlico Connection, began pairing engineering students from the Imperial College of Science, Technology at the University of London (Goodlad, Abidi, Anslow, & Harris, 1979). From 1975 to 1978, 750 university tutors provided over 17,000 hours of remediation to over 8,600 secondary pupils Wednesdays after school for 15 weeks each year in science, mathematics, and craft and design technologies (Goodlad & Hirst, 1989). The program was considered to be hugely successful, and tutees noted their favorite parts about peer tutoring were the rapid responsiveness, helpfulness, and individual attention provided by tutors. When asked for feedback about the program, "Most pupils report *no dislikes at all*" (p. 100, emphasis in original). Even over 40 years after its initial implementation, The Pimlico Connection continues to provide peer tutoring to secondary pupils in London schools, and continues to be considered a major success (Imperial College Union, 2017).

The positive feedback received from participants found in Goodlad and Hirst's (1989) investigation of the Pimlico Connection is not uncommon among peer tutoring programs. In another program in which 10 fifth-grade tutees kept journals, nine students reported they felt great about participating in peer tutoring, and the tenth's reaction was neutral (Austin, 2008). In a somewhat unusual peer tutoring program in reading, 223 students participated with mothers, fathers, and siblings acting as tutors for tutoring sessions at home, compared to a control group of 80 students without family participation (Blanch et al., 2012). By anonymous survey, pupils reported they had been satisfied with the support received and many noted enjoying "sharing a close time with their family tutors" (p. 1687). Even in programs where no significant academic progress was found (Lloyd et al., 2015; Nisbett, 1999; Perisco, 1994), most of participants considered the program to have a positive impact. For example, in one study teachers reported operating the program increased their confidence and some senior leaders reported they thought participation in the program increased teachers' instructional skills (Lloyd et al., 2015).

Perceived barriers to attendance. Despite the perceived benefits of peer tutoring, one of the most frequently cited challenges implementing an effective peer tutoring is lack of attendance from both tutees and tutors (Grubbs, 2009; Perisco, 1994; Yawn, 2012; Zuelke & Nelson, 2016). According to one researcher, the implementation of a peer tutoring program will be received warmly by tutees and there will be an abundance of tutors to readily provide support (Merrett, 1994), but other researchers have found attendance less auspicious (Baker et al., 2006; Goodlad & Hirst, 1989; Grubbs, 2009; Johnson, 2014; Lloyd et al., 2015; Schagrin, 2017; Zuelke & Nelson, 2016).

Attendance barrier. Several researchers have noted lack of attendance can be a significant challenge. In one secondary school of 1,600, a peer tutoring program was offered in multiple content areas before and after school (Johnson, 2014). For 10 weeks, 108 tutees and 43 tutors attended for a total of 242 review sessions, but only 40% of tutees came more than once, and 20% more than twice, similar to the less-than-anticipated attendance reported by Lynch (1993). In another secondary school, over the course of three years 110 tutors and 300 tutees participated in a peer tutoring program during lunch (Schagrin, 2017). Of the 300 students who attended, 198 students completed at least the minimum recommended three hours of participation, 102 attended for between 50 minutes and three hours, and 472 students were eligible to participate but chose not to. Lack of attendance negates the opportunity for substantial remediation (Perisco, 1994), and other researchers have recorded attendance as low as 50% (Yawn, 2012).

There are many potential reasons for tutors and tutees' lack of attendance. In one study, 52% of tutors believed tutees may not have chosen to participate due to the perceived social stigma of asking another student for assistance (Schagrin, 2017). In other studies, researchers believed students may not have chosen to attend because they would rather have spent time socializing with their friends (Goodlad & Hirst, 1989; Grubbs, 2009; Schagrin, 2017). If the program is held before or after school, students may be unable to attend due to challenges posed by a lack of transportation (Topping, 1988). Tutees may instead prefer to receive assistance from a teacher (Schagrin, 2017) or alternatively younger students may have felt uncomfortable working with older students (Lloyd et al., 2015). Alternatively, tutees may opt not to participate because they do not

think they need help (Johnson, 2014; Schagrin, 2017). Between tutors and tutees, tutees have been noted to be absent more frequently (Novotni, 1985), and if tutees do not attend peer tutoring, then academic benefits from participation may deteriorate (Perisco, 1994) and tutors become frustrated (Baker et al., 2006). Conversely, if tutors are not present, changes must be made to accommodate tutees present, either by shuffling students present to form groups of tutors with more than one tutee (Baker et al., 2006; Lloyd et al., 2015), which in turn can lead to dissatisfaction among participants (Baker et al., 2006), or by having tutees work together (Perisco, 1994). Receiving aid in a small group (Baker et al., 2006) or having tutees work together (Persico, 1994) are not necessarily bad practices, but are not the promised one-on-one support, and excessive absences can also be damaging to developing effective conclusions about the influence of peer tutoring since some researchers do not include data about tutees who have had excessive absences in their analyses (Novotni, 1985; Yawn, 2012).

   Addressing attendance challenges. Researchers have implemented a variety of solutions to address lack of attendance (Baker et al, 2006; Grubbs, 2009; Johnson, 2014; Lloyd et al., 2015). One recommended strategy is to publicize the program and remind students to attend, brochures may be created and shared with students and teachers (Grubbs, 2009). A second is to promote attendance is not to make peer tutoring mandatory, as tutees will be more willing to learn when choosing to rather than being forced to attend (Johnson, 2014). A third is to ensure remediation is in the same place every week and there is some form of enjoyment involved in each session (Merrett, 1994). Fourth, when a tutor is absent, supervising teachers may provide remediation to ensure tutees still benefit (Baker et al., 2006), or if multiple tutor–tutee dyads are present

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solitary tutees can be matched with another pair to form a trio of one tutor and two tutees (Lloyd et al., 2015). Additional research into techniques for addressing attendance challenges in peer tutoring would be beneficial, for without consistent attendance by both tutors and tutees, supervisors will be unable to develop and maintain a cost-effective means for academic support.

Cost-Effectiveness of Peer Tutoring

Financially, implementation of a peer tutoring program is considered significantly less expensive than comparable means of academic improvement, such as adult tutoring, Reading Recovery, or reducing class size (Levin et al., 1987). However, although peer tutoring may be more frugal than other supplemental strategies, a low financial price does not mean peer tutoring is necessarily more cost-effective. In addition to the monetary expense needed, a peer tutoring program requires a substantial amount of time and energy from teachers, tutors, and tutees, the sum of which may not necessarily be greater than other means of intervention (Lloyd et al., 2015). Peer tutoring programs have had a spectrum of academic impacts from large gains (Schagrin, 2017) to moderate (Allen & Chavkin, 2004; Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982) to minor (Grubbs, 2009; Zambrano & Gisbert, 2015) comparable to the spectrum of influences seen in programs with financially compensated tutors which have shown a mix of significant gains (Fitzgerald, 2001; Rothman & Henderson, 2011), minor gains (Lynch, 1993), and negative influences (Zuelke & Nelson, 2001).

Cost in money. Fiscally, peer tutoring is appealingly frugal. From the school's perspective, operating a peer tutoring program costs considerably less than private tutoring since participants are volunteers, and assuming adequate facilities are available,

the only fiscal requirement is supervisor compensation and supplies (Feldman et al., 1976; Levin et al., 1987). For location and administration, peer tutoring can be facilitated within the school building during or after school and is usually facilitated by a single supervisor (Allen & Chavkin, 2004; Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982; Grubbs, 2009).

Estimating the cost-effectiveness of peer tutoring is tricky though because peer tutoring may be more economical but not necessarily as effective as other means of academic support. For example, in one study university students were paid to tutor 144 first and second graders in reading (Fitzgerald, 2001). Tutors received 33 hours of training, provided aid twice a week for 40 minutes, and one group of 19 students received support for 6–12 weeks while a second group of 64 students received support for 25 weeks. The program showed minor gains for the students receiving less support, $d = .29$, and very high gains for the students receiving more, $d = 1.19$. The cost of this peer tutoring program was $153,746, or $595 per student. The same researcher estimated comparable support from for privatized tutoring would have cost $1,068 per student or $4,000 per student for Reading Recovery (Shanahan & Barr, 1995). Fitzgerald's (2001) estimate is high, but considers many factors, such as the cost of the university program to operate the peer tutoring program and funding for investigation to pay tutors and supervisors, and on a per pupil basis argues peer tutoring is more cost-effective than other means of support.

Other researchers agree with Fitzgerald's (2001) conclusion that peer tutoring is more cost-effective than other means of support. Levin et al. (1987) estimated the cost of providing peer tutoring would be $212 per tutee, compared to adult tutoring for $827 per

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tutee. Both Fitzgerald (2001) and Levin et al. (1987) estimate the cost-effectiveness of peer tutoring to be roughly one-fourth the cost of adult tutoring, and other estimates are even lower (Feldman et al., 1976; Lloyd et al., 2015). In one study, the development of a reading peer tutoring program was estimated at £2,625, or £10.50 per student (Lloyd et al., 2015); $3,391.92 overall or $13.55 per student assuming a £1 to $1.29 exchange rate. Similarly, Feldman et al. (1976) estimates the cost of a peer tutoring program would be a manager's salary plus $1 per student per year for supplies, although the estimated manager's salary was not given.

Cost beyond money. Operating a peer tutoring program takes a substantial amount of time, and when operated by teachers the time needed to supervise a peer tutoring program needs to be taken from somewhere else. For example, in one study teachers involved in the program had to be given an extra free period in order to complete the paperwork involved in operating the program, and remediation was provided at the expense of instructional time (Lloyd et al., 2015). The loss of time with teachers may have a negative influence, as some students prefer to work with teachers rather than peer tutors (Lloyd et al., 2015; Schagrin, 2017). For example, as Lloyd et al. (2015) noted in a peer tutoring program many staff were required help coordinate, "Not all senior leaders we spoke to were convinced that the programme had, or would, improve literacy levels among pupils due to the lack of directed reading" (p. 49). In theory, one of peer tutoring's strengths is increasing the total amount of instructional time a student receives (Levin et al., 1987), but if such instructional time means additional pressure elsewhere the resulting supplemental instruction may not be sufficient to justify implementation (Lloyd et al., 2015).

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From the tutors' perspective, peer tutoring requires a significant time investment. Researchers identify numerous qualitative benefits to participation, such as satisfaction with helping others (Austin, 2008; Goodlad & Hirst, 1989; Grubbs, 2009), feeling more self-confident (Alrajhi & Aldhafri, 2015; Baiduri, 2017; Fogarty & Wang, 1982; Goodlad & Hirst, 1989), and appreciating a closer bond with their peers (Fogarty & Wang, 1982). A few studies acknowledge tutors feel as if they have benefitted academically from participation (Goodlad & Hirst, 1989; Flores & Duran, 2014; Worley & Naresh, 2014), but more research is needed to understand the extent of tutors' academic benefit (Hattie, 2009). Despite the beneficial qualitative aspects of peer tutoring, attendance requires time, time peer tutors may have preferred to do something else such as spend time with their friends (Grubbs, 2009; Schagrin, 2017).

From the supervisor's perspective, peer tutoring programs requires time to coordinate activities (Baker et al., 2006; Davis et al., 1995). On a class-wide scale, supervision of a peer tutoring program involves the level of involvement the supervisor chooses to have during a peer tutoring session, such as being an observer when tutoring occurs (Perisco, 1994; Yawn, 2012), being a participant-observer by acting as a reference or support during tutoring as needed (Austin; 2008; Baker et al., 2006; Johnson, 2014), or fully participating in tutoring sessions by helping develop lessons with tutors (Schagrin, 2017). Some level of teacher involvement has been recommended as a means of increasing program effectiveness (Feldman et al., 1976; Zambrano & Gisbert, 2015), although requiring supervisors to overcommit time and energy may cause backlash (Schagrin, 2017). On a program-wide scale, a program supervisor must arrange for monitoring of peer tutoring sessions, match tutees with appropriate tutors, adapt for

absences, and maintain paperwork (Baker et al., 2006), all of which are temporally

draining.

The cost of ineffective remediation. Failing to understand how to effectively

provide remediation may result in an ineffective program, even if a school chooses to use

professional tutors. For example, during the 1991–1992 school year, the Texas Northside

Independent School District implemented a district-wide support tutoring program by

hiring professional teachers to provide support (Lynch, 1993). Of the 14,159 students

eligible to receive tutoring, 1,559 students attended at least one of the 32 support sessions

available before and after school. Of the 1,559 participants, 61.5% of students attended

only once, and 32.2% attended between 2 and 5 times. Feedback from students was

positive, yet there was too little attendance for the program to have a significant

influence. If students participate in a support program, acknowledge participation in the

program as helpful, and then subsequently choose not to attend, then something is wrong,

and the reasons behind students' perspectives and actions need to be explored for peer

tutoring programs to be successful.

Summary

Overall, peer tutoring literature suggests peer tutoring is an academically effective

supplementary educational strategy for tutees (Cohen et al., 1982; Hattie, 2009; Jun et al.,

2010; Leung, 2014), beneficial practice for tutors (Goodlad & Hirst, 1989; Flores &

Duran, 2014; Worley & Naresh, 2014), and received well by participants and teachers

(Austin, 2008; Baker et al., 2006; Fogarty & Wang, 1982; Goodlad & Hirst, 1989; Lloyd

et al., 2015). With so many benefits, why then do researchers cite attendance as a

challenge (Grubbs, 2009; Johnson, 2014; Lynch 1993; Schagrin, 2017)? Either peer

tutoring is not as effective as perceived to be (Nisbett, 1994; Perisco, 1994; Zuelke &

Nelson, 2016), or despite benefits of participation many students may not wish to attend

(Grubbs, 2009; Perisco, 1994). Therefore, additional inquiry into the influence of peer

tutoring, the perception of participants, and how to most effectively offer peer tutoring is

necessary in order to understand how to optimize the effectiveness of a peer tutoring

program.

CHAPTER 3: METHODS

The goal of this program evaluation was to gauge the academic benefit of peer tutoring, optimize student attendance in peer tutoring programs, gain a better understanding of participants' perspectives about the benefits and barriers of peer tutoring, and contribute to the existing body of peer tutoring literature. Chapter 3 outlines the research strategies used in this investigation, addressing the evaluation model, research paradigm, sources of information, collection methods, and techniques for data analysis, concluding with delimitations, limitations, assumptions, and ethical considerations.

Study Design

This study was conducted using the CIPP Evaluation Model (Stufflebeam, Gullickson, & Wingate, 2002) and aligns with the pragmatic paradigm or "Use Branch" of investigation (Mertens & Wilson, 2012).

CIPP Evaluation Model. The CIPP Evaluation Model was chosen because of its emphasis upon context throughout the investigation. Understanding the context of ARGS was critical to developing effective recommendations. The CIPP Evaluation Model is also consistent with the pragmatic paradigm guiding this mixed-methods analysis (Mertens & Wilson, 2012).

> This model presents a comprehensive approach to assessing *context*, including the nature, extent, and criticality of beneficiaries' needs and assets and pertinent environmental forces; *input*, including the responsiveness and strength of project

plans and resources; *process*, involving the appropriateness and adequacy of project operations; and *product*, meaning the extent, desirability, and significance of intended and unintended outcomes. (p. 65, emphasis in original)

The CIPP Evaluation Model enables research to be conducted in a straightforward manner, tracing research from input to process to product. The flow from input to process to product to recognize what steps lead to a certain result and test if the justification for a product was the intervening process. The input in this investigation were the tutors, tutees, supervisor, and students who were recommended for peer tutoring but chose not to participate. The process was the delivery of the peer tutoring program reflected by attendance data. The products were the academic improvement of tutees, attendance data, and perceptions from all participants.

Use Branch. The combination of quantitative and qualitative strategies in this mixed-methods evaluation is most similar to methods in the pragmatic paradigm, or "Use Branch" of program evaluation (Mertens & Wilson, 2012). Here are a few of the underlying philosophies of the pragmatic approach:

- Investigators use quantitative and qualitative data to provide the best understanding of a research problem (Creswell, 2014).

- There needs to be a rationale for combining quantitative and qualitative methods (Creswell, 2014).

- The evaluator chooses methods based upon what is most appropriate for the particular context and stakeholder groups (Mertens & Wilson, 2012).

- "Pragmatists see the value of the evaluation as *how it is used and the results of that use*" (Mertens & Wilson, 2012, p. 90, emphasis in original).

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The Use Branch of investigation was chosen because this evaluation aimed to provide program improvement in several different areas. Therefore, an optimal research strategy requires the amalgamation of academic change, participant reflection, and attendance analysis to develop recommendations.

Evaluation questions. This program evaluation focused on five questions to investigate different elements of peer tutoring,

1. What is the academic influence of participation in peer tutoring upon tutees in the subject tutees receive support?

2. When do tutors and tutees most reliably attend peer tutoring?

3. When do tutors and tutees prefer to attend peer tutoring?

4. What benefits to participation do tutors and tutees most frequently identify?

5. What barriers to participation do tutors and tutees most frequently identify?

Study Context

The focus of this study was a secondary governor's school. All students at the school applied to study in one of six focus areas: dance, literary arts, music, technology, theater arts, or visual arts, and must have completed Algebra I prior to enrollment. A total of 362 students attended during the 2018 school year, and in 2019 4.12% of the student received free or reduced lunch. Students attending the school came from one of 14 different school districts. Classes operated on an A/B day schedule, and so students had the same classes all year, and so students' academic progress could be tracked by examining grades from quarter to quarter and there was sufficient time for students to identify and receive support as needed. Buses at ARGS arrived between 8:00 and 8:20 and left every afternoon at 3:37. No buses ran after 3:37, which meant that all afternoon

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peer tutoring participants were responsible for providing their own transportation. During the 2019 school year, the ARGS peer tutoring program had been in operation for eight years and had a positive reputation in the school.

