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A FRESHMAN BRIDGE PROGRAM: TRANSITION TO SUCCESS

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A FRESHMAN BRIDGE PROGRAM: TRANSITION TO SUCCESS

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APPROVAL OF THE DISSERTATION

This dissertation, ("A Freshman Bridge Program: Transition to Success"), has been approved by the Ed.D. Faculty of Lynchburg College in partial fulfillment of the requirements for the Ed.D. degree.

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Abstract

Dr. Mary Ann Mayhew

The purpose of this study was to examine the effect of a Freshman Bridge Program on student attitude, student achievement in Algebra I, and overall student academic achievement beginning in the spring of the eighth grade year through the first semester of the ninth grade year. The Freshman Bridge Program began with a three-week summer program in July focused on hands-on math activities, career counseling, and study skills. Throughout the first semester of their ninth grade year, participants were a part of a continuum of interventions that included bi-quarterly case management meetings with the researcher and school counselor, data monitoring, and peer tutoring as needed. The research questions focused on student attitude, student achievement in Algebra I, and overall student achievement.

Three of the five research questions were supported by the study. Participation in the Freshman Bridge Program did result in improved achievement in Algebra I, improved student attitude, and overall academic achievement. While no significant relationship was found between student attitude and achievement in Algebra I and student attitude and overall academic achievement, significant relationships were found among the five domains of student attitude (Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitude toward School, Goal Valuation, and Motivation). Two focus groups also enriched the data by providing first-hand information from the participants. Students reflected on their overall experience in the Freshman Bridge Program, including feedback on the program elements, having two teachers, and the benefits of the program. Students also described their transitional experience, especially

changing expectations from the middle to the high school. Finally, students discussed the importance of graduation and how graduation was tied to their personal goals.

The data will be shared with the faculty and students of the Central Virginia High School and with central office staff. The data will also be used to implement changes to the Freshman Bridge Program and adopt a school-wide continuum of interventions with data monitoring. The Freshman Bridge Program provides a model for other school districts to use to help students have a successful transition to high school and move closer toward graduation.

Dedication

To the two loved ones I lost while writing this dissertation:

Papa Hale, thank you for always supporting and believing in me.

While I wish you were here, I know that you have been smiling

down on me throughout this process.

And to Dakota. You have been my best friend for a long time,

and I'm sorry you were not able to share these final dissertation days with me.

Thank you for being the best silent partner and being with me in spirit.

To my husband, Phillip,

thanks for all you have done to make this possible.

I am grateful for all the sacrifices you have made over the years and

am looking forward to enjoying some quality time together.

Acknowledgements

I would like to acknowledge my family and colleagues who have helped me reach this milestone.

First, I would like to acknowledge my family for their support. Mom and Dad, you have always told me that I can do anything I set my mind to. You raised me in a nurturing household, but also maintained high expectations for me that fostered my independence. Thanks for being my biggest cheerleaders. To Daniel, thanks for being a great big brother who always asked how my dissertation was coming along when we talked. Though you are miles away, knowing you cared about my progress meant a lot. To Owen, thanks for listening to my statistical conversations and research thoughts. You are the best little brother a sister could ask for.

To all of my friends and colleagues in education, thank you for inspiring me every day to be a better school leader. Our conversations over the years have helped me reach this point, and I am grateful for the wisdom you have shared with me. To the two teachers who taught in the Freshman Bridge Program, I especially thank you for being willing to give your time during the summer and for developing such positive relationships with our students while teaching them to love math and learning. This program would not have been possible without you.

Chapter One: Introduction

One of the most critical transitional years for students in grades kindergarten through twelfth grade in the United States is the move from eighth to ninth grade. It is considered the make-it or break-it year since ninth grade performance is tied to graduation and to the likelihood of dropping out (Consortium on Chicago School Research, 2007; Nelid, 2009; McIntosh, Flannery, Sugau, Braun, & Cochrane, 2008; Roderick & Camburn, 1999). Only about seventy percent of ninth graders graduate within four years, and it is the most failed grade in school (Center for Comprehensive School Reform and Improvement, 2009). Students are three to five times more likely to fail a course in ninth grade than any other grade (Breakthrough Collaborative, 2011).

In the ninth grade, students face new changes and challenges. Most high schools are larger than middle or junior high schools, have more rigorous academic standards, and involve multiple transitions throughout the school day as students move from one class to the next (Roderick & Camburn, 1999). These institutional and organizational factors impact students' performance and attitude toward school. Other factors put a student at greater risk for failing, including low achievement, low grades, and low attendance (Roderick & Camburn, 1999). These risk factors may have serious consequences and repercussions beginning with course failure. Course failure increases the likelihood that students will drop out (Nelid, 2009). Dropping out of high school has long-term impacts. Individuals without a high school diploma earn substantially less than those individuals who have one (Nelid, Stoner-Eby, & Furstenberg, 2007). Compared to high school graduates, they are also more likely to be unemployed, comprise seventy percent of the US prison population, and have lower life expectancies, impacting not just the individual but also the local economy (McBrady & Williamson, 2010).

Much of the research highlights the challenges of the ninth grade year; however, the research on effective strategies to address these challenges has shown mixed results. Researchers have found it is difficult to pinpoint exactly what works in various remediation programs. Some remediation programs focus on academic supports, and others focus on either the school itself or summer programs. Programs such as Upward Bound provide tutoring and study skills support with workshops and classes during the school year and a six-week summer enrichment program. Using random assignment and controlling for student ability through longitudinal data on GPA and course credits, researchers found that by the end of high school "on average, lower performing ninth grade students earned more credits throughout high school than those in the control group," emphasizing the positive results of the program (Calderon, Klein, Fitzgerald, & Berger, 2005, p. ix). Additionally, the lower performing ninth grade students were less likely to drop out; however, the results did not translate to academic benefit as the majority of participants did not achieve academic success in terms of passing grades (Calderon et al., 2005). Other programs focus on a school-within-a-school for ninth graders. For example, the Talent Development program operates as a school-within-a-school with freshmen taking strategic reading, freshmen seminar, and transition to advanced mathematics courses. Though students in the Talent Development school were found to perform better than the control group with regard to academic achievement and overall performance, the study did not utilize random assignment, limiting the generalizability of the study (Calderon et al., 2005). Career academies and alternative schools are two examples of school restructuring. A career academy provides workplace related training within the school building, while alternative schools provide a different educational setting. Studies have found participation in career academies and alternative schools did not necessarily lead to positive effects (Calderon et al., 2005). Other

summer bridge programs like Step Up to High School provide remediation in the summer before the ninth grade. The Step Up to High School summer program encompasses math, literacy, and counseling components and was found to lead to positive short-term results (Calderon et al., 2005; Paek, 2008). While promising research has been conducted regarding academic supports, school restructuring, and summer programs, more research is needed to find the best combination of solutions for ninth graders (Calderon et al., 2005).

Significance of the Study

Researchers agree the transition to ninth grade is a critical moment for students; however, there is not a consensus on what intervention is most effective. The research highlights summer learning opportunities as positive influences on students' achievement (Terzian, Moore, Hamilton, Foundation, & Trends, 2009). Many secondary schools have implemented summer bridge programs and/or summer freshmen academies to provide more attention and support to rising ninth grade students (McCallumore & Sparapani, 2010). Combining a summer bridge program with a continuum of interventions has not been fully studied. This study integrates a transitional summer program with a continuum of interventions to provide additional support during the school year with varying levels of interventions. These interventions include case management with each individual student, individual bi-quarterly meetings, analysis of student data followed by action plans, and tutoring to provide needed support in the ninth grade year and beyond (Allensworth, 2013; Duke, 2010). Integrating a summer bridge program with a continuum of interventions during the ninth grade year contributes to the research field of effective ninth grade transitional strategies. The primary significance of the study is increased research on what measures and programs support students by providing a successful transition to high school through the ninth grade year. The researcher implemented a similar program during

the previous summer, and by conducting action research, the researcher will use the techniques to systematically examine the implementation of educational practices to solve important issues for students as they transition into high school. This research will continue the work of the previous program while implementing further support and systematically providing data for the evaluation of program effectiveness. Because the study involves action research with mixed methodology, it will benefit the Central Virginia School District as results of the program are shared with the local community to inform future practice within the school district and support ninth graders as they transition to high school.

Definitions

1. *Summer bridge program*-A transitional program that focuses on remediation in math and/or literacy during the summer months before the ninth grade (Roderick, Engel, & Nagaoka, 2003).
2. *Student attitude*-Student attitude is defined by the domains of the School Attitude Assessment Survey-Revised including Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitude toward School, Goal Valuation, and Motivation and Self-Regulation (McCoach & Siegle, 2003).
3. *Overall student academic achievement*-In ninth grade, student achievement is defined as passing five out of seven classes by the end of the first semester and the end of the ninth grade year.
4. *MAP assessment*-Measures of Academic Progress assessment intended to measure student growth and progress on vertical skills in math through a Computer Adaptive Format (NWEA, 2016).

5. *Student achievement in Algebra I*-Defined as performance on the Algebra I released SOL tests (pre-RSOL 1, mid-RSOL 2, post-RSOL 3).
6. *Algebra I released SOL tests*-Three versions of released Standards of Learning (SOL) tests (two based on the test released in the Spring of 2015 and one released in the Spring of 2016) from the Virginia Department of Education to help prepare students for the end of year SOL test in Algebra I. It is based on the minimum standards the state of Virginia requires in Algebra I courses.
7. *Summer learning gap*-The regression of literacy and math skills during the summer months, disproportionally impacting poor and students of color (Alexander, Entwisle, & Olson, 2001; Alexander, Entwisle, & Olson, 2007).
8. *Summer learning programs*- A transitional program during the summer typically focused on an engaging academic curriculum with interactive, hands-on activities to help rising ninth grade students transition to high school (Center for Comprehensive School Reform and Improvement, 2009; Paek, 2008).
9. *Freshman academies*- In a freshman academy, ninth grade students are housed in a different, separate area of the high school and taught by an interdisciplinary team of teachers to provide more individualized attention and support (McCallumore & Sparapani, 2010).
10. *Career counseling*- Relationship in which "a professional counselor assists a client or group of clients to cope more effectively with career concerns" (Niles & Harris-Bowlsbey, 2009, p.13).
11. *Continuum of interventions*- A model that has various interventions or services based on students' needs (Duke, 2010).

Problem Statement

The researcher is examining the impact of a Freshman Bridge Program on student attitude, student achievement in Algebra I, and overall student academic achievement from the spring prior to the student entering the ninth grade to the end of first semester of the ninth grade year at Central Virginia High School (CVHS). The researcher wants to understand the influence of the program on student attitude and student achievement in Algebra I as well as the influence of the program on student attitude and overall student academic achievement during the transition from eighth to ninth grade.

Roadmap of the Dissertation

In the literature review, the historical context of the ninth grade in American public schools and a description of the context of the Central Virginia High School is described first. Then, the importance of the ninth grade for students and graduation is discussed, including the institutional factors, academic challenges, and positive aspects of the ninth grade. Student attitude is then examined with a specific focus on student attitude toward math. Student achievement in high school is defined before transitioning to the summer learning gap. Summer learning programs and freshman academies are considered before discussing math strategies and a continuum of interventions, leading to the methodology chapter. In the methodology chapter, the research questions and hypotheses are discussed, followed by a description of the research design, which is an action research focus with mixed methods approach. The personal context of the study, participants, and data collection methods are described as well as the instrumentation and measurement procedures. Finally, the data analysis and justification of the design are discussed prior to concluding statements about the significance of the study. In the fourth chapter, results and findings for each research question are provided. In the final chapter, a

summary of findings is presented for both the quantitative and qualitative research, followed by implications for practice. The researcher then discusses limitations of the research, the need for future research, and conclusions.

Chapter Two: Review of the Literature

Introduction

In this chapter, the historical context of the ninth grade is considered. Then, the importance of the ninth grade is discussed followed by institutional and academic factors that represent the challenges in the ninth grade. While there are noted challenges related to the ninth grade, there are also other positive aspects that will be discussed. Student attitude is examined from both an overall broad perspective and from a specific focus on student attitude toward math. Student achievement in high school is defined before transitioning to the summer learning gap. The research on summer learning programs is examined and examples of specific programs are discussed. Freshmen academies are also considered with a description of the Talent Development Program. Math strategies are examined before the discussion of a continuum of interventions. Lastly, a summary concludes this chapter.

Historical Context of High Schools, Ninth Grade, and Graduation

Beginning in the 1900s, more Americans started attending high schools, typically grades ninth through twelfth. High school enrollment steadily increased during the twentieth century due to child labor laws, the Great Depression, and the growing belief that education determined economic welfare. Despite the growing number of students attending high school, the majority of these students did not graduate in the 1930s for a variety of reasons ranging from high curriculum standards to the lack of a relevant curriculum for adolescents (Reese, 2011). After World War II, the American public placed increasing demands on high school as more individuals attended high school than ever before due to desegregation and special education laws. Additionally, the launching of Sputnik by the Soviet Union in 1957 alarmed many Americans that American students were falling behind the rest of the world in science and

mathematics education. These increasing expectations culminated in the passing of the National Defense and Education Act of 1958, followed by the passing of the Elementary and Secondary Education Act (ESEA) in 1965. ESEA provided federal aid to education through preschool programs like Head Start and Title I funds for children living in poverty. In the 1960s, many smaller high schools consolidated into comprehensive schools. The American public and politicians pushed for higher standards for behavior and academics in the 1970s and 1980s (Reese, 2011). During his presidency, President Reagan created the National Commission on Excellence in Education to study the state of education in the United States. After eighteen months of study, the 1983 National Commission on Excellence in Education warned that without implementing their recommendations, the culture of US democracy was at stake in *A Nation at Risk*. Furthermore, the United States would continue to lag behind other countries and fall further behind them with regard to education and future economic success. The report was critical of the state of high schools and recommended increased standards and higher expectations for students (*A Nation at Risk*, 1983).

The focus on accountability in secondary schools and graduation has continued with the "Goals 2000 Educate America" Act under President George H. Bush and the passage of the No Child Left Behind (NCLB) Act in 2002 under President George W. Bush. One major goal listed for the Goals 2000 Educate America Act was for the high school graduation rate to increase to 90%. This goal was not met in 2000, but high school graduation rates have improved over time. Under NCLB, schools were required to have highly qualified teachers, test students in reading and math in grades three through eight as well as in high school subjects, and make adequate yearly progress in various areas including graduation (Reese, 2011). Despite these measures, there are students who do not graduate. With the adoption of the Every Student Succeeds Act

(ESSA) in 2015, high school graduation continues to be a priority as high schools are required to focus on graduation in their ratings (McGuinn, 2016). Researchers examining graduation rates have found the transition to ninth grade is a critical time for graduation since success in ninth grade ensures students are on track for graduation. If schools hope to improve their graduation rates, researchers suggest they target the ninth grade (Consortium on Chicago School Research, 2007; Nelid, 2009; Roderick & Camburn, 1999).

Why the Ninth Grade Matters

One of the most critical transitional years for students is the move from eighth to ninth grade. It is considered the make-it or break-it year since ninth grade performance is tied to graduation and the likelihood of dropping out (Consortium on Chicago School Research, 2007; Nelid, 2009; Roderick & Camburn, 1999). Thirty percent of ninth graders do not graduate within four years, making it the most failed grade in school (Center for Comprehensive School Reform and Improvement, 2009). Students are three to five times more likely to fail a course in ninth grade than any other grade (Breakthrough Collaborative, 2011). In the ninth grade, students face many changes. Most high schools are larger than middle or junior high schools, do not regularly utilize a team approach, involve more rigorous academic standards, and incorporate multiple transitions throughout the school day as students move from one class to the next (Roderick & Camburn, 1999). These institutional and organizational factors influence students' performance and attitude toward school. Other factors put a student at greater risk for failing. Students with "low achievement, low grades and attendance, are overage (older than most students in the grade) for their grade and have greater levels of school mobility prior to the transition year are at greatest risk of experiencing difficulty during their first year in junior high or high school" (Roderick & Camburn, 1999, p. 312). These risk factors may have serious

consequences and repercussions beginning with course failure. Course failure increases the likelihood that students will drop out (Nelid, 2009). Dropping out of high school is a process that has long-term consequences. Individuals without a high school diploma typically earn substantially less than those individuals who have one and are more likely to be unemployed and incarcerated (Bottoms, & Young, 2008; McBrady & Williamson, 2010; McIntosh et al., 2008; Nelid, Stoner-Eby, & Furstenberg, 2007). Compared to high school graduates, they also have lower life expectancies (McBrady & Williamson, 2010). Dropping out not only impacts the individual, but the community as well. With regard to lost wages and welfare, one dropout can cost a state as much as $5000 a year (Bottoms, 2008).

When studying students' transitions to high school, Roderick and Camburn (1999) found that course failure was tied to the skills students brought to high school; and first semester absences predicted course failure during the first semester of high school. Once students started failing, they were likely to continue in a cycle of course failures (Roderick & Camburn, 1999). The researchers concluded that early intervention was necessary and needed in order to reduce the risk of course failure and potentially dropping out (Center for Comprehensive School Reform & Improvement, 2009; Roderick & Camburn, 1999). It is important for educators to understand the cognitive, affective, and physical changes these students undergo during the transition to high school.

Challenges and Positive Aspects of Ninth Grade

Development of Students. As fourteen-year olds, ninth graders have unique needs related to their development. They become more focused on themselves and figuring out their place in society. They gravitate away from parents to friends and peers and are able to develop more abstract thinking (Ellerbrock & Kiefer, 2010; Wood, 2015). Fourteen-year olds are looking

for fidelity, or "the strong loyalty or devotion to an emerging sense of self, or some other person or persons, to ideas or fads" (Wood, 2015, p. 168). The search for fidelity predominantly centers around the school, an important social setting in their lives (Wood, 2015). It is especially important for students to have their needs met at school (Ellerbrock & Kiefer, 2010). In the classroom, ninth graders benefit from opportunities to evaluate and improve their work as well as working in small learning groups. Particularly in math, students need to be exposed to various number systems, different representations of numbers including graphs, and working with functions with two or more variables. Algebra is considered an appropriate subject at this age (Wood, 2015).

While there is noted concern with the transition to ninth grade, other researchers found positive aspects of this change related to the social development of students. When asked about what helped them successfully transition to ninth grade, students commented that coming to school each day and having interesting classes helped them (Butts & Cruzeiro, 2005). Additionally, by qualitatively interviewing teenagers from different social groups in various grades and at different points in time, Kinney (1993) found that many teenagers typically classified as "nerds" described middle school as a challenging time for them, but became increasingly more confident in high school. For some, it meant that they transitioned to another peer group and others followed their own individual paths. Kinney (1993) concluded that most teenagers report affirmatory self-evaluations in high school and grew more comfortable with themselves during this time period. This shift provides another view of the transition to high school.

Institutional Factors. Some institutional norms work against the developmental needs of ninth graders. One factor influencing the transition to ninth grade is the impersonal nature of

high schools. Students report they feel unimportant due to the structure of high school and multiple transitions throughout the day, conflicting with their egocentrism (Nelid et al., 2008; Nelid, 2009). Students often report feeling lonely and disconnected from the school and their peers (McCallurmore and Sparapani, 2010). Struggling students can often slip through the cracks in these schools, which can lead to students failing courses without any noted intervention from the school (Nelid et al., 2008). In general, researchers have found certain components help high schools feel more personal. Schools with a greater community focus with an emphasis on common responsibility had higher gains in learning than traditional schools (Nelid et al., 2008; Nelid, 2009). In Chicago, researchers also reported that freshmen failed fewer classes in schools with higher levels of "trust between teachers and students than at school with low levels of teacher-student trust" (Nelid, 2009, p. 63). Trust influences the relationships developed between school faculty and students. Furthermore, smaller size schools also report greater gains in student learning (Nelid, 2009).

Across the nation, ninth grade has the highest enrollment of any grade (McCallurmore & Sparapani, 2010). Educators refer to this phenomenon as the "ninth grade bulge" (Kennelly & Monrad, p.2, 2007). This increase in numbers in ninth grade is due to the amount of failures in ninth grade and the use of a credit system predominant in high schools in which students must earn a certain number of credits to be promoted to the next grade level (McCallurmore & Sparapani, 2010). The amount of ninth graders promoted to tenth grade is lower than the rate of promotion for any other grade level (Wheelock & Miao, 2005). Particularly concerning is that for students who repeat the ninth grade, only ten to fifteen percent graduate (Kennelly & Monrad, 2007, p. 2).

Due to the structure of high schools, ninth grade students have more freedom and independence in a larger school. While this freedom is important as they are becoming more developmentally independent, it can undermine their success as they have increased opportunities to skip classes and be in the hallways, contributing to low attendance (Allensworth, 2013; Nelid at al., 2008). Low attendance during the first few weeks of ninth grade can indicate early signs of dropping out (Kennelly & Monrad, 2007). The structure of ninth grade and freedom of high school contribute to students' difficulties.

Another interesting institutional perspective of the ninth grade involves the physical act of changing buildings. Though most of the research focuses on the declining performance when a student changes schools, fewer studies have been done to see the effect of moving to a different building versus not changing buildings in ninth grade. Weiss and Bearman (2007) found that "the presence of a transition from eighth grade to ninth grade makes almost no difference for students' ninth-grade outcomes relative to those of students who do not change schools between those grades" (p. 395). The act of changing buildings alone does not explain student performance (positive or negative) in the ninth grade.

Academic Concerns. One of the greatest factors impacting student achievement in the ninth grade is the lack of academic skills. For many students, their deficits in skills continue to grow over the years so that when they enter the ninth grade, they are not prepared for more challenging and rigorous course work. Furthermore, forty-five percent of students who dropped out stated they were not prepared for high school, and once they fell behind, they were unable to catch up (Bridgland, Dilulio, & Morison, 2006). These students also commented that if they had support or other academic help, they would have been able to graduate (Bridgland, Dilulio, & Morison, 2006).

The two main areas of concern for students are literacy and mathematics. Many students struggle in reading with fluency and comprehension, impacting not only language arts classes, but also every other subject as well (Nelid, 2009). Mathematics is another core subject area impacted. Algebra I is a barrier class for most students who are performing below grade level, meaning it is a challenging course for them to pass. In Madison, Wisconsin, during the 2013-14 school year, "over 250 ninth graders received an F for at least one semester of Algebra I," making it the most failed subject in high school (Beck, 2014, p. 1). Additionally, it is considered the gateway course to other mathematics classes in high school, and some educational boards recommend the course be completed before a student enters ninth grade (Bottoms & Timberlake, 2008; National Mathematics Advisory Panel, 2008). The National Mathematics Advisory Panel (2008) recommends students need to fully understand fractions, decimals, and the signs of numbers in order to be successful in Algebra I (Nelid, 2009). Mathematics performance is highly related to promotion to tenth grade. Freshmen who performed at grade level on math standards tests were more likely to be promoted to the tenth grade than those scoring significantly below grade level (Nelid, 2009). Performing on grade level in Algebra I is critical because if students cannot pass that course, they cannot graduate.