Participants

Participants in this study included tutors, tutees, and me as the supervisor of the ARGS peer tutoring program. Regardless of participant background, all participation was voluntary; tutees were not required to participate for a longer or shorter about of time regardless of their quarter score when entering. Though parents, administrators, and teachers were stakeholders in the ARGS peer tutoring program, this investigation only focused upon individuals directly involved with peer tutoring sessions.

Tutee background. Tutees were ARGS students who volunteered to receive support in the peer tutoring program. During the 2016–2018 school years, at the end of the first, second, and third quarters during the year if a student earned a grade lower than 60, a failing grade, then the student's family received a recommendation by mail for the pupil to participate in peer tutoring. Before participating, all tutees had to complete a peer tutoring request form. The 2018 tutee request form is in Appendix A. The enrollment form required tutees to indicate what times they were available, what subjects they requested tutoring in, and required a parent or guardian's signature. Enrollment in the ARGS peer tutoring program was continuous throughout the year and tutees were almost always paired with a tutor within two weeks. Tutees were recommended to participate for at least 10 hours of remediation, although not all did, and three consecutive unexcused absences resulted in a tutee's removal from the program. During the 2018 school year, 26 tutees were freshmen, 12 were sophomores, 11 were juniors, and three were seniors.

Tutor background. Tutors were ARGS students who volunteered to provide support for tutees in the ARGS peer tutoring program. Before participating in peer tutoring, all tutors had to complete a one-hour peer tutor training session designed to help tutors practice challenges that could occur during tutoring. Tutor training was a composition of advice, question and answer, role-play, and description of the program's structure. The complete PowerPoint used in peer tutor training with sample solutions and a description of the role-play scenarios is in Appendix D. Tutors were trained continuously throughout the year, though often several weeks passed between when tutors indicated they were eligible to participate and when they were paired with a tutee. All students were eligible to become tutors, although tutors were recommended to have a B or above in the subject or subjects they intended to tutor. After completing peer tutor training, tutors completed an availability form indicating what times they were eligible to tutor and what subjects they were able to tutor in. The peer tutor availability form can be found in Appendix B. Tutors were encouraged to participate for at least 10 hours, but there was no minimum or maximum amount of time required to volunteer. Like for tutees, three consecutive unexcused absences resulted in a tutor's removal from the program. During the 2018 school year, two tutors were freshmen, six sophomores, 20 juniors, and 19 seniors. Twenty-four of the ARGS students who were tutors during the 2017 school year returned to be tutors during the 2018 school year.

Supervisor background. My role as a participant–observer supervisor in the ARGS peer tutoring program was to train tutors, coordinate tutor and tutee pairs to meet at mutually convenient times, to be available during peer tutoring to answer questions, and ensure tutor and tutee dyads remained on task. The 2019 school year was my 11th

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year of teaching professionally and fourth year as ARGS peer tutoring supervisor. I taught all sections of Geometry and three out of five Algebra II. My familiarity with ARGS freshmen made coordinating peer tutoring more efficient, and for each of the years I have been the peer tutoring supervisor Geometry, a freshmen class at ARGS, has been requested more frequently than any other subject. At the end of each school year, I encourage freshmen to participate in peer tutoring as tutors for topics they are skilled in.

Data Sources

This investigation drew data from five different sources: tutees' quarter grades, non-tutees' quarter grades, attendance logs, end of the year surveys, and end of the year student surveys.

Tutees' grades. The first data source was the quarter grades of tutees for subjects in which peer tutoring was received. Analysis of changes upon tutees' grades from participation was intended to measure peer tutoring's efficacy as a supplemental service. During the 2016–2017 school years, ARGS operated on a seven-point grading scale, or 93–100 was an A, 86–82 a B, 78–85 a C, 70–77 a D, and 69 or below an F. Since the 2018 school year, ARGS has operated on a 10-point grading scale, such that 90–100 is an A, 80–89 a B, 70–79 a C, 60–69 a D, and 59 or below an F. Grades for the subjects tutees received tutoring in were collected during the 2016–2019 school years.

Non-tutees' grades. The second data source was the quarter grades of non-tutees for subjects in which participation in peer tutoring was recommended but not pursued. Analysis of non-tutees' grades was intended to be a control to measure the changes in tutees' grades against. Non-tutees were students who chose not to attend after receiving a letter recommending assistance for the subject with a non-passing score at the end of the

first, second, and third quarters of the school year. Non-tutees' quarter grades were

collected from the 2016–2018 school years for Geometry, Algebra II, Pre-Calculus,

Biology, Chemistry, World History I, Spanish I, and Spanish II. These classes were

selected for comparison because tutees had received at least 50 total hours of tutoring in

each of these classes during at least one of the 2016–2018 school years. The minimum of

50 total hours was chosen to ensure classes would have a significant number of both

tutees and non-tutees for comparison. The policy of sending letters home at the end of

every quarter was discontinued after the 2018 school year, and so the potential to

examine non-tutee grades concluded in 2018.

Attendance log. The third data source was the 2019 peer tutoring attendance log.

Every morning, tutors and tutees who had peer tutoring that day received a reminder e-

mail. The e-mail is in Appendix E. This e-mail served a double purpose. Its first purpose

was as a reminder to encourage tutors and tutees to attend peer tutoring. Its second

purpose was to be a record of which tutors and tutees were scheduled to attend on a given

day. Tutors and tutees who attended recorded their attendance in a daily log along with

the date, subject tutored, and time of attendance. Each tutor's time log was then checked

and signed by the supervisor for accuracy. Each tutor who volunteered was given a time

log specific to himself or herself, and a blank time log can be found in Appendix C.

2019 student survey. The fourth data source was the 2019 student survey. This

survey was designed to analyze feedback about tutors' and tutees' perceptions about

attending peer tutoring during lunch compared to after school, as well as their overall

perception of the peer tutoring program. This survey is in Appendix F. The attendance

data from the 2019 student survey was used to compare the accuracy of participants'

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perceptions of their success measured by grade change and attendance as measured by the attendance log. The survey topics are further explored below.

Student time preference. Understanding what participants perceived to be the optimal time for participation was explored to consider when tutoring should be scheduled. For example, if tutors and tutees preferred to meet during lunch, additional times for tutoring during lunch could be offered. An example question from this section is:

Open Response 1: "Assuming both options were possible, would you prefer to attend during lunch, after school, or both?"

Student analysis of benefits to participation. Understanding what tutors and tutees perceived to be incentives for participating was explored to learn what strategies could be used to recruit more tutors to volunteer or persuade hesitant tutees to join. An example question from this section is:

Open Response 3: "What do you consider the greatest benefit to attending during lunch?"

Student analysis of barriers to participation. Understanding what barriers tutors and tutees identified for not participating was explored to identify what barriers could be removed and how to encourage participation. An example question from this section is:

Open Response 4: "What do you consider the greatest barrier to attending during lunch?"

End of school year surveys. The final source of data was extant data from the 2016 – 2018 tutor and tutee peer tutoring feedback surveys. The 2016 – 2018 surveys were given at the end of school years, given before formal research for program

improvement had been considered. Only responses to similar to the 2019 survey were included in this analysis. This survey is available in Appendix G. All responses were scored on a 5-point Likert scale. A score of 1 represented *Strongly Disagree*, 2 *Disagree*, 3 *Neutral*, 4 *Agree*, and 5 *Strongly Agree*. There was also the choice of *N/A or unsure* on all Likert scale responses to ensure responses were not forced. The topics on the survey are subsequently described.

Overall satisfaction. Tutors' and tutees' satisfaction was analyzed to compare how satisfied participants were with peer tutoring to the academic influence measured from quarter grade analysis. For example, if students were satisfied with the program but academic influence was negligible, then additional measures may be needed to ensure participants are staying on task or better materials may be needed to improve the quality of remediation. An example of a question from this section is:

Q1, "Overall I was satisfied with the (year) peer tutoring program."

Tutor training. Tutors' feedback regarding satisfaction with their training was gathered to develop more effective training methods and to contribute to a disputed area of literature peer tutoring literature, what type of peer tutoring is most appropriate (Allen & Chavkin, 2004; Goodlad & Hirst, 1989; Grubbs, 2009; Merrett, 1994; Topping, 1988; Yawn, 2012) or if peer tutor training is even necessary (Cohen et al., 1982). If tutors perceived a one-hour training session to be satisfactory, then one hour of training may be adequate, yet if tutors considered the training to be insufficient, then more effective training may be needed. An example of a question from this section is:

Q3: (Tutors only): "I found peer tutor training helpful."

Tutor–tutee relationship. Tutors' and tutees' perceptions of their relationship with their partners was analyzed to test how participants' relationships may have influenced satisfaction. For example, if participants reported a poor relationship with their tutors or tutees but were satisfied with the program, more investigation into how tutors and tutees are matched or the supervisor's role during tutoring session may be necessary. An example of a question from this section is:

Q5, "I had a good relationship with my tutor/tutee."

Benefits to participation. While academic progress is the primary goal of peer tutoring, there are numerous opportunities for qualitative benefits, such as increased tutor or tutee confidence and willingness to work with teachers. The 2016–2019 end of year surveys provided the opportunity for participants to identify benefits from participation in the ARGS peer tutoring program. An example of a question from this section is:

Open Response 2, "What did you find most helpful about peer tutoring?"

Barriers to participation. There are many potential barriers to participation, such as lack of transportation availability (Topping, 1988), not considering remediation necessary (Grubbs, 2009; Schagrin, 2017), forgetfulness (Grubbs, 2009; Schagrin, 107), or a preference to work with teachers rather than peers (Schagrin, 2017). Understanding what barriers to attendance participants consider most significant what necessary to develop strategies to alleviate such barriers or modify the program to accommodate challenges. An example of a question from this section is:

Open Response 3, "What did you find most challenging or difficult about peer tutoring?"

2019 survey field test. After receiving IRB and local approval for research, to ensure the 2019 survey's wording and formatting were clear and the length of the survey was reasonable, a pilot version was created. In early spring of 2019, the pilot survey was given to five tutors and five tutees who had participated in the ARGS peer tutoring program during previous years and were still at ARGS, but who had chosen not to participate during the 2019 school year. The students subsequently met with me in person to discuss their feedback.

Feedback from the 2019 survey field test. Feedback from tutors and tutees was unanimously positive, and all of the tutors and tutees stated the survey seemed appropriate. Tutors and tutees also gave specific feedback, and changes based upon students' recommendations follow.

Changes to the 2019 survey. The final introduction sentence was modified from "This survey should take less than 15 minutes and contains two parts, one about part requesting feedback about attendance, the other satisfaction." to "This survey should take less than 15 minutes and contains two parts, one part requesting feedback about attendance, the other satisfaction."

Open Response 2 in the Attendance section was changed from "Why did you choose this time frame?" to "Why did you choose the selected time frame?"

The question "Why?" was removed from the end of Open Response 6 on the Attendance section for pacing.

Question 4 in the Satisfaction section was modified from "Daily attendance e-mails were helpful to remember when attend tutoring." to "Daily attendance e-mails were helpful to remember when to attend tutoring."

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A question in the Satisfaction section of the survey, "*Preference*: Assuming both options were possible, would you prefer to attend during lunch, after school, or both?" was removed since it was already asked in the Attendance section.

The *Lunch tutoring* questions inquiring about the convenience of meeting during lunch in the Satisfaction section were removed.

Data Collection

There were three types of data in this program evaluation: grades, attendance data, and survey responses. Grades from the 2016–2018 school years for tutees and non-tutees and in 2019 were collected by requesting grades from teachers and guidance staff after receiving administrative approval. Attendance data were collected though daily reporting by participants and supervisor from September 2018 through June 1, 2019. Additionally, a student survey requesting feedback with respect to attendance and student satisfaction was offered from April 22, 2019 to May 6, 2019. The 2016–2018 end of year survey responses were available for analysis as archival data.

Tutees' quarter grades. With administrative approval, tutees' quarter grades in the subjects participants received tutoring in were collected from administration. An example of the grade request form used is in Appendix H.

Non-tutees' grades. With administrative approval, non-tutees' quarter grades in the subjects non-tutees were recommended for tutoring in were collected from non-tutees' teachers and administration.

Daily attendance data. A record of which tutors and tutees attended peer tutoring was collected in an attendance log maintained daily. This method of attendance recording had been reliable during the 2016–2018 school years and so was continued. To compare

which pairs of tutors and tutees scheduled to attend to which pairs actually attended, attendance log data was compared to a reminder e-mail sent daily to each tutor and tutee scheduled to attend, a practice that began on March 21, 2016.

Surveys. During the 2016–2018 school years, all students who had participated in peer tutoring that year received an e-mail during the last three weeks of the school year inviting them to complete a feedback survey and a reminder e-mail one week later. During the 2016 school year, end of year surveys were collected using SurveyMonkey. During the 2017–2019 school years, end of year surveys were collected using Qualtrics. For the 2019 survey, as before, all participating tutors and tutees received an e-mail requesting completion of a peer tutoring survey in mid spring 2019. The window for completing this survey was two weeks, and a reminder e-mail was sent one week after initial distribution.

Several measures were employed to ensure a high rate of survey returns during the 2019 school year. First, tutors were directed to complete the survey at the start of each tutoring session after April 22, 2019, until the end of the survey window. Second, to incentivize completing of the survey, students were informed in the initial survey e-mail that upon completion of the survey they could come to my classroom to receive a cookie. Because the incentive was small, the offer of a reward for survey completion was not anticipated to skew results or negatively impact survey return rate. Admittedly, because the surveys were completed anonymously, I was unable to verify if a student receiving their reward had completed their survey, and participant anonymity may have resulted in the dispensation of more cookies than surveys completed. Any financial loss on my behalf was considered acceptable to have encouraged provision of data important to this

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research. Third, during the 2016–2018 school years students participating in peer tutoring received an end of the year party each year. A party was likewise given for all tutors and tutees who attended peer tutoring during 2019 school year on May 1, 2019. At this party, tutors and tutees were reminded to complete the survey if they had not already done so.

Researcher as instrument. As both researcher and peer tutoring program supervisor, there was a strong potential for researcher bias. I minimized the potential for bias in analysis by using a quantitative analysis to measure student progress and checking participants' perception of my involvement.

Data Analysis

The analysis of quantitative and qualitative data for the ARGS peer tutoring program was focused upon developing accurate and reliable results. Several methods of analysis were implemented to understand the academic influence of peer tutoring, when to provide peer tutoring, and how to understand students' perceptions of the program in as much detail as possible. A summary of the evaluation questions, data sources, and intended analysis is provided in Table 4.

Table 4

Evaluation Questions, Data Sources, and Analyses

Evaluation Question	Data Sources	Data Analysis
1. What is the academic influence of participation in peer tutoring upon tutees in the subjects tutees receive support?	Tutees' 2016–2019 quarter grades.	Short-term change, long-term change, t-test
	Non-tutees' 2016–2018 quarter grades.	Influence with respect to duration, t-test
	2017–2019 student satisfaction surveys.	Geometry subgroup analyses: t-test and one-way ANCOVA
	(Scale Response, #10)	Comparison with non-tutees' grades, t-test
2. When do tutors and tutees prefer to attend peer tutoring?	2019 tutor volunteer forms 2019 tutee request forms	Quantitative: descriptive statistics
	Attendance portion of the 2019 student survey.	Qualitative: emergent themes
	(Open Response #1, 2)	
3. When do tutors and tutees most reliably attend peer tutoring?	2019 peer tutoring attendance logs.	Quantitative: descriptive statistics
	Attendance portion of the 2019 student survey.	
	(Open Response #1, 2)	
	2016–2019 student satisfaction surveys.	
	(Scale Responses, #1, 4, 6)	
4. What benefits to participation do tutors and tutees most frequently identify?	Attendance portion of the 2019 student survey.	Quantitative: descriptive statistics
	(Open Response #3, 5)	Qualitative: emergent themes
	2016–2019 student satisfaction surveys.	
	(Scale Response, #1–3, 5, 9) (Open Response, #1–2)	
5. What barriers to participation do tutors and tutees most frequently identify?	Attendance portion of the 2019 student survey.	Quantitative: descriptive statistics
	(Open Response #4, 6)	Qualitative: emergent themes
	2016–2019 student satisfaction surveys.	
	(Scale Response #7–8) (Open Response, #3)	

Note. ANCOVA = analysis of covariance

EQ 1. What is the academic influence of participation in peer tutoring upon tutees in the subject tutees receive support? The academic influence of the ARGS peer tutoring program was measured using the changes in tutees' quarter grades in the content areas tutees received tutoring compared to a variety of factors.

The first method used to evaluate the academic influence of peer tutoring was a comparison between tutees' short-term and long-term changes in quarter grades. Short-term changes were calculated by subtracting a tutee's quarter score from the quarter the tutee began peer tutoring to the next. For example, suppose a tutee joined during the first quarter and had a 72 in Geometry. If during the second quarter the student earned a 79 in Geometry, then the tutee's short-term grade change would be calculated as +7. If instead the tutee earned a 69 for their second quarter grade, then the tutee's short-term grade change would have been -3. Analyzing changes in tutees' short-term grades was intended to measure peer tutoring's immediate influence upon student achievement, and grades from tutees participating for at least two quarters were used. Long-term changes were calculated by subtracting the tutee's score from the quarter the tutee began peer tutoring to the tutee's score from the final quarter the tutee participated in peer tutoring or, if the tutee participated until the end of the year, the tutee's fourth quarter score. For example, suppose a tutee joined during the first quarter of the school year and had a 62 in Biology. If during the fourth quarter the tutee earned a 77 in Biology, then the tutee's long-term grade change would be calculated as +15. The changes in grades between the first and last quarter a tutee participated were not included in the measure of peer tutoring's long-term analysis. Analysis of the change in long-term grades was intended to measure peer tutoring's sustained influence upon student achievement. Grades from tutees participating

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for at least three quarters were used to measure long term change. The requirement of students to participate for at least three quarters was implemented to ensure tutees whose grades were used to measure long term change had participated in peer tutoring for at least 10 weeks.

Grades from tutees who attended during the 2016–2019 school years were used to analyze short and long-term changes. If a tutee participated in multiple subjects, each subject's grade change was calculated independently. The short and long-term changes in tutees' grades were calculated using a one-way ANOVA test.

Comparing changes in tutees' and non-tutees' quarter grades. The influence of peer tutoring upon tutees compared to non-tutees was measured by comparing the change in tutees' to non-tutees' grades. To ensure an equal comparison, when comparing changes in tutees' quarter grades to changes in non-tutees' grades, only tutees who entered peer tutoring with a failing quarter grade were included in the analysis. Tutees' changes in score were measured by calculating the difference in tutees' grades from the quarter tutees entered peer tutoring to the final quarter of the year, regardless of a tutee's duration of participation. Likewise, non-tutees' changes in score were measured by calculating the difference in non-tutees' grades from the quarter non-tutees were informed they earned a failing grade to the final quarter of the year. Tutees and non-tutees who received a failing score during the first, second, or third quarter during the 2016–2018 school year in Geometry, Algebra II, Pre-Calculus, Biology, Chemistry, Spanish I, Spanish II, and World History I, were included in this analysis as well as tutees who received a failing score during the first, second, or third quarter during the 2019 school year in at least one of the aforementioned subjects. The comparison between the change in grades of tutees

who earned a failing score and then chose to participate compared to non-tutees' change in grades was measured using a one-way ANOVA test.

Comparing changes in math and non-math classes. Several of the case-studies investigated the academic influence of peer tutoring exclusively on math classes (Austin, 2008; Baker et al., 2006; Nisbett, 1999; Novotni, 1985), with a mix of significantly positive (Austin, 2008; Baker et al., 2006) and neutral results (Nisbett, 1999; Novotni, 1985). To test if there was a significant difference between the influence of peer tutoring upon student achievement in math compared to non-math classes, the short-term change and long-term change for all math compared to all non-math classes was calculated. Tutees who participated exclusively during the fourth quarter during the 2016–2019 school years were not included in this analysis. The analysis of short and long-term change in math compared to non-math classes during the 2016–2019 school years was measured using a one-way ANOVA test.

Influence with respect to duration. Tutees' changes in quarter grades from the 2016–2019 school years were also measured with respect to duration of participation in the peer tutoring program. The changes were measured by comparing tutees' initial quarter grades to final quarter grades, and results were grouped into different durations of participation: fewer than five hours, 5-15 hours, and more than 15 hours. The initial grade used for this analysis was tutees' quarter score the quarter the tutees began peer tutoring. The final grade was tutees' quarter score the quarter the tutees concluded peer tutoring. Tutees' total time was calculated by adding the sum of time for all sessions, with each individual session rounded to the nearest 15 minutes. The participants used in this analysis were tutees who attended for at least two quarters of the school year during the

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2016–2019 school years. The change in tutees' grades was measured using a one-way ANCOVA analysis.

Geometry subgroup. A subgroup analysis for short-term change, long-term change, and influence with respect to duration was conducted using only students in Geometry. Geometry was the most frequently requested subject in peer tutoring during the 2016–2019 school years, providing the opportunity to examine the influence of peer tutoring for a homogenous subgroup. The subgroup analyses of short and long-term change in Geometry during the 2016–2018 school years were measured using a one-way ANOVA test. To compare the academic influence of peer tutoring upon students in Geometry compared to students not in Geometry, an additional subgroup analysis of the short-term change and long-term change for the 2016–2018 school years for all tutees not receiving support in Geometry was measured using a one-way ANOVA test.

EQ 2. When do tutors and tutees prefer to attend peer tutoring? Attendance preference was measured by comparing when tutors volunteered to provide support and tutees requested peer tutoring prior to participation to when tutors and tutees indicated they preferred to meet when surveyed after participation. Tutors and tutees were also surveyed about what influenced their choice of time frame, and whether they considered peer tutoring to have been arranged at a convenient time.

Preference based on availability. The time tutors and tutees identify themselves as most available to attend peer tutoring was measured by examining the time frames circled upon tutor volunteer forms and tutee request forms to see if certain times were highlighted or ignored with notable frequency. For example, if some students only identified they were available during lunch and others only identified they were available

after school, then a mix of during and after-school tutoring times could be an optimal schedule to ensure all students can benefit from tutoring. Inversely, if students rarely identified certain times as available, then such times could be eliminated without negatively impacting the program. The selection of time frames was grouped into three categories: during lunch, after school, or a combination of both during lunch and after school. One set of time frames was calculated for tutors, and one set for tutees. Participants' initial time preference was measured using the 2019 tutor volunteer forms and 2019 tutee request forms. The peer tutoring request form used by tutees is available in Appendix A, and the peer tutoring volunteer form used by tutors is available in Appendix B.

   Preference based on feedback. Tutors and tutees' feedback about preference to attend during lunch, after school, or both was measured by using one question from the 2018 survey and two questions from the attendance portion of the 2019 student survey available in Appendix F:

   Open Response 1, "Assuming both options were possible, would you prefer to attend during lunch, after school, or both?" and,

   Open Response 2, "Why did you choose this time frame?"

   Student preference indicated in Open Response 1 was analyzed by counting the number of participants who indicated preferring to meet during lunch, after school, or no preference divided by the total number of responses. Student rationale indicated in Open Response 2 was analyzed using a priori codes and emergent themes. Potential a priori codes included "I couldn't meet after school" and "I had to stay after school anyway for

an event." Subgroup analyses were completed for the time tutors prefer to meet and the time tutees prefer to meet by year and tutor/tutee role.

EQ 3. When do tutors and tutees most reliably attend peer tutoring? The reliability of tutors and tutees to attend peer tutoring was measured by analyzing how consistently and frequently participants attend peer tutoring at a given time.

Consistency of attendance. The consistency by which participants attended peer tutoring was calculated by counting the number of tutoring sessions that occurred during the time dyads were scheduled to meet divided by the total number of sessions scheduled during the same time. The assessment of consistency as intended to identify which times participants had the fewest conflicts. Tutor and tutee dyads' attendance was analyzed separately by day for lunch and after-school tutoring. If a tutor, tutee, or both were absent, but a temporary dyad could be formed with a tutee from one dyad and a tutor from another dyad, then the temporary dyad formed on such occasion counted towards the consistency of participants attending during this time. For example, assume two tutors and two tutees scheduled to attend peer tutoring Monday during lunch. A tutor and tutee are absent, each from a different tutor-tutee pair, but the remaining tutor could and was willing to provide support for the remaining tutee. The consistency for that time counted as 50% since one tutoring session still occurred. If however one tutor and one tutee were absent, but the remaining tutor could not assist the remaining tutee, the consistency for that time would be counted as 0% since no tutoring occurred. The consistency of student attendance was measured using the 2019 attendance log, 2019 daily reminder e-mails, one question from the satisfaction portion of the 2019 student survey:

Q6, "Attending on time regularly was not a challenge."

The attendance log is available in Appendix C and daily reminder e-mail in Appendix E.

Frequency of attendance. The analysis of the frequency of attendance was intended to identify during what time frame the most tutoring occurred. During the 2019 school year, peer tutoring was offered during lunch Monday, Tuesday, and Thursday, and after school Monday through Friday. Frequency was considered by counting the total number of meetings during each given timeframe. The frequency of attendance was measured using the time logs from September 2018 to June 2019 and one question from the attendance portion of the 2019 student survey:

Q2, "I was able to attend peer tutoring at my scheduled time without conflicts."

Overall satisfaction. Satisfaction was measured using the 2016–2018 student satisfaction surveys and the first question from the satisfaction portion of the 2019 student survey:

Q1, "Overall I was satisfied with the (year) peer tutoring program, on the 2016–2019 peer tutoring surveys."

Analysis of satisfaction responses was calculated by examining patterns of all tutor and tutee responses over 2016–2019 school years.

Daily attendance reminders. Participants' perception of the utility of daily attendance reminders was measured by examining responses from the 2017–2018 student satisfaction surveys and fourth question on the 2017–2019 surveys:

Q4, "Daily attendance e-mails were helpful to remember when attend tutoring."

Responses were measured using a 5-point Likert scale, and analyzed by examining responses from the four years of data.

EQ 4. Evaluating the benefits of attending the ARGS peer tutoring program.

Evaluation of what participants perceived as benefits to participation in the ARGS peer tutoring program was necessary to understand why tutors and tutees attended peer tutoring. The evaluation of benefits was measured using a combination of descriptive statistics and emergent themes using data from the 2016–2018 student satisfaction surveys and 2019 student survey.

Tutor training. Tutors' perception of the effectiveness of peer tutor training was measured by examining tutors' responses to the 2016–2018 student satisfaction surveys and third question from the satisfaction portion of the 2019 student survey:

Q3, "(tutors only) I found peer tutor training helpful."

Tutor-tutee relationship. Tutors' and tutees' perceptions of tutor-tutee relationships were measured by examining participants' responses to the 2016–2018 student satisfaction surveys and fifth question from the satisfaction portion of the 2019 student survey:

Q5, "I had a good relationship with my tutor or tutee."

Benefits of participation. Learning what tutors and tutees identified as benefits is valuable information for improving and promoting the peer tutoring program. Tutors' and tutees' perceptions were measured by examining responses using a priori codes and emergent themes to Open Response questions on the 2016–2018 student satisfaction surveys and Questions 1 and 2 from the satisfaction portion of the 2019 student survey:

Open Response 1, "What motivated you to participate in peer tutoring?" and

Open Response 2, "What did you enjoy most about peer tutoring?"

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From personal experience, three potential a priori codes for tutors included "to help other students," "because tutoring looks good on my college application," and "to help me prepare for the SAT." From existing research, potential a priori codes included "for volunteer hours," "to help others," and "friends" (Johnson, 2014, p. 88). From personal experience, two potential a priori codes for tutees included "to improve academically" and "because their parent or guardian made them participate."

EQ 5. Evaluating the barriers to attending the ARGS peer tutoring program. Evaluation of what participants perceived as barriers to participating in the ARGS peer tutoring program was intended to recognize what challenges prevent tutors and tutees from attending. Analysis was conducted targeted at logistic and general barriers to attendance. The evaluation of what barriers participants identify most frequently was measured using a combination of descriptive statistics and emergent themes using data from the 2019 attendance survey.

Logistic barriers to attendance. Logistic barriers were those outside of a tutor or tutees' ability to control that prevented a student from attending, such as meeting conflicts or lack of transportation. The influence of logistic barriers was measured using two questions from the responses to the 2016–2019 student surveys:

Q7, "Events outside of peer tutoring interfered with my attendance." and

Q8, "Transportation was easy to arrange."

Responses were analyzed using a five-point Likert scale.

General barriers to attendance. Other potential impediments preventing tutors and tutees from attending peer tutoring were measured using open responses on the attendance portion of the 2019 student survey:

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Open Response 4, "What do you consider the greatest barrier to attending during lunch?" and

Open Response 6, "What do you consider the greatest barrier to attending after school?"

Responses were also analyzed using the satisfaction portion of the 2016–2019 student surveys:

Open Response 3, *"*What did you find most challenging?"

Tutor responses from the 2019 open ended questions on the student survey were analyzed using a priori codes and emergent themes. From existing research, potential a priori codes for barriers to attend included the "aspect of social stigma" (Schagrin, 2017, p. 148), "pupils of different ages finding it difficult to work together" (Lloyd et al., 2015, p. 48), and "spending time with friends" (Grubbs, 2009, p. 25), all of which are social in nature. Other anticipated barriers included participant apathy or participant forgetfulness.

Limitations, Delimitations, and Assumptions

"With peer tutoring, it is particularly hard to control all the variables which might affect the outcome of a tutoring experiment" (Goodlad & Hirst, 1989, p. 69), and likewise there were several limitations in this analysis. Some delimitations were implemented to ensure the ARGS program could be evaluated efficiently, and some assumptions have been made about data. Additionally, limitations arose from both ARGS as a school and me as a peer tutoring supervisor. Between the 2016 and 2019 school years, significant shifts in school policy and program operation have occurred, as will be subsequently discussed.

Delimitations. The first delimitation was that lunch tutoring was available three days during the week compared to after-school attendance being available every day of the week. In theory, the greater availability of after-school tutoring gave after-school tutoring an advantage in frequency. The choice to limit lunch tutoring to three days was made because of conflicts from other school activities. On Wednesdays, I offer office hours during lunch. On Fridays, students were required to participate in clubs.

The second delimitation was assessing the consistency of tutor and tutee attendance by counting the number of sessions occurring divided by the number of sessions possible. This method was chosen because such could be reliably calculated using peer tutoring time logs while identifying which times were most reliably attended within the research location's context. In theory, identifying lack of attendance by tutors or tutees could have been calculated by counting the number of tutors and tutees who showed up for peer tutoring compared to the number reminded to in the morning. While potentially more useful to the researcher, this method would have been unfair to the participating students because often tutors and tutees notified me before their scheduled session by word or by e-mail that they could not attend. Upon doing so, I notified their partner, providing the tutor or tutee the opportunity to make alternative arrangements during the scheduled peer tutoring time. For students who planned to attend after school, having time in advance to arrange for transportation was particularly important, as some students rode the bus over two hours to attend ARGS. Communication was therefore highly encouraged between me and participants to ensure if a tutor or tutee had to be absent their partner would be made aware. Had participants not been informed of their partners' anticipated absences, a more accurate assessment of tutor and tutee attendance

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would likely have been obtained, but such advantage to researchers would have come at the disadvantage of participants, which I was ethically unwilling to do. Therefore, counting the number of tutors and tutees who attended was not used as a metric.

Limitations. The first limitation was ARGS' grading scale changed from a seven-point scale for 2016 and 2017 to the 10-point grading scale for 2018 and 2019. Changes in grade point average were calculated using the same method in both systems, and so measuring the numeric change of grades was not affected. However, the change in scale likely led to less participation in peer tutoring during the 2018 school year, which dropped from 626 hours during the 2017 school year to 324 hours in 2018.

The second limitation was I took paternity leave during the first two weeks of the fourth quarter of the 2018 school year. The ARGS peer tutoring program was suspended except on Mondays during this time, and frequent doctor visits after paternity leave negated peer tutoring on many days. An alternate supervisor was available to provide data and record attendance on Mondays, but significantly fewer students attended. My absence may also have influenced students' responses from the 2018 end of year survey since peer tutoring was unreliable during the fourth quarter weeks before Standards of Learning (SOLs) and exams.

The third limitation visible from an analysis of 2018 attendance data was dyads who met during lunch infrequently met for the full 56 minutes scheduled, but tutors and tutees who met after school usually met for close to one hour and occasionally longer. Two key reasons for lunch sessions only being partially completed were because during lunch many tutees either needed to get lunch before attending or go to a meeting for a portion of lunch, which when looking at attendance data from 2018 resulted in many

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sessions lasting half an hour or less. This limitation was expected to persist during the 2019 research period and may have caused the total time participated during of lunch peer tutoring to be less than total time after school, despite participants having met during lunch for more total sessions.

Assumptions. First, I assumed tutors' and tutees' responses on surveys to be truthful. All participants were informed their responses were anonymous, and data was gathered over the course of four years to ensure a large sample. I hope participants provided as honest and accurate responses as possible, but my position as teacher, supervisor, and internal investigator strongly carries the potential for unintentional bias based upon students' attitudes of me.

Second, I assumed a food-based incentive for attendance during the first year of peer tutoring did not skew that year's survey results. During the 2016 school year, students were provided cookies at each dyad's first meeting. This practice was discontinued after the first year due to personal time and funding constraints. However, at the end of each school year a small party with watermelon and cookies has been provided for all tutees and tutors. This party was not offered as an incentive to joining but has taken place during the last two weeks of peer tutoring each year. I assume the cookies and this party did not have an influence upon students' quantitative grades and did not influence participants' attendance or survey responses since students were not informed until the week before the party of its implementation.

Ethical Considerations

To ensure research was conducted appropriately, results were useful, and methods of investigation were reasonable, the evaluation of the ARGS peer tutoring program

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upheld the propriety, utility, feasibility, and accuracy standards for evaluation outlined in 2011 the Joint Committee on Standards for Educational Evaluation (Yarbrough, Shulha, Hopson, & Caruthers, 2011).

Gaining Institutional Review Board Approval

To gain approval from The College of William and Mary's Institutional Review Board (IRB), I completed a series of online training modules provided by the Collaborative Institutional Training Initiative in accordance with The College of William and Mary's research protocols. Permission to conduct research within the ARGS school division was secured through a combination of administrative approval at ARGS and approval from the school district's Office of Research and Evaluation. Approval from The College of William and Mary's IRB was required prior to applying for approval from the Office of Research and Evaluation.