Student Attitude

Student attitude is an important factor influencing student achievement. Attitude is defined by the individual and encompasses both emotions and behaviors (Dursun, 2015). Attitude also includes "cognitive, sensory, and behavioral components" (Yasar, 2016, p. 932). Attitude also represents students' self-confidence in their skills (Arslan, Yavuz, & Deringol-Karatas, 2014). In general, students who like school more have higher achievement (Lai, Stevens, Martinez, & Ye, 2015). In a cross-national study, Lai, Stevens, Martinez, & Ye (2015)

examined the relationship between student attitude toward school and performance in school by analyzing the 2009 Program for International Student Assessment (PISA) results for Asia Pacific countries. Overall, the researchers found focusing on eliminating negative attitudes toward school could be a helpful strategy to improve student achievement. Additionally, in Indonesia and Thailand students' attitudes influenced motivation and the perception that schooling could help increase their position in school and society. While this study examined the relationship between student attitude toward school and performance on the PISA test, the data for attitude was self-reported by students, which may or may not be entirely accurate (Lai et al., 2015).

When studying underachievement in students, McCoach and Siegle (2003) examined five domains influencing students' attitudes toward school. The first domain, Academic Self-Perceptions, involves students' impressions of their own academic capabilities or confidence. Having a positive self-concept has been found to have a positive relationship to academic achievement (McCoach & Siegle, 2003). Students have also verbalized this concept through interviews. A high school junior commented that when one has confidence, one does not worry so much about others' views about him or her (Kinney, 1993). The second domain, Attitude toward Teachers and Classes, centers on the relationship between students and teachers. Researchers have noted that "teachers' personality and organization may affect students' achievement" (McCoach & Siegle, 2003, p. 416). The third domain, Attitudes toward School, reflects students' enthusiasm toward school and motivation. Again, Attitudes toward School is related to achievement. With Goal Valuation, the fourth domain, the researchers found that how much a student valued a task or job influenced performance or achievement (McCoach & Siegle, 2003). Finally, Motivation and Self-Regulation, the fifth domain, encompasses "metacognitive strategies, self-management and control of effort, and cognitive strategy use" and have been

found to influence student achievement (McCoach & Siegle, 2003, p.418). The researchers compiled these domains into School Attitude Assessment Survey-Revised to quantify these measures (McCoach & Siegle, 2003).

Student Attitude Toward Math. Students' attitudes toward math are particularly important. Many students do not experience success in math, developing negative, anxious attitudes over time to the discipline (Yasar, 2016). Across the world, students exhibit anxiety related to math. As students experience increased stress and anxiety over time, stress can negatively influence learning by activating the autonomic nervous system and HPA-axis, impacting the effectiveness of these systems in sorting incoming information (Joëls, Pu, Wiegert, Oitzl, & Krugers, 2006). While some researchers found that anxiety helps students perform, too much anxiety or stress can cause students discomfort and inhibit learning. When in a state of distress, it is more difficult to regulate the information that is sent to the brain (Jensen, 2005).

Anxiety toward math in part comes from the various curriculum approaches to math in the U.S. In the traditional teaching of math and especially Algebra, formal methods are emphasized including symbols, simplification, equations, and factoring. With the non-traditional teaching of math, students focus on more real world problems as well as functions to increase problem-solving skills (Kieran, 2007). The difference between equations and functions in Algebra is confusing for many students, contributing to anxiety and potentially a negative attitude (Kieran, 2007). In order to be successful in math, students need to minimize their anxiety. Furthermore, research in Turkey suggests attitude and anxiety have an inverse relationship. The more positive the attitude toward mathematics, the less anxiety students reported about it (Dursun, 2015). Dursun's (2015) research also suggests that students develop more positive attitudes toward math over time, particularly in the twelfth grade. This research,

though, was limited by a small sample size of Turkish high schools, which may not be generalizable to other contexts. It also provides information about students' attitudes toward math, but not the causes of these attitudes toward math (Dursun, 2015). Using the Mathematical Attitude Scale comprised of nineteen items, Yasar (2016) examined students' attitudes toward mathematics, surveying 1,801 students in Turkey. He found that the most significant variables explaining students' attitudes toward math were the gender of the math teacher (in favor of female), the mother's job, and the amount of schooling of the father. The amount of schooling of the father and the mother's profession (ranging from 1=housewife, 2=worker, 3=officer, 4=trader, 5=farmer, 6=retired) had a positive relationship with students' attitudes toward math, meaning the positive levels of schooling for the father and the profession of the mother (the highest being with the profession of trader) reflected a positive relationship with student attitude toward math. Overall, he also found that students had a moderately positive attitude toward school (defined by the survey as "I partly agree:"), but called for more studies to determine how to increase students' positive attitudes toward mathematics (Yasar, 2016).

Student Achievement and Attendance

In high school, student achievement includes students' course grades and failures. Because students earn credits in order to graduate, passing classes is key to staying on track to graduate (Nelid, Stoner-Eby, & Furstenberg, 2008). The amount of classes passed and credits earned influences the promotion rate. Different schools define promotion rates in different ways, usually by number of courses passed.

Attendance is another factor influencing student achievement. In order to learn, students must be present. The research suggests that improving attendance can influence student achievement (Gottfried, 2009). Additionally, missing too many days not only limits instructional

hours, school policy may assign a failing grade. Furthermore, poor attendance has been linked to dropping out. Low attendance during the first few weeks of ninth grade can indicate early signs of dropping out (Kennelly & Monrad, 2007). Low attendance is even more concerning if a student had previous patterns of absenteeism in middle school. Schools with high dropout rates often have serious absenteeism in feeder middle schools (Balfanz, 2009). Monitoring student attendance and intervening early is key to address this warning sign of dropping out of high school.

Summer Learning Gap

One area of concern for traditional school calendars is the summer learning gap or loss. This loss disproportionally affects students of lower socioeconomic status more so than those of higher status (Alexander, Olson, & Entwisle, 2007). Researchers found that while poor and African American students are able to make significant gains in learning throughout the school year, they regress in skills over the summer. These skills typically involve memorization such as math computation and heavily impact the areas of math over language since math skills build upon one another (Alexander, Entwisle, & Olson, 2001; Alexander et al., 2007). Children from low income families are often unable to participate in summer programs due to cost and accessibility (Blazer, 2011). Researchers also noted the importance of intervening early during the eighth to ninth grade transition (Alexander et al., 2007). Furthermore, Alexander et al. (2007) found that ninth grade achievement was linked to the summer learning loss in the elementary grades, highlighting the critical importance of intervening early. In a meta-analysis of summer learning programs, Cooper, Nye, Charlton, Lindsay, and Greathouse (1996) found that over the summer students appear to "lose one month of grade-level equivalent skills relative to national norms," with the largest impact in math related skills (p. 259). The researchers

suggested a focus on math may be needed during the summer and called for studies on students in high school (Cooper et al., 1996). Though Cooper et al. (1996) suggested a focus on math instruction during the summer months, Terzian et al. (2009) found that the effectiveness of such programs was questionable. When reviewing eleven studies with random assignment, Terzian et al. (2009) found that reading gains were more likely than gains in math during summer programs.

Baltimore Beginning School Study. In order to measure the impact of the summer learning gap, researchers in Baltimore randomly selected students from twenty public elementary schools beginning with the first grade in 1982 (Alexander et al., 2007). To measure achievement, researchers administered the California Achievement Test battery in October and May. These researchers found disadvantaged students made gains during the school year of 191.3 points, but had learning loss over the summer. One limitation of the study, though, was attrition and missing data as students moved out of the school district. Alexander et al. (2007) called for summer schools for disadvantaged students with a focus on academics as well as enrichment experiences. Such programs are needed to supplement learning and combat the summer slide.

Summer Learning Programs

One potential solution to the challenges of the ninth grade transition and the summer learning gap is a summer bridge program. A summer bridge program is an orientation program typically focused on an engaging academic curriculum with interactive, hands-on activities to help rising ninth grade students transition to high school (Center for Comprehensive School Reform and Improvement, 2009; Paek, 2008). Most summer learning programs are about six weeks long and include remediation and enrichment activities. Students usually have the option

to attend, and many programs last the full day. These programs usually try to incorporate educational activities as well as games more typical of summer camps (Terzian et al., 2009).

The curriculum encompasses the essential skills of reading, writing, math, and academic skills, as well as an emphasis on social and emotional development (U.S. Department of Education, 2013). Usually, summer transition programs include some form of monitoring student progress and data, recruitment of students who are most in need, professional development among school teachers and staff, communication with families, and increased relationships with the community (Center for Comprehensive School Reform and Improvement, 2009). While the primary goal is for students who participate to earn enough credits by the end of the ninth grade year to move onto the tenth grade, other potential benefits may include "increased enthusiasm and motivation for learning, improved academic skills, enhanced self-esteem, and fewer discipline problems" (Center for Comprehensive School Reform and Improvement, 2009, p. 1). Additionally, researchers have found that the most successful summer programs center on the ninth grade year and implement differentiated support in order to meet the needs of students through more individualized instruction. While students are supported by an "academic network," teachers also grow through increased skills or expertise (Paek, 2008, p. 3).

When reviewing summer learning programs, researchers found that encouraging approaches "made learning fun," used real-world relevant examples, used experienced teachers, maintained small class sizes, and involved the community and families with food and whole day options (Terzian et al., 2009, p. 17). Moreover, the Harvard Family Research Project suggests that programs establish strong relationships between students involved in programs and families

for longer-lasting, positive partnerships (Terzian et al., 2009). Developing a strong relationship during the summer can carry over to the school year as well.

Examples of Summer Learning Programs

Dekalb County's Summer Bridge Program. An example of a summer bridge program is the one instituted by the County of Dekalb in Georgia. All rising ninth grade students attending Stephenson High School are invited to a week-long program lasting eight hours a day the summer before the ninth grade year. The curriculum is interdisciplinary and incorporates language arts, mathematics, science, and social studies. Researchers found that ninety percent of students who attended the bridge program passed enough classes and earned enough credits to move on to tenth grade. The director, Deneen McBean-Warner, commented, "We build a culture of high expectations that all students can learn and then provide them with engaging activities" (Center for Comprehensive School Reform and Improvement, 2009, p. 4). A culture of high expectations is critical at the program. While students learn about academic skills, they also take a class called *High School 101*. This class focuses on study skills and other high school policies to help prepare students for ninth grade (Center for Comprehensive School Reform and Improvement, 2009). The majority of the information on this program was narrative in nature. While the narrative reflected positive aspects of the program, more research on the effectiveness of this program is needed (Center for Comprehensive School Reform and Improvement, 2009).

Upward Bound. Upward Bound is a program funded by the U.S. Department of Education to support low-income students and potential first generation college attendees as they prepare for college. In the summer, students attend a six-week enrichment program; and throughout the school year, students receive "tutoring, counseling, mentoring, cultural enrichment, work-study programs, education or counseling services to improve the financial and

economic literacy of students" (U.S. Department of Education, 2016, p.1). Using random assignment and controlling for student ability, researchers found ninth grade students in the program earned more credits than those in the control group (Calderon et al., 2005).

Step Up to High School. Step Up to High School is a summer program for rising ninth graders in Chicago Public Schools (CPS). Unlike the Dekalb program, eligible students for the program scored between the 35th and 49th percentile in reading or math on the Iowa Test of Basic Skills or on the ACTS Explore test (a test given by ACT to rising ninth graders but no longer published) in the eighth grade. The program encompasses math, literacy, and counseling components. During four weeks of the summer, students received ninety minutes of literacy instruction, ninety minutes of math instruction, and forty-five minutes of guidance counseling with a school counselor each day. Teachers of the program also attended five professional development meetings before the program started and weekly meetings during the program. Researchers investigating the effectiveness of the program found that students who participated in the Step Up Program failed Algebra I less often than non-participants (referenced in Table 2-1). While statistical significance was not provided for the results, it was found that students who participated in the Step Up program failed double period Algebra I less often than non-participants as referenced in Table 2-2 (Paek, 2008).

Table 2-1
CPS Algebra I % Failing

Semester	Step Up Participants	Non-Step Up Participants
Fall 2004	18.2	19.9
Spring 2004	25.6	27.4
Fall 2005	15.1	29.4
Spring 2005	24.3	36

(Paek, 2008, p. 7)

Table 2-2
Double Period Algebra I % failing

Semester	Step Up Participants	Non-Step Up Participants
Fall 2004	18.3	24.6
Spring 2004	24.3	30.6
Fall 2005	15.3	18.7
Spring 2005	21.7	26.3

(Paek, 2008, p.7)

While the program has promising results, the quasi-experimental study lacked random assignment. It is also difficult to say that the program alone caused or even contributed to the students' success in Algebra I (Paek, 2008).

Freshmen Academies

Another intervention to ease the transition to high school is a Freshman Academy, often called a small learning community (Oxley & Luers, 2010). In this program, ninth grade students are housed in a different, separate area of the high school. They are usually taught by an interdisciplinary team of teachers as part of a smaller learning community or support system (Duke & Jacobson, 2011; Ellerbrock & Kiefer, 2010; Kennelly & Monrad, 2007). The goals of these academies include helping students be academically successful and providing them with more individualized attention. Some school districts use summer programs as part of their Freshmen Academies. Others also provide after school academic support, seminars, and block scheduling. During the 2004 and 2005 school year, 154 strictly ninth grade schools reported being open (Kennelly & Monrad, 2007). At Westhore High School, Ellerbrock & Kiefer (2010) found that the Freshman Focus course, a part of curriculum of the Freshman Academy, helped develop "a strong community of care" between students, teachers and the school (p. 397). While some academies report success with helping ninth graders be successful, others note the negative characteristics of these programs including students' complaints that it feels like an extra year of middle school (Kennelly & Monrad, 2007; McCallumore & Sparapani, 2010).

Talent Development Model. The Talent Development Model was developed by the Center for Research on Students Placed at Risk from John Hopkins and Howard University and was used in Philadelphia schools. It includes components of a whole school reform as well as a Ninth Grade Success Academy in order to "enhance the skills of incoming freshmen" (Kennelly & Monrad, 2007, p. 9). It operates as a school within a school with freshmen taking a strategic reading course, freshmen seminar, and transition to advanced mathematics. The academy is located in a separate area of the school and students are taught by an interdisciplinary team of teachers. Disruptive students are also assigned to a Twilight School in the afternoon to improve their behavior. The Talent Development teachers receive extensive professional development at the beginning of the year on curriculum and instruction and throughout the year with feedback from classroom coaches. In an interrupted time-series study, the Talent Development program was evaluated and compared to students in the same district with similar demographics and achievement, but not using the Talent Development model. The researchers found that "on average, ninth graders at the Talent Development schools attended school for about nine more days per year than comparison ninth graders and earned 0.67 credits" (Nelid, 2009, p. 67). The students also earned more Algebra credits (Nelid, 2009). Despite these results, the study did not use random assignment, limiting the generalizability about the effectiveness of the program (Calderon et al., 2005).

Math Strategies

Algebra I is considered a gatekeeper course for many students since Algebra I skills are needed for any type of higher math and Algebra I is needed for graduation (National Mathematics Advisory Panel, 2008; Stoelinga & Lynn, 2013). Algebra I is a challenging course for students since it is an "important transition point in the learning of mathematics, requiring the

use of generalized models, mathematical abstractions, and understandings of variables and symbols" (Stoelinga & Lynn, 2013, p. 3). Furthermore, completing Algebra II is associated with later success in college and future jobs (National Mathematics Advisory Panel, 2008). While most students take Algebra I in the eighth or ninth grade, advanced students in Virginia take Algebra I as early as the seventh grade. Before implementation of higher standards for graduation, students could potentially graduate from high school without ever taking Algebra I. Now, most states require at least three years of mathematics, with the start of the math sequence being Algebra I (Stoelinga & Lynn, 2013). Additionally, Stoelinga and Lynn (2013) recommend that all students take Algebra I by the end of their ninth grade year. In college, students who major in math, engineering, and the physical sciences earn about nineteen percent more than students not majoring in math (Hanover Research, 2016). Unfortunately, the United States ranks behind global high school students in math based on the results of the National Assessment of Educational Progress (NAEP) and Program for International Student Assessment (PISA). The PISA test assesses students at the end of compulsory schooling in order to provide a basis of comparison. In 2015, the average math scores for the United States was a 470, which was lower than fifty percent of the other participating countries and below most industrialized countries (Kastberg, Chan, Murray, & Gonzales, 2016). Additionally, in the United States "nearly three out of ten fifteen-year old students scored below proficiency on the assessment" (Kastberg et al., 2016, p. 15). Along with international concerns, equally troubling is the fact that students who start high school behind in math will likely stay behind in math (Hanover Research, 2016).

When examining effective practices in secondary math instruction, researchers found that online credit recovery programs, intervention and bridge programs, double blocking of math classes, and professional development for teachers can help support student achievement in math

(Balfanz, Legters, & Jordan, 2004; Durwood, Krone, & Mazzeo, 2010; Hanover Research, 2016; Heppen et al., 2016; Stoelinga & Lynn, 2013). In Chicago Public Schools, researchers compared the effect of online credit recovery Algebra I courses to face-to-face credit recovery courses. Ninth graders who failed the second semester of Algebra I were randomly assigned to one of the two programs. With 1,224 ninth graders participating, the researchers found that students recovered credit in both courses, but were not as likely to pass the face-to-face course. Students in the online program also scored lower on the posttest than those in the face-to-face program and received lower grades. The researchers concluded that online credit recovery programs can help students recover credit; however, they need to be improved and provide additional support for students (Heppen et al., 2016). They also found that the flexibility of online software can help students when they have failed Algebra I previously and need to retake the course (Hanover Research, 2016). Intervention and bridge programs also can help support student achievement in math. When studying the implementation of the Talent Development High School (TDHS) instructional model in Baltimore, Philadelphia, and Newark, Balfanz, Legters, and Jordan (2004) found that providing a double period of math (along with English) and intensive professional development and coaching for teachers influenced student achievement. Students in TDHS passed Algebra I at statistically higher rates than students in control schools with similar demographics, previous achievement, and attendance (Balfanz et al., 2004). In Chicago Public Schools, low-achieving ninth graders received two periods (double-dose) of Algebra I beginning in 2003. Researchers found that students' scores increased in the double-dose classes as well as in the higher level classes (Durwood, Krone, & Mazzeo, 2010). While the scores improved, the pass rates for the course remained about the same and those students with the weakest skills were the least likely to be successful in the double-dose classrooms. Overall, the researchers

concluded that the double-dosing of Algebra I, "when accompanied by additional supports for teachers, has significant promise for improving the academic skills of all students" (Durwood et al., 2010, p. 1). Stoelinga & Lynn (2013) also recommend that schools use criteria to identify which students will need additional help in order to be successful in Algebra I. For each of the strategies, a key component for success was professional development for teachers. In the TDHS program, teachers received 25-30 hours of support through specific course workshops and in-class coaching (Balfanz et al., 2004). Balfanz, Legters, and Jordan (2004) also found that school systems that provided less professional development did not necessarily see the same results in closing achievement gaps. In Chicago Public Schools, teachers teaching the double-dose of Algebra I attended three workshops throughout the school year and received additional curricular resources (Durwood, Krone, & Mazzeo, 2010). Professional development provided needed support for teachers to support students.

With regard to instruction, the United States Department of Education advocates that teachers work to cultivate a better understanding of Algebra I and encourage process-oriented thinking and learning (McCallum & Anderson, 2015). Recommended instructional strategies include "using solved problems to engage students in analyzing algebraic reasoning and strategies, teaching students to utilize the structure of algebraic representations, and teach students to intentionally choose from alternative algebraic strategies when solving problems" (Hanover Research, 2016, p. 7). For students who are having difficulty in math, researchers recommend using explicit instruction when presenting new material or concepts, using small group instruction for reviewing concepts, and using scaffolding techniques to help students utilize specific strategies. Teachers of math also need specific and individualized instruction with teaming approaches to best support students in math (Hanover Research, 2016).

A Continuum of Interventions

While a summer bridge or learning program provides initial support during the transition from eighth to ninth grade, more support is needed once school is in session. A continuum of interventions is a model that has various interventions or services based on students' needs. It is recommended that all schools have such programs. In Hartford, Connecticut, secondary school students' needs are addressed through a Pyramid of Interventions (Duke, 2010). The initial levels are intended to support at-risk students before they fail classes. In the first level, the summer transition program serves as the support for rising ninth graders. Once school starts, all ninth grade students are placed in interdisciplinary teams for the second level. All ninth grade students attend tutored study halls, the third level in the pyramid. In the fourth level, school faculty identify students they are concerned about within the first fifteen days of school. The next levels involve more individualized attention to students' needs. In the fifth level of intervention, students who are having academic difficulties are pulled out of class for support either individually or in small groups. Students then attend afterschool study halls if their grades are not improving in the level seven of the continuum of interventions. After students fail a class, they are placed in credit recovery and potentially summer school in level seven. In the eighth level, with parental permission, students are moved to the Success Team where they learn in a smaller environment and receive more intensive services. Finally, the last level consists of the LIFE program, an alternative school consisting of work and counseling components. In order to provide a continuum of interventions, teachers must be aware a student is having difficulty, recognize what is causing the difficulty, possess the capacity to provide a targeted intervention, and have the ability to make adaptations to the intervention as needed (Duke, 2010). In a

freshman bridge program, a transitional team, career counseling, student data monitoring, and peer tutoring can provide a system of support or continuum of interventions.

Transitional Team. Transitioning from one school to another is a process. Due to the concern with ninth grade, this transition is of particular concern. Researchers have found that the most effective programs focus on early intervention, communication with the middle school, special summer programs, and targeted academic instruction (Williamston, 2010). There are challenges with transitional intervention, including the number of adults to students, teacher support, and the relationship between the family, student, and teacher (Balfanz, 2009). Positive relationships between families, students, and teachers are key to a successful transition. Researchers suggest that a transitional team incorporate information, social support, and academic support activities to help students as they move from eighth to ninth grades (Williamston, 2010). A transitional team should also utilize the best teachers. These teachers should be provided time to develop a standards-based curriculum to support students' needs. Additionally, it is recommended that a transitional team focus on deficiencies in reading and math as well as study skills and career preparedness (Bottoms, 2008).

A transitional team incorporating looping is a promising practice that can impact student achievement in a continuum of interventions. Looping was developed by Rudolf Steiner in 1919 using the Waldorf School model and involves multi-year teaching (Hitz, Somers, & Jenlink, 2007). Traditionally in a looping situation, a teacher moves to the next grade level with her or his students for at least two years. Researchers have found that looping results in "a continuity of relationship with their teacher that enables children to flourish" (Hitz, Somers, & Jenlink, 2007, p. 80). Trust and strengthened relationships are positives associated with looping (Baran, 2010). In an empirical study of looping, researchers also found that looping positively impacted

student attendance and the likelihood that the student would be promoted to the next grade level when comparing students in looping classrooms to those not in looping classrooms (Cistone & Aleksandr, 2004). Looping can be particularly effective during a time of transition and is recommended for freshmen (Baran, 2010; McBrady & Williamson, 2010). When qualitatively examining teachers' and students' perceptions of looping in the seventh and eighth grades in a middle school, Baran (2010) found that teachers noted the strong relationships, sense of family, and benefits to academic instruction and addressing students' needs. Students shared similar advantages of looping. They also shared that the second year of looping was not as stressful as the first and that they had better attitudes toward school. Teachers also commented on the drawbacks of increased emotional stress by becoming over-involved with students due to the longer relationship with students. Drawbacks for students included being with a teacher they did not like for two years and they felt they did not know other students who were not in their looping class (Baran, 2010). Looping has also been found to support female students' growth in math and math competence (Franz, Thompson, Fuller, Hare, Miller, & Walker, 2010). Incorporating aspects of looping in a transitional team can provide support for students as they move to a different grade.

Career Counseling and Case Management. An important component of a continuum of interventions is increased support for students throughout the school year. One such support is career counseling. Career counseling is the practice in which "a professional counselor assists a client or group of clients to cope more effectively with career concerns" (Niles & Harris-Bowlsbey, 2009, p. 13). In a school setting, this relationship is between the school counselor and students on his or her case load. Nationally, school counselors are considered vital to preparing students to be college and career ready (The Education Trust, 2011). Career counseling

emphasizes workplace readiness skills such as academic and interpersonal skills. Appropriate interventions for high school include developing a career plan, completing various career inventories, and engaging in informational interviews (Dedmond, 2005; Niles & Harris-Bowlsbey, 2009). By providing students with college and career counseling, students will be prepared for a job or school beyond high school (The Education Trust, 2011).

Student Data Monitoring. Another component of a continuum of interventions is the monitoring of student data. The Consortium of Chicago School Research developed such an indicator to track student progress. The researchers previously found that tracking whether or not students were on track to graduate after the ninth grade year could effectively predict graduation (Allensworth & Eaton, 2005). After further research, they noted that attendance and course failure were major factors influencing students' graduation, adding attendance to the on-track indicator (Allensworth & Eaton, 2007). A student was considered on track if he or she had enough credits at the end of the freshman year to be promoted to tenth grade (Jerald, 2006). By using the on-track indicator, schools were able to narrow conversations to factors the school could control, identify students at risk, and develop a strategic plan based on patterns from the data. Some of the most important factors include grades, failures, low attendance especially in the first thirty days of school, test scores, and referrals (Jerald, 2006). Once students were identified, administrators and teachers were able to identify students before they entered high school, intervene early with appropriate supports, and then help students recover credits if needed. By looking at the data, school officials were able to focus on interventions to help students make strides toward graduation (Allensworth, 2013, Balfanz, 2009). Managing data and using that data to track student progress is crucial during the ninth grade transition.

Peer Tutoring. Another intervention supported by research is peer tutoring. According to Utley and Mortweet (1997), peer tutoring is defined as "a class of practices and strategies that employ peers as one-on-one teachers to provide individualized instruction, practice, repetition, and clarification of concepts" (p. 1). Peer tutoring strategies employ time to respond and allow for immediate feedback. Through a meta-analysis of twenty-six peer tutoring studies of single-case research in different subject areas, Bowman-Perrott, Davis, Vanest, & Williams (2013) found the "effect size of 195 phase contrasts was 0.75 with a confidence interval of 0.71 to 0.78, indicating that moderate to large academic benefits can be attributed to peer tutoring" (p. 39). It was reported to be particularly effective at the middle and high school level; and studies utilizing more rewards had greater effect sizes. Vocabulary had a large effect in this meta-analysis, and peer tutoring was reported as an effective intervention for students with disabilities. The researchers concluded that more attention to fidelity measures needed to be included in future studies (Bowman-Perrott et al., 2013).

Another model of peer tutoring focuses on the "acquisition of knowledge/skill through active helping and supporting among status equals or matched comparisons, where both tutees and tutors benefit from the transaction" (Topping, 2015, p. 1). A critical component of the tutoring relationship is trust between the tutor and tutee (Topping, 2015). In Scotland, Tymms, Merrell, Thurston, Andor, Topping, and Miller (2011) conducted a randomized control study of peer tutoring in an entire district consisting of 129 elementary schools for two years. Using a factorial clustered model, some students received reading peer tutoring through the Paired Reading method, some students received math peer tutoring through the Duolog method, and some students received both. The Paired Reading Method focuses on error correction and reading roles while the Duolog math method focuses on the tutor prompting the tutee to solve

math problems, encouraging metacognitive strategies. In the study, some students received tutoring three times a week while others received it only once a week. Another factor in the study was same age versus cross-age tutoring. In all, 8,847 students participated, though 286 moved during the study and 26 schools dropped out. Student achievement or attainment was measured through the Performance Indicators in Primary Schools Assessments (PIPS), curriculum based assessments used in Scotland. To ensure fidelity to the treatments, the researchers randomly observed selected schools and had teachers complete a survey at the end of the project. The researchers found that cross-age tutoring showed the greatest effect size of .20 while same age tutoring did not show an effect size. Math and reading tutoring together showed somewhat higher gains; and tutoring once a week was just as effective as tutoring three times a week. The researchers concluded that tutoring, in particular cross-age tutoring, could positively contribute to the sense of community and achievement in a school (Tymms et al., 2011).

Summary

The research highlights that the transition to ninth grade is a critical change for students. Failing ninth grade can impact graduation, but intervening early can prevent a student from dropping out (Consortium on Chicago School Research, 2007; Nelid, 2009; Roderick & Camburn, 1999). While success in reading and writing is tied to student achievement, success in math is critical for graduation (Nelid, 2009; Stoelinga & Lynn, 2013). Student performance in school can be related to their overall attitude toward school (Lai et al., 2015). Math is particularly concerning as many students express anxiety toward the subject, especially Algebra I (Yasar, 2016). Algebra I is a gateway course to higher level math and critical to future math courses and graduation (National Mathematics Advisory Panel, 2008; Stoelinga & Lynn, 2013). Over the summer, students of lower socioeconomic backgrounds lose content and skills in

comparison to their wealthier school peers (Alexander, Entwisle, & Olson, 2001; Alexander, Entwisle, & Olson, 2007). Providing summer learning opportunities can positively influence students' achievement (Terzian et al., 2009). Many secondary schools have taken this approach by implementing summer bridge programs and/or summer freshmen academies. These programs provide more attention and support to ninth grade students (McCallumore & Sparapani, 2010). Though a transitional program can positively influence student achievement, a continuum of interventions provides additional support during the school year with different levels of increasing support. Case management during the first semester by a school counselor and principal with individual bi-quarterly meetings, analysis of student data and action plans, and peer tutoring can provide needed support in the ninth grade year and beyond (Allensworth, 2013; Duke, 2010).

Chapter Three: Methodology

Introduction

A review of the literature highlighted the importance of a successful ninth grade transition for graduation and beyond as well as the importance of intervening early when problems arise (Consortium on Chicago School Research, 2007; Nelid, 2009; Roderick & Camburn, 1999). The summer is also a critical time to intervene as students lose knowledge and skills during this time off (Alexander et al., 2001; Alexander et al., 2007). Freshman summer bridge programs are one strategy utilized by school systems to improve student achievement. While these programs have been studied in larger urban areas including Chicago, Illinois and DeKalb County, Georgia, they have not been fully studied in less populated and rural areas. Furthermore, research highlights that a continuum of interventions is the key to helping students stay on track for graduation (Duke, 2010). A Freshman Bridge Program has the potential to positively influence student academic achievement, especially when coupled with a continuum of interventions throughout the first semester of the ninth grade year.

The Central Virginia High School Freshman Bridge Program first provided a three-week summer program focusing on Algebra I, academic skills, and career counseling. It also incorporated a transitional team with one of the eighth grade teachers teaching in the summer program. During the first semester of the ninth grade year, the Freshman Bridge Program utilized a continuum of interventions including case management during the first semester by a school counselor and principal (researcher) with individual bi-quarterly meetings, analysis of student data with action steps if needed, and peer tutoring when the need arose or was requested by the student. This program was examined not only through the lens of overall student academic and math achievement, but also through the lens of student attitude, an often

overlooked variable influencing student achievement or success. This study adds to the field by combining intervention strategies through a transitional bridge program and a continuum of interventions. It also contributes to the field by focusing on a rural school of 857 students since the majority of ninth grade programs have been conducted at larger urban schools. Finally, it combined mixed methods using quantitative and qualitative data to examine the impact of the Freshman Bridge Program on student attitude, student achievement in Algebra I, and overall student academic achievement, an approach that had not been used in previous research.

Problem Statement

The purpose of this study was to examine the impact of a Freshman Bridge Program on student attitude, student achievement in math, and overall student academic achievement from the spring of 2017, when the student was enrolled at the middle school, to the end of the first semester of the ninth grade year (December, 2017). The researcher wanted to know the influence of the program on student attitude and student achievement in Algebra I, as well as the influence of the program on student attitude and overall student academic achievement during the transition from eighth to ninth grade. The Freshman Bridge Program provided a three-week summer program from July 10-28th from 9-12 pm Monday through Friday. The program focused on Algebra I, academic skills, and career counseling. During the first semester of the ninth grade year, the Freshman Bridge Program utilized a continuum of interventions including case management during the first semester by a school counselor and the principal (researcher) with individual bi-quarterly meetings, analysis of student data with action steps as needed, and peer tutoring as the need arose or was requested by the student. This program was examined not only through the lens of academic and math achievement, but also through the lens of student attitude, an often overlooked variable influencing student achievement or success.

Research Questions and Hypotheses

The first goal of the research was to determine the relationship between student attitude and student achievement in Algebra I for those participating in the Freshman Bridge Program during the first semester of the 2017-18 school year. The second goal of the research was to determine the relationship between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program during the first semester of the 2017-18 school year. Student attitude was defined by the domains of the School Attitude Assessment Survey-Revised including Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation and Self-Regulation. Algebra I achievement is defined by the pre- (RSOL 1), mid- (RSOL 2) and post-tests (RSOL 3) scores aligned to the first semester of the Algebra I curriculum. The pre-test (pre-RSOL 1) was administered in May and the randomized version of the post-test (post-RSOL 3) was administered again in December of 2017. The mid-test (RSOL 2) was administered in July of 2017. All tests were based on released SOL test questions from the Virginia Department of Education. Overall student academic achievement was defined as the number of passed courses at the end of the first semester. In order to be on track to graduate and move to the tenth grade, students must pass five out of seven classes.

RQ1: Is there a relationship between student attitude and student achievement in Algebra I for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

$H_0$1: There is no significant relationship between student attitude and student achievement in Algebra I for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year.

RQ2: Is there a relationship between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

$H_0$2: There is no significant relationship between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year.

RQ3: Does participation in the Freshman Bridge Program result in a more positive attitude toward school?

$H_0$3: Participation in the Freshman Bridge Program does not result in a more positive toward school.

RQ4: Does participation in the Freshman Bridge Program result in improved student achievement in Algebra I as measured by the Algebra I released SOL pre-, mid-, and post-tests?

$H_0$4: Participation in the Freshman Bridge Program does not result in improved student achievement in Algebra I.

RQ5: Does participation in the Freshman Bridge Program result in improved overall student academic achievement as measured by passing five out of seven courses by the end of the first semester?

$H_0$5: Participation in the Freshman Bridge Program does not result in improved overall student academic achievement.

Research Design

Due to the concern for the transition to ninth grade and the importance of the ninth grade year, the research design for this study was an action research approach with mixed methods. In action research, the researcher focuses on solving a problem related to his or her field of study or

workplace as a practitioner (Johnson & Christenson, 2014). Sagor (2000) defined action research as "the disciplined process of inquiry conducted by and for those taking the action. The primary reason for engaging in action research is to assist the actor in improving or refining his or her actions" (p. 3). The focus of action research centers on "professional action," empowerment "to adjust future action," and "improvement" (Sagor, 2011, pp. 5-6). Action research was appropriate for this study because it was tied to the researcher's profession and within her professional influence to make changes. Additionally, the primary goal of the Freshman Bridge Program was improvement in student attitude, achievement in Algebra I, and overall student academic achievement. Action research is also a cyclical process with the four steps of "planning, acting, observing, and reflecting" (Johnson & Christenson, 2011, p. 71). Similarly, this study followed the four steps. The study incorporated concurrent mixed methods with embedded design. Mixed methods is defined as "research that involves the mixing of quantitative and qualitative methods or other paradigm characteristics" (Johnson & Christenson, 2014, p. 33). In an embedded design study, the qualitative research takes places within the quantitative study. Since both quantitative and qualitative data were collected concurrently, a greater priority was placed on quantitative data and qualitative data served a supporting role (Center for Innovation in Research and Teaching, 2017). By utilizing mixed methods, quantitative data measured the impact of the program on student attitude, student achievement in Algebra I, and student academic achievement. Qualitative data took the form of comparing pre-, mid-, and post-tests of the School Attitude Assessment Survey-Revised and the Algebra I released SOL tests. Qualitative data attained through focus groups provided the students' voices on their experiences in the Freshman Bridge Program.

Participation in the Freshman Bridge Program was the independent variable and the dependent variables were student attitude, Algebra I achievement, and overall student academic achievement. The Freshman Bridge Program incorporated a three-week summer program and a continuum of interventions during the first semester of the ninth grade year. The continuum of interventions included case management during the first semester by a school counselor and principal with individual bi-quarterly meetings with students, analysis of student data to determine if peer tutoring was needed, and tutoring during the first semester by peers (older students in a tutoring program) for those students who needed it based on their academic performance or request. The researcher kept track of attendance of peer tutoring sessions through a log as well as notes from each session. Student attitude was defined as Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation and Self-Regulation. Algebra I achievement was measured by the pre-test (pre-RSOL 1), mid-test (mid-RSOL 2), and post-test (post-RSOL 3) of the Algebra I released SOL test. Overall student academic achievement was defined as the number of courses passing at the end of the first semester. In order to be on track to graduate and move to the tenth grade, students must pass five out of seven classes.

Spring of 2017 Research. Originally, the researcher intended to compare participants' and non-participants' scores on the pre-, mid-, and post-assessments of the School Attitude Assessment Survey-Revised and the Algebra I released SOL tests. No students and parents provided consent and assent to have their scores used so there was no comparison group for the study. During the spring of 2017, students who consented and assented to participate in the study completed a pre-test survey on student attitude (School Attitude Assessment Survey-Revised ((SAAS-R)-see Appendix A). Students also completed the pre-test (pre-RSOL 1) Algebra I

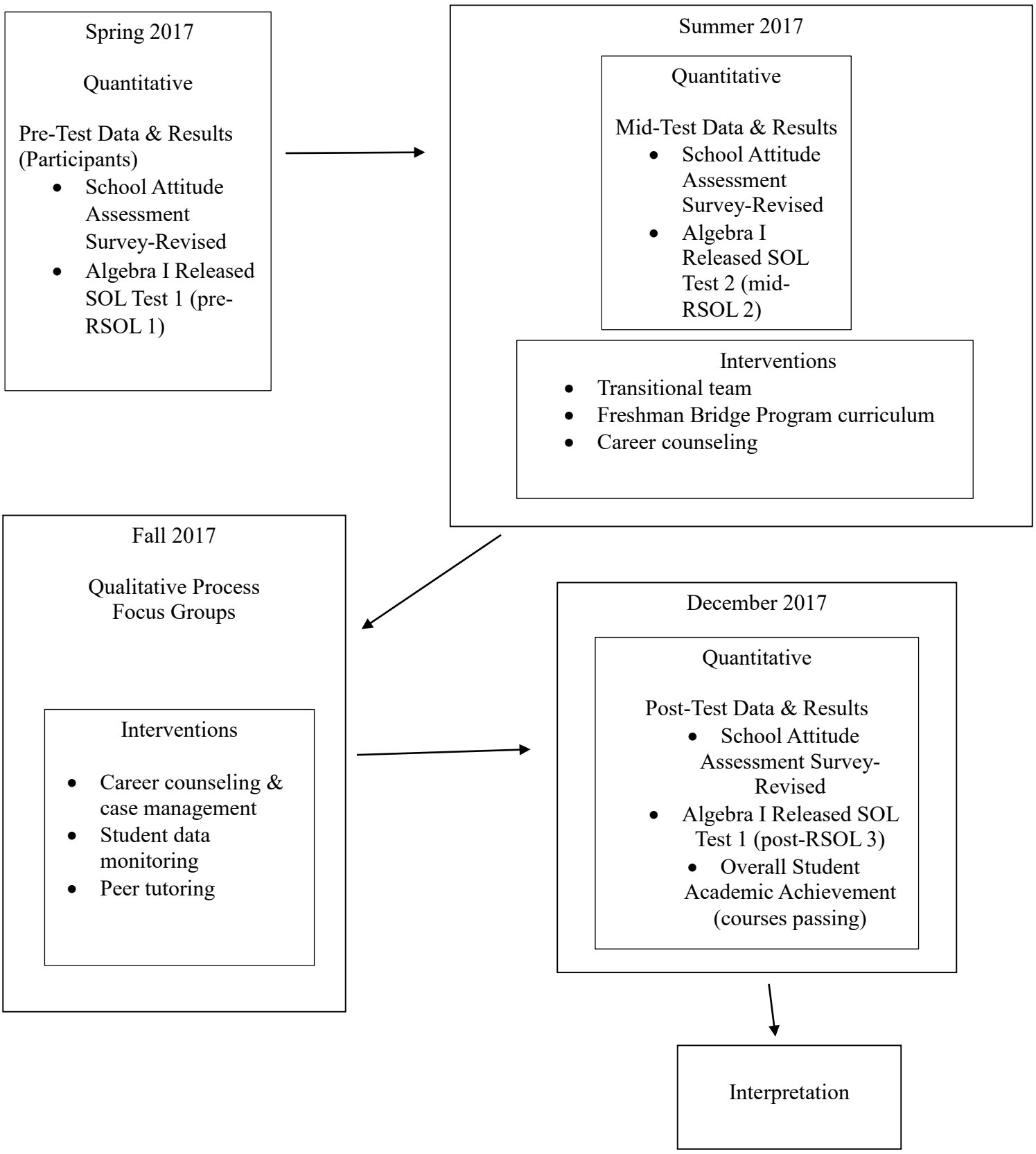
released SOL test 1 to measure Algebra I achievement prior to the summer portion of the Freshman Bridge Program during their Grade 8 Math Class (see Appendix B). The only criteria for participating in the Freshman Bridge Program was taking Grade 8 Math during the eighth grade year.

Summer of 2017 Research. Throughout the summer portion of the Freshman Bridge Program, students received hands-on math instruction on modeling expressions, solving equations and inequalities, understanding function families, and pairing tables, equations, and graphs. Students also learned different note-taking strategies and the seven habits of effective teenagers from the text, *The Seven Habits of Highly Effective Teenagers*. Students also explored different career inventories and took three fields trips, one to the local department of motor vehicles office, one to a technical college, and one to a local community college. After the three-week summer portion of the Freshman Bridge Program in July of 2017, students completed a mid-test survey on attitude (SAAS-R) and the Algebra I released SOL mid-test (mid-RSOL 2-see Appendix C).

Fall of 2017 Research. During the first semester of 2017, participants were randomly selected from the pool of those who elected to participate in the Freshman Bridge Program by using a random number generator to pick student numbers from the data set. These numbers were divided into two groups to hold two focus groups with 8 to 10 students in each group in October of 2017. In the focus groups, students answered questions and reflected on their experiences in the program and the first semester of their ninth grade year as the researcher used the semi-structured focus group guide questions (see Appendix E). The focus groups were held during enrichment time, which prevented the participants from missing instruction.

December of 2017 Research. In December of 2017, participants completed the post-test of the SAAS-R survey during enrichment time to avoid missing instruction and the post-test Algebra I released SOL test 3 (post-RSOL 3) during the participants' Algebra I class (see Appendix D). Most of the standards had been taught during the first semester of the Algebra I course. Figure 3.1 summarizes the research process.

Figure 3.1. Research Process



Background of Central Virginia High School

The research study was completed at a rural high school in Central Virginia. The current student enrollment for the 2017-18 school year is 855, with 210 students in the ninth grade. In the 2016-17 school year, 89% of students passed the End of Course Reading SOL assessment, which was an increase from 85% during the 2015-16 school year (pass rates include expedited retakes). Eighty-four percent of students passed the Writing SOL assessment, 88% passed the History SOL assessments, and 76% passed the Science SOL assessments in the 2016-17 school year (Virginia Department of Education, 2017). Additionally, 85% of students passed Algebra I, Geometry, and Algebra II SOL assessments (Virginia Department of Education, 2017). Approximately 89.4% of students miss less than 10% of school, and the school has an on-time graduation rate of 93.3% (Virginia Department of Education, 2017). Prior to 2016-17, the lowest assessments scores were in math; however, math scores improved five percentage points from the 2015-16 to 2016-17 school year. Algebra I scores for all students improved from a 68% pass rate in 2015-16 to an 85% pass rate in 2016-17 (Virginia Department of Education, 2017). For ninth grade students taking Algebra I, the pass rate improved 16 percentage points from 2016 to 2017 from a 71% pass rate to an 87% pass rate (Virginia Department of Education, 2017). Math continues to be an area of concern along with graduation. For the 2015-16 school year, the school had a 4.29% dropout rate (Virginia Department of Education, 2017).

As a school division requirement, students in the school under study must pass at least five out of seven credits by the end of their freshman school year. Student achievement is also measured in growth assessments, including the Measures of Academic Progress (MAP) assessment and the standardized end-of-course assessments, the Standards of Learning SOL tests. The MAP test is given three times a school year in the fall, winter, and spring in the

Central Virginia School Division. The assessment is intended to measure student growth and progress on vertical skills in math through a Computer Adaptive Format. The MAP assessment has been linked to the Virginia Standards of Learning as well (NWEA, 2016). It is intended to be a formative assessment that drives instruction, meaning the teacher uses the results of the data to alter instruction for students and provide interventions as necessary. The End-of-Course SOL assessments are administered during the spring of the school year. These summative assessments measure student success in English, Math, Science, and Social Studies (Virginia Department of Education, 2016). According to the school division attendance policy, a student receives failing nine weeks grades with nine unexcused absences. Unexcused absences are determined by the school administration team and typically include any absence not pre-approved by the principal and absences not verified by doctor's notes.