CHAPTER 4: RESULTS

During the 2016–2019 school years, a total of 217 tutors and 230 tutees participated in the ARGS peer tutoring program for a total of 1,918.25 hours of remediation. All tutors and tutees received surveys, though not all participants responded. Data from all tutors and tutees who did respond were collected and used for analysis. All tutees' grades were collected, although only tutees' grades beginning after the first quarter interim who participated for at least two quarters were used for analysis.

The intent of this program evaluation was to analyze the change in tutee's grades compared to multiple factors, the strengths and weaknesses of offering peer tutoring during lunch compared to after school, and tutors' and tutees' perceptions of a peer tutoring program. Chapter 4 begins with a brief review of the criteria used for data collection, examine participants' response rates, and describe the research and results by evaluation question.

Response Rate

Tutors and tutees were invited to complete a feedback survey about the peer tutoring program at the end of each year examined in this evaluation. A description of the number of tutors and tutees who participated each year and the number who responded to surveys is in Table 5.

Table 5

Response Rates

| | Tutors | | | Tutees | | |
Year	No.	Responses	%	No.	Responses	%
2016	62	30	48.4	60	20	33.3
2017	55	36	65.5	68	21	31.8
2018	52	26	50.0	45	19	42.2
2019	48	38	79.2	59	29	49.2
Total	217	130	59.9	232	89	38.4

Data in Table 5 shows the response rate for tutors was notably higher during the

2019 school year. One potential explanation for this increase is because during the 2019

school year participants received the survey at the end of April when tutors and tutees

were participating regularly, whereas in former years the survey had been given at the

end of May after most students had concluded attendance. Another potential reason is

because the 2019 survey was distributed at the time of an end-of-year peer tutoring party,

whereas in former years tutors and tutees were informed there would be a survey, but the

survey was not sent until at least a week after the end-of-year celebration.

Criteria for Quantitative Data

All tutors and tutees were invited to participate in the end-of-year surveys, and all

survey responses were used for analysis. However, when calculating grade changes

certain exclusion criteria were implemented to ensure equitable comparisons. First,

grades were only used for tutees who participated for at least two quarters. This

constraint was necessary since at least two quarter grades were needed to calculate a

tutees' grade change. Second, grades were only used for tutees who began peer tutoring

after the first quarter interim. At ARGS, first quarter interims were distributed the end of the fifth school week. The cutoff dates for the first quarter interims in this analysis were October 9, 2015, October 7, 2016, October 6, 2017, and October 5, 2018, for each year of evaluation. This constraint was added to ensure changes in participants' grades were the result of intervention. Third, a very small number of tutees, fewer than three per year, received tutoring in classes without grades. Grades were omitted for different reasons. For two tutees, the classes were not offered at ARGS, such as Algebra I or Mandarin, for others the course was ungraded, such as instrumental music, and in one other situation the tutee was taking a class they had previously completed but needed for SOL review. Participation from these tutees did not contribute to data for analysis about grade changes, but their attendance was still recorded and they were invited to complete each year's survey.

Multiple grades per student. Many tutees received peer tutoring for more than one subject. When a tutee received tutoring in multiple subjects, each subject's grade change was calculated separately. Because some tutees received tutoring in more classes than others, there was a potential for bias since some tutees may have consistently had better or worse grade changes.

Criteria for comparing tutees and non-tutees. Additional restrictions were placed upon which grades were considered when comparing the change in tutees' grades to non-tutees' grades to ensure an accurate assessment. Only changes in quarter scores from tutees who participated for at least two quarters, joined after the first quarter interim, participated in a graded course, and received a failing grade during Quarter 1, 2,

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or 3 were compared to changes in scores for non-tutees. A summary of how these

restrictions modified the number of comparable grades is in Table 6.

Table 6

Tutee and Non-Tutee Grades by Year

Year	No. Tutee Grades	No. After Exclusions	No. With Failed Quarter	No. Non-Tutee Grades
2016	73	57	30	34
2017	98	67	23	31
2018	75	51	12	9
2019	88	50	5	N/A
Total	334	225	70	74

Note. The Total Tutee Grades column represents the total number of changes in quarter grades earned by tutees each year. The Tutee Grades After Exclusions column represents the number of tutee grades changes used for evaluation after grades from students who joined before the first quarter interim and received instruction in one of the graded courses were removed.

Except in the comparison between changes in tutee and non-tutee grades, the

Tutee Grades After Exclusions column represents the number of grades used for

analyzing all changes in tutees' grades. The Tutee Grades With a Failed Quarter column

represents the number tutees who received a failing grade at the end of a quarter, received

a letter home recommending they participated in peer tutoring, and subsequently

participated in peer tutoring. By comparison, the Non-Tutee Grades column represents

the number of students who received a failing grade at the end of a quarter, received a

letter home recommending they participate in peer tutoring, and subsequently did not

participate. Grade changes for non-tutees were not included during the 2019 school year

since reminders by mail were discontinued after the 2018 school year, providing no non-

tutee grades for comparison. Each step of exclusion has been included to illustrate how

different criteria influenced the size of the data pool. The drop in the number of tutees and non-tutee grades beginning during the 2018 school year is attributed to ARGS' change from a 7-point to 10-point grading scale during the 2018 school year.

Evaluation Question #1: What is the academic influence of participation in peer tutoring upon tutees in the subjects tutees received support?

Several methods of comparison were used to evaluate the academic influence of the ARGS peer tutoring program to see what if any factors had a significant influence upon tutees' academic achievement. Each year by survey, tutees were asked how much they perceived peer tutoring to have increased their understanding within a content area. As seen in Table 7, tutees overwhelmingly thought peer tutoring had a positive influence upon their understanding in various content areas.

Table 7

I Think Peer Tutoring Increased My Understanding in the Content Area

Year	Tutors				Tutees			
	N	*M*	*SD*	Mode	*N*	*M*	*SD*	Mode
2017	33	4.55	.75	5	19	4.11	1.29	5
2018	23	4.30	.82	5	17	4.53	.80	5
2019	28	4.07	.97	5	22	4.36	.79	5
Total	84	4.32	.86	5	58	4.32	.98	5

Participants' responses suggest tutoring was perceived as beneficial to both tutors' and tutees' understanding. However, subsequent comparisons measuring tutees' grade changes provide a somewhat different conclusion.

Tutee compared to non-tutee grades. To compare how participation in peer tutoring influenced tutees' grades compared to non-tutees' grades, changes in tutees'

grades were calculated by taking the difference between tutees' quarter score during the

first quarter tutees received a failing grade and tutees' fourth quarter grade in the same

class. Non-tutees' grade changes were likewise calculated by taking the difference

between non-tutees' quarter score during the first quarter non-tutees received a failing

grade and non-tutees' fourth quarter grade in the same class. Changes in tutee grades

compared to the changes in non-tutees' grades were measured using a one-way ANOVA

test, and the results from this analysis are in Table 8.

Table 8

Comparison in Quarter Grade Changes Between Tutees and Non-Tutees

Group	N	M	SD	p	F	F_{crit}
Tutee grades	70	7.09	12.46	.056	0.31	3.91
Non-tutee grades	74	8.38	15.14			

Note. Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.
$p < .05$, $p < .01$, $p < .001$

Results from Table 8 indicate there was no statistically significant difference in

the influence of peer tutoring upon a tutee's grade compared to a non-tutee's grade. On

average, students who had failed at least one quarter tended to improve their grades, and

participation in peer tutoring did not appear to have a significant influence upon this

change. There was a high standard of deviation because the changes in tutee grades

ranged from -34 to 33 points and non-tutee grades from -30 to 59 points. A positive score

indicated the student's grade went up after receiving a failing quarter grade, and a

negative score indicates the student's grade decreased further.

Math compared to non-math grades. The second means of analysis compared

how tutees' grades changed in math classes compared to non-math classes for both short-

term and long-term influences. Long-term changes in tutees' grades were measured exclusively using grades from tutees who participated more than two quarters to prevent repeating data already used to evaluate short-term changes. Four math and 24 non-math classes were used in this analysis. The math classes were Geometry, Algebra II, Pre-Calculus, and Calculus. The non-math classes were Spanish I, Spanish II, Spanish III, French I, French II, French III, Latin I, Latin II, Latin III, Biology, Chemistry, AP Chemistry, Physics, Geosystems, Anatomy, Engineering, Economics, World History I, World History II, US History, US History CC, Intro to Literature, Poetry, and English CC. The short-term and long-term changes for the 2016–2019 school years in grades for math classes compared to non-math classes were analyzed using one-way ANOVA tests. The short-term changes are in Table 9 and the long-term change in Table 10.

Table 9

Short-Term (ST) Change in Math Compared to Non-Math Quarter Grades

Group	N	M	SD	p	F	F_{crit}
ST Math	52	1.54	11.12	.95	0.005	3.95
ST Non-Math	36	1.39	8.78			

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

Table 10

Long-Term (LT) Change in Math Compared to Non-Math Quarter Grades

Group	N	M	SD	p	F	F_{crit}
LT Math	79	1.90	9.20	.55	0.36	3.91
LT Non-Math	58	0.72	13.55			

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

Results from both short-term and long-term comparisons of the influence of peer tutoring upon tutees' grades reveal no statistically significant difference in tutee achievement based upon whether tutees participated in math or non-math classes either for short-term or long-term durations. As seen in the previous comparison, there were notably high standard deviations for both short-term and long-term grade changes due to the range of changes in tutees' grades.

Geometry compared to non-Geometry grades. During the 2016–2019 school years, Geometry received the most requests for peer tutoring, facilitating the opportunity for a subgroup analysis comparing the short-term and long-term influence of peer tutoring upon Geometry compared to all other classes. Changes in tutees' Geometry grades in compared to non-Geometry grades were compared using a one-way ANOVA test. The results of the short-term analysis are in Table 11 and long-term analysis in Table 12.

Table 11

Comparison of Short-Term Grade Changes for Geometry and Non-Geometry Tutees

Group	N	M	SD	p	F	F_{crit}
Geometry	16	1.25	10.82	.92	0.01	3.95
Non-Geometry	72	1.53	10.10			

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

Table 12

Comparison of Long-Term Grade Changes for Geometry and Non-Geometry Tutees

Group	N	M	SD	p	F	F_{crit}
Geometry	46	1.15	10.21	.85	0.03	3.91
Non-Geometry	91	1.53	11.75			

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

Tables 11 and 12 revealed there was no significant difference in the influence of peer tutoring upon tutee grades in Geometry compared to non-Geometry classes.

Influence with respect to duration. The next analysis was designed to compare how tutees' grades changed with respect to tutees' duration of participation. For this analysis, changes in tutees' grades were divided into three groups: fewer than five hours, between five and 15 hours, inclusively, and more than 15 hours. A single-factor ANOVA test was used to compare changes based upon duration of attendance, and results are in Table 13.

Table 13

Mean Student Achievement by Duration

Group	N	M	SD	p	F	F_crit
> 15 hr	55	3.35	9.83	.403	0.91	3.04
5–15 hr	111	1.18	10.86			
< 5 hr	59	0.93	11.54			

Mean changes in score on a 10-point grading scale, 60 – 69
D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

The results in Table 13 revealed no statistically significant difference between the

duration of tutees' attendance and the mean change in tutees' grades.

Unusual result in the investigation. While synthesizing data, out of curiosity I

compared tutees' mean quarter grade changes by duration by year and noticed an unusual

pattern. In this comparison, I noticed two negative changes in participants' grades based

upon tutees' duration during the 2019 school year, at 5–15 hours and fewer than five

hours. There was also one negative change during the 2018 school year for participating

fewer than five hours, as seen in Table 14.

Table 14

Mean Initial to Final Quarter Grade Changes by Duration

	Year			
Duration	2016	2017	2018	2019
> 15 hr	4.22 (*n* = 22)	1.00 (*n* = 18)	7.88 (*n* = 9)	0.33 (*n* = 6)
5–15 hr	2.85 (*n* = 27)	3.97 (*n* = 32)	1.42 (*n* = 26)	-4.23 (*n* = 26)
< 5 hr	9.13 (*n* = 8)	2.41 (*n* = 17)	-1.38 (*n* = 16)	-2.06 (*n* = 18)
M change	4.26 (*N* = 57)	2.78 (*N* = 67)	1.41 (*N* = 51)	-2.90 (N = 50)

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.

I tried to figure out what had changed during the 2018–2019 school years. The only major shift in program structure I could think of was the proliferation of lunch tutoring, and so I compared the mean changes in tutees' quarter grades for tutees who participated during lunch compared to after school. The results are in Table 15.

Table 15

Mean Initial to Final Quarter Grade Changes During Lunch Compared to After School

Group	*N*	*M*	*SD*	*p*	*F*	F_{crit}
During Lunch	46	-3.41	12.23	0.00032***	13.42	3.89
After School	146	3.07	9.85			

Mean changes in score on a 10-point grading scale, 60 – 69 D, 70 – 79 C, 80 – 89 B, 90 – 100 A.
*p < .05, **p < .01, ***p < .001

The analysis of grades changes during lunch compared to after school revealed with high statistical certainty there was a difference in the changes in grades for tutees who participated during lunch compared to after school. Furthermore, participation during lunch tended to have a *negative* correlation with tutee achievement, a result highly

unusual within peer tutoring literature, and an indicator that something at ARGS had caused peer tutoring during lunch to be less effective than after school.

Evaluation Question #2: When do tutors and tutees prefer to attend peer tutoring?

Before and after participating in tutoring during the 2019 school year, tutors and tutees were asked whether they would prefer to meet during lunch or after school. Both before and after participating, tutors and tutees preferred to meet during lunch compared to after school, as seen in Tables 16 and 17.

Table 16

Tutors' and Tutees' Initial Time Preference

Time	Tutor Preference	%	Tutee Preference	%
Lunch	22	57.9	30	52.6
After School	8	21.1	17	29.8
Both	8	21.1	10	17.5
Total	38		57	

Table 17

Tutors' and Tutees' Time Preference After Participating

	Tutors				Tutees			
Time	2018	2019	Total	%	2018	2019	Total	%
Lunch	16	25	41	63.1	10	14	24	51.1
After	4	8	12	18.5	7	10	17	36.2
Both	5	5	10	16.4	1	5	6	12.7
Total	25	38	63		18	29	47	

When asked why participants chose a particular time, responses tended to be based upon convenience. Interestingly, transportation, particularly among tutees, was rarely reported as a factor in choosing a preferred time, as seen in Table 18.

Table 18

Tutors' and Tutees' Rationale for Choosing This Lunch or After-School Timeframe

Rationale	Tutors	%	Tutees	%
Convenience	20	54.1	17	54.8
Activity Conflicts	8	21.6	2	6.5
Transportation	7	18.9	2	6.5
Less Pressure (after school)	1	2.7	2	6.5
N/A (ex: "3:30")	0	0	3	9.7
No Option (only time tutor could meet)	0	0	3	9.7
Fewer Distractions	0	0	2	6.5
More Flexibility (both)	1	2.7	0	0

Since the 2017 school year, the ARGS peer tutoring program expanded to offer lunch one day each week during the 2018 school year and three days each week during the 2019 school year. When asked to what extent participants considered peer tutoring to have been offered at a convenient time, responses were positive, as seen in Table 19.

Table 19

Peer Tutoring was Arranged at a Convenient Time

Year	Tutors				Tutees			
	N	*M*	*SD*	Mode	*N*	*M*	*SD*	Mode
2017	34	4.76	.55	5	19	4.42	.90	5
2018	15	4.26	.88	5	17	4.11	1.32	5
2019	36	4.28	1.10	5	27	4.30	.91	5
Total	85	4.47	.90	5	53	4.29	1.04	5

Evaluation Question #3: When do tutors and tutees most reliably attend peer

tutoring?

To promote attendance, during the 2017 school year attendance reminders were

sent in the morning to tutors and tutees scheduled to meet that day to promote tutor and

tutee attendance. The daily reminder e-mails were overwhelmingly identified as being

very helpful, as seen in Table 20.

Table 20

Daily Attendance E-mails were Helpful

	Tutors				Tutees			
Year	*N*	*M*	*SD*	Mode	*N*	*M*	*SD*	Mode
2017	32	4.75	.80	5	19	4.84	.50	5
2018	25	4.68	.90	5	17	4.24	1.35	5
2019	35	4.49	1.07	5	27	4.78	.64	5
Total	92	4.63	.94	5	63	4.65	.91	5

However, while participants considered reminder e-mails to be effective,

attendance data in Table 21 reveals reminders were not a sufficient method for promoting

tutor and tutee attendance.

Table 21

Tutor and Tutee Attendance

Day	Scheduled	Attended	*%*
Lunch			
Monday	252	123	48.81
Tuesday	182	60	32.97
Thursday	230	97	42.17
Total	**664**	**280**	**42.16**
Afternoon			
Monday	39	29	74.36
Tuesday	69	40	57.97
Wednesday	65	36	55.38
Thursday	26	6	23.08
Friday	17	8	47.06
Total	**216**	**119**	**55.09**

Participants' perceptions. When surveyed during the 2017–2019 school years, on average tutors considered themselves to attend regularly (2017: $m = 4.32$, $SD = .84$; 2018: $m = 3.38$, $SD = 1.05$; 2019: $m = 3.23$, $SD = 1.24$; 2017–2019: $M = 3.78$, $SD = 1.15$), as did tutees (2017: $m = 4.00$, $SD = 1.20$; 2018: $m = 3.39$, $SD = 1.29$; 2019: $m = 3.56$, $SD = 1.01$; 2017–2019: $M = 3.64$, $SD = 1.16$). Responses show tutors and tutees consistently perceived themselves as attending on time regularly, a perception unsupported by attendance data during the 2019 school year since during the 2019 school year, 57.84% of all lunch tutoring and 44.91% of all after-school tutoring sessions were missed.