Personal Context

During the 2016-17 school year, the Director of Secondary Instruction in the Central Virginia Public School division issued a call for proposals for 'Get Out of the Box" grants. Assistant principals were encouraged to submit proposals addressing areas of concern and need at their different schools. The researcher developed and submitted a proposal for Central Virginia High School (CVHS) entitled the Algebra Academy. In the proposal, the researcher requested funds for an Algebra Academy for rising freshmen during the summer of 2016. The two goals of the Academy were to help develop students' math skills and help them be better prepared for ninth grade. The proposal was approved, including funding for two to three teachers based on the number of participants. In the spring of 2016, the feeder middle school to the CVHS identified students who could benefit the most from this program. Out of thirty-three students, fifteen students elected to participate in the Academy. Two teachers were recruited for

providing instruction during the Academy. One teacher was from the middle school and taught some of the students in Grade 8 Math. The other teacher was from the high school and would teach many of the students in Algebra I during the upcoming school year. The hope was that having a teacher from the middle school and having a teacher from the high school would provide a bridge for these students, a hybrid form of looping. The two teachers worked together to design the curriculum for the Algebra Academy in June and the Academy was held for two weeks in July in 2016. Of the fifteen students, twelve showed growth from the pre- to post-tests and three did not show improvement. The pre and post-tests were based on previously released SOL test questions and aligned with the first semester of the Algebra I curriculum. The students also commented during a focus group interview that they felt the Algebra Academy was helpful. Based on these preliminary results, the Director of Secondary Education as well as the researcher and teachers wanted to continue the Academy with modifications based on student feedback. The Freshman Bridge Program was developed as a result of the success of the Algebra Academy and student feedback.

Freshman Bridge Program Curriculum

The curriculum for the Freshman Bridge Program focused on the first semester of Algebra I standards (see Appendix F) and skills as well as academic skills such as study habits. Students received hands-on math instruction on modeling expressions, solving equations and inequalities, understanding function families, and pairing tables, equations, and graphs. After learning the different concepts and skills, students completed application problems tied to those concepts and skills. The book *The Seven Habits of Highly Effective Teens* was a resource for the program and each student participant received a copy. The Freshman Bridge Program curriculum also included career counseling topics such as completing career inventories, visiting

the local community college and technical college, and visiting a local transportation office to learn about different careers in math. Each week featured a theme and students embarked on a weekly field trip tied to the weekly theme.

Participants and Data Collection

The participants were rising ninth grade students who were enrolled in Grade 8 Math (Pre-Algebra) during their eighth grade year. These students attended one middle school and had two different math teachers. The sample was a criterion-based, convenient, purposive sample because these students were enrolled in Grade 8 Math and attended the Central Virginia High School. The sample was criterion-based since the participants were rising ninth graders and were taking Grade 8 Math during the 2016-17 school year. It was also convenient since the participants were readily accessible due to the researcher's employment as the principal at the high school. Finally, the sample was purposive as the participants met specific characteristics set by the researcher (Johnson & Christenson, 2014). This sample included 110 students with the majority of these individuals being male (see Table 3-1) and the majority also being white (see Table 3-2). Additionally, 16.3% of these students have a disability. To achieve a confidence interval of 7, 71 participants were needed in the study (Creative Research Systems, 2012). This confidence interval was not achieved with a participation rate of 17% (n=19). Since the students were underage, informed consent from the parent and informed assent from the student was necessary. Informed parent consent and informed assent was gathered during the spring semester of the eighth grade following Institutional Review Board approval from Lynchburg College (see Appendix G). Additionally, the researcher secured permission from the Superintendent of the Central Virginia High School division (see Appendix I). Since the students are a vulnerable population, students were assigned a number to match pre-, mid- and post-tests in the data set as

well as with the number of classes passing by the end of the ninth grade year. In the research, pseudonyms were used when discussing the data. While the researcher hoped to have a matched comparison group, no students provided informed assent and consent to have their scores used in the study.

Table 3-1

Gender Distribution of the Sample

Female	Male
43% (47)	57% (63)

Table 3-2

Race Distribution of the Sample

White	Black	2 or More Races	Asian	American Indian
77% (85)	14% (15)	7% (8)	1% (1)	1% (1)

Convenience sampling was used. All of the students attended one middle school and students chose to participate in both the program and the study. The sampling was also criterion-based since the criteria for participation in the program was taking Grade 8 Math in the eighth grade. Participants who did not stay in the program were accounted for and excluded from data analysis. Focus group participants were randomly selected from the pool of those participants who elected to participate by using a random number generator to pick student numbers from the data set. These numbers were divided into two groups of seven to eight students in each group in October of 2017. These focus groups allowed the researcher to hear first-hand from the participants about their experiences in the program. Participants had the option to decline participating in the focus group, but no one declined participation.

Description of Instrumentation and Measurement Procedures

The School Attitude Assessment Survey-Revised (SAAS-R) was used as the instrument measuring student attitude (McCoach, 2002). The School Attitude Assessment Survey-Revised is a published survey to identify the five domains of attitude: Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation and Self-Regulation. The SAAS-R uses a 7-point Likert scale ranging from strongly disagree to strongly agree with 35 total items (see Appendix A). The reliability analysis indicated that the scores on the subscales showed an internal consistency reliability coefficient of at least .80 on each of the five factors (McCoach, 2002, p. 421). McCoach's (2002) findings suggest that "the scores on the SAAS-R appear to demonstrate evidence of adequate construction validity, criterion-related validity, and internal consistency reliability" (p. 426). The researcher secured permission from the author to use the SAAS-R in the study (see Appendix H). It was administered during the spring of 2017, on the last day of the summer portion of the Freshman Bridge Program, and again in December of 2017. Another data measure was the pre-, mid-, and post-test results of the Algebra I released SOL tests. The pre-test (RSOL 1) was administered to participants in the spring of 2017. The mid-test (RSOL 2) was administered to participants in the Freshman Bridge Program in the summer of 2017. The post-test Algebra I (RSOL 3) was also administered to participants in December of 2017. A final data measure was overall student academic achievement (passing five out of seven courses) at the end of the first semester of the ninth grade year.

In order to hear directly from the participants about their experiences in the Freshman Bridge Program, two semi-structured focus groups were held, one with eight students and the other with seven students. A focus group is a group interview during which "a moderator leads a discussion

with a small group of individuals to examine, in detail, how the group members think and feel about a topic" (Johnson & Christenson, 2014, p. 234). An interview guide was used for the two semi-structured focus groups and opened with the following statements to encourage students' honest responses:

> Today you're here because I want to learn about your experiences in the Freshman Bridge Program and your freshman year at high school. I will ask questions throughout our time together.
>
> You can answer in any order you want to, just add in and contribute.

A semi-structured interview guide or protocol provides a pre-developed list of questions to use with participants, but other questions may arise during the interview and can be included (Lichtman, 2013). The list of questions that were used to guide the focus groups are included in Appendix E. The focus groups were audio recorded and then transcribed by the researcher. By hearing from the participants first-hand, the researcher learned ways to improve the Freshman Bridge Program, a key part of the action research process.

Data Analysis

Statistical Package for Social Science (SPSS) version 25 was used for analysis of quantitative data. Descriptive statistics were analyzed for student attitude, student assessment scores on the Algebra I pre-, mid- and post-tests, and overall student academic achievement. Other descriptive data that were included for background purposes were MAP scores for participants' eighth grade year (fall, winter, and spring), race, gender, attendance, and course grades. For the relationship between student attitude and student achievement in Algebra I in the Freshman Bridge Program, the researcher used Spearman's rank order correlation to determine if there was a statistically significant correlation between student attitude and student achievement in Algebra I since the

student attitude variable included ordinal data. Spearman's rank order correlation was also used to determine if there was a statistically significant correlation between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program.

Originally, the researcher intended to use ANOVAs to compare means between participants in the Freshman Bridge Program to limited participants on the pre-, mid-, and post-tests of the SAAS-R and Algebra I released SOL tests and overall student academic achievement for the third, fourth, and fifth research questions The researcher planned to match participants in the program to an equal number of individuals in the sample who did not participate in the program based on previous MAP scores, gender, and previous academic achievement, but provided informed parent consent and informed assent for their scores on the SAAS-R, the pre-Algebra I released SOL test 1 (pre- RSOL 1), and Algebra I released SOL post-test (post-RSOL 3) to be used. Since the researcher did not have a match comparison group, Paired Samples T-tests were used to compare the pre-SAAS-R to the mid-SAAS-R, the mid-SAAS-R to the post-SAAS-R, and the pre-SAAS-R and the post-SAAS-R for the third research question. For the fourth research question on student achievement in Algebra I, the researcher compared the means between participants' scores on the pre-RSOL 1, mid-RSOL 2, and post-RSOL 3 using a repeated measures ANOVA. For the last research question regarding overall student academic achievement, the researcher provided how many classes participants were passing at the end of the first semester of the ninth grade year.

The researcher first transcribed the focus group interviews by using the audio recording. In order to analyze the focus groups, participants' responses were analyzed using open (initial) coding, axial coding, and selective coding (Rudestam & Newton, 2015). In the first phase of initial coding, reading the transcript of the focus group verbatim led to the recognition and

naming of data. In the next phase, axial coding, concepts from the initial coding were categorized into themes. Finally, in selective coding, the data was examined as a whole to determine the main idea or big picture from the data. This process allowed for the emergence of themes and categories of themes based on the participants' responses (Johnson & Christenson, 2014). In an embedded design study, the qualitative research takes places within the quantitative study. Because the design of this study was embedded concurrent, a specific number of participants for the focus groups was not specified; however, it was anticipated that two focus groups of eight to ten students each would be conducted. These focus groups were completed to validate the quantitative data to the point of saturation or the point where no new information was being revealed from the data (Johnson & Christenson, 2014).

Justification of the Design.

This action research study focused on the transition to ninth grade, a major concern for educators in schools (Johnson & Christenson, 2014). The School Attitude Assessment Survey-Revised (SAAS-R) measured participants' Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation and Self-Regulation. The Algebra I pre-, mid-, and post-tests (RSOL 1, RSOL 2, and RSOL 3) administered during the spring, summer, and December of 2017 measured student understanding of the Freshman Bridge curriculum based on the first semester of the Algebra I curriculum. Overall student academic achievement was defined as passing five out of seven classes at the end of the first semester of the ninth grade year. The results of the SAAS-R, the scores on the Algebra I RSOL 1, RSOL 2, and RSOL 3 tests, and overall student academic achievement provided quantitative information about the Freshman Bridge Program. The qualitative focus group interviews strengthened and validated the research. The qualitative focus groups provided the students' own voices on their

experiences in the Freshman Bridge Program. These complementary methods provided a better overall view of the effectiveness of the Freshman Bridge Program (Johnson & Christenson, 2014).

Despite these strengths, there were also a few potential threats to validity. One threat to internal validity was the maturation of the rising ninth grade participants. Since these participants were growing physically and mentally, their academic achievement could have increased as a result of age rather than participation in the program (Johnson & Christenson, 2014). By assessing students within a five-month period, this threat was reduced as maturation effects would be expected by the end of the ninth grade year rather than during a semester. Another threat to validity concerns testing. Students completed the Algebra I released SOL test 1 (pre-RSOL 1) during the spring and December of 2017 (post-RSOL 3) and completed the Algebra I released SOL test 2 (mid-RSOL 2) during the summer of 2017. One limitation associated with the Algebra I released SOL tests were the small number of questions of each tests (twenty-two). While this number is appropriate since the questions corresponded to the standards taught during the first semester of Algebra I, it is a limitation of the study. Additionally, being exposed to the test more than once can influence the results (Johnson and Christenson, 2014). By using different versions of the test, this threat was reduced. A third threat to internal validity was the potential for intervening variables, especially with respect to the participants' Algebra I teacher during their freshman year. This threat was reduced by having all participants in the Freshman Bridge Program placed with the same Algebra I teacher for their ninth grade year. This teacher served as one of the teachers during the summer portion of the Freshman Bridge Program. An additional threat to internal validity was participant self-selection on the SAAS-R survey. When individuals self-select, the responses might not actually be the

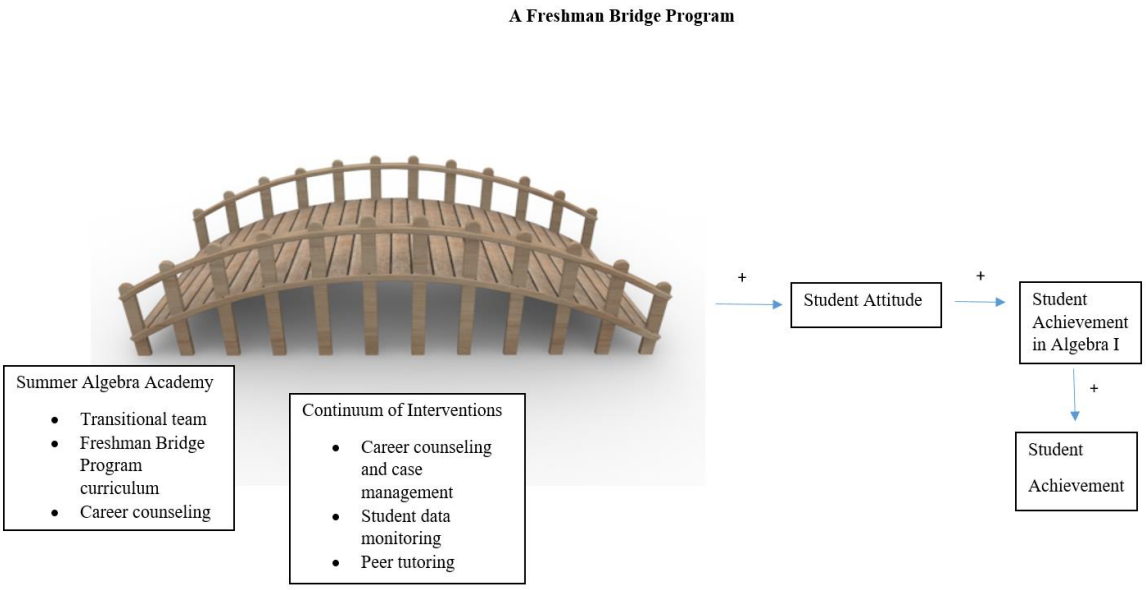
most correct (Johnson & Christenson, 2014). Finally, a threat to external validity was the sample itself. It was an accessible sample and participants were able to self-select to participate in the Freshman Bridge Program or their parents could select for them to participate in the Freshman Bridge Program. Though the researcher hoped to reduce this threat to external validity by comparing these students to similar individuals who did not participate in the Freshman Bridge Program based previous MAP scores, gender, and previous academic achievement, there was no matched comparison group in the study. A final limitation was the position of the researcher. As a school administrator, she has the potential to influence student responses, especially during the focus group interview. This threat was reduced by the researcher following the focus group question guide during the focus groups and by the researcher having developed a relationship with the students from July to December of 2017. The researcher had met with students each four and a half weeks with the school counselor so the students were more comfortable with her.

Conclusions

In this study, the researcher examined the relationship between student attitude and student achievement in Algebra I, the relationship between student attitude and overall student academic achievement, and the impact of the Freshman Bridge Program on attitude toward school, student achievement in Algebra I, and overall student academic achievement (see Figure 3.2). Additionally, the researcher examined a problem and evaluated a solution as an educational practitioner through action research. The concurrent embedded mixed methods design provided both quantitative and qualitative data. The primary significance of the study is increased research on what measures and programs help students have a successful transition to high school. Specifically, this study will add to the field by integrating a summer bridge program with a continuum of interventions during the ninth grade year. This integration will contribute to the

research field of effective ninth grade transitional strategies. It will also contribute to the field by focusing on a rural school of 855 students since the majority of ninth grade programs have been studied at larger urban schools. By using action research, the study will continue the work from the previous program and provide better data to evaluate the effectiveness of the program. Because the study involves action research with mixed methodology, it will benefit the Central Virginia School District as results of the program are shared with the local community.

Figure 3.2. Conceptual Model of a Freshman Bridge Program



Chapter Four: Analysis of Data

Introduction

This chapter includes both quantitative and qualitative results from the study of the Freshman Bridge Program. First, a description of the sample is provided before the students participated in the Freshman Bridge Program including their race, gender, eigthth grade first semester attendance, eighth grade end of year course grades, Measures of Academic Progress (MAP) scores for the participants' eighth grade year (August 2016, December 2016, and March 2017). Then, descriptive statistics are provided for the period after students participated in the Freshman Bridge Program including their ninth grade fall semester attendance and their responses regarding their grade point average (GPA), time spent weekly on homework, and if their parents required them to participate in the Freshman Bridge Program. Descriptive statistics are also presented along with analytic data for each of the study's research questions. Quantitative data were collected through the released SOL pre-test (pre-RSOL 1), mid-test (mid-RSOL 2), and post-test (post-RSOL 3), the pre-, mid-, and post-surveys of Student Attitude Assessment Survey-Revised (SAAS-R), and end of first semester of ninth grade course grades. Qualitative data is presented by the discussion of emerging themes from the participant focus groups. A summary of both the quantitative and qualitative data concludes the chapter.

Description of the Sample

Pre-Intervention-May 2017. The original sample included 110 students with 57% being male and 47% being female. Additionally, the majority of students in the sample were white (77%) or black (14%). Other identified races included two or more races (7%), Asian (1%), and American Indian (1%). Nineteen student participants completed the informed assent and their parents completed the informed consent to participate in the study. Similar to the sample, a

majority of the student participants were male (58%) while 42% of the student participants were female. Also similar to the original sample, a majority of the student participants were white (68%) or black (16%). Other identified races included 2 or more races (11%) and Asian (5%). In order to achieve a confidence interval of seven, 71 participants were needed in the study (Creative Research Systems, 2012). This confidence interval was not achieved with a participation rate of 17% (n=19).

With regard to attendance from August to December of 2016, the majority of participants missed no days or just 1 day of school (one participant was not enrolled at the middle school during the first semester so there is no attendance data for that student for the first semester of the eighth grade year). Twenty-seven percent of participants missed 2-3 days of school while only one student missed five days of school and one student missed thirteen days. Five participants received failing grades in three courses at the end of their eighth grade year. In Grade 8 Math, the majority of students received an A or B in the course (69%) with 26% receiving a C and 5% (1 student) receiving an F. In English 8, most participants received an A or B in English (78%). Only 22% of participants received a C or D in English 8. The lowest grades were in Earth Science. Thirty-two percent of participants received a D or F in that course. Similarly, 22% of participants received a D or F in World Geography. All of the participants passed PE/Health 8 with an A and all participants passed their elective class with an A, B, or C (see Table 4-1).

Table 4-1

Eighth Grade Course Grades

Subject	Grade 8 Math	English 8	Earth Science	World Geography	PE/Health 8	Elective
As	11%(2)	15% (3)		5% (1)	100% (19)	52% (10)
Bs	58% (11)	63% (12)	26% (5)	42% (8)		37% (7)
Cs	26% (5)	11% (2)	42% (8)	31% (6)		11% (2)
Ds		11% (2)	11% (2)	11% (2)		
Fs	5% (1)		21% (4)	11% (2)		

During their eighth grade year, participants completed the Math Measures of Academic Progress (MAP) assessment three times, beginning in the fall (August 2016), once in the winter (November/December 2016), and once in the spring (March 2017). The MAP assessment score can range from 100-350 (NWEA, 2016). The mean MAP score for the fall of 2016 was 216.7, which was lower than the national average score of 226.3 (SD=17.85). Participants' mean MAP score for the winter of 2016 was 220.5, which was also lower than the national average of 229.1 (SD=18.31). Lastly, the mean MAP score for the spring of 2017 was 227.7. This score was also lower than the national average of 230.9 (SD=19.11) (NWEA, 2016). The participants' overall mean scores increased with each assessment window, with an overall growth in the average MAP score from the fall of 2016 to the spring of 2017 of 11 points.

Post-Intervention

The next descriptive statistic provided is ninth grade attendance for the fall semester of 2017 (August to December 2017). Participants' attendance during the fall semester of their ninth grade year was similar to their attendance during the fall semester of their eighth grade year. The overwhelming majority of participants missed 0-1 days of school during the first semester of 2017 (68%). Sixteen percent of participants missed 2-3 days of school during the first semester

and 11% of students missed 4-5 days. Only one student (5%) missed nine days of school (see Table 4-2). In comparison to their eighth grade year, more participants only missed 0-1 days of school and 2-3 days fo school from August to December of 2017; however, one more student missed 4-5 days of school during the first semester of their ninth grade year than during the first semester of their eighth grade year. Only one student missed nine or more missed days from August to December of 2016 and from August to December of 2017.

Table 4-2

Participants' Attendance for the Fall Semesters of 2017 and 2018

	0-1 missed days	2-3 missed days	4-5 missed days	9 or more missed days
8th Grade Year (August-December 2016)	61% (11)	27% (5)	6% (1)	6% (1)
9th Grade Year (August-December 2017)	68% (13)	16% (3)	11% (2)	5% (1)

On the last section of the post-Student Attitude Assessment Survey-Revised (SAAS-R) administered in December of 2017, participants answered questions regarding their grade point average, time spent weekly completing homework, and if their parents required them to participate in the Freshman Bridge Program. The majority of students (63%) reported a GPA of 3.0 or higher with 21% of students reporting a GPA of 2.0 to 2.99. Three students (16%) did not know their GPA (see Table 4-3). On the average amount of time spent weekly completing homework, 42% (8) of students spent from an hour to less than 3 hours on homework with 32% (6) of students spending less than 1 hour on homework. Twenty-one percent of students (4) reported spending three hours to less than five hours on homework. Only one student (5%) reported spending 10 hours to less than 15 hours weekly on homework (see Table 4-4). The

overwhelming majority of participants reported that their parents required them to participate in the Freshman Bridge Program (84%) while only 16% of participants did not have their parents require them to participate in the program.

Table 4-3

Participants' Ninth Grade GPA

Don't know	2.0-2.99	3.0-3.99
16% (3)	21% (4)	63% (12)

Table 4-4

Average Time Spent Weekly on Homework

Less than 1 hour	1 hour-less than 3 hours	3 hours-less than 5 hours	10 hours-less than 15 hours
32% (6)	42% (8)	21% (4)	5% (1)

Overall, the participants in the Freshman Bridge Program reflected the gender and race of the population with the majority being white males. The participants' lowest eighth grade course grades were in Earth Science and World Geography. The participants had higher eighth grade course grades in Grade 8 Math, English 8, PE and Health, and Electives. Participants' MAP scores also improved from an average of 11 points from the fall MAP test in their eighth grade year to the end of their eighth grade year. During the first half of their ninth grade year, the vast majority of students missed 0-3 days of school. Most students reported a GPA of at least a B or C average with only three students not knowing their GPA. The average amount of time spent weekly on homework varied for the students, from less than one hour per week to three to five hours per week. Additionally, most students were required to participate in the Freshman Bridge Program by their parents. In the next section, each research question of the study will be examined along with the descriptive and analytic statistics.

Quantitative Findings

In this section, the five research questions of the study are discussed along with the relevant descriptive statistics. Then, the data analyses for each question are provided, including Spearman's rank order correlation, Paired Sample T-tests, and ANOVA results.