Evaluation Question #4: What benefits to participation do tutors and tutees most frequently identify?

Based upon survey responses tutors and tutees, even with a tutor or tutee's partner being absent frequently and without tutees seeing a significant academic improvement, almost all participants reported being highly satisfied, as seen in Table 22.

Table 22

Overall Satisfaction with the Peer Tutoring Program

	Tutors				Tutees			
Year	*N*	*M*	*SD*	Mode	*N*	*M*	*SD*	Mode
2016	30	4.10	.80	4	20	3.85	.99	4
2017	34	4.59	.66	5	19	4.37	.76	5
2018	25	4.12	.99	4	18	4.39	.92	5
2019	35	4.40	1.07	5	27	4.44	.80	5
Total	124	4.32	.90	5	64	4.41	.88	5

Tutors and tutees identified many different benefits to attending either during lunch or after school. The most frequently identified benefit to attending during lunch was its convenient time (54.5%), and the most frequently identified benefit of attending after school was a better learning environment (35.8%), as seen by participants' 2019 peer tutoring survey responses in Table 23.

Table 23

What Tutors and Tutees Consider the Greatest Benefit to Attending

During Lunch	Tutors	Tutees
Convenience	23	13
Transportation	9	6
Provides academic prep	1	10
Provides more flexibility for meeting times	2	1
Break from studies	1	0
After School		
Better learning environment	10	11
Fewer conflicts	11	3
Longer	6	6
Convenience	2	3
N/A	4	1

In addition to convenience, both tutors and tutees noted transportation was a benefit to attending tutoring during lunch, meaning that no additional transportation was necessary. A significant number of tutees noted attending during lunch provided academic preparation, suggesting that tutees who attended during lunch could use what they practiced during lunch for afternoon classes. The ability to study for a test or quiz later in the school day is a previously unrecognized benefit unique to attending during lunch.

Participant motivation. Based upon participants' responses, the majority of tutors attended peer tutoring to help others. The majority of tutees attended for academic benefit, which is unsurprising since tutees' academic benefit is the primary goal of a peer

tutoring program. A full list of tutors' responses is in Table 24 and tutees' responses in

Table 25.

Table 24

Tutors: What Motivated You to Participate in Peer Tutoring?

Response	2017	2018	2019	Total	%
To help others	23	16	20	59	55.7
To earn service hours	3	4	9	16	15.1
Recommended by a teacher to participate	6	1	6	13	12.3
Gain teaching experience	2	3	2	8	7.5
Remain proficient in a subject	0	3	0	3	2.8
Previous tutoring experience	1	0	2	3	2.8
Convenience	1	0	1	2	1.9
Requested to participate by a friend	1	1	0	2	1.9
Fun	0	0	1	1	0.9

Table 25

Tutees: What Motivated You to Participate in Peer Tutoring?

Response	2017	2018	2019	Total	%
To improve my grades	8	5	15	28	48.3
To understand the concept better	6	8	9	23	39.7
Required to by parents	1	2	1	4	6.9
The program had a good reputation	1	0	2	3	5.2

Building relationships. Tutors and tutees were asked how good they perceived

their relationship with their tutor/tutee, and during all three years surveyed, tutors and

tutees overwhelmingly reported having a good relationship with their partners, as seen in

Table 26.

Table 26

I Had a Good Relationship With my Tutee/Tutor

	Tutors				Tutees			
Year	*N*	*M*	*SD*	Mode	*N*	*M*	*SD*	Mode
2017	33	4.39	.82	5	18	4.28	1.07	5
2018	25	4.12	1.09	5	18	4.33	1.14	5
2019	34	4.12	1.19	None	23	4.22	1.04	5
Total	92	4.21	1.07	5	59	4.27	1.07	5

The collective sentiment that tutors and tutees had a positive relationship was likely influenced by the school culture. Since ARGS has a very collaborative student culture, these responses are unsurprising.

Tutors' enjoyment. The elements of tutoring tutors enjoyed most, bonding with tutees, meeting new students, and helping others, correlated with tutors' motivation for participating in peer tutoring seen in Table 25, and centered around the larger theme in Table 26, tutors building good relationships (*M* = 4.21, *SD* = 1.07). Tutors also frequently noted they enjoyed meeting new students, and so the opportunity to meet others is a potential strategy for recruiting new tutors. A full list of what tutors enjoyed most is in Table 27.

Table 27

Tutors: What Did you Enjoy Most About Peer Tutoring?

Response	2017	2018	2019	Total	%
Bonding with my tutee(s)	21	9	8	38	42.6
Meeting new students	8	3	8	19	21.3
Helping others	0	2	16	18	20.2
Working in the subject	0	2	2	4	4.5
Program operation	1	2	0	3	3.4
Cookies	1	2	0	3	3.4
Being in a teaching position	0	1	1	2	2.2
Casual atmosphere	1	0	0	1	1.1
Learning	1	0	0	1	1.1

Tutees' enjoyment. Though a significant number of tutees also identified bonding with their tutors as one of their favorite benefits to attending peer tutoring, overall tutees identified their primary benefit to attending peer tutoring to be learning, as seen in Table 28.

Table 28

Tutees: What Did you Enjoy Most About Peer Tutoring?

Response	2017	2018	2019	Total	%
Learning	5	8	11	24	44.4
Bonding with my tutor(s)	4	1	11	16	29.6
Better grades	3	2	1	6	11.1
Finishing homework	1	1	2	4	7.4
Nothing	2	0	0	2	3.7
Meeting new people	0	1	0	1	1.9
The environment	1	0	0	1	1.9

Tutor training. For the ARGS peer tutoring program, all tutors participated in a one-hour training session prior to meeting with tutees, and the slides used for peer tutor training are in Appendix D. Tutors were asked to consider to what degree they found tutor training helpful, and their opinions of the training session were consistently positive (2017 $m = 4.39$, $SD = .82$; 2018 $m = 4.12$, $SD = 1.09$; 2019 $m = 4.12$, $SD = 1.19$; 2017 – 2019 $M = 4.40$, $SD = 0.96$).

Evaluation Question #5: What barriers to participation do tutors and tutees most frequently identify?

Despite having satisfied participants, good tutor-tutee relationships, participants' perception of the program as effective, and consideration of peer tutoring to have been held at a convenient time, there was still a high rate of absence during the 2019 school year. A deeper analysis of why tutors and tutees did not to attend is needed and begins with participants' identification of key challenges in Table 29.

Table 29

What Tutors/Tutees Consider the Greatest Barrier to Attending

During Lunch	Tutors	%	Tutees	%
Activity conflicts	21	56.8	7	20.6
Academic conflicts	3	8.1	14	41.2
Eating	4	10.8	6	17.6
Miscellaneous conflicts (unlabeled)	5	13.5	1	2.9
Students want a break from studies	3	8.1	2	5.9
Overcrowding	1	2.7	2	5.9
Tutee absence	0	0.0	1	2.9
Wanting to spend time with friends	0	0.0	1	2.9
After School				
Transportation	22	56.4	17	58.6
Activity conflicts	10	25.6	5	17.2
Tired	3	7.7	1	34.4
N/A (Ex: "N/A")	1	2.6	2	6.9
Difficult to find time	2	5.1	1	3.4
Partner Absence	1	2.6	1	3.4
Distractions	0	0.0	1	3.4
Issues at home	0	0.0	1	3.4

Discussion of lunch barriers. Tutees identified academic conflicts as the greatest barrier to attendance during lunch. Having academic conflicts interference with lunch meetings is understandable since both tutors and tutees identified the greatest benefit to attending during lunch was convenience, and likewise lunch was a convenient time to meet with teachers as well. Tutors identified activity conflicts as the greatest barrier to

attending during lunch, which too is understandable since ARGS has a total of 31 clubs

offered during the day and after school, and all but four of the clubs meet during lunch, as

again lunch is a convenient time to meet. In addition to clubs, students' focus areas

occasionally required lunch meetings, whether for seasonal productions such as the

ARGS Fashion Show or special productions. To gauge the frequency of conflicts, tutors

and tutees were asked how often events outside of tutoring interfered with their

attendance, and their responses are in Table 30.

Table 30

Events Outside of Tutoring Interfered With My Attendance

	Tutors				Tutees			
Year	*n*	*M*	*SD*	Mode	*n*	*M*	*SD*	Mode
2017	34	3.85	.89	4	18	3.61	1.54	4
2018	25	3.60	1.22	4	17	3.71	1.31	4
2019	36	3.86	1.19	4	25	3.64	1.12	4
Total	95	3.79	1.09	4	60	3.65	1.28	4

Responses in Table 30 indicate most participants agreed events interfered with

attendance. Furthermore, while conflicts were highest for tutors during the 2019 school

year, participants' responses remained consistently high regardless of whether peer

tutoring was offered during or after school, suggesting academic and activity conflicts

have been a persistent challenge facing tutors and tutees.

Discussion of after school barriers. In Table 29, tutors and tutees indicated

transportation challenges were the greatest barriers to attending after school, and activity

conflicts were the second greatest. However, when directly asked how easy transportation

was to arrange, tutors and tutees gave very different feedback, as seen in Table 31.

Table 31

Transportation Was Easy to Arrange

	Tutors				Tutees			
Year	*n*	*M*	*SD*	Mode	*n*	*M*	*SD*	Mode
2017	34	4.52	.90	5	19	4.16	1.07	5
2018	18	4.28	1.02	5	16	4.25	1.00	5
2019	24	3.92	1.25	5	22	4.32	1.13	5
Total	76	4.28	1.07	5	57	4.28	1.06	5

In Table 31, both tutors and tutees considered transportation easy to arrange, even when peer tutoring was only offered after school. One explanation for why there is disagreement between the analysis of difficulty in Tables 29 and Tables 31 is because tutors and tutees who attended during lunch may have done so because they anticipated transportation would be difficult to arrange, and so chose to attend during lunch instead. A second theory is because transportation may be the greatest barrier for students to attend after school, but the barrier could be overcome.

What tutors found most challenging. The challenges tutors have considered most difficult have changed between years. During the 2017 school year, the most commonly reported challenge facing tutors was how to best provide education for their tutees, and with the introduction of lunch tutoring, tutors' primary challenge then changed to managing time conflicts with their tutees, as is seen in Table 32.

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Table 32

Tutors: What Did you Find Most Challenging?

Response	2017	2018	2019	Total	%
Time conflicts	5	6	9	20	29.0
Adapting to tutees' learning style	8	5	5	18	26.1
Tutee low attendance	2	2	6	10	14.5
Tutee challenges, such lack of motivation, confidence, or refusal of help	5	3	1	9	13.0
Nothing	1	1	2	4	5.8
Time management	1	0	2	3	4.3
Tutoring materials	1	0	1	2	2.9
Tutor self confidence	0	0	1	1	1.4
Transportation	1	0	0	1	1.4
Scheduling additional hours	1	0	0	1	1.4

The identification of time conflicts found in Table 32 as the most frequent challenge of peer tutoring is consistent with tutors' frequent identification of activity conflicts as a barrier seen in Table 29.

What tutees found most challenging. By comparison, the challenges tutees identified stayed fairly consistent by year, split between tutor low attendance, difficulty of understanding remediation, and meeting conflicts, as seen in Table 33.

Table 33

Tutees: What Did you Find Most Challenging?

Responses	2017	2018	2019	Total	%
Tutor low attendance	4	5	3	12	21.8
Understanding	4	3	5	12	21.8
Nothing	3	3	3	9	16.4
Meeting Conflicts	3	1	4	8	14.5
Social Anxiety	0	1	3	4	7.3
Asking the right questions	1	1	2	4	7.3
Tutor	0	1	1	2	3.6
Lack of motivation	0	0	2	2	3.6
Needing more time	0	0	1	1	1.8
Boring	0	0	1	1	1.8

Based upon participants responses, activity conflicts appear to be more prevalent for tutors than for tutees. This conclusion is understandable, since tutors tend to be involved in more clubs than tutees since tutors have usually been at ARGS longer.

CHAPTER 5: CONCLUSIONS

Admittedly, the results of the program evaluation of the ARGS were not what I had expected. This program evaluation found overall peer tutoring did not have a significant influence upon changes in tutees' grades compared to changes in non-tutees' grades. Analysis of the attendance log revealed attendance was low among participants. Attendance and the grade changes for tutees who participated during lunch were lower than attendance and grade changes after school, despite both tutors and tutees indicating they preferred to meet during lunch. A considerable number of results did not meet anticipated expectations, and so the process of drawing conclusions will be guided by reflecting upon the evaluation process itself as described in the Evaluation Logic Model in Figure 1 in Chapter 1.

Contexts and Inputs

As a supervisor, the process of effectively advertising the peer tutoring program, recruiting tutors, gaining tutees, and coordinating pairing times for tutors and tutees to meet went very well, even though the results of such actions were not what was anticipated. In hopes other supervisors may gain from my experience, a brief reflection upon the elements of organizing a peer tutoring program follows.

Advertising the program. For me, advertising the ARGS peer tutoring program focused at different groups of students throughout the year. The first phase occurred during the first four weeks of school and was aimed at recruiting tutors. During this phase, I promoted the program to students in honors math classes by going to the classes

and speaking with students, teachers were asked for tutor recommendations, and former

tutors were invited to return. Recruiting tutors at the start of the year was very effective,

and I think recruitment went well because tutors did not already have their weekly

routines developed yet and were therefore open to new ideas and activities. By the end of

the first four weeks each year, I had gained about half of my year's tutors (25–30 tutors).

This large tutor pool gave me a lot of flexibility when pairing tutors with tutees, which in

turn made the second phase of the program, advertising the program to everyone, much

smoother.

The second phase of operation took place roughly between the fifth week of

school to the end of the first quarter. During this phase, I aimed to work with tutor and

tutee dyads to improve the quality of support and identify what times participants would

be most likely to attend. During this time, some tutee requests began trickling in, a few

more tutors joined, pairs of tutors and tutees began meeting, and the program overall

offered about 10–15 tutoring sessions per week. This number of sessions was easily

manageable, gave me feedback about which tutors and which tutees would be reliable in

the future, and helped me gain experience about how to balance the time needed to

supervise peer tutoring along with other concerns. This phase is best described as the

"calm before the storm" phase and should be used to prepare to adapt the program to

phase three: the second quarter spike.

The third phase of peer tutoring each year occurred at the start of the second

quarter when first quarter grades were sent home along with notes recommending

students participated in peer tutoring (notes included during the 2016–2018 years). Even

without letters during the 2019 year, the start of the second quarter has consistently

marked a surge in requests for peer tutoring as students and parents who are unsatisfied with their grade try to figure out how to provide improve grades. By definition, a peer tutoring supervisor's job is to offer academic intervention for all struggling students through peer support, and so having a ready pool of trained but unmatched tutors is critical for being able to respond to this surge quickly and effectively. At ARGS, during each year since 2016 our program has been able to do so.

The second quarter surge usually lasts for about two to three weeks each year. After the surge, some tutees discontinue peer tutoring because their grades improved, they have mastered better study habits, or they fail to attend. After the third comes the fourth phase during which usually lasts until the end of the second quarter and can best be described as "business as usual." Tutors and tutees meet, support is received, and there are enough tutors and tutees to operate at close to an even tutor–tutee pool. A few more tutors and tutees join, and as supervisor my responsibility shifted to daily operation and maintenance of the program. The final phase of supervision occurs after the end of the second quarter, after midterm exams.

After midterm there is a small surge in tutee requests, but nothing like the surge seen at the start of the second quarter. The biggest challenge from the start of the third quarter to the end of the year is tutor mortality. Only a handful of tutees tend to request tutoring after the small surge following the start of the third quarter, but after the end of the second quarter the recruitment of tutors is virtually non-existent. At this point, either students have become set in their schedules or available and interested tutors are already involved, and as a supervisor so many students have formed dyads that managing the program takes so much time that there is little time for training available anyway.

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Participation in the tutoring program from tutors and tutees slowly declines near the end of the third quarter, and the rate of decline accelerates near SOLs. Temporary dyads become more frequent, and both during and after SOLs, most all tutees indicate they wished to discontinue tutoring, and attendance is minimal until the end of the year.

Tutor training. Despite its lack of meta-analytic support, like the majority of case study researchers investigated (Allen & Chavkin, 2004; Baker et al., 2006; Fogarty & Wang, 1982; Grubbs, 2009; Lloyd et al., 2015; Nisbett, 1999; Novotni, 1985; Perisco, 1994; Schagrin, 2017), I found tutor training to be helpful, and therefore recommend offering peer tutor training. The ARGS peer tutoring program did not change tutees' grades by a statistically significant amount, but I am attributing the lack of grade change to factors other than tutor training. As a peer tutoring supervisor, developing a peer tutor training program helped me anticipate what areas tutors were likely to encounter and coach new tutors on how to address these concerns. Furthermore, during my experience tutors often used lessons they learned in training since scenarios described in training as tutees arrived without materials, with their homework completed, or with their backpack in complete disarray, and tutors knew how to respond. Additionally, peer tutor training acted as a screener activity for students who were interested in becoming tutors but had not fully considered the time commitment volunteering would require. Tutors only had to attend one training session, and I made arrangements for students who were interested in tutoring but couldn't attend during traditional training times. However, even with flexible training options many tutors upon revisiting their schedule realized they were unable to attend during any day during the week, and so would not have been able to provide tutoring. The loss of enthusiastic tutors was unfortunate, but such tutors would not have

been able to attend reliably anyway after being paired with a tutee, and so training helped prevent creating dyads that would have never been able to meet.