RQ1: Is there a relationship between student attitude and student achievement in Algebra I for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

At the beginning of the study, it was hypothesized that there would be a significant relationship between student attitude and student achievement in Algebra I for students who participated in the Freshman Bridge Program by the end of the first semester of the ninth grade year. As previously described, student attitude was defined by the Student Attitude Assessment Survey-Revised (SAAS-R), which included the domains of Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation and Self-Regulation. The SAAS-R includes a 7 point Likert scale with 1=strongly disagree and 7=strongly agree. The survey was administered to participants in May, July, and December of 2017. On the pre-SAAS-R in May, only 1.8% of data was missing while 10.5% of data was missing on the mid-SAAS-R in July. Less than one percent of data was missing for the post-SAAS-R in December (0.75%). Missing data was accounted for by substituting the series mean for missing scores. On the pre-assessment of the SAAS-R given in May of 2017, the mean overall score was 4.729 with the highest mean domain in Goal Valuation at 6.575 (SD=0.905) (see Table 4-5). The mid-point assessment of the SAAS-R was administered at the end of the summer portion of the Freshman Bridge Program in July of 2017. The mean overall score on the mid-assessment survey was a 5.06. Goal Valuation continued to the highest reported mean

attitude domain on the survey at 6.274 (SD=0.902) (see Table 4-5). On the post assessment of the SAAS-R, the mean overall score for the entire survey was a 5.434 (1=strongly disagree, 7=strongly agree). Again, Goal Valuation was the highest reported mean attitude domain (6.67, SD=0.824) (see Table 4-5).

Table 4-5

Pre-SAAS-R, Mid-SAAR, and Post-SAAS-R Scores

	n	Pre-SAAS-R Mean	SD	Mid-SAAS-R Mean	SD	Post-SAAS-R Mean	SD
Academic self-perceptions	19	4.73	1.249	4.43	1.145	4.485	1.483
Attitude toward teachers and classes	19	5.34	0.841	4.802	1.123	5.787	0.828
Attitudes toward school	19	4.687	1.574	5.106	1.087	4.768	1.372
Goal valuation	19	6.575	0.685	6.274	0.931	6.670	0.710
Motivation and self-regulation	19	4.949	1.40	4.721	1.180	5.37	1.343
Overall Attitude Score	19	5.281	0.905	5.06	0.902	5.434	0.824

Scale: 1(Strongly disagree)-7 (Strongly agree)

Student achievement in Algebra I was defined by a portion of a released Algebra I SOL test, consisting of 22 total questions. There were three different versions of the test, pre-RSOL 1 (administered in May of 2017), mid-RSOL 2 (administered in July of 2017), and post-RSOL 3

(administered in December of 2017). All three versions corresponded to the same Algebra I curriculum standards. The only missing data was during the July administration of mid-RSOL 2 with two missing tests. This missing data was accounted for by substituting the series mean for the two (10.5%) missing scores. For the May administration of RSOL 1 (pre-test), the mean score was a 9.05 (SD=3.894). In July, the mean score of RSOL 2 (mid-test) was 7.706 (SD=2.328). For the last administration of the post test, RSOL 3, given in December of 2017, the mean score was 13.526 (SD=4.115) (see Table 4-6).

Table 4-6

Algebra I Achievement

	n	Mean	SD
R-SOL 1 (Pre-test)	19	9.053	3.894
R-SOL 2 (Mid-test)	19	7.706	2.328
R-SOL 3 (Post-test)	19	13.526	4.115

Note: Highest score 22

In order to examine the relationship between student attitude and student achievement in Algebra I, a Spearman's rank order correlation was used since the SAAS-R utilized ordinal data while the pre-assessment (RSOL 1), mid-assessment (RSOL 2), and post-assessment (RSOL 3) of the released SOL test included continuous data. There was no significant relationship between the overall mean for the post-assessment of the SAAS-R and the post-assessment of the released SOL test (R-SOL 3) ($r(18)= -.01$, $p=0.969$). Similarly, no significant relationship was found between the overall mean for the mid-assessment of the SAAS-R and the mid-assessment of the released SOL test (R-SOL 2) ($r(18)= -.296$, $p=.249$), and between the overall mean for the pre-

assessment of the SAAS-R and the pre-assessment of the released SOL test (R-SOL 1) (r(18)=.008, p=.974).

The Spearman's rank order correlation was also used to examine the relationship between the different domains of the SAAS-R and achievement in Algebra I. Overall, the researcher found no significant relationship between student attitude and achievement in Algebra I, thus failing to reject the null hypothesis for the first research question.

While no significant relationships were found between the pre-, mid-, and post-assessments of the Algebra I released SOL test, several significant relationships were found among the domains of the SAAS-R (see Table 4-7). With regard to the pre-assessment of the SAAS-R, significant relationships were found between Goal Valuation and Motivation (r(18)=.726, p-=.001) and between Attitude toward Teachers and Classes and Motivation (r(18)=.502, p=.001). Another significant relationship existed between Academic Self-Perceptions and Attitude toward Teachers and Classes with an r (correlation coefficient) value of .658 (p=.002). Additionally, there was a relationship between Academic Self-Perceptions and Motivation with a correlation coefficient (r) value of .648 (p=.003). For the mid-assessment of the SAAS-R, significant relationships were found between Attitude toward Teachers and Classes and Attitudes toward School (r(18)=.741, p=.001), Attitude toward Teachers and Classes and Academic Self-Perceptions (r(18)=.676, p=.001), and Attitudes toward School and Academic Self-Perceptions (r(18)=.699, p=.001) (see Table 4-8). On the post-assessment of the SAAS-R, the only significant relationship was found between Motivation and Academic Self-Perceptions (r(18)=.678, p=.001). The significant relationships among the domains of student attitude point to the complexity of student attitude and interrelationships between them.

Table 4-7

Correlations of the Domains of Pre-SAAS-R and Pre-RSOL 1

Variables	1	2	3	4	5
Pre-RSOL 1	-				
Pre-Academic Self-Perceptions	.243	-			
Pre-Attitude toward Teachers and Classes	.031	.658**	-		
Pre-Attitudes toward School	.020	.420	.523*	-	
Pre-Goal Valuation	-.298	.339	.502*	.301	-
Pre-Motivation and Self-Regulation	-.023	.648**	.768**	.509*	.726**

Note: n=19
**p=.01
*p<.05
Scale: 1(Strongly disagree)-7(Strongly agree)
Variables: 1-Academic Self-Perceptions, 2-Attitude toward Teachers and Classes, 3-Attitudes toward School, 4-Goal Valuation, 5-Motivation and Self-Regulation

Table 4-8

Correlations of the Domains of Mid-SAAS-R and Mid-RSOL 2

Variables	1	2	3	4	5
Mid-RSOL 2	-				
Mid-Academic Self-Perceptions	.052	-			
Mid-Attitude toward Teachers and Classes	-.331	.676**	-		
Mid-Attitudes toward School	-.255	.699**	.741**	-	
Mid-Goal Valuation	-.126	.324	.447	.226	-
Mid-Motivation and Self-Regulation	-.323	.465*	.707**	.485*	.489*

Note: n=19
**p=.01
*p<.05
Scale: 1(Strongly disagree)-7(Strongly agree)
Variables: 1-Academic Self-Perceptions, 2-Attitude toward Teachers and Classes, 3-Attitudes toward School, 4-Goal Valuation, 5-Motivation and Self-Regulation

RQ2: Is there a relationship between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

It was hypothesized at the start of the study that a significant relationship would exist between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year. Student attitude continued to be defined by the post-assessment of the SAAS-R while academic achievement was defined as the number of passing courses at the end of the first semester of the ninth grade year (out of seven total classes). The descriptive statistics for the post-assessment of the SAAS-R were provided above in Table 4-5. For academic achievement, the mean was 6.895 with a standard deviation of 0.3153 (n=19). Since the student attitude variable consisted of ordinal data, Spearman's rank order correlation was used to determine the strength of the relationship between academic achievement and the overall post-SAAS-R score. No significant relationship was found between academic achievement and the overall post SAAS-R score ($r(18)=-1.063$, $p=0.799$). The researcher then examined the relationship between the five different domains of the SAAS-R and academic achievement. There was a significant negative relationship between academic achievement and the post attitude domain of Attitude toward School with an r (correlation coefficient) value of -.456 (p=.05). The researcher failed to reject the null hypothesis that there is not a significant relationship between student attitude and overall student academic achievement. The researcher did, though, find a significant negative relationship between academic achievement and the domain of Attitudes toward School on the post-SAAS-R survey, indicating that an increase in the number of courses passed was related to a decline in Attitudes toward School.

RQ3: Does participation in the Freshman Bridge Program result in a more positive attitude toward school?

It was hypothesized at the beginning of the study that participation in the Freshman Bridge Program would result in a more positive attitude toward school. The student attitude assessment survey-revised (SAAS-R) was administered to students in May of 2017, in July of 2017, and in December of 2017. The same version of the survey was used for each administration. The researcher planned to compare scores on the pre-, mid-, and post-surveys of the SAAS-R between students who participated in the Freshman Bridge Program and those students who did not participate in the program. No students and parents provided informed assent and consent to just have their scores used for the assessments while not participating in the Freshman Bridge Program, thus no comparison group could be used. Due to the absence of a comparison group, the researcher used Paired Samples T-tests to compare the differences between the pre-, mid-, and post-assessments of the student attitude survey. There was a significant correlation between the pre-and mid-assessment of the survey, between the mid- and post-assessment of the survey, and between the pre- and post-assessments of the survey. Between the pre-SAAS-R and the mid-SAAS-R, there was a significant relationship with an r value of .810 ($p=.001$). Another significant relationship existed between the post-SAAS-R and the mid-SAAS-R ($r(18)=.695$, $p=.001$). Finally, a significant correlation was found between the pre-SAAS-R and the post SAAS-R ($r(18)=.884$, $p=.001$) (see Table 4-9).

Table 4-9

Correlations of the Pre-SAAS-R, Mid-SAAS-R, and Post-SAAS-R

Variables	1	2
Pre-SAAS-R	-	
Mid-SAAS-R	.810**	-
Post-SAAS-R	.884**	.695**

Note: n=19
**p=.01
Scale: 1(Strongly disagree)-7(Strongly agree)
Variables: 1-Mid-SAAS-R, 2-Post-SAAS-R

The researcher used Paired Samples T-tests to compare the pre-SAAS-R to the mid-SAAS-R, the mid-SAAS-R to the post-SAAS-R, and the pre-SAAS-R and the post-SAAS-R. The scale of the survey ranged from 1=strongly disagree to 7=strongly agree. In order to account for Type 1 error for running multiple t-tests, the researcher utilized the Bonferroni correction and divided the p values by the number of tests run, which was three (Ranstam, 2016). As seen in Table 4-10, the Paired Samples T-test on the pre-SAAS-R and the mid-SAAS-R ($t(18)=1.73$, $p=.033$) showed that students reported overall higher mean scores on the pre-attitude survey ($M=5.281$, $SD=.905$, $n=19$) than on the mid-attitude survey ($M=5.06$, $SD=.906$, $n=19$). This difference in mean scores was statistically significant. The Paired Samples T-test between the mid-SAAS-R and the post-SAAS-R ($t(18)=2.408$, $p=.009$) demonstrated that students reported higher scores on the post-attitude assessment ($M=5.434$, $SD=.824$, $n=19$) than the mid-attitude assessment ($M=5.06$, $SD=.906$, $n=19$) at a statistically significant level (see Table 4-10). As seen in Table 4-10, the last Paired Samples T-test between the pre-SAAS-R and the post-SAAS-R ($t(18)=-1.570$, $p=.045$) showed that students reported higher overall scores on the post-attitude

(M=5.434, SD=.824, n=19) assessment than the pre-attitude assessment (M=5.281, SD=.905, n=19). Though student attitude scores decreased between the pre-SAAS-R and mid-SAAS-R, students reported higher overall scores by the post-SAAS-R at a statistically significant level, supporting the hypothesis that the Freshman Bridge Program results in a more positive attitude toward school.

Table 4-10

Paired Samples T-tests between the Pre-SAAS-R and Mid-SAAS-R, Post-SAAS-R and Mid-SAAS-R, and Pre-SAAS-R and Post-SAAS-R

Paired Sample T-Tests	Variables	n	Mean	SD	t-test	p
T-Test 1 (Pre-Mid)	Pre-SAAS-R	19	5.281	.905	-1.570	.033
	Mid-SAAS-R	19	5.06	.906		
T-t=Test 2 (Post-Mid)	Post-SAAS-R	19	5.434	.824	.2408	.009
	Mid-SAAS-R	19	5.06	.906		
T-Test 3 (Pre-Post)	Pre-SAAS-R	19	5.281	.905	1.73	.045
	Post-SAAS-R	19	5.434	.824		
	Scale: 1(Strongly agree)-7 (Strongly disagree)					

RQ4: Does participation in the Freshman Bridge Program result in improved student achievement as measured by the Algebra I released SOL pre-, mid-, and post-tests?

The researcher hypothesized that students who participated in the Freshman Bridge Program would have improved student achievement in Algebra I based on the pre- and post-tests. As stated above, the researcher intended to have a comparison group of students who completed the assessments but were not in the Freshman Bridge Program. Since there was no comparison

group, the researcher was unable to compare the difference in the means of the assessment scores between participants and limited participants. Instead, the researcher compared the means between participants' scores on the pre-RSOL 1, mid-RSOL 2, and post-RSOL 3 using a repeated measures ANOVA. The mean for the pre-RSOL 1 was 9.052 (SD=3.894, n=19), and the mean for the mid-RSOL 2 was 7.706 (SD=2.328, n=19). Finally, the mean for the post-RSOL 3 was 13.526 (SD=4.115, n=19) (see Table 4-11). Using a general linear model with repeated measures, the researcher defined time into three different levels to compare to the three different assessments of the SOL (pre-RSOL 1, mid-RSOL 2, and post-RSOL 3). The ANOVA test showed a significant linear difference between time and the SOL assessments, $F_{1,18} = 31.581$, $p < .01$ (see Table 4-12). Though students had lower scores on the mid-RSOL 2, overall scores improved between the pre-RSOL 1 and post-RSOL 3. This significant difference does provide some support for the hypothesis that participation in the Freshman Bridge Program resulted in improved student achievement for these students as measured by the Algebra I released SOL pre and post-tests; however, the researcher was unable to fully answer the question without the comparison group.

Table 4-11

Pre-RSOL 1, Mid-RSOL 2, and Post-RSOL 3

Variables	n	Mean	SD
Pre-RSOL 1	19	9.052	3.894
Mid-RSOL 2	19	7.706	2.328
Post-RSOL 3	19	13.526	4.115

Note: Highest score 22

Table 4-12

ANOVA Summary Table for Time and Pre-RSOL 1, Mid-RSOL 2, Post-RSOL 3

Source	SS	Df	MS	F	p
Between Groups	5808.749	1	5808.749	238.026	.001
Within Groups	190.132	1	190.132	31.581	.001

RQ5: Does participation in the Freshman Bridge Program result in improved overall student academic achievement as measured by passing five out of seven courses by the end of the first semester?

At the start of the study, it was hypothesized that participation in the Freshman Bridge Program would result in improved overall student academic achievement as measured by passing five out of seven courses by the end of the first semester. Since there was no comparison group, the researcher could not compare academic achievement between participants and limited participants. The researcher did, though, have students' eighth grade fall semester course grades, excluding the one participant who did not enroll at the middle school until the second semester. At the end of the first semester of their eighth grade year (December 2016), four students had failing grades in two courses. In Grade 8 Math, most students (56%) had an A or B in the course while 44% of students had a C in the course. Students had higher grades in English 8 with 72% having an A or B in the course and 22% having a C. Students had lower grades in Earth Science and World Geography 39% having a D or an F in Earth Science and 28% of students having a D or F in World Geography (see Table 4-13). Overall, participants' ninth grade fall semester grades in December of 2017 were higher than their eighth grade fall semester grades in December of 2016 (see Table 4-13). In comparison to end of course grades for eighth grade, participants'

ninth grade fall semester grades were similar to their end of course grades in Math and English, but higher than end of course for eighth grade in Science, History, and in electives (eighth grade end of course grades represented in Table 4-1). During the fall semester of their ninth grade year, only two participants received a failing grade in one course. In Algebra I, the vast majority of students received an A or B in the course (79%) with only 5% receiving a C and 16% receiving a D. Similar to Algebra I, the vast majority of participants received an A or B in English (79%) with only 16% receiving a C and 5% receiving a D. Most participants also received As and Bs in World History I (69%) and Science (58%) (see Table 4-13). By the end of their eighth grade year, 74% of participants passed six or more classes with 21% passing at least five classes. One student (5%) only passed four classes. The mean number of courses participants passed (academic achievement) at the end of the eighth grade year was 5.95 with a standard deviation of .848 (n=19). In comparison to their eighth grade year, the mean number of course participants passed (academic achievement) at the first semester of the ninth grade year was 6.897 with a standard deviation of .3153 (n=19). For all ninth grade students enrolled at the Central Virginia High School, the mean academic achievement for the first semester of the ninth grade year was 6.58 with a standard deviation of .955 (n=205). Overall, all participants passed at least five out of seven courses by the end of the first semester of their ninth grade year. Their academic achievement was not only higher than their eighth grade first semester achievement, it was also higher than overall academic achievement for the entire Central Virginia High School ninth grade class at the end of the first semester.

Table 4-13

Participants' Course Grades for the Fall Semesters of Eighth and Ninth Grade

Core Course Grades for the Fall Semester of Eighth and Ninth Grade								
Subject	Grade 8 Math	Algebra I	English 8	English 9	Earth Science	Science	World Geo.	World Hist. I
As	6% (1)	11% (2)	6% (1)	16% (3)		16% (3)		32% (6)
Bs	50% (9)	68% (13)	66% (12)	63% (12)	28% (5)	42% (8)	33% (6)	37% (7)
Cs	44% (8)	5% (1)	22% (4)	16% (3)	33% (6)	26% (5)	39% (7)	26% (5)
Ds		16% (3)	6% (1)	5% (1)	28% (5)	5% (1)	11% (2)	5% (1)
Fs					11% (2)	11% (2)	17% (3)	

Conclusion of Quantitative Findings.

The results of the SAAS-R, the Algebra I released SOL tests, and the students' overall academic achievement did not support the first and second research questions. No significant relationship was found between student attitude and achievement in Algebra I; however, significant relationships were found between certain domains of the SAAS-R. The relationships between the different domains may reflect the timing of the when the assessment. In May of 2017 when the pre-assessment of the SAAS-R was administered, students may have had a positive attitude toward school since they were completing the eighth grade. In July of 2017 when the mid-assessment of the SAAS-R was administered, students were positive about the transition to high school and their relationship with their Algebra I teacher. By December of 2017, students had become comfortable with their own academic self-perceptions and motivation. Additionally, Goal Valuation was the highest attitude domain for the pre-, mid-, and post-assessments of the student attitude survey. The researcher also did not find a significant

relationship between student attitude and overall academic achievement and found that as student attitude toward school decreased, their academic achievement increased. This finding is surprising and more research is needed to validate it.

While the assessment data did not support the first two research questions, the data did provide more support for the last three research questions. Though overall student scores on the SAAS-R decreased from the pre-SAAS-R to the mid-SAAS-R, the mean score of the post-SAAS-R was higher than the pre-test, indicating that student attitude improved by the end of the Freshman Bridge Program (end of the first semester of the ninth grade year). Similarly, student scores from the pre-RSOL 1 to the mid-RSOL 2 decreased, but increased on the post-RSOL 3. The difference between the scores on the pre-RSOL 1 and the post-RSOL 3 were statistically significant, supporting the hypothesis that participation in the Freshman Bridge Program was related to higher achievement in Algebra I. Finally, all participants in the Freshman Bridge Program had high overall academic achievement by passing at least 6 out of 7 classes. Their academic achievement was higher by December of 2017 than in December of 2016, when they were in the eighth grade. These finding, though, were limited by the lack of a comparison group. In order to gather more firsthand information from the participants, the researcher conducted two focus groups. The next section provides the qualitative research analysis from these focus group interviews. Pseudonyms are used to depict specific student's point of view.

Qualitative Findings

Focus Group Analysis

The focus groups interviews centered on participants' experiences in the Freshman Bridge Program, the first semester of their ninth grade year, and their plans toward graduation and beyond. The focus groups provided rich first-hand data from the participants. Two focus

groups were held during enrichment time (non-instructional time of the school day) and recorded by the researcher. There were eight participants in the first focus group and seven in the second focus group (Focus group questions are included in Appendix E). The researcher transcribed the focus groups, read the transcripts verbatim, and then identified concepts by highlighting key words and phrases from the transcription. Based on the highlighted key words and phrases, three emerging themes were identified including the Freshman Bridge Program, Transitional Experience, and Post High School Plans. Sub-themes were also identified within each of the three major emerging themes (see Table 4-14).

Table 4-14

Focus Group Themes

Freshman Bridge Program	Transitional Experience	Post High School Plans
1. Comprehensive program elements 2. Dynamic of two teachers 3. Benefits of the program	4. Changing expectations-academic 5. Changing expectations-behavior 6. Changing expectations-relationships with teachers 7. Structural factors 8. Attitude and self-perception 9. Social opportunities and changes	10. Graduation and personal goals

Focus Group Themes

Theme 1: The Freshman Bridge Program. In reference to the Freshman Bridge Program, participants were asked to describe the program, their experience in the program, and provide feedback about what they enjoyed in the program and what they would do differently. Sub-themes found within the overall theme of the Freshman Bridge Program included comprehensive program elements, the dynamic of two teachers, and the benefits of the program.

Sub-theme 1: Comprehensive program elements. The participants recognized that the Freshman Bridge Program had many different components. They understood it was academic in nature and primarily focused on math instruction. One participant noted that math felt easier during the Freshman Bridge Program and contributed to her understanding polynomials during the first semester of Algebra I. Another student, David, remarked, "We really learned more things, like we go to learn like read the rulebook and get do a little bit more math just to kind of get a visual of what we're going to learn about in high school." Participants also commented on enjoying the way they learned since instruction in the summer program was more focused on manipulatives and application. While the participants in both focus groups noted enjoying learning math over the summer, they felt that including other subjects would be helpful for them.

The participants also commented on field trips, another program element. Participants completed three field trips to the local office of the Department of Transportation, the local technical college, and the local community college. Reflecting on the trip the local Department of Transportation, Patrick commented, "You don't think it takes a lot of math to do anything but it really does." The majority of students saw the positives of the field trips, especially the presentation of different opportunities during each. One student, Ryan, stated that he might change the trips a little by asking participants about their future plans and looking into taking trips to places more aligned to their interests.

Sub-theme 2: Dynamic of two teachers. Another sub-theme related to the Freshman Bridge Program was the dynamic of two teachers. Participants were taught by their previous eighth grade math teacher from the middle school and their future high school Algebra I teacher. Knowing one of the teachers influenced them to sign up for the Freshman Bridge Program. They

liked being able to switch classes and learn from two teachers. Participants saw the two different teaching styles of the teachers as a strength of the program. Patrick commented, "I liked that we could see, yeah, like two different ways to do it." Having the two teachers created a dynamic the students enjoyed by providing two different perspectives. Emma noted the following about working with both teachers,

> "So if you need help and one was busy, you had the other one to call to. And if you preferred the way this one was doing it or this one could do it, you could just pick between them."

Emma felt comfortable with each teacher, which supported her learning. Participants in both focus groups felt having two teachers was a positive of the program and should continue in the future.

Sub-theme 3: Benefits of the Freshman Bridge Program. The final sub-theme tied to the Freshman Bridge Program from the focus group interviews was the benefits of the program. One of the first benefits Jonathan mentioned was being able to have something to do over the summer. The timing of the program was a major positive for the participants. Ryan noted that he "liked it in July cuz like my mind was still fresh when I came here for the first day of school so I could get around the school easier." Participants felt the program helped them be comfortable with the building and knowing their way around the school even before the first day. Patrick commented that "we had a few trips around the school so we could know where everything was, and then when school came and you got your schedule you could practically just walk through every teacher you had." Knowing the school helped him feel less worried and more confident as he officially started his ninth grade year. Another benefit of the program according to the participants was knowing what to expect in high school. Knowing the rules and

expectations helped participants in their transition to high school. Finally, participants connected the Freshman Bridge Program to their current academic success. William commented that he "felt like if I didn't go then, I wouldn't do good…yeah, my grade wouldn't be as good as it is now." Two other participants echoed his sentiment and remarked that they would probably be failing their classes without the Freshman Bridge Program. The timing of the program, knowing the school and expectations of high school, and being academically prepared for high school were perceived benefits of the Freshman Bridge Program.

Theme 2: Transitional Experience. The second theme that emerged from the focus group interviews was the participants' transitional experience. Participants were asked questions about differences between middle school and high school, what was easiest and most difficult about their transition to high school, their academic performance, and how things were going with their ninth grade teachers and Algebra I class. Emerging sub-themes included changing academic expectations, changing behavioral expectations, changing expectations in relationships with teachers, structural factors, attitude and self-perceptions, and social opportunities and changes.

Sub-theme 4: Changing academic expectations. During both focus group interviews, students reflected on changing academic expectations regarding work and homework completion, challenging coursework, and academic interventions. Participants noted that high school teachers expected them to complete their work and study. Emma shared, "Like you gotta get your stuff done. If not, you you get out the class and you go on somewhere." One of the biggest distinctions between middle and high school was the expectation that students would complete their work. Additionally, participants commented on the different high school policy on zeroes. In middle school, students were allowed to make up zeroes, but in high school,

students would receive a zero for assignments and other work that was not submitted. Participants also grasped the academic damage of a zero. William noted that, "If you get a zero, your grade going down." Though participants were concerned about missing work and receiving zeroes, they also expressed an understanding of why the zero policy was in place. Participants commented that the policy was to teach responsibility. Emma stated in high school, teachers were "getting you ready for the real life because if you have a project to do at work you have to get it done by that date. You can't just push it off." Since high school was preparing them for life after high school, they were expected to turn in work on time and be responsible.

Another change in academic expectations in high school was the more challenging nature of their coursework. Participants reflected that the teachers expected them to do more than in middle school. These increased expectations were shown in assessments and assignments. David commented that in math, "you really got to think more than what you did at middle school. You really got to really think about each question." Participants also noted some classes were harder than others. For one participant, Sophia, Spanish I class was very difficult at the beginning due to the amount of work, but became easier throughout the first semester as she adjusted to the increased expectations. Another challenging class for many participants was English 9. Participants shared that they were expected to complete more independent work than they were used to at the middle school. Meeting these increased academic expectations was a part of their transitional experience to high school.

A final change in academic expectations in high school was different academic interventions. A few participants commented on having an additional period of math in order to help them better understand the concepts and skills of the course. Though the class was long, they enjoyed the small class size and the teacher. Another participant, Charlotte, utilized peer

tutoring during her enrichment period since she was having difficulty in one of her classes. She stated the tutors "just really helped me and that's how I got my grades up." For some participants, in order to meet the changing academic expectations, they had to take advantage of different interventions at high school.

Sub-theme 5: Changing behavioral expectations. Participants in both focus groups also noted the changing behavioral expectations from middle to high school. Participants felt behavioral expectations were higher at high school and that they were expected to leave middle school behavior behind. First, participants found there were fewer warnings in high school because "its's getting ready for the real life." Additionally, participants noted they were provided more freedom at high school, especially in the morning. David commented, "You really have more freedom here, you know, you feel, you're around all these people and they're really mature and they're grown up." Maturity and responsibility were assumed at high school. Participants also connected these increased behavioral expectations to the classroom. Ryan noted that ninth graders had to "pay attention in class and don't goof off." The participants did not feel these increased behavioral expectations were intimidating, but that they were able adapt to them.

Participants also recognized that changing behavioral expectations meant leaving middle school behavior behind. William and Patrick reflected on the following:

William: "If you like, if you had a lot of trouble in eighth grade, you caused trouble…"

Patrick: "Don't do that in ninth grade."

William: "Yeah, it's going to be terrible."

Students who continued to misbehave or who were caught up in drama had a difficult transition to high school. If the drama involved upperclassmen, it was particularly challenging

for those students. Along with not misbehaving and starting drama, participants reflected on friend choices. Jonathan commented that his advice to rising ninth graders would be to "be careful who you hang with." Overall, participants associated higher behavioral expectations in high school to moving away from middle school behaviors.

Sub-theme 6: Changing expectations in relationships with teachers. Another sub-theme regarding the transitional experience that emerged from the focus group interviews was changing expectations in relationships with teachers. Focus group participants discussed how students and teachers were learning about each other and developing relationships during the first semester of the ninth grade year. They also commented on how the teachers showed them tough love and had an increased expectation of independence. Finally, they reflected on the significant relationship they had developed with their Algebra I teacher.

First, focus group participants noted that students and teachers were learning about each other during the first semester of the ninth grade year. Ryan commented that, "Like the teachers don't know how you like to be teached so everything's taught differently and you have to like pick up on the way they like teacher." This process of learning each other was reciprocal. Students had to adapt to different teaching styles, and teachers had to learn how the students liked to learn. Participants also found that this process was harder for newer teachers, and some teachers became more focused on controlling the class rather than the process of learning. Focus group participants also reflected on increased expectations in developing relationships with their teachers. High school teachers had different expectations than middle school teachers. According to the participants, a bare minimum expectation was to do well. Though this expectation might sometimes seem controlling, David remarked that the teachers "want you to succeed in life." Most participants felt that their relationships with their ninth grade teachers

were positive and were important to their success at school. Jonathan described this importance: "…I have a good relationship with them [teachers]. I get to know them at school and they're like. It makes school easier for me." Participants described these relationships as even stronger in classrooms with a co-teacher since the teacher and co-teacher were a team that could respond to their needs. Overall, learning each other was a significant part of the process of developing relationships with their teachers.

Focus group participants also felt their teachers showed them tough love at times and expected them to be more independent. Patrick commented that high school teachers "don't play as much" and "aren't as fun in high school." Participants described high school teachers as being more serious. Sometimes this tough love related to students' work and grades. With the zero policy and how some teachers handled missing work, for some participants this came across as uncaring about their grades and performance in their classes. Similar to tough love, focus group participants viewed their high school teachers as expecting them to be more independent. For some participants, the expectation of more independence was a surprise. Patrick described his English teacher as the following, "she makes you read out the book. She doesn't go up in front of the class and teach you an easier way or something." Other participants described similar teaching styles in other classes. By expecting more independence without always providing support, some students developed a more negative relationship with those teachers.

Finally, focus group participants commented on the positive and strong relationship they had developed with their Algebra I teacher. One building block of this strong relationship was that they knew her since the summer. Ryan reflected that, "She just expects more from me cuz she knows that I can do more than I, than I normally do she expects more from me than others."

Furthermore, she was always willing to help students, especially during intervention time. As a result, Algebra class was "the best class ever" according to one participant.

Sub-theme 7: Structural factors. Another sub-theme tied to transitional experience that emerged from the focus groups was structural factors. Participants commented on the amount of students in the building and that there were older students in the building. Participants also noted that they had to learn where things were (a benefit of the Freshman Bridge Program) in order to effectively move around the building. Even with knowing the building before school started, moving in between classes with the number of students in the building was at times difficult. Movement within the building was an important part of the participants' transition to high school.

Sub-theme 8: Attitude and self-perceptions. An additional sub-theme related to participants' transitional experience was their attitude and self-perceptions. Participants noted that they were becoming more mature as ninth graders. David commented that high school "changes yourself, you know. To know that you're in a different environment than what you were at the middle school or elementary school." This maturity for some participants meant they were enjoying school more. In particular, Michael used to hate coming to school. He described his changing attitude as the following: "It's actually been going good to actually want to come to school." This changing attitude for some participants meant getting more sleep. It also was reflected in the way they perceived their own performance in certain classes. Some participants felt math was a strong subject for them and one they excelled in. This growing awareness of their own performance was linked to their transitional experience.

Sub-Theme 9: Social opportunities and changes. Focus group participants commented on social opportunities and changes with their transition to high school. One major change was

having the opportunity to participate in different clubs, sports, and activities. Participants were enthusiastic about these opportunities and commented on participating or planning to participate in football, chorus, French club, and soccer. Having a wide range of activities, clubs, and sports to choose from was different from their middle school experience. Another social opportunity and change focused on meeting new people and changing friendships. Some participants felt meeting and talking to new people was an easy aspect of their transition to high school, while others felt it was more difficult, especially when talking to older upperclassmen. Many participants noted that their friend groups were changing. Some participants had changing friendships due to what Ryan called "a lot of drama" and remarked that his friends "kinda, can like expand and then contrast." While some participants saw these changing friendships as a negative, others felt it gave them new opportunities. David described the changes in a positive light:

> "I guess it kinda gives you a chance, you know, to make more friends besides having the other friends that you already have."

Overall, the transition to high school presented both social opportunities and changes for the participants.

Theme 3: Post High School Plans. A final theme that emerged from the focus group interviews was participants' post high school plans. Participants were asked questions about the importance of graduation and why, as well as where they see themselves in four years. Within the theme of post-high school plans, one sub-theme was identified; graduation and personal goals.

Sub-theme 10: Graduation and personal goals. Focus group participants connected graduation with their personal goals. They understood the importance of graduation not only to

have a job, but also for their future plans. While participants knew the significance of graduation linked to achieving their goals, they anticipated possible bumps along the way.

First, focus group participants understood the importance of graduation for jobs and in connection with their family history. All participants felt graduation was of the utmost importance on a scale of 1 to 10 (1=least important, 10=most important). One participant even commented that the importance of graduation was not just a 10, it was a "million." Participants linked graduation to job success. Ryan described the significance of graduation, "Because if you don't, uh, graduate, like if you don't get your diploma then it's hard to find a job." Another participant viewed graduation as opening up the door to other job opportunities. A few focus group participants knew the significance of graduation based on their family history. Ethan shared the following: "Uh, some of my family they didn't finish school and they got sucky jobs. Some of them don't even have jobs." For him, he did not want to follow in their footsteps and expressed the importance of graduation to him.

Focus group participants also connected the importance of graduation to their future plans. Some participants planned to go to college and knew a high school diploma would be key to their success. Their families were also a part of this process and often supported them, even when their parents may not have finished college. When asked about where she sees herself in four years, Sophia did see herself graduating because her parents had not finished college and according to her, "that's what I'm trying to do." Another participant had plans to join the military so knew he had to get his high school diploma to achieve that goal. Ryan felt that receiving an advanced diploma would help him find a job over someone without an advanced diploma. Overall, participants associated graduation with their future goals.

Finally, focus group participants already felt that there could be potential bumps in their graduation plans. For some participants, they had overheard of these bumps from their families. When asked about whether she saw herself graduating, Sophia commented, "I see myself graduating, but um, my mom and dad didn't go to college. I think my dad went for like two years and then he got a job so I'll be the first one going to college." Another participant also wanted to graduate and finish college, but knew his dad did not graduate college and his grandpa dropped out of high school in the ninth grade. Their family's educational history concerned these participants. Some focus group participants also knew they would have some academic struggles in high school that might interfere with their plans. Jonathan shared that "I would like to see myself graduate, but [I] just gotta work at it to get there." For Jonathan, graduating from high school was important, but was not necessarily going to be easy. Overall, focus group participants understood the importance of graduation, especially for their goals, but also knew there could be potential issues along the way.

Conclusion of Focus Group Analysis. Following the analysis of the focus group interviews, three general themes emerged including the Freshman Bridge Program, transitional experience to high school, and post-high school plans. Within the Freshman Bridge program, participants reflected on the comprehensive program elements, the dynamic of two teachers, and the benefits of the program. For their transitional experience, participants noted changing expectations with academic, behavior, and their relationships with their teachers. Other transitional experience sub-themes included structural factors, attitude and self-perception, and social opportunities and changes. The last theme of post-high school plans tied to graduation and personal goals.

Conclusion

In summation, the quantitative data tied directly to the five research questions of the study. Three of the five research questions were supported by the data analysis of the SAAS-R, the Algebra I released SOL tests, and students' overall academic achievement. Participation in the Freshman Bridge Program did result in improved achievement in Algebra I, improved student attitude, and overall academic achievement. While no significant relationship was found between student attitude and achievement in Algebra I and student attitude and overall academic achievement, significant relationships were found among the five domains of student attitude (Academic Self-Perceptions, Attitude toward Teachers and Classes, Attitudes toward School, Goal Valuation, and Motivation).

Though the quantitative data provided numerical information about the study's research questions, the qualitative data enriched this data with first-hand information from the participants. Students reflected on their overall experience in the Freshman Bridge Program, including feedback on the program elements, having two teachers, and benefits of the program. Students also described their transitional experience, especially changing expectations from middle to high school. Finally, students discussed the importance of graduation and how graduation is tied to their personal goals.

In the final chapter, results and findings will be reviewed along with a discussion of limitations of the study and the need for future research. In particular, the researcher will discuss the feedback of the program from the participants and the potential changes to the Freshman Bridge Program.

Chapter 5: Discussion of Findings and Recommendations

Purpose of the Study

The purpose of this study was to examine the effect of a Freshman Bridge Program on student attitude, student achievement in Algebra I, and overall student academic achievement beginning in the spring of the eighth grade year through the first semester of the ninth grade year. The Freshman Bridge Program began with a three-week summer program in July during which the participants' eighth grade math teacher instructed along with the participants' ninth grade math teacher. Math instruction was focused on hands-on activities involving application of Algebra I skills. Students took three field trips throughout the program, one to a local department of transportation office and two to local colleges. Students also learned about study skills and participated in career counseling. Throughout the first semester of their ninth grade year, participants were a part of a continuum of interventions that included bi-quarterly case management meetings with the principal (researcher) and school counselor, data monitoring, and peer tutoring if needed. During the fall of the ninth grade year, the researcher also heard first-hand from the participants by conducting two focus groups. In the next section, a summary of findings will be presented for both the quantitative and qualitative research, followed by implications for practice. The researcher will then discuss limitations of the research, the need for future research, and conclusions.

Summary of Findings

Quantitative Research

RQ1: Is there a relationship between student attitude and student achievement in Algebra I for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

Though the researcher did not find a statistically significant relationship between student attitude and achievement in Algebra I, the overall mean for the Student Attitude Assessment Survey-Revised increased from the pre-SAAS-R from 5.281 to 5.37 on the post-assessment. The overall mean score did decrease from the pre-SAAS-R from 5.281 to 5.06 on the mid-assessment. Similarly, the average student score on the pre-test of the released SOL test (pre-RSOL 1) increased from 9.053 to 13.526 on the post-assessment (post-RSOL 3), but decreased from the pre-RSOL 1 to the mid-RSOL 2. The dip in scores for the mid-assessment likely reflects the summer learning loss since students had been out of school for over one month when they completed the mid-assessments of the SAAS-R and Algebra I released SOL test at the end of the summer portion of the Freshman Bridge Program in July of 2017. According to Cooper et al. (1996), students can lose up to one month of grade level skills over the summer. Alexander et al. (2007) found that the summer learning loss also influenced ninth grade achievement. Even though students were participating in the Freshman Bridge Program, they were only receiving three hours of instruction per day, which is almost half of the instruction they receive on a typical regular school day. Additionally, the summer portion of the program ended a few weeks before school started on August 15th. Students were likely concerned about starting a new school, and this concern could be reflected in the Student Attitude Assessment Survey-Revised. Furthermore, 84% of students reported that their parents required them to participate in the program. They may not have given their best effort on the mid-assessment of the released SOL test as a result of their parents requiring them to be in the program. Overall, the research points to the importance of intervention in the summer to limit the summer learning loss and help students transition to high school.

With regard to student attitude, the Student Attitude Assessment Survey-Revised focused on five specific domains (Academic Self-Perceptions, Attitude toward School, Attitude toward Teachers and Classes, Goal Valuation, and Motivation and Self-Regulation). When examining the domains of the SAAS-R, the researcher found that several statistically significant relationships existed among them. For the pre-assessment of the SAAS-R, the most significant relationships were between Goal Valuation and Motivation, Attitude toward Teachers and Classes and Motivation, Academic Self-Perceptions and Attitude toward Teachers and Classes, and Academic Self-Perceptions and Motivation. Since the pre-assessment was administered in May of 2017, students were getting ready to complete the eighth grade and potentially felt positive about their own attitudes toward school. For the mid-assessment of the SAAS-R administered in July of 2017, the most significant relationships were found between Attitude toward Teachers and Classes and Attitudes toward School, Attitude toward Teachers and Classes and Academic Self-Perceptions, and Attitudes toward School and Academic Self-Perceptions. Over the summer portion of the Freshman Bridge Program, students participated in career counseling, learned about their new high school, met and worked with their Algebra I teacher as well as their former Grade 8 Math Teacher, and participated in hands-on math instruction. The relationships on the mid-assessment of the SAAS-R may reflect their beliefs about transitioning to a new school, their relationship to their new teachers, and their perceptions of their own academic skills. For the post-assessment of the SAAS-R administered in December of 2017, the only significant relationship was found between Motivation and Academic Self-Perceptions. This relationship may reflect the connection between students' sense of themselves and their motivation. For the pre- and mid-assessments of the SAAS-R, significant relationships were found between other domains and the domain of Attitude toward Teachers and Classes. This supports the research

that having positive relationships between families, students, and teachers are essential to a successful transition (Balfanz, 2009; Bottoms, 2008; Williamston, 2010). Students had already developed a relationship with their Algebra I teacher in the summer of 2017, which influenced their attitude toward school and helped them transition to high school. This finding was also supported in qualitative data gathered from the focus groups as students commented on knowing their Algebra I teacher as a major benefit of the Freshman Bridge Program. Ensuring students have a positive relationship with their ninth grade teachers is essential for a successful transition.

On the pre-, mid-, and post-assessments of the survey, Goal Valuation was the highest reported domain. Furthermore, a major theme from the focus groups was graduation and personal goals. Participants viewed graduation as an important step in achieving their overall person goals ranging from boot camp to college to work. When working with high school students, focusing on goals can be a significant strategy to utilize for student success. Additionally, more information is needed regarding student attitude as a whole. The interrelationships of the different domains point to the complexity of attitude. More information is needed to further examine student attitude and student attitude in math.

RQ2: Is there a relationship between student attitude and overall student academic achievement for those participating in the Freshman Bridge Program by the end of the first semester of the ninth grade year?

The researcher did not find a statistically significant relationship between student attitude and overall student academic achievement for Freshman Bridge Program participants, failing to refute the null hypothesis for the second research question. A statistically significant negative relationship was found between overall academic achievement and the post-SAAS-R domain of Attitude toward School, indicating that as student attitude toward school decreased or

became negative, their academic achievement increased. This result was surprising and needs to be validated with other studies since it is inconsistent with other research. For example, when examining student attitude, Lai et al. (2015), found a link between attitude toward school and performance on the Programme for International Student Assessment (PISA). The researchers concluded that motivation was an important factor impacting students' attitude toward school and performance. Since Goal Valuation was the highest domain of the SAAS-R for this study, it needs to be connected to student motivation. More research is needed to determine what aspect of student attitude is most influential with regard to student performance.

RQ3: Does participation in the Freshman Bridge Program result in a more positive attitude toward school?

The researcher did find support for the third research question. Statistically significant relationships were found between the pre-, mid-, and post-assessments of the SAAS-R. Overall, student mean scores increased from the pre-SAAS-R to the post-SAAS-R, but decreased from the pre- to mid-SAAS-R. This finding might point to students not necessarily wanting summer break to end since the mid-assessment of the student attitude survey was administered a few weeks prior to the start of school. Starting the ninth grade is a major transition for students. As adolescents, ninth graders are searching for their own fidelity, especially in schools (Wood, 2015). The concern with moving to a new school could be reflected in the mid-assessment student attitude score prior to the start of school. Student attitude scores did, however, increase by December of 2017, pointing to them becoming more comfortable at their new school as they participated in a full transitional program.

RQ4: Does participation in the Freshman Bridge Program result in improved student achievement as measured by the Algebra I released SOL pre-, mid-, and post-tests?

The researcher did find some support for research question four. A statistically significant difference in means was found among the pre-, mid-, and post-assessments of the released SOL test. Students' average scores on the mid-assessment of the released SOL test (mid-RSOL 2) were lower than the average scores on the pre- (pre-RSOL 2) and post-assessments (post-RSOL 3) of the released SOL tests. Student average scores, though, were highest on the post-RSOL 3. While there was a significant difference in means between the pre-, mid-, and post-assessments, the researcher was unable to fully answer research question four without a comparison group. Since this study involves action research, the researcher will continue to monitor the participants' achievement in Algebra I.

These findings are in line with research that supports that students can make gains from the summer learning loss during the regular school year as they receive daily consistent instruction (Terzian et al., 2009). These findings also provide support for a continuum of interventions for students (Duke, 2010). Participants in the Freshman Bridge Program attended a three-week long bridge program in the summer where they received hands-on math instruction, learned study skills and effective habits, participated in career counseling, and took field trips to a local department of motor vehicles office, a local trade school, and a local community college. During the first semester of their ninth grade year, they also received case management, were monitored using data analysis, and received peer tutoring if needed. By working with the Algebra I teacher since the summer and by receiving a continuum of interventions, students were able to make gains in their mathematical learning. From the focus groups, students also understood the benefits of the program and felt they would not have been as successful in the

ninth grade without the program. Each intervention provided continual support and safety nets for students in their transition to high school.

RQ5: Does participation in the Freshman Bridge Program result in improved overall student academic achievement as measured by passing five out of seven courses by the end of the first semester?

The findings of the Freshman Bridge Program support the fifth research question of the study. All participants of the Freshman Bridge Program passed at least five out of seven of their classes at the end of the first semester of the ninth grade year. Only two students received failing grades. These grades were in Science, which was a subject area that some of the participants struggled in during their eighth grade year as reflected in their end of course grades. The participants' academic achievement at the end of the first semester was not only higher than their eighth grade first semester achievement, it was also higher than overall academic achievement for the entire Central Virginia High School ninth grade class at the end of the first semester.