Processes

From a researcher's perspective, the acquisition of data for this evaluation went very well. Quarter grades were able to be obtained for all 232 tutees and 74 non-tutees who participated during the 2016–2019 school years, 59.9% of all tutors and 38.4% of all tutees responded to surveys, and attendance data was able to be gathered with fidelity.

From a supervisor's perspective, this evaluation revealed a serious flaw in participant attendance both during lunch and after school. Most participants indicated they preferred to meet during lunch compared to after school, and there was no notable change in preference after participation. The lack of change in participants' opinion is unsurprising since few tutees experienced peer tutoring during both lunch and after school timeframe, providing participants with little perspective for comparison. And yet, despite participants' preference to meet during lunch, tutors and tutees attended after-school tutoring sessions much more reliably.

Ensuring tutors and tutees attend reliably is an established challenge in peer tutoring literature (Grubbs, 2009; Perisco, 1994; Yawn, 2012; Zuelke & Nelson, 2016), and has been recognized as a challenge since the ARGS peer tutoring program's first year of operation in 2011. During the 2019 school year, tutoring sessions held during lunch tended to be attended less consistently and for shorter durations than sessions after school. During lunch tutoring, tutors and tutees often arrived 10–15 minutes late either because they had to get lunch from the cafeteria, a known limitation of offering peer tutoring during lunch, or because upon late arrival participants informed me they had to

complete a task before attending. Participant tardiness sometimes caused a tutor or tutee

after who had arrived on time and waited five minutes to leave, only for their partner to

come a few minutes later, resulting in the tutoring session being counted as an absence.

Additionally, tutors and tutees often tended to be eager to conclude peer tutoring before

the end of lunch in order to complete additional tasks. To help improve participant

attendance in the future, I offer two recommendations for supervisors.

Hold peer tutoring sessions when there are few activity conflicts. Tutors and

tutees tended to choose when to meet based upon convenience, and lunch was the more

convenient time. Lunch probably was the more convenient time for most tutors and tutees

to meet, but too frequently unanticipated conflicting tasks, such as make-up assignments,

teacher sponsored reviews, attending a club, or meeting with a group for a project took

priority. A school with fewer time conflicts may have more success in peer tutoring

during lunch, as Schagrin (2017) did, but if like at ARGS there a multitude conflicts is

anticipated, then I recommend finding another time period to offer tutoring if at all

possible.

Have tutors and tutees list what activities they participate in and when their

activities occur. Following the former recommendation, finding a time when students

will have no time conflicts is unlikely. Therefore, to help anticipate what conflicts

students will have, include a question in tutor volunteer and tutee request forms asking

participants specifically what activities they participate in and what conflicts they can

expect in the future. For example, if a tutor plans to play basketball, then as supervisor I

would know the student would be unable to participate from late November until early

March. This time frame is more specific than having a tutor state they are unavailable

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during the second and third quarter, and if a tutee is similarly participating on the basketball team during this time frame, then a potential dyad could be formed on days when the students did not have practice. Alternatively, knowing a tutor was part of an honors societies that met once each month would inform the supervisor to schedule the tutor for a different day if possible. More detailed volunteer and request forms can create more efficient tutor-tutee pairings, and therefore I recommend gathering additional information about tutors and tutees when having them apply to participate.

Product

This pragmatic evaluation sought to gather and analyze information about the quantitative and qualitative influences of peer tutoring over the course of four years at a secondary governor's school. Supervision experience, analysis of the changes in tutees' and non-tutees' quarter grades, participant volunteer and request forms, attendance logs, and participant surveys have yielded material for a wealth of analysis and recommendations, and the synthesis of four years' peer tutoring research follows.

How participating in peer tutoring influenced a tutee's grade. The results of the investigation found no consistent significant correlation between academic change and participation in peer tutoring based upon comparisons to changes in tutee and non-tutee grades. The lack of positive change in tutee grades was consistent with half of the case-studies investigated; seven of the case-studies examined found positive results (Allen & Chavkin, 2004; Austin, 2008; Baker et al., 2006; Fogarty & Wang; 1982; Rothman & Henderson, 2011; Schagrin, 2017; Yawn, 2012) six neutral, (Grubbs, 2008; Klingbeil et al., 2017; Lloyd et al., 2015; Nisbett, 1999; Novotni, 1985; Perisco, 1994), and one negative (Zuelke & Nelson, 2016), and so the lack of positive change is not

uncommon. When comparing other potential other factors, short-term and long-term participation, grade changes within subject areas, duration of attendance, and attending during lunch compared to after school, only the time peer tutoring was offered at ARGS resulted in any significant difference in tutee's grade changes, though all factors deserve additional reflection.

*Tutee compared to non-tutee grades***.** Due to unreliability of participant attendance and evidence participation during lunch resulted in an average *decrease* in tutees' changes in quarter grades, I consider the conclusion that the ARGS peer tutoring program had so significant influence upon tutees' grades accurate. In theory, ARGS tutors are students who are familiar with content, can easily build a positive rapport with their tutee, and are supervised by a professional educator who ensures their tutoring are highly productive. In theory, the circumstances appear to be favorable to producing high quality of academic remediation. Tutors were selected from qualified academic backgrounds, and so tutor academic strength does not appear to be an issue. Results from table 26 showed participants felt they had a good relationship with their partner, and so building relationships was not an issue. By process of elimination then, I must have had shortcomings as a supervisor, which I acknowledge I certainly did.

Recommendations to improve supervision. Operating a peer tutoring program was a very difficult commitment in terms of time and development of professional logistics; looking at Table 14, one element that strikes me is that the effectiveness of peer tutoring appears to correlate inversely with its availability. Anecdotally, due to personal and professional demands of time I was only able to give limited attention to managing tutoring outside of sessions and providing attention to dyads during sessions became

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more difficult as the program grew. The fact that other factors interfered with my time is somewhat poetic given the most frequent challenge identified by tutors was activity conflicts. With that in mind, I have some recommendations for tutoring supervisors in the future.

Start small. Organizing and operating a peer tutoring program was a lot more work than I had expected, and the stress of managing a peer tutoring program has also been highlighted by other researchers (Lloyd et al., 2015; Schagrin, 2017). Some strategies for steadily developing a program include only offering remediation for the first level math class students during the program's first year of operation, then offering all math classes the next, and subsequently expanding the program to include more content areas as the supervisor and participants become more comfortable with a program's operation. Steadily growing and developing a peer tutoring program will provide more time for supervisors to reflect and adjust the program to better suit the school's needs and help build a steady supply pool of veteran tutors ready to participate as the program expands.

At the end of each year, measure participant growth and feedback using a combination of qualitative and quantitative means. During each of 2016–2018 school years, I collected tutor and tutee feedback at the end of each year by survey responses only. Participants were satisfied, and so I assumed all was well. I was wrong. I would still encourage supervisors to use feedback surveys to gather information, but some metric of measuring changes in tutees' grades is to essential to evaluate the efficacy of support.

Notify parents when tutees have unexcused absences. As noted by Baker et al. (2006), one of the key tasks of a program supervisor is to adapt for absences, and as a

supervisor I could have taken more actions to ensure participation. I only notified parents of a tutees' absence when a tutee had frequently missed tutoring. If a tutee was absent, the tutee usually informed me either in person or by e-mail they would be unable to attend. When tutees had an unexcused absences, I sent an e-mail to the tutee only and should have copied the tutee's parents or guardians on the e-mail. This recommendation comes from anecdotal evidence of an event occurring during the 2020 school year when I decided at the end of one quarter to update parents about their children's peer tutoring attendance. Unexcused absences came as a shock to many parents, and after sending this e-mail the number of tutee absences dropped significantly. Had I notified parents in the event of tutees' unexcused absences in the past, I think tutees' consistency of attendance would have been higher.

Lack of influence based upon duration of attendance. There was no significant difference found in tutees' grade changes based upon duration of attendance. One explanation as a corollary to the previous finding is if peer tutoring has no influence upon a tutee's grade change then duration of participation is irrelevant. Another explanation is for some tutees their grade may not have changed, but for even with support the score they entered tutoring with was either the best they could do or as well as they needed to. While as a supervisor I consider higher grade changes to be better, tutees may have only wanted to maintain their current average, such as a small group of students each year who joined peer tutoring already earning an A. Based upon survey results, both tutors and tutees were overwhelmingly satisfied with the program, and so the lack of more notable grade changes may have resulted from the lack of tutees' motivation for grade changes to be higher.

Grade changes within subject areas. This program evaluation found no difference in tutee grade changes between math compared to non-math classes, and no difference between grade changes between Geometry compared to non-Geometry classes. From a case-study perspective, the lack of a difference in tutee grade changes for math and non-math classes is unsurprising as case-studies revealed with a mix of significantly positive (Austin, 2008; Baker et al., 2006) and neutral results (Nisbett, 1999; Novotni, 1985). However, meta-analytic research suggests tutees should have made higher gains in math compared to non-math classes (Bowman-Perrott et al., 2013; Cohen et al., 1982), and so results from this study disagrees with meta-analytic findings. The contrast is particularly salient to me because as supervisor I have a background in mathematics and should have been able to assist participants who had questions about mathematics more effectively. The lack of difference between math and non-math scores suggests my involvement in the program was minimal. Therefore, additional supervisor involvement in the program during support sessions may be warranted to improve tutoring efficacy.

Lunch compared to after school tutoring. Perhaps the most unusual finding from this program evaluation was that peer tutoring held after school had a significantly higher influence upon tutees' grade changes than tutoring held during lunch. Furthermore, peer tutoring during lunch had an overall negative influence upon student learning, since tutees who participated during lunch on average had their grades decrease by 3.41 points out of 100. Both of these results are interesting and require further examination.

Differences in attending during lunch compared to after school. My first hypothesis for why grade changes for tutees who attended during lunch were lower compared grade changes for tutees after school is because tutees who attended after

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school attended more reliably and for longer durations. The importance of consistent and reliable attendance was recognized by Wasik (1998) as the most important factor for determining the efficacy of a peer tutoring program. On average, 42% of tutor–tutee dyads attended during lunch and 55% after school. This difference implies tutees met after school met 25% more consistently, though both attendance rates were lower than desirable. Moreover, the average session duration for tutor–tutee dyads during lunch was 35 minutes compared to 49 minutes per session after school. This difference implies after school sessions were 40% longer. Therefore, participants' grade changes in after-school tutoring compared to tutoring during lunch were more favorable because after-school sessions were attended more reliably and for longer.

My second hypothesis for why tutors who attended after school saw more positive grade changes because after-school tutoring provided a better learning environment. This conclusion follows from both tutors' and tutees' identification of the primary benefit of attending after school being a superior learning environment and supervision experience. Lunch tutoring often did include many more distractions, such as students not participating in peer tutoring entering to ask me questions, the necessity of procuring and eating lunch, and the general noise level that resulted from students in nearby rooms talking. By comparison, after school tutoring relatively quiet, there were fewer conflicting obligations, participants did not need to get lunch, and fewer students outside of tutoring came to visit me. The result was a better learning environment.

In an optimal tutoring scenario, I like Baker et. al.'s (2006) practice of offering a snack for participants during the first 15 minutes of tutoring, either as an incentive or just to give students a break after a day of school. On many occasions tutors and tutees

informed me they did not come to tutoring because they just "needed a break" during the day. Attending during lunch can overload students since participation in peer tutoring eliminated a student's chance to relax midday. The lack of opportunity to rest may have disincentivized students from attending during lunch. Students who attended peer tutoring at the end of the day would potentially have similar challenges of fatigue after a full day, but there's a difference between going to an hour of academic support knowing your efforts will be followed by three more hours of schoolwork compared to going to an hour of academic support knowing afterwards you are done with school.

Negative grade change as a result of attending during lunch. The finding that tutees who attended during lunch had a negative overall change in their quarter grades was quite extraordinary. The shortcomings already mentioned probably played a large part in tutoring during lunch being less effective than after-school sessions. Lunch tutoring sessions were shorter, attended less consistently, had more distractions, had fewer opportunities for supervisor intervention, and offered were more taxing due to their midday timeframe. However, these shortcomings would only explain a tutoring program having no change in participants' scores, as insufficient remediation should have no effect. But there was not a zero point change—the change was negative.

The only good hypothesis I have for the negative change is because tutees became reliant upon tutoring during lunch for assistance. If tutoring did not occur, then tutees may have suffered during their afternoon classes. Alternatively, if tutoring did occur but did not meet tutees' expectations for support, a similar negative effect could have resulted. For example, suppose a tutee had a Geometry test on Monday afternoon, and decided to postpone studying in order to meet with their tutor during lunch. If the tutor

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failed to arrive or tutee was unable to attend for some reason, then the tutee's procrastination would have led them to walk into a test unprepared. This error would not occur in after-school tutoring since a tutee would not rely on outside support to prepare for a test, and (hopefully) make more studious preparations.

I weak hypothesis I have for why support during lunch had a negative influence upon tutees' grades is because tutoring in fact had no influence, and the mean change in students' grades overall was negative during the school year, resulting in a negative overall change. I lack evidence to justify this hypothesis though, and so include it only as a potential theory for other researchers to test if they find similar negative results and have the resources to test how their negative correlation coincides with general student grade trends.

More peer tutoring services will be made available at optimal times and inefficient times will be discontinued. The analysis of optimal times to provide peer tutoring provided some very specific recommendations regarding how to increase the reliability of participant attendance.

Don't hold peer tutoring during lunch. Although I am aware another peer tutoring researcher has found lunch tutoring to be successful (Schagrin, 2017), the evidence from this investigation consistently disputes any benefit of offering peer tutoring during lunch compared to after school. Compared to peer tutoring after school, offering peer tutoring during lunch has a poorer influence upon tutees' quarter grade changes, less reliable attendance, and, at least at ARGS, too many potential conflicts to be considered beneficial. Therefore, tutoring during lunch, at least in the format outlined by this study, is not recommended.

Offer tutoring after school Mondays, Tuesdays, and Wednesdays. Mondays,

Tuesdays, and Wednesdays after school were attended most consistently of all times

during the 2016 – 2019 school years. I have two theories for why these time frames were

attended more consistently then others. One theory is because students may have had

more energy at the start of the week, and therefore were more willing to attend after

school activities. A second theory is because receiving tutoring early in the week

provided an opportunity for students to practice what they had learned later in the week.

ARGS operated on an A/B schedule, and so if a student attended Monday or Tuesday the

student would have had the same class at least once later that week and reinforcing what

had been learned during tutoring. Whatever the reason, sessions held Monday, Tuesday,

and Wednesday were attended with greater frequency and fidelity than Thursday or

Friday.

Do not schedule meetings for Thursday after school. Enough tutors and tutees

spoke with me indicating the only time they could possibly meet was on Friday, and

enough students participated on Friday for me to recommend continuing to offer peer

tutoring on Friday despite its weaker attendance rates and reliability compared to

Monday, Tuesday, and Wednesday. Thursday received almost no endorsements, so and I

strongly recommend against offering peer tutoring on Thursday afternoon. After-school

tutoring session on Thursday were identified as the second lowest preference of all times

by tutors and tutees, and had the lowest attendance rate out of any times, 23%, lower than

any other tutoring time during lunch or after school by nearly 10%. As an unpopular

choice by preference and unreliable timeframe in practice, I do not recommend offering

peer tutoring Thursday afternoon unless no other are time frames are available.

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Recognize areas of satisfaction participants acknowledge from attending.

Despite a mediocre change in tutees' grades as a result of participating and frequent low attendance, overall both tutors and tutees responded they were highly satisfied with the peer tutoring program. This result intrigues me, for if a program is failing to provide effective support and participants often are not even there, as a supervisor and researcher I would anticipate feedback to be considerably more negative. But participant feedback was not negative. Assuming positive feedback was not the result of participant bias, which I consider a possibility, identifying how participants considered their hopes to have been met warrants additional consideration

Participant motivation to attend. Overall, tutors responded they were motivated to participate to help other students, and tutees were motivated in order to improve grades. Identification of participating in peer tutoring being to help others is a result consistent with other researchers' findings in peer tutoring literature (Austin, 2008; Goodlad & Hirst, 1989; Grubbs, 2009). Tutees' identification of participating to improve their grades is likewise consistent since peer tutoring was developed for the purpose of raising lower performing students' achievement through support from more experienced peers (Topping, 1988).

Identifying these motivations, from a certain perspective tutors' goals were met. Tutors stated their motivation was to help other students, not help other students consistently on a weekly basis for a full hour per week. Tutors were able to help other students, even if for shorter time periods than expected and on a somewhat irregular basis, and therefore would justifiably been satisfied.