A major component of students passing at least five out of seven courses at the end of the first semester was student data monitoring. The researcher monitored students' grades throughout the first semester and met with each student along with a school counselor twice a quarter. Based on these meetings, students were also referred for peer tutoring. Allensworth (2013) and Balfanz (2009) found that monitoring student data and providing timely interventions helped students stay on track to graduate. Furthermore, a continuum of interventions provides needed supports for students (Duke, 2010).

Despite these findings, grades are considered very subjective and may not be the best indicator of academic achievement, especially as the participants had different teachers for their other courses in both eighth and ninth grade. Since grades, though, are used to determine course

credit in high schools, they are still an appropriate measure of academic achievement for this study.

Qualitative Research

While the quantitative research provided important numerical information for the five research questions, the qualitative research enriched the numerical data with first-hand reflections from the participants. Three overall themes emerged from the focus groups: the Freshman Bridge Program itself, students' transitional experience, and post high school plans.

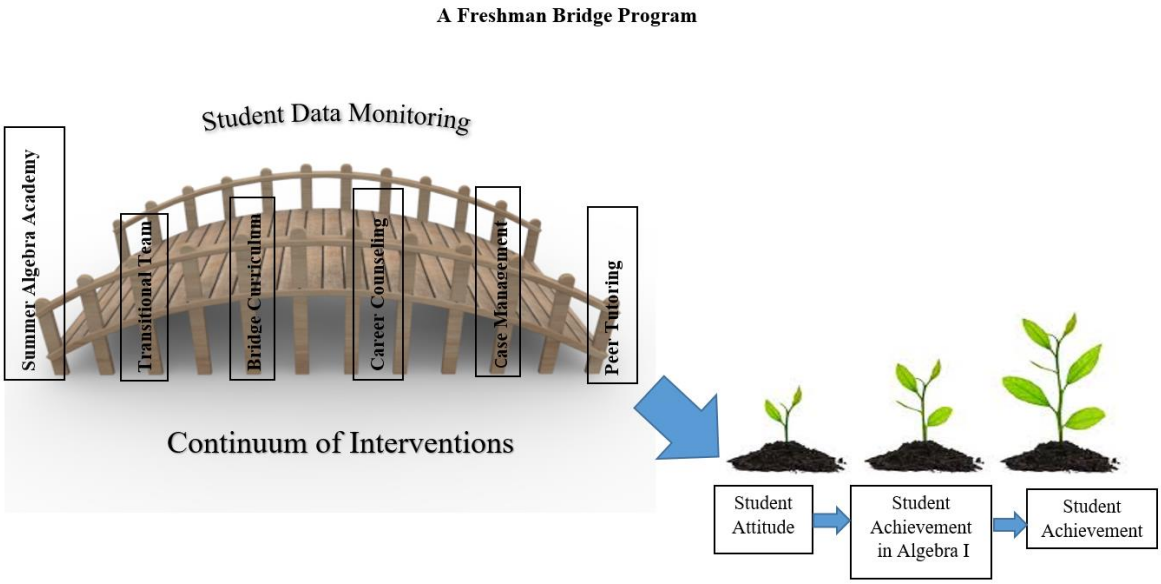
When commenting on the Freshman Bridge Program, the participants noted the comprehensive program elements ranging from hands-on math instruction with manipulatives and application problems to field trips. Participants also felt having two teachers was important and helped them in the program. Additionally, students understood the benefits of the program. They knew the school building, school-wide expectations, and their math teacher before school started, helping them transition to high school.

As students reflected on their transitional experience, one significant sub-theme involved changing expectations. Academically, students had more challenging courses and were expected to do their work. Behaviorally, students were expected to leave middle school behavior and drama behind. Students also noted that their relationships changed with their teachers. At the beginning of school, students and teachers were learning each other. Sometimes the teachers showed students tough love and held them accountable for missing work. Students also felt they had a strong positive relationship with their Algebra I teacher because she would help them. In the Chicago Public School system, Nelid (2009) found that classes had less failures when there was trust between the teachers and students. The focus group findings also reflected the importance of the trusting relationships between teachers and students.

Other sub-themes found related to the transitional experience included structural factors, attitude and self-perceptions, and social opportunities and changes. Structurally, students felt the school was bigger with more students. They enjoyed, though, the freedom of high school. With regard to attitude and self-perceptions, students saw themselves becoming more mature and responsible. Additionally, students enjoyed having more opportunities in high school for sports and clubs and having the opportunity to make different friends.

The final qualitative theme was graduation and personal goals. All focus group participants knew the importance of graduation and connected it to their personal goals. Some students were thinking of college while another student commented on wanting to join the military. Participants also saw their family as related to their graduation and post high school plans. Some students commented on their families pushing them to graduate. Some students also did not want to be like members of their family who had dropped out of high school. The qualitative findings provided further insight into the participants' experience in the Freshman Bridge Program and transition to high school. Based on the quantitative and qualitative findings, the researcher edited the conceptual model for the Freshman Bridge Program. The researcher found that a bridge program with appropriate supports led to improved student attitude, improved student achievement in Algebra I, and improved overall student academic achievement (see Figure 5.1).

Figure 5.1. Revised Conceptual Model of a Freshman Bridge Program



Implications for Practice

The study of the Freshman Bridge Program was action-oriented in order to take "professional action" to improve the program for students (Sagor, 2011, pp. 5-6). In order to improve the Freshman Bridge Program, there are four major implications for professional practice.

First, the findings of the study will be shared with the faculty, central office staff, and students. Sharing the results of the study with the faculty may increase their direct involvement with the Freshman Bridge Program and expose them to the main components of a continuum of interventions. It is hoped that a continuum of interventions model can be utilized for all grade levels, not just ninth grade. Sharing the results with central office staff will provide data to support the continuation of funding for the Freshman Bridge Program and become a model that can be utilized by the whole division. Finally, by sharing the results of the study with rising

ninth graders, they may be more inclined to participate in the Freshman Bridge Program for the 2018-18 school year.

The second implication for professional practice will be the changes to the Freshman Bridge Program for the 2018-19 school year based on the feedback from the participants. First, two teachers (one eighth grade teacher, one ninth grade teacher) will continue to collaborate and co-teach math. Many students commented on the need for support in other subjects and students' eighth grade course grades were lowest in science and history. For the 2018-19 Freshman Bridge Program, English will be added as another subject along with a preview of ninth grade history and Science. In order to include English and the survey of history and science, the Freshman Bridge Program will be extended by one hour each day. Another change to the Freshman Bridge Program will be field trips tailored to student interest. Many participants enjoyed the weekly field trips, but felt they would be more meaningful if they were tied to their interests. In order to know student interests before the Freshman Bridge Program, rising ninth grade students will complete an interest survey in the spring of their eighth grade year.

A third implication for professional practice will be the school-wide adoption of a continuum of intervention with student data monitoring. When surveying dropouts, Bridgland et al. (2006) found that students felt if someone had provided help earlier in their high school years, they would not have dropped out of high school. Adopting a school-wide continuum of interventions will provide the mechanism to identify students who are having difficulties and provide appropriate intervention. Such intervention is needed to help all students graduate. By sharing the results of the Freshman Bridge Program study, making changes to the 2018-19 Freshman Bridge Program, and implementing a school-wide continuum of interventions with

data monitoring, the benefits of the Freshman Bridge Program will extend beyond the nineteen participants to all grade levels.

A final implication for professional practice is the adoption of a Freshman Bridge Program or similar transitional program for all schools in the Central Virginia School District. Combining a summer program with a continuum of interventions during the school year provided needed support for students. While more research is needed regarding student attitude and the link to student achievement, the study found the importance of such a program with regard to student attitude, student achievement in Algebra I, and overall student academic achievement. This importance was found not just through data, but also first hand from students during the focus groups. The Freshman Bridge Program is a model that can be utilized in various school districts.

Limitations

There were several limitations of the study. The first limitation of the study was a lack of a comparison group. By not having a comparison group, the researcher was unable to compare students who participated in the Freshman Bridge Program to those students who did not participate in the program. This prevented the researcher from comparing participants' scores on the student attitude survey, the Algebra I released SOL tests, and their overall academic achievement to similar peers not in the program. Not having a comparison group limits the generalizability of the study as it is not clear if participants' scores increased on the student attitude survey, the Algebra I released SOL test, and their overall academic achievement specifically as a result of the Freshman Bridge Program. In the future, a comparison group is needed to compare the students who participated in the Freshman Bridge Program to similar peers who did not participate in the program.

Another limitation of the study was a small sample size. The study only included nineteen participants, limiting the generalizability of the results. Future studies should include larger sample sizes to determine the effects of a Freshman Bridge Program with a larger group of students.

A third limitation was some missing data, especially for the mid-assessments of the Student Attitude Assessment Survey-Revised and the mid-released SOL test (mid-RSOL 2). Though the researcher substituted the series means for the missing scores, the scores on each of these assessments were lower than the pre- and post-assessments. Future studies should ensure missing data is as limited as possible. An additional limitation related to the mid-assessments included the version of the mid-RSOL 2. This test assessed the same Algebra I curriculum standards as the pre-RSOL 1 and the post-RSOL 3, but was created from a different Algebra I released SOL test. The average score was lower on this assessment, so it may have influenced the data. In the future, randomized versions of the same assessment should be used.

A fifth limitation was the lack of an SOL assessment score at the conclusion of the study. Since the study ended in December of 2017, participants had not yet completed the Algebra I SOL test. Including students' scores on the Algebra I SOL test in the spring of 2018 would add important data to the study.

There were also several threats to the internal validity of the study. First, students mature throughout their ninth grade year, which may reflect in higher scores as they age. By just studying the students through the end of the first semester of their ninth grade year, this limitation was minimized. Another threat to internal validity was using the same test. This internal threat was minimized by using a different version for the mid-assessment of the released SOL test (mid-RSOL 2) and randomizing the post-assessment of the released SOL test (post-

RSOL 3). The testing threat was not minimized, though, for the pre-, mid-, and post-assessments of the Student Attitude Assessment Survey-Revised. Another threat to internal validity was the small number of questions on the released SOL tests. The pre-, mid-, and post-assessments of the released SOL tests only had twenty-two questions, which reflected the Algebra I standards that were taught in the first semester. In the future, more released questions should be used if possible. A fourth threat to internal validity was intervening variables including students' time spent on homework outside of school and having different math teachers. The researcher could not control student time spent on homework outside of school, but all students did have access to a daily intervention period where they could complete homework. While it is impossible to completely minimize the threat of intervening variables, it was reduced by having students placed with the same Algebra I teacher. A fifth threat to internal validity was student self-selection on the SAAS-R and their selection into the Freshman Bridge Program as well as parental selection for their students to participate in the program. Eighty-four percent of students reported participating in the program because their parents made them. By being required to participate in the program by parents, students may not have given their best effort throughout the program, especially during the summer. Though the researcher did plan to have a comparison group to minimize the threat of self and parental selection, a comparison group was not available for this study. A final threat to internal validity was the role of the researcher as an administrator in the school building. The researcher limited the impact of this role by not administering the SAAS-R and the released SOL test assessments and by conducting case management meetings with a counselor in order to develop positive relationships with students prior to the focus groups. The researcher also used the focus group interview protocol with a welcoming opening to limit her potential influence on the focus group results.

Future Research

While this study adds to the literature on ninth grade transitional programs, more research is needed in this field. First, a similar study could be conducted with a larger sample size. By having a larger sample, the results can become more generalizable. A similar study could also use a comparison group to compare the results of students who participate in the Freshman Bridge Program to those students who do not. By having a comparison group, more intervening variables can be ruled out.

Furthermore, a longitudinal study is needed to follow the students for all four years of high school rather than just the first semester of the ninth grade year. With a longer study, a bridge program can be connected to students' graduation rates. An even longer study could also provide data on what students do after high school, including whether they join the workforce, enter the military, or go to college.

Future research is also needed with regard to student attitude. The researcher did not find a statistically significant relationship between student attitude and achievement in Algebra I or between student attitude and overall student academic achievement. The researcher did, however, find important relationships among the different domains of student attitude. Students' scores were also consistently highest for the attitude domain of Goal Valuation. This quantitative finding was also supported by the focus group research since a significant theme that emerged was graduation and personal goals. More research is needed to determine what contributes to student motivation and their goals as well as how schools can help students with goal setting. Having more individual interviews specifically tied to student motivation and goal setting may provide more data on student attitude.

Conclusion

The purpose of this study was to examine the impact of a Freshman Bridge Program on student attitude, student achievement in Algebra I, and overall student academic achievement beginning in the spring of the eighth grade year through the first semester of the ninth grade year. The researcher did not find statistically significant relationships between student attitude and student achievement in Algebra I or between student attitude and overall student academic achievement. The researcher did find significant relationships among the different domains of student attitude, with Goal Valuation being the highest average attitude domain. The researcher did find some support that participation in the Freshman Bridge Program resulted in a more positive attitude toward school, increased achievement in Algebra I, and increased overall student academic achievement, but was limited by the lack of a comparison group. Participants also provided more in-depth data on the Freshman Bridge Program, their transitional experience, and their post high school plans.

The data will be shared with the faculty to encourage a school-wide adoption of a continuum of interventions model with student data monitoring. It will also be shared with central office staff to support continued funding and to provide a model for the entire division and shared with rising ninth grade students to encourage them to participate in the 2018-19 Freshman Bridge Program. Another implication for practice will be changes to the next Freshman Bridge Program to include English and more subjects and tailored field trips. A final implication for professional practice is the adoption of a Freshman Bridge Program or similar transitional program for all schools. Combining a summer program with a continuum of supports is a positive model that can help students be successful in their transition to high school.

Though the study had several limitations, the purpose of the study was to examine and improve upon an existing program for the school. By using the data from the study, the researcher can make changes to improve the program for the future and develop a model that can be utilized by other school districts.

Future research should include a larger sample size with a comparison group as well as a longitudinal study to determine if Freshman Bridge Program participants graduate and what they do post high school. More research is also needed in the field of student attitude, especially with regard to motivation and goal-setting. Based on the findings of this study, the researcher will implement suggested changes to the Freshman Bridge Program and implement a continuum of interventions with data monitoring for grades nine through twelve. Additionally, other schools should adopt similar programs to help students as they transition to a new school by focusing on hands-on instruction, study skills, and career counseling. By supporting students in the ninth grade, students can develop positive relationships with their teachers. They also can have a successful transition to high school and become closer to meeting the ultimate goal of graduation.

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Appendix A: School Attitude Assessment Survey-Revised

School Attitude Assessment Survey-Revised

Instructions: This survey should take approximately 5 minutes to complete.
Part I: Please rate how strongly you agree or disagree with the following statements. In answering each question, use a range from (**1**) to (**7**) where (**1**) stands for **strongly disagree** and (**7**) stands for **strongly agree**. Please circle only one response choice per question.

Statement	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
1. My classes are interesting.	1	2	3	4	5	6	7
2. I am intelligent.	1	2	3	4	5	6	7
3. I can learn new ideas quickly in school.	1	2	3	4	5	6	7
4. I check my assignments before I turn them in.	1	2	3	4	5	6	7
5. I am smart in school.	1	2	3	4	5	6	7
6. I am glad that I go to this school.	1	2	3	4	5	6	7
7. This is a good school.	1	2	3	4	5	6	7
8. I work hard at school.	1	2	3	4	5	6	7
9. I relate well to my teachers.	1	2	3	4	5	6	7
10. I am self-motivated to do my schoolwork.	1	2	3	4	5	6	7
11. I am good at learning new things in school.	1	2	3	4	5	6	7
12. This school is a good match for me.	1	2	3	4	5	6	7
13. School is easy for me.	1	2	3	4	5	6	7
14. I like my teachers.	1	2	3	4	5	6	7
15. I want to get good grades in school.	1	2	3	4	5	6	7
16. My teachers make learning interesting.	1	2	3	4	5	6	7
17. My teachers care about me.	1	2	3	4	5	6	7
18. Doing well in school is important for my future career goals.	1	2	3	4	5	6	7
19. I like this school.	1	2	3	4	5	6	7
20. I can grasp complex concepts in school.	1	2	3	4	5	6	7
21. Doing well in school is one of my goals.	1	2	3	4	5	6	7
22. I am capable of getting straight A's.	1	2	3	4	5	6	7
23. I am proud of this school.	1	2	3	4	5	6	7

Statement	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
24. I complete my schoolwork regularly.	1	2	3	4	5	6	7
25. It's important to get good grades in school.	1	2	3	4	5	6	7
26. I am organized about my schoolwork.	1	2	3	4	5	6	7
27. I use a variety of strategies to learn new material.	1	2	3	4	5	6	7
28. I want to do my best in school.	1	2	3	4	5	6	7
29. It is important for me to do well in school.	1	2	3	4	5	6	7
30. I spend a lot of time on my schoolwork.	1	2	3	4	5	6	7
31. Most of the teachers at this school are good teachers.	1	2	3	4	5	6	7
32. I am a responsible student.	1	2	3	4	5	6	7
33. I put a lot of effort into my schoolwork.	1	2	3	4	5	6	7
34. I like my classes.	1	2	3	4	5	6	7
35. I concentrate on my schoolwork.	1	2	3	4	5	6	7

PART II: Please choose only one response choice per question.

1. What is your cumulative GPA? What are your average grades?

- ☐ 4.0 or higher (All A's)
- ☐ 3.75 to 3.99 (Mostly A's)
- ☐ 3.5 to 3.74 (More A's than B's)
- ☐ 3.25 to 3.49 (More B's than A's)
- ☐ 3.0 to 3.24 (Mostly B's, some A's and C's)
- ☐ Don't know
- ☐ 2.5 to 2.99 (More B's than C's)
- ☐ 2.0 to 2.49 (More C's than B's)
- ☐ 1.5 to 1.99 (More C's than D's)
- ☐ 1.0 to 1.49 (More D's than C's)
- ☐ less than 1.0 (Mostly D's and F's)

2. On average, how much time *per week* do you spend doing homework?

- ☐ Less than 1 hour
- ☐ From 1 hour to less than 3 hours
- ☐ From 3 hours to less than 5 hours
- ☐ From 5 hours to less than 10 hours
- ☐ From 10 hours to less than 15 hours
- ☐ From 15 hours to less than 20 hours
- ☐ From 20 hours to less than 25 hours
- ☐ 25 hours or more

3. Did your parent require you to participate in the Freshman Bridge Program?

- ☐ Yes
- ☐ No

Thank you for your time!

Appendix B: Algebra I Released SOL Pre-Test (Pre-RSOL 1)

1 **Travis would like to buy some toys to donate to charity. He plans to buy 9 dolls at d dollars each, 2 toy cars at c dollars each, and 3 train sets at t dollars each. Which expression represents the total cost, in dollars, of these items that Travis wants to buy?**

A $9c + 2t + 3d$
B $9d - 2c - 3t$
C $9d + 2c + 3t$
D $9c - 2t - 3d$

2 Directions: Type you answer in the box.

What is the value of this expression when $a = 64$ and $b = -5$?

$$-2\sqrt[3]{a} + b^2$$

3 **Pierre solved an inequality as shown.**

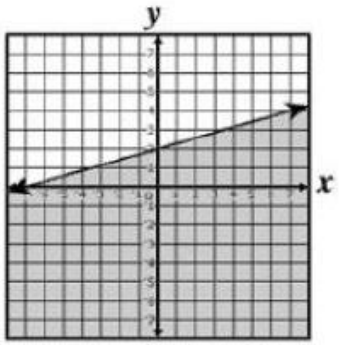
Step 1: $-8 \geq n + 3$
Step 2: $-8 + (-3) \geq n + 3 + (-3)$
Step 3: $-11 \geq n + 0$
Step 4: $-11 \geq n$

What property justifies the work between Step 3 and Step 4 ?

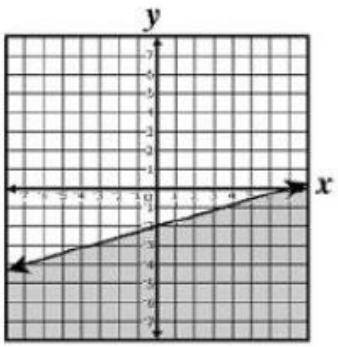
A Inverse property of addition
B Identity property of addition
C Addition property of inequality
D Commutative property of addition

4 Which graph best models $y \leq \frac{2}{7}x - 2$?

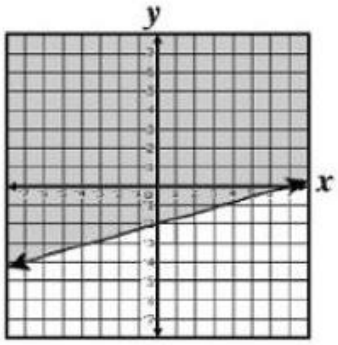
A



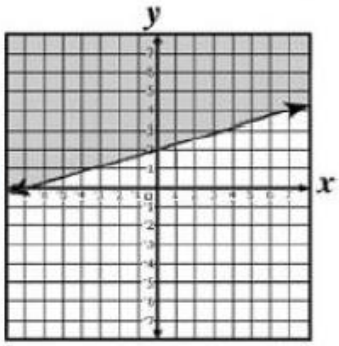
C



B



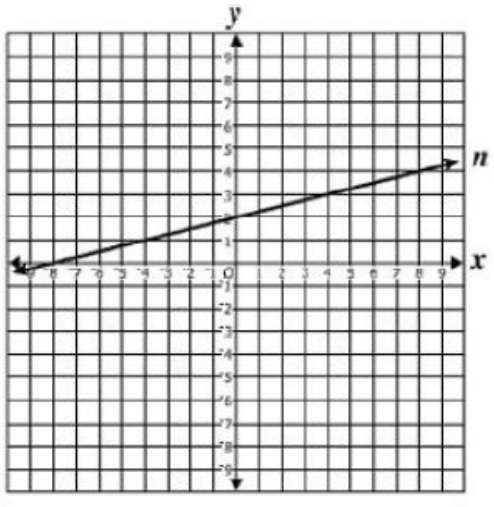
D



5 Which inequality represents all the solutions of $9(4x - 8) < 4(6x + 9)$?

A $x < -3$
B $x > -3$
C $x < 9$
D $x > 9$

6 **The graph of line n is shown.**



Which number is closest in value to the slope of line n ?

A -4

B $\frac{-1}{4}$

C $\frac{1}{4}$

D 4

7 **The formula shown can be used to find A , the amount of money Raul has in his savings account.**

$$A = P + Prt$$

Raul wants to find r , the rate of interest his money earns. Which equation is correctly solved for r ?