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Explaining why tutees were satisfied with the program is trickier. The first explanation is the null hypothesis. Even with a neutral grade change, tutees were genuinely satisfied with the support they received, appreciated tutors were volunteering their time to help them, and attributed their lack of grade change to factors other than the peer tutoring program. A second possibility is because tutees recognized their grades were not changing, but also acknowledged they had not been attending regularly, and so chose to rate the program favorably out of a sense of guilt. A third possibility is because tutees stated their motivation to attend was to improve their grades, not to see a constant increase in quarter scores as a result of regular attendance. As previously seen, participant attendance was irregular. Tutees' grades may have increased during when tutees attended peer tutoring but then decreased when tutees failed to attend, resulting in a neutral overall change. A fourth option is because although tutees' primary reason for attending peer tutoring was to improve their grades, tutees may have been attending for other agenda, such as to meet new people or satisfy their parents' or guardian's' coercion to attend. If tutees' low attendance was not regularly reported to parents and guardians, it unfortunately wasn't, then attending often enough to not be removed from tutoring would satisfy parents' or guardians' demands to attend peer tutoring while satisfying tutee's desires to do other activities such as spend time with friends.

Development of strong tutor-tutee relationships. In this study, tutors and tutees were paired randomly based upon availability with rare exceptions, such as a tutor or tutee specifically requesting to work with a particular student. Tutors and tutees almost unanimously indicated they had a good relationship with their partner, and within peer tutoring literature, some of the most effective peer tutoring programs have cited strong

tutor-tutee relationships as part of a successful program (Baker et al., 2006; Goodlad & Hirst, 1989; Rothman & Henderson, 2011).

The development of strong tutor-tutee relationships has two notable implications. First, tutees may have reported being satisfied with peer tutoring due to their positive peer relationships rather than academic improvement. Second, an alternate hypothesis for why peer tutoring had a significantly more positive effect after school than during lunch is because tutors and tutees had more time to develop deeper relationships with their partners. On average, tutors and tutees who met after school met for 14 minutes longer than participants who met during lunch. This extra time implies 14 minutes more to work and 14 extra minutes to bond with their classmates. Meta-analytic researchers have noted relationships between teachers and students to have a statistically significant influence upon student learning (Hattie, 2009). A similar relationship may have been applicable for tutors to tutees.

Recognize barriers and areas of dissatisfaction. Most of the known barriers to attendance have already been reflected upon in earlier sections of this dissertation. These barriers include activity conflicts, the need to obtain lunch, the need to meet with a teacher for a quiz or remediation, the need to meet with fellow students for a project, or the need for a break. However, two additional elements, the challenge of securing transportation and the challenge of how to provide and receive high-quality instruction, have not analyzed yet, and reflections upon these two final barriers follow.

Transportation. The lack of transportation was a notable potential logistics barrier identified in peer tutoring literature (Topping, 1988) that would have forced participant low attendance regardless of other circumstances. Tutor and tutee perceptions

of whether transportation was easy to arrange were conflicting. In one survey question, most participants identified transportation as the greatest barrier to participation after school. In a second survey question participants considered transportation easy to arrange.

I believe the latter response to be more accurate for ARGS participants. Arranging transportation after school at ARGS may be a significant barrier for some students, such as students who rely exclusively upon buses for transportation or live over two hours away, and each year there have been a very small number of students who wished to participate in peer tutoring but were unable attend after school. Special arrangements were made for these students, sometimes from a teacher and on rare occasions from a student (such special circumstances became the pilot for tutoring during lunch at ARGS). However, during the 2017 and 2018 school years, the ARGS tutoring program was available exclusively after school, and both the 2017 and 2018 years individually provided more total hours of remediation than the 2018 and 2019 school years combined. Furthermore, after-school attendance was more reliable than attendance during lunch, and on average considered participants considered tutoring easy to arrange (tutors: $M = 4.28$, $SD = 1.07$; tutees: $M = 4.28$, $SD = 1.06$). However, while the results of this investigation suggest in the context of ARGS that transportation was not a significant barrier to participant attendance, I am hesitant to suggest transportation would not be a significant barrier at other schools because the availability of transportation is very circumstantial.

Providing and receiving high-quality instruction. Based upon survey feedback, 26.1% of tutors indicated they had difficulty adapting to tutees' learning style, and 21.8% of tutees indicated they had difficulty understanding tutors' instruction. Tutors may have

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known their content well, but they were not professional teachers, and often during tutoring participants would ask for topics to be explained a different way or be uncertain what should be worked on.

One potential strategy to help guide remediation would be for teachers to arrange for a packet or specify what tutees should work on during peer tutoring. This level of preparation would require coordination between teachers but may be more effective than relying upon tutees to know what should be studied. Additionally, if tutors knew what would be tutored ahead of time then tutors could review the relevant material, producing a lesson easier for tutees to understand.

Another potential strategy is to develop means of selective pairing tutors with tutees. In theory, developing strategies for pairing tutors with tutees the supervisor suspects would form a better relationship may lead to improved academic yield or participation. This thought comes in part because occasionally tutors or tutees requested to work with a specific person, and in those situations the dyads tended to meet consistently and work very well together, although this conclusion is based upon observation and would need experimentation to verify. Anecdotally, in one circumstance I had an experienced tutor who received a D in the subject they were requested to tutor in. The tutor was specifically recommended for a tutee because of the anticipated tutor–tutee relationship that would be formed, and the tutee had already tried unsuccessfully to improve their grades with a different tutor citing an incompatible tutor–tutee. Within a few weeks of pairing, the tutee's score rapidly improved, and by the end of the year the tutee's score had gone from a low D to a B in the subject tutored. The change in this tutor–tutee relationship seems to have made a significant difference in the quality of

support received and makes me wonder if other such ideal pairings could provide more positive results. Selective pairing is an idea not considered in this study and one I have not seen before in peer tutoring literature, and one I would recommend for further research.

Goals

The goal of this program evaluation was to evaluate the academic impact of tutoring, to optimize student attendance, to understand what participants perceive to be the benefits and barriers to attendance and contribute to existing literature. During this evaluation, there were no unsurpassable barriers to obtaining information, a sizeable volume of data was gathered to draw conclusions for each of the desired evaluation questions, and everything that was set out to be measured was done so with fidelity. In terms of conducting the program evaluation, everything went very well. As a supervisor, I did not necessarily like many of the results that were found, but as a researcher I can present them with confidence. This program evaluation yielded many insights into the ARGS peer tutoring program, and from these insights my final reflections upon each finding and recommendations for supervisors and researchers who also wish to examine peer tutoring follow.

Evaluate the academic impact of tutoring. The culmination of four years of measuring changes in participants quarter grades paint a very clear picture, at least in the context described in this investigation, that peer tutoring does not have a significant influence upon changes in tutees' grades. For future researchers and supervisors, I have two final recommendations about how to gain a more complete picture of the academic impact of peer tutoring upon tutees.

Learn the study habit of non-tutees. This study's most glaring limitation was the lack of knowing what steps non-tutees took after being notified they had failed a class, and since many non-tutees had graduated by the start of evaluation, trying to learn previous non-tutees' study habits would have been unrealistic. However, in a future study learning the study habits of non-tutees could be done at the end of the year by sending a survey to all students who had failed a class, tutees and non-tutees, and inquiring what students who had failed a class did in response to improve their academic standing. Regardless of whether non-tutees hired a tutor, decided to study more, did nothing, or took some other action, the study habits from tutees who failed a class could then be calibrated against the study habits of non-tutees to test the efficacy of the program. If tutees' grades improved at the same rate as non-tutees but most non-tutees had professional tutors, then a peer tutoring program would be considered to be operating quite well. If tutees' grades improved less than non-tutees who took no special action, then revisions to the program would be advised. Knowing the grade changes and study habits of a control group provides a much stronger measure of the effectiveness of a tutoring program, and therefore measuring not only grade change but also habits of students not participating in peer tutoring is recommended.

Learn how consistency and frequency of attendance correlate with the change in tutees' grades. One of the themes I wish I had evaluated more deeply is the idea of how consistency and intensity influence student achievement presented by Wasik (1998). Consistency implies a tutee attended reliably, and evaluating for consistency could have been done by measuring the grade changes for tutees who attended some percentage of the time, such as 76–100% compared to tutees who attended to tutees who attended for a

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different percentage, such as 50–75%. If there was a significant difference in achievement between the two groups, then better conclusions about a program's efficacy could be drawn. Frequency implies tutees met for longer each meeting and evaluating for frequency could have been done by measuring the change in grades in different periods of time, such as less than 30 minutes, between 30 minutes and an hour, or an hour or more. If one of these durations showed significantly greater gains than the other, then such would develop insight into what the optimal duration of individual peer tutoring session should be.

Optimize student attendance. The culmination of a year's worth of emails, requests, volunteer forms, and attendance logs also paint a very clear picture that peer tutoring attendance at ARGS is not optimal. Beyond the ideas already provided in the product section, I have some potential strategies for increasing the rate of which dyads meet.

If a lunch program is offered, offer lunch in the classroom. Offering tutoring during lunch resulted in high rates of poor attendance. One challenge presented was that students who wish to participate during lunch first had to get their lunch from the lunchroom, which often resulted in shorter sessions and failed pairings. To avoid this problem, a supervisor could have lunches for participants brought into the tutoring location prior to tutoring. Participants would therefore save time from having to wait in line, and, assuming they wanted their lunch, be more incentivized to attend tutoring.

Decrease competition. Participants noted activity conflicts interfered with attendance. If a school could arrange that no other activities would occur during lunch on these days, there would be less competition for students to meet during that time. This

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mandate would be difficult to enforce at a school like ARGS where activities are ubiquitous, but in another setting reserving at least one day exclusively for peer tutoring would likely improve attendance.

Limit how many dyads can meet during a scheduled time. Putting a cap on the number of dyads that can meet during a given time may seem counterintuitive since peer tutoring is designed to be a universal safety net for academic support. However, as lunch tutoring became popular, on many occasions more than eight pairs of students met simultaneously (the highest number in one day was 14). As supervisor, on days with very high participation I did my best to float from group to group to answer questions, but working with tutoring dyads tended to be slow, and when there were more than about six peer tutoring dyads providing attention to each group became difficult. Furthermore, when more than about six dyads met at the same time, my classroom became very loud, so loud that students could not understand one another, and so tutoring spilled into the hallway and adjacent classrooms. While neighboring staff were happy to oblige, I was not able to answer participants' questions efficiently when the participants were in a different room and trying to account for absences when a high number of dyads were scheduled to meet in one day became overwhelming. Putting a cap on the number of dyads who meet in one day enables a supervisor to give more individual attention to tutoring groups and provide tutors with instructional support as needed. Particularly for tutors who have little experience, having someone experienced nearby and readily available when questions arise helped, and so limiting the number of pairs scheduled to attend ensures a higher quality of remediation for scheduled dyads.

Overfill the tutee pool at popular meeting times. As previously mentioned, I lost a lot of tutoring during the 2020 school year, and midway through the year I had to become creative to provide remediation. Though not measured in this evaluation, anecdotally I have noticed tutees were absent with much greater frequency than tutors. So, rather than try to struggle to attempt to maintain 100% attendance between scheduled dyads, I tried a different approach. On days when at least four dyads are scheduled to meet, I assumed at least one tutee would be absent. Therefore, an additional tutee to be present was scheduled during that time slot with the intent that the tutee would meet with whichever tutor lacked a partner. This method was initially intended to provide tutees with temporary support until a permanent partner tutor could be found or trained. I always picked times when several dyads were scheduled to meet in case a tutor was absent too, and sometimes this strategy resulted in one or two tutors working with two tutees. Overall though, the strategy was easy to implement and worked surprisingly well. Tutors have been able to provide support more consistently, another student is receiving help after school rather than waiting for a partner, and as time passed when tutees had to discontinue tutoring due to changes in yearly activity schedules the overfill tutee immediately replaced the discontinuing tutee's spot.

This technique has some considerable drawbacks. First, it is slightly unethical since a peer tutoring program has been advertised as a pairing between one tutor and one tutee, not several tutors and several tutees. Second, since the tutee may be floating between tutors each week less of a tutor-tutee relationship gets built. Third, this strategy only works when the overfill tutee is requesting a subject already taught by multiple tutors. I could not overfill a tutee requesting support in AP Calculus for the same time as

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four other tutees requested Geometry. Last, this strategy only works on days when tutoring is popular. Even if all tutees are present, having six tutors work with seven tutees is doable since at least one of the tutors will likely have enough experience or ability to work with two tutees. Scheduling an overfill tutee on a day when only one dyad is scheduled to attend is problematic because if the scheduled tutee does attend the tutor may not be prepared to work with two tutees, and if the tutor doesn't attend then two tutees do not receive remediation.

Understand what participants perceive to be the benefits of participation and barriers to attendance. Investigation into the perceived benefits of participation and barriers to attendance could have benefitted from a deeper investigation. The evaluation method that was planned went fine. Surveys were distributed, surveys were returned, and responses were collected over four years to provide more reliable feedback. However, the data collected feels…superficial. All of the responses tutors and tutees provided were based on a 15-minute web survey for which results could have easily been skewed by how participants felt about the school or how participants felt about me. Moreover, I am assuming that tutees were assuming that peer tutoring was benefitting their grade. Tutees' perceptions may have been different if Question 1 on the satisfaction portion of the survey instead had read:

> Overall, participating in the ARGS peer tutoring program has been found to have no significant influence upon your quarter grades compared to quarter grades of students who didn't participate, and participation during lunch has been found to have a negative overall influence upon your quarter scores.

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Question 1: How satisfied were you with this year's peer tutoring program?

Obviously, this rephrasing was impossible at the outset of this investigation since the quantitative influence of peer tutoring was not known at the time. But I am curious to see how participant responses would have changed from receiving this feedback.

Even without offering the academic outcome of what this evaluation as a foreword to the study, many of the participants' survey responses clashed with evidence and other responses. Tutors and tutees considered daily attendance to be very helpful, but the emails appeared to have little influence upon attendance. Tutors and tutees considered tutoring during lunch to be more convenient than attending after school but attended after-school tutoring more regularly. Tutors and tutees consider peer tutoring to be the greatest barrier to attending after school, but also considered transportation easy to arrange. Participants' perceptions are conflicted, and while conflict may be reasonable from participant responses, a deeper probe using means such as group interviews would have given participants a chance to explain why the conflicts occurred, enabling a clearer interpretation of their perceptions.

Contribute to existing literature. I hope this study will effectively contribute to the body of peer tutoring literature. In terms of academic influence, the after-school tutoring program provides a seventh example of a cross-age case-study with neutral academic influence, and the lunch tutoring program provides a second example of a cross-age case-study with negative influence upon tutees' grades. The analysis of participant attendance provides a strong example of how a program thought to be running effectively can in reality be attended with frequent unreliability and provides evidence for the need to continuously evaluate participants' attendance during and at the end of the

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school year. Last, the qualitative information gathered by surveys provides many questions about why participants perceptions often did not match the quantitative data. The results from this evaluation provide a good stepping stone for further qualitative research, and I hope they do so.

Final Thoughts

As a supervisor of this program, this evaluation has made clear to me that significant changes are needed. One of the first actions I took during the 2020 school year was to eliminate lunch tutoring. Tutees and other teachers received the change well, and tutees' positive reception of the discontinuation of lunch tutoring's may be an indication of how ineffective the time was. Tutors, however, did not receive the change well, and because of the change I lost over half of my tutor pool at the start of the year. I will continue rebuilding and revising the program based on the findings of this program evaluation.

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Peer Tutoring Request Form

ARGS Peer Tutoring

The ARGS Peer Tutoring program builds upon one of our academic community's greatest strengths, the pervasive culture of passionate support from all members of its family, by coordinating efforts for students to help students so not just one, but all Dragons have the opportunity to achieve their very best.

ARGS provides a free after school peer tutoring program for all students. All peer tutors in the peer tutoring program are current ARGS students who have completed the courses tutoring is requested in, and do so as a volunteer service to the school. Students participating will be matched with one of their peers, usually for 10 – 20 hours (depending upon contract with tutor) beginning within two weeks of receiving a request. Students participating in peer tutoring will meet at least once per week unless there are extenuating circumstances.

Advantages to peer tutoring:
1) Tutees receive assistance from tutors who are familiar with the teacher and content he or she is struggling with.
2) Tutors can also share insight to the social challenges of a particular focus.
3) The service is provided by ARGS, free, and in a convenient location.
4) Tutors receive community service credit for their altruism.

Notes:
Transportation is **not** provided to or from peer tutoring, and must therefore be provided by the student or guardian.

Peer Tutoring will meet from 3:30 – 5:30, Monday – Friday, in room 202, or during lunch Monday.
If you are interested in participating in ARGS Peer Tutoring, please send an e-mail to cwatson@args.us. Tutees and tutors will need to complete a request form, and both will have to sign a contract indicating the length of time they intend to work together. Tutors and tutees will complete the minimum number of hours designated in the contract, but may extend the contract if desired.

ARGS 2017 – 2018 Peer Tutor Request Form

Student name: _____

Student e-mail: _____

Subject(s) requested: _____

Tutor requested (optional): _____
Tutoring times requested – circle all possible

Monday	Tuesday	Wednesday	Thursday	Friday
3:30 – 4:00	3:30 – 4:00	3:30 – 4:00	3:30 – 4:00	3:30 – 4:00
4:00 – 4:30	4:00 – 4:30	4:00 – 4:30	4:00 – 4:30	4:00 – 4:30
4:30 – 5:00	4:30 – 5:00	4:30 – 5:00	4:30 – 5:00	4:30 – 5:00
5:00 – 5:30	5:00 – 5:30	5:00 – 5:30	5:00 – 5:30	5:00 – 5:30

Lunch

Parent/Guardian name: _____

Parent/Guardian e-mail: _____

Primary contact phone: _____

Parent signature: _____

I understand that I am responsible for bringing my own materials to peer tutoring. I understand that attendance is my responsibility, and in the event of an absence I am to contact both my peer tutor and peer tutoring supervisor at least 24 hours in advance. I understand the goal of peer tutoring is to improve my academic proficiency, and a breach of attendance or intent may result in my dismissal from the ARGS peer tutoring program.

Student Signature:
_____

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Student Name: _____

Year in school: _____   Focus area: _____

Student e-mail: _____

Subject(s) volunteering to tutor:
_____
Tutee Requested (optional): _____
Tutoring times available –circle all possible

1st Quarter	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	
Monday	Tuesday	Wednesday	Thursday	Friday
3:30 – 4:00	3:30 – 4:00	3:30 – 4:00	3:30 – 4:00	3:30 – 4:00
4:00 – 4:30	4:00 – 4:30	4:00 – 4:30	4:00 – 4:30	4:00 – 4:30
4:30 – 5:00	4:30 – 5:00	4:30 – 5:00	4:30 – 5:00	4:30 – 5:00
5:00 – 5:30	5:00 – 5:30	5:00 – 5:30	5:00 – 5:30	5:00 – 5:30

Lunch

Length of tutoring contract – circle all that apply (all +1 hour tutor training)

10 hours   20 hours   25 hours

Parent/Guardian Name: _____

Parent/Guardian e-mail: _____

Primary contact phone: _____

I understand the goal of ARGS tutoring is to assist other ARGS students, and attendance is my responsibility. In the event of an absence I will contact both supervisor and tutee at least 24 hours in advance. I understand the goal of peer tutoring is to improve a student's academic proficiency, and a breach of attendance or intent may result in my dismissal from the peer tutoring program.

Student Signature:
_____

Peer Tutoring Time Log

2017 – 2018 ARGS Tutor Time Log

Tutor:_____

Name of Tutee	Date	Subject	Time	Supervisor Signature
				5
				10
				15

				20

Peer Tutor Training Slides

These are the slides used for peer tutor training. The writing in blue describes the supervisor's actions or commentary during training and are removed from slides during training. The training is intended to be interactive; challenges are provided in a question, answer format and in role play one tutor or the supervisor acts as the tutee and another as the tutor. All other slides are read, and tutors' responses are prompted as indicated.

ARGS Peer Tutoring

Tutor Training

Welcome new tutors. Inquire about their year in ARGS and interest in peer tutoring program. Thank students for their willingness to participate as tutors.

Outline of Meeting

- Part 1 – General Tips

- Part 2 – Tutoring Challenges

- Part 3 – Role Play

- Part 4 – Logistics

- Part 5 – Ideas for Peer Tutoring

- Part 6 – Questions and Comments

Read the outline.

General Tips

- Be friendly, good-humored, and don't be afraid to socialize for the first 10 minutes.

- When solving a problem, let the tutee talk as possible.

- After solving a problem, give a similar problem to check if the tutee can repeat the process.

- NEVER discourage a tutee.

Read the general tips. Encourage tutors to always support to tutees, remain their peers, and be helpers, not disciplinarians.

Challenge #1

- I forgot my notebook and I don't know what the homework is.

Look on the teacher's website, check the book, try to speak with the teacher, or review something. Even without the day's homework assignment, there is always work to do.

Challenge #2

- We just took a test and don't have any work to do.

There is always work to do. Review what was challenging or begin what comes next.

Challenge #3

- Can you help me write this paper?

You can help brainstorm and work on grammatical mechanics. However, tutees must do their own work.

Challenge #4

- Another student wants to study with you.

This is up to you. If you are comfortable with working with two students and the second is non-distracting, then such is OK. However, your primary goal is to assist your tutee. There is nothing wrong with informing the other student they should speak with Mr. Watson to set them up for peer tutoring.

Challenge #5

- You cannot make tutoring one afternoon.

E-mail me and your tutee.

Challenge #6

- The tutee's bag is overflowing with papers.

Take time to organize the tutee's backpack. Helping in your content area aids one class. Getting organized aids all classes.

Challenge #7

- I have no idea how to do this.
- (Tutor): I don't either.

Open your book and try to work out the problem. Check notes and see if anyone nearby can help. If necessary, check online for resources. Don't ignore the challenge – you can do this.

Challenge #8

- Can you help me with my Frankenstein project?

No.

Challenge #9

- I just don't get any of this!

Step back and take a break. Eventually you will need to return to the problem and start again, but first take a few minutes to cool off, talk, and get water. Nothing will be gained from increased frustration.

Challenge #10

- After several weeks a tutee's grade is not improving.

Speak with either myself or the tutee's teacher. For example, you may be assisting your tutee with homework, but the papers never arrive in the tutee's class. Alternatively, the teacher may be able to recommend a better way to study. Don't take the lack of tutee improvement personally though, ultimately your tutee's academic achievement is their responsibility.

Role Playing #1

- Scenario: Overly eager tutor.

Action: One tutor expresses themselves bounding with energy and excitement while the other watches and takes in the effect.

Reflection: While enthusiasm and energy are nice, too much can be scary and deteriorates your relationship with the tutee. It's OK to be enthusiastic, but stay professional.

Role Playing #2

- Scenario: Overly shy tutee.

Action: One tutor is very quiet, makes few responses, and stays to themselves. The other tutor attempts to encourage the tutee to participate.

Reflection: Practice asking neutral questions, introducing yourself, and bonding socially before engaging in academic work. Your tutee needs to know they can trust you, and taking a few minutes each session to socialize at the start, though not for too long, is excellent to build a strong relationship.

Role Playing #3

- Tutor doesn't understand the concept.

Action: One tutor is asked to assist a tutee in a concept he or she does not understand. The other tutor attempts to benefit from the educational exchange.

Reflection: This is always a tricky exercise designed to make tutors aware of their resources and limitations. The goal is upon practice the tutor will ask the tutee to take out their book, notes, and have the tutee guide the instructional lesson, but this scenario usually needs to be run twice.

Role Playing #4

- Tutee is frustrated.

Action: One tutor is frustrated to the point where they do not wish to continue. The other tutor attempts re-engage the tutor in learning.

Reflection: This scenario is always fun. The goal is to have the tutor practice different social skills to reconnect with a frustrated tutee and on a larger scale show the tutee how to re-engage with learning after hitting a wall. The prompts needed to do so require little practice: "Let's take a break for a few minutes." or "Why don't we get a drink of water and then come back to it." For this prompt though, I choose to play the role of the tutee and express frustration due to a facetious problem. For example, the tutee is failing gym because they cannot find the gym. Alternatively, the tutee is failing Driver's Ed. because they crashed the car. The result has always been laughter and a positive note to end tutors' challenges and role playing.

Mr. Watson's Schedule

- My primary role is to supervise students peer tutoring and match tutors with tutees at appropriate times, as well as keeping a record of hours volunteered. I am also available for support as requested.

- I still offer after school tutoring, and will act as a general tutor to all ARGS students Monday from 3:30 – 4:30.

- Tuesday and Wednesday are dedicated to tutor training and recruiting.

Read the description.

Tutor Schedule

- Tutoring goal: 2 hours per week with a maximum of 3 hours. I aim to have students tutor 2 hours on the same day.

- Excused Absences – Variable by time

Read the description. Note that if tutors know several days in advance to e-mail me and a substitute may be found (rare).

Substitute Tutoring

- ARGS is a school with a substantial number of extracurricular activities and commitments due to focus areas. If your tutee is absent and another tutor is absent, you may be asked to substitute for another tutor. However, you are never required to substitute, and may take the afternoon off as desired.

Though part of the training, this has never actually happened.

Idea – Incentives

- I would like an additional individual or cooperative incentives for the school year.

  For example, every 100 total hours of tutoring cookies are provided. What are your ideas on this?

The most popular response has been a party at the end of the year. There has been a small party at the end of each school year for all participating tutors and tutees.

Your turn

- Questions?
- Comments?

Read description.

Homework

- Complete Peer Tutor Volunteer Form

Training is complete. Students may be paired after returning their volunteer availability forms.

APPENDIX E

Daily Reminder E-mail

Good morning students,

 This is a reminder that you have peer tutoring today. Please let me know if you will be unable to attend.

-Mr. Watson

2018 – 2019 Student Survey

Introduction: Welcome to the 2018 – 2019 ARGS Peer Tutoring Attendance Feedback survey. All responses are anonymous and will be used to improve the quality of the ARGS Peer Tutoring program and peer tutoring as an educational practice. This survey should take less than 15 minutes and contains two parts, one about part requesting feedback about attendance, the other satisfaction.

Please click to begin.

Part 1: Questions about attendance.

Question 1: Did you participate in peer tutoring this fall during lunch, after school, or both?

Question 2: I was able to attend peer tutoring at my scheduled time without conflicts.

SD, D, N, A, SA

Open Response 1: Assuming both options were possible, would you prefer to attend during lunch, after school, or both?

Open Response 2: Why did you choose this time frame?

Open Response 3: What do you consider the greatest benefit to attending during lunch?

Open Response 4: What do you consider the greatest barrier to attending during lunch?

Open Response 5: What do you consider the greatest benefit to attending after school?

Open Response 6: What do you consider the greatest barrier to attending after school?

Why?

Part 2: Questions about Satisfaction

Experiential Questions:

Question 1: Approximately how many hours did you participate? Fewer than 5, 5 – 15, More than 15.

Question 2: How many subjects did you receive tutoring in? 1   2   3 More than 3

Question 3: What subject(s) did you receive tutoring in?

If more than 1: Did you find peer tutoring more effective in some classes than others? If so, which?

Question 4: How many tutors did you have? 1   2   3   More than 3.
If more than 1: Did you find some tutors more effective than others? If so, why?

Scale Responses: Please respond to each question on a scale of 1 to 5, with 1 being strongly disagree and 5 being strongly agree. Select N/A or unsure if you are uncertain.

Question 1: Overall I was satisfied with the (year) peer tutoring program.

Question 2: The peer tutoring program ran effectively.

Question 3: (tutors only): I found peer tutor training helpful.

Question 4: Daily attendance e-mails were helpful to remember when attend tutoring.

Question 5: I had a good relationship with my tutor/tutee.

Question 6: Attending on time regularly was not a challenge.

Question 7: Events outside of peer tutoring interfered with my attendance.

Question 8: Transportation was easy to arrange.

Question 9: Peer tutoring was arranged at a convenient time for me to meet.

Question 10: I think peer tutoring increased my understanding in the content area.

Question 11: The supervisor, Mr. Watson, provided academic assistance (e.g. how to solve problems) to our group each week.

Question 12: The supervisor, Mr. Watson, provided instructional assistance (e.g. how to study more effectively) to our group each week.

Question 13: The supervisor, Mr. Watson, provided managerial assistance (e.g. keeping our group on track) to our group each week.

Lunch tutoring: This year, tutoring during lunch on Mondays was introduced to the ARGS peer tutoring program. Did you participate as a tutee/tutor on Mondays?   Yes   No.
If yes: *Compare Times*: How do you consider the convenience of meeting during lunch compared to after school?

Less Convenient   About the same   More Convenient   Unsure

Lunch tutoring: This year, tutoring was during lunch on Mondays, Tuesdays, and Thursdays. Did you participate as a tutee/tutor during lunch?
Yes   No.

      If yes: *Compare Times*: How do you consider the convenience of meeting during lunch compared to after school?

Less Convenient   About the same   More Convenient   Unsure

Preference: Do you think you would prefer tutoring during lunch or after school?

Open Response 1: What motivated you to participate in peer tutoring?

Open Response 2: What did you enjoy most about peer tutoring?

Open Response 3: What did you find most challenging about peer tutoring?

Open Response 4: Do you have any additional thoughts or comments about the program?

Conclusion: Thank you for your involvement in the 2018 – 2019 ARGS peer tutoring program. Enjoy your summer!

2015–2016, 2016–2017, and 2017–2018, End of Year Survey

The survey below represents the initial survey provided to tutors and tutees in 2015 – 2016. Additional questions were added to the 2016 – 2017, and 2017 – 2018 surveys, and these are denoted accordingly. Questions either unique to tutors or unique to tutees are likewise denoted accordingly.

(year) I*ntroduction*: Welcome to the (year) ARGS Peer Tutoring survey. All responses are anonymous and will be used to improve the quality of the ARGS Peer Tutoring program and peer tutoring as an educational practice.
Please click to begin.

Experiential Questions:

Question 1: Approximately how many hours did you participate? Fewer than 5, 5 – 15, More than 15.

Question 2: How many subjects did you receive tutoring in? 1   2   3 More than 3

Question 3: What subject(s) did you receive tutoring in?
         If more than 1: Did you find peer tutoring more effective in some classes
         than others? If so, which?

Question 4: How many tutors did you have? 1   2   3   More than 3.
         If more than 1: Did you find some tutors more effective than others? If so,
         why?

Scale Responses: Please respond to each question on a scale of 1 to 5, with 1 being strongly disagree and 5 being strongly agree. Select N/A or unsure if you are uncertain.

Question 1: Overall I was satisfied with the (year) peer tutoring program.

Question 2: The peer tutoring program ran effectively.

Question 3: (tutors only): I found peer tutor training helpful.

(2016 – 2017, 2017 – 2018 only) Question 4: Daily attendance e-mails were helpful to remember when attend tutoring.

Question 5: I had a good relationship with my tutor/tutee.

Question 6: Attending on time regularly was not a challenge.

Question 7: Events outside of peer tutoring interfered with my attendance.

Question 8: Transportation was easy to arrange.

Question 9: Peer tutoring was arranged at a convenient time for me to meet.

Question 10: I think peer tutoring increased my understanding in the content area.

(2016 – 2017, 2017 – 2018 only) Question 11: The supervisor, Mr. Watson, provided academic assistance (e.g. how to solve problems) to our group each week.

(2016 – 2017, 2017 – 2018 only) Question 12: The supervisor, Mr. Watson, provided instructional assistance (e.g. how to study more effectively) to our group each week.

(2016 – 2017, 2017 – 2018 only) Question 13: The supervisor, Mr. Watson, provided managerial assistance (e.g. keeping our group on track) to our group each week.

(2017 – 2018 only) *Lunch tutoring*: This year, tutoring during lunch on Mondays was introduced to the ARGS peer tutoring program. Did you participate as a tutee/tutor on Mondays?   Yes   No.
        If yes: *Compare Times*: How do you consider the convenience of meeting during lunch compared to after school?

Less Convenient   About the same   More Convenient   Unsure

(2017 – 2018, only) *Preference*: Do you think you would prefer tutoring during lunch or after school?

Open Response 1: What motivated you to participate in peer tutoring?

Open Response 2: What did you enjoy most about peer tutoring?

Open Response 3: What did you find most challenging about peer tutoring?

Open Response 4: Do you have any additional thoughts or comments about the program?

Conclusion: Thank you for your involvement in the (year) ARGS peer tutoring program. Enjoy your summer!

APPENDIX H

Grade Request Form

Good afternoon _____,
         (subject teacher)
      I am conducting a survey to analyze the effectiveness of peer tutoring upon student achievement in order to improve the ARGS Peer Tutoring program and use the results from data gathered as a population sample of data for my doctoral program at William and Mary. Therefore, I would like to gather the following quantitative data for _____, who began peer tutoring on _____.
(student name)
All data will be presented confidentially, and in order to compare the student's ability before and after peer tutoring began, I would like to analyze students' performance before, during, and possibly after entering peer tutoring.
What was the student's grade each quarter?

Q1:   Q1:

Q2:   Q2:

Q3:   Q3:

Q4:   Q4:

Thank you for your help! Please return your response either to room 202 or my mailbox.
-Mr. Watson

Vita

Author's Full Name

Charles Caldwell Watson III

Birthdate: May 28, 1985

Birthplace: Baltimore, MD

Education

2019   The College of William and Mary
         Williamsburg, Virginia
         Doctor of Education, Policy, Planning, and Leadership:

2008   University of Virginia
         Charlottesville, Virginia
         Master of Teaching in Education
         Bachelor of Arts in Mathematics

Academic and Professional Education Positions

Appomattox Regional Governor's School (August 2012 – Current). Petersburg, Virginia.

Peer Tutoring Supervisor at Appomattox Regional Governor's School (September 2015 – Current). Petersburg, Virginia.

Ettrick Elementary School (January 2015 – April 2015) (Part-Time). Chesterfield, Virginia.

L.C. Bird High School (June 2014 – August 2014). Chesterfield, Virginia.

Individual tutoring through homebound Instruction, Tutor Doctor tutor, and Freelance tutor (October 2013 – April 2015). Midlothian and Chesterfield, Virginia.

Matoaca High School (June 2013 – July 2013). Colonial Heights, Virginia.

Columbia High School (August 2010 – June 2011). Columbia, North Carolina.

Avalon School Elementary and Middle School (May 2009 – May 2010). Incheon, South Korea.

Lynchburg City Schools Substitute Teacher (December 2008 – April 2009). Lynchburg, Virginia.

Upward Bound Algebra II and Geometry Teacher (Spring 2005 – Summer 2008) (Part-Time). Charlottesville, Virginia.

UVA, Statistics and Calculus II Math tutor (2007). Charlottesville, Virginia.

UVA, Teaching Associate – Albemarle High School (Fall 2007). Charlottesville, Virginia.

UVA, Practicum – Monticello High School (Spring 2007). Charlottesville, Virginia.

Related Training and Experience

2014   University of Richmond
        Richmond, Virginia
        Courses for Gifted Endorsement in Education