A $r = APt$

B $r = A - 2Pt$

C $r = \frac{A}{2Pt}$

D $r = \frac{A - P}{Pt}$

8 **Which equation represents the horizontal line passing through (7, 5) ?**

A $x = 5$
B $y = 5$
C $x = 7$
D $y = 7$

9 **What value of p will make this equation true?**

$$\frac{6p + 4}{6} = \frac{4p - 8}{3}$$

A -10
B -6
C 2
D 10

10 Directions: Type your answer in the box.

What is the slope of the line represented by this equation?

$$3x + 5y = -7$$

Slope =

11 **The length, l, of a rectangle is 3 times its width. The perimeter of the rectangle is greater than 48 centimeters. Which inequality expresses all the possible lengths, in centimeters, of the rectangle?**

A $l > 6$
B $l > 12$
C $l > 18$
D $l > 36$

12 Directions: Click on a box to choose each ordered pair you want to select. You must select all correct ordered pairs.

Using the ordered pairs shown, select each relation containing three ordered pairs with a domain of { -1, 2, 4 }.

(-3, -1)	(4, -2)
(-1, 0)	(3, 4)
(-2, 2)	(2, 3)

13 **This relation is an inverse variation.**

$$\{ (-1, 8), (4, -2), (-2, 4) \}$$

Which equation represents this relation?

A $y = -3x + 5$

B $y = -2x$

C $y = \frac{-x}{8}$

D $y = \frac{-8}{x}$

14 **Which equation represents the pattern shown in the table?**

x	y
$^{-}3$	$^{-}10$
$^{-}2$	$^{-}7$
$^{-}1$	$^{-}4$
0	$^{-}1$

A $y = -3x - 19$

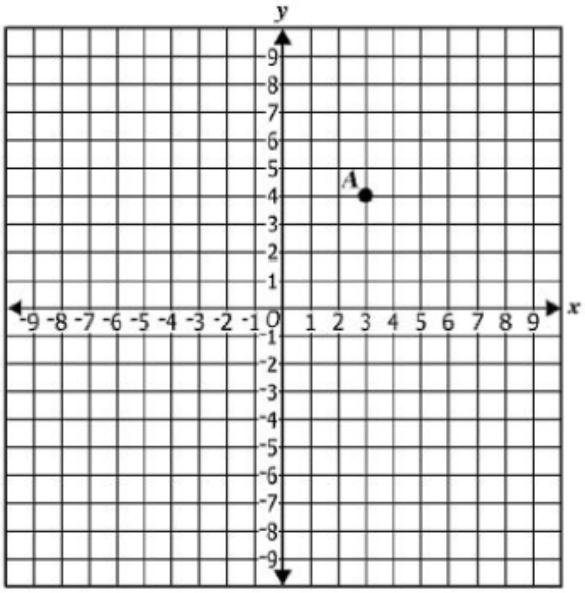
B $y = -x - 13$

C $y = x - 1$

D $y = 3x - 1$

15 Directions: Click on a box to choose each point you want to select. You must select all correct points.

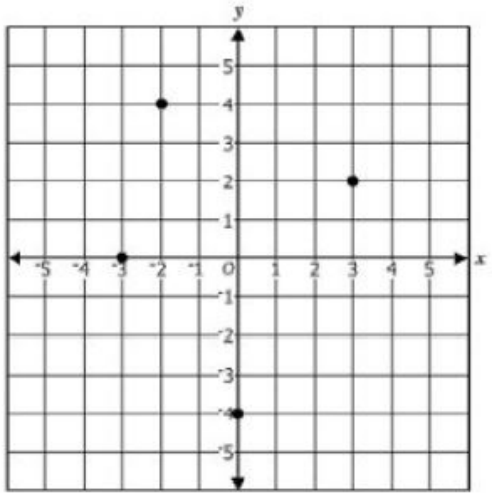
The graph of the equation representing a direct variation passes through point *A* .



Identify each additional point that is on the graph of this equation.

(-6, -8)	(-3, -4)
(-5, -6)	(4, 3)
(0, 0)	(6, -8)

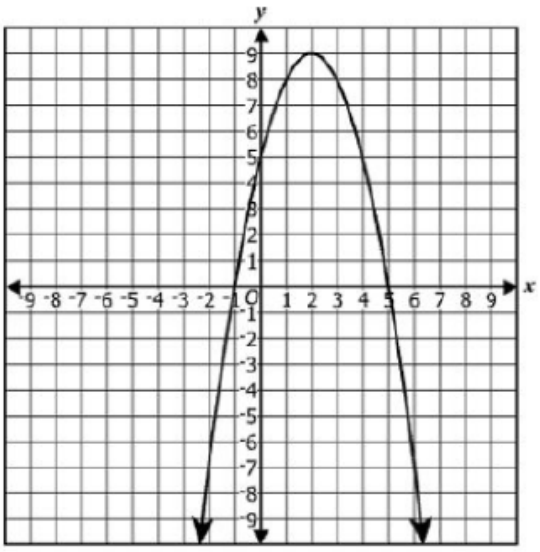
16 **What is the range of this relation?**



A $\{ x \mid -3 \leq x \leq 3 \}$
B $\{ -3, -2, 0, 3 \}$
C $\{ y \mid -4 \leq y \leq 4 \}$
D $\{ -4, 0, 2, 4 \}$

17 Directions: Click on a box to choose each point you want to select. You must select all correct points.

Identify the *x* – and *y* – intercepts of the relation shown.



(–1, 0)
(0, –1)
(5, 0)
(0, 5)
(2, 9)

18 **What is $f(-8)$ for the function f ?**

$$f(x) = \frac{11(x - 24)}{2}$$

A −56
B −88
C −176
D −352

19 **The table shows the relationship between corresponding values of x and y.**

x	y
−6	−3
−3	−2
3	0
6	1
9	2

To determine the y-value —

A add 3 to the x-value
B subtract 3 from the x-value
C divide the x-value by 3 and add 1
D divide the x-value by 3 and subtract 1

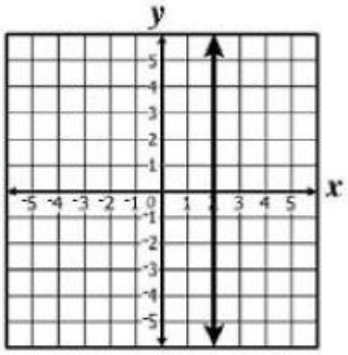
20 **Which relation is a function?**

A { (−3, 3), (5, 5), (−3, 2), (5, 3) }

C

Domain	Range
4	3
5	4
2	5
4	6

B



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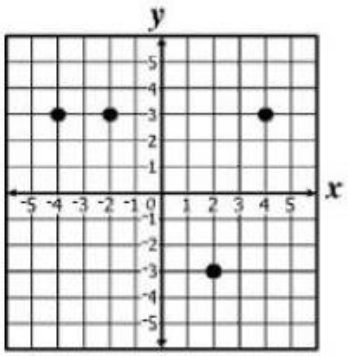
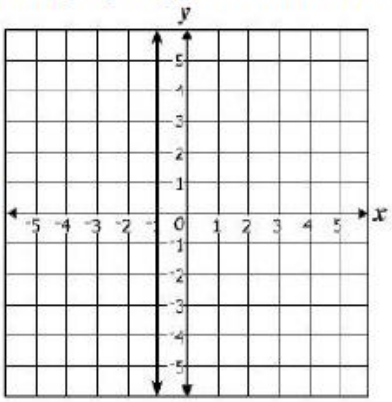
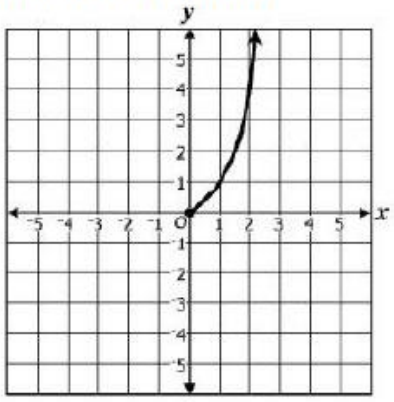


21 **Which graph appears to show a relationship that is NOT a function?**

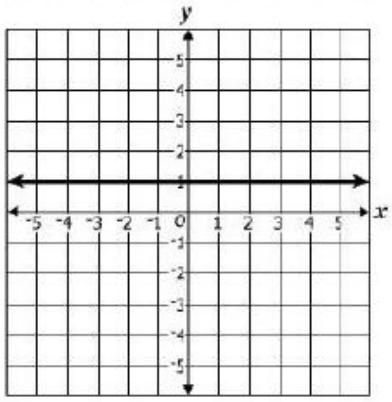
A



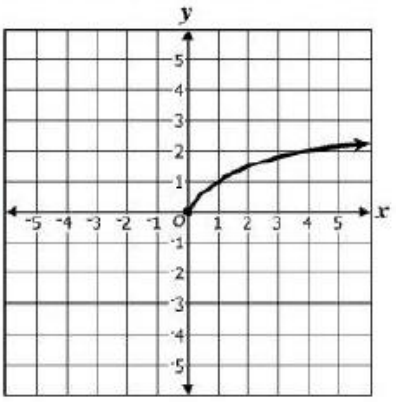
C



B



D



22 **A representation of a function is shown.**

$$f(x) = -4x + 2$$

What are the x-intercept and the y-intercept of this function?

A x-intercept of $(0, -2)$ and y-intercept of $\left(\frac{-1}{2}, 0\right)$

B x-intercept of $(0, 2)$ and y-intercept of $\left(\frac{1}{2}, 0\right)$

C x-intercept of $\left(\frac{-1}{2}, 0\right)$ and y-intercept of $(0, -2)$

D x-intercept of $\left(\frac{1}{2}, 0\right)$ and y-intercept of $(0, 2)$

Appendix C: Algebra I Released SOL Mid-Test (Mid-RSOL 2)

1

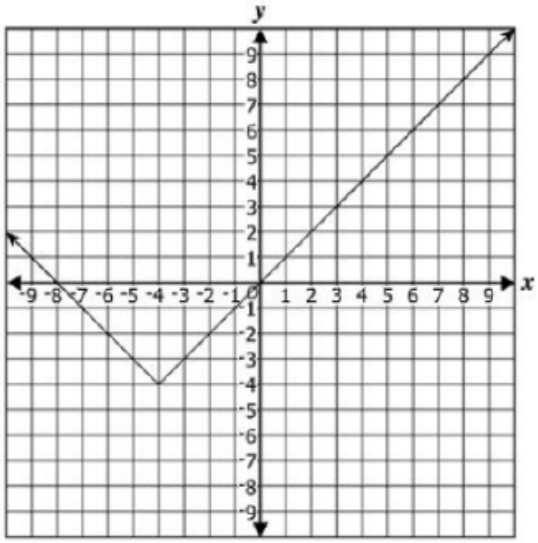
Directions: Type your answer in the box.

Based on the transitive property, complete this statement.

If $2(y - 3) \geq 3x - 4$ and $3x - 4 \geq 6 - y$, then $2(y - 3) \geq$ _?_

2

The following graph shows a relation.

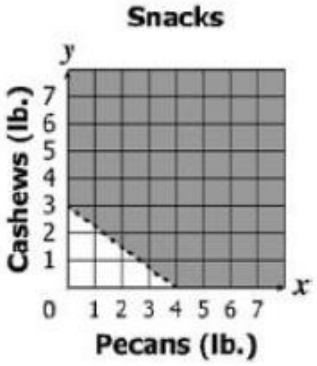


Which of the following best describes the range of this relation?

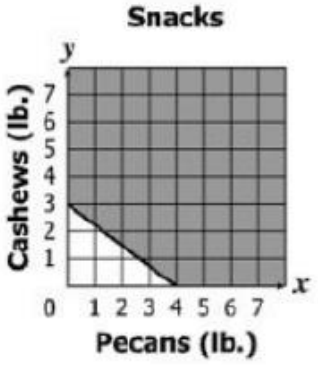
A All real numbers
B All real numbers between -10 and 10
C All real numbers less than or equal to -4
D All real numbers greater than or equal to -4

3 **Malik can spend no more than $24 to buy pecans and cashews. He will pay $6 per pound for pecans and $8 per pound for cashews. Which graph best represents the number of pounds of pecans and the number of pounds of cashews Malik can buy?**

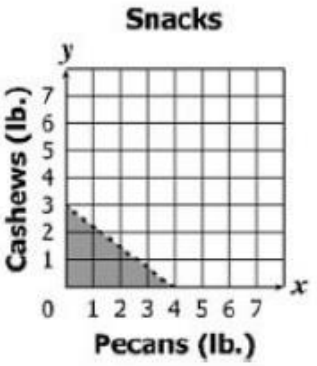
A



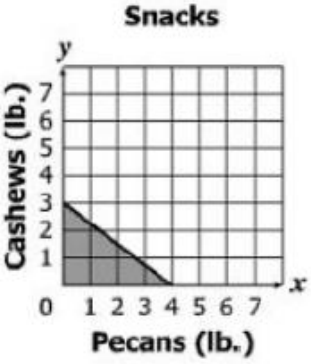
C



B



D

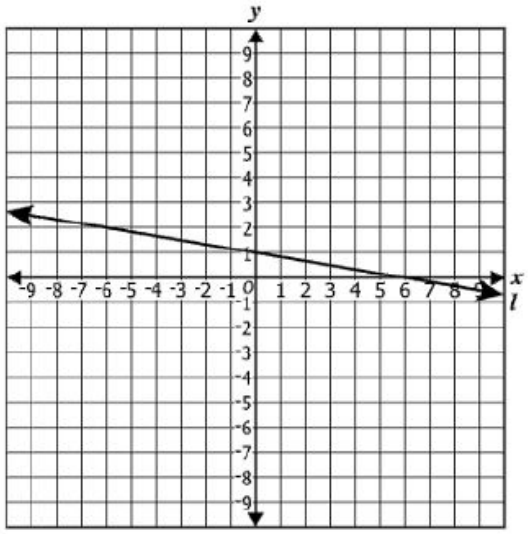


4 **Which number is NOT an element in the domain of this relation?**

{ (−2, 3), (0, 4), (1, 1), (6, 0) }

A 4
B 1
C 0
D -2

5 **The graph of line *l* is shown.**



Which number is closest in value to the slope of line *l*?

A -6

B $\frac{-1}{6}$

C $\frac{1}{6}$

D 6

6 **Ms. Scott will pay $2,000 to have her house painted. The amount each painter earns, *A*, varies inversely for the number of painters, *n*, that will paint the house. Which equation best represents this situation?**

A $A = 2{,}000 + n$

B $2{,}000 = A + n$

C $A = 2{,}000n$

D $2{,}000 = An$

7 **In which table does y vary directly with x ?**

A

x	y
1	3
2	3
3	3

B

x	y
1	4
2	8
3	12

C

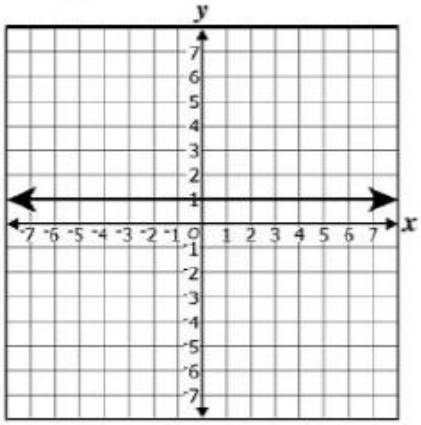
x	y
1	5
2	7
3	9

D

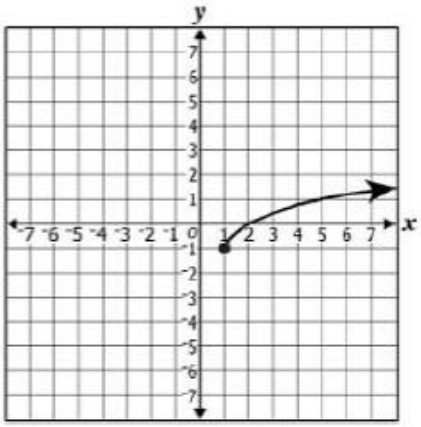
x	y
1	9
2	7
3	5

8 **Which graph has exactly one x -intercept and one y -intercept?**

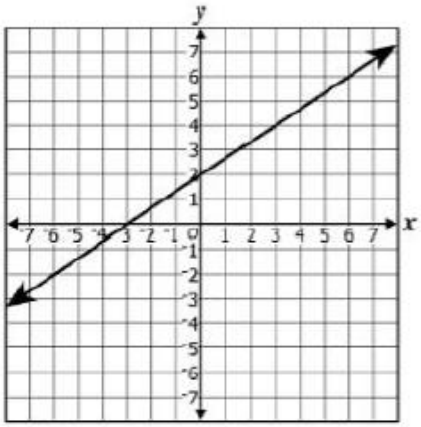
A



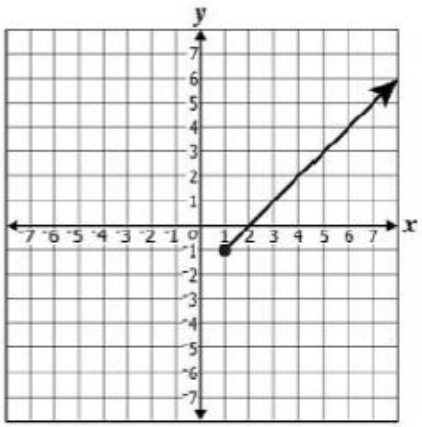
C



B



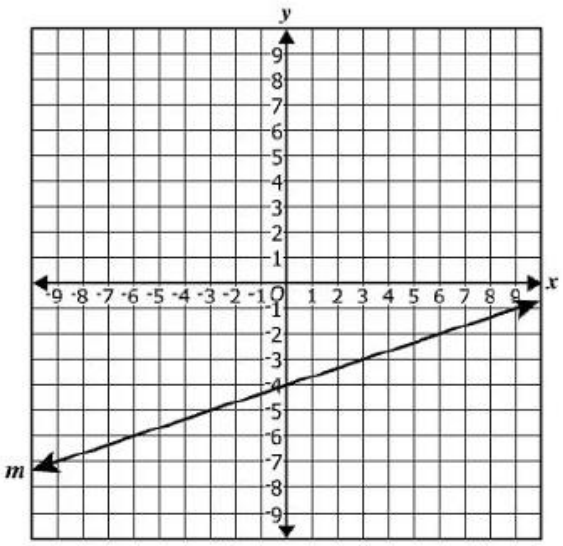
D



9 **If $f(x) = (x - 3)^2 + 1$, what is $f(6)$?**

A -2
B 7
C 10
D 16

10 **Which equation best represents line m ?**



A $y = -3x - 4$
B $y = \frac{-1}{3}x - 4$
C $y = \frac{1}{3}x - 4$
D $y = 3x - 4$

11 **Which equation represents the line that passes through the points (–4, 4) and (8, –2) ?**

A $y = -2x + 14$
B $y = -2x - 4$
C $y = \frac{-1}{2}x + 2$
D $y = \frac{-1}{2}x - 2$

12 **Which equation could represent a graph with x -intercepts of (4, 0) and (−7, 0) ?**

A $y = x^2 + 3x - 28$

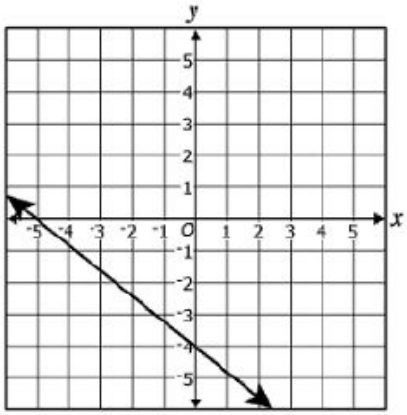
B $y = x^2 - 3x - 28$

C $y = x^2 + 3x + 28$

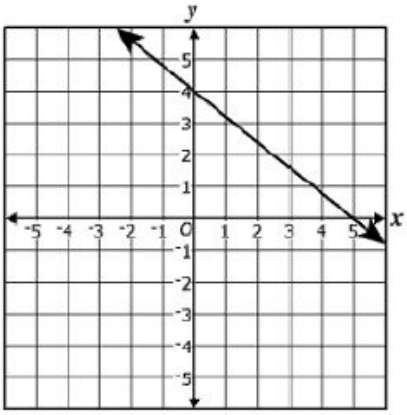
D $y = x^2 - 3x + 28$

13 **Which graph best represents the equation $4x + 5y = -20$?**

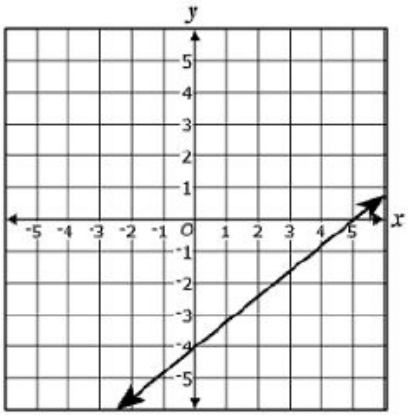
A



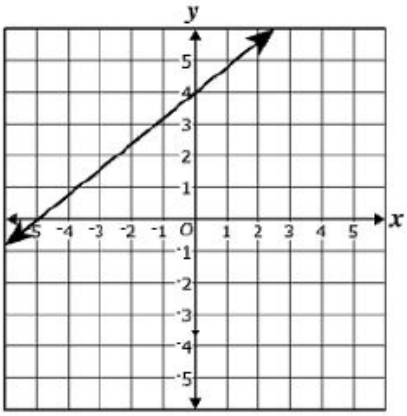
C



B

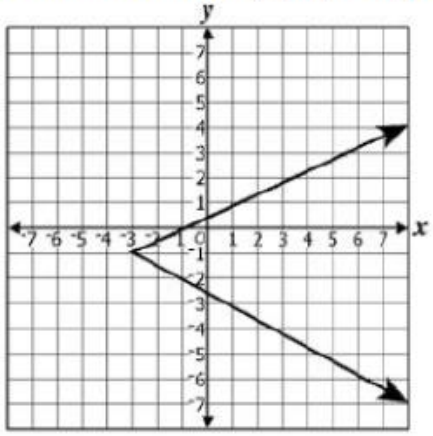


D

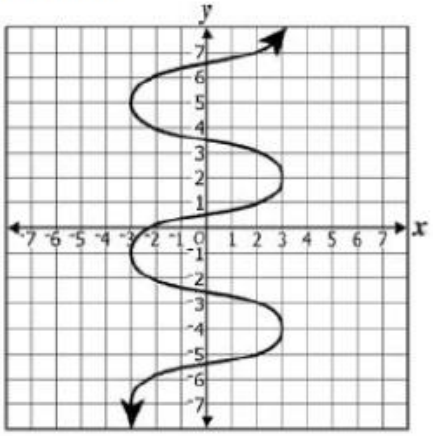


14 **Which of the following graphs appears to be a function?**

A



C



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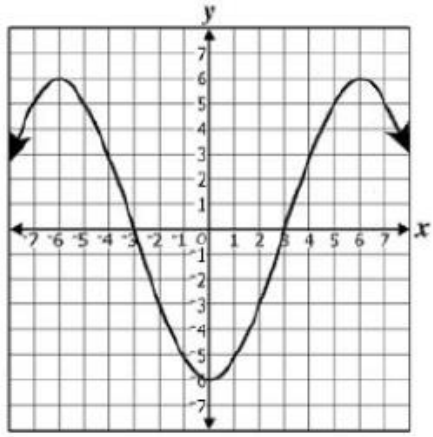

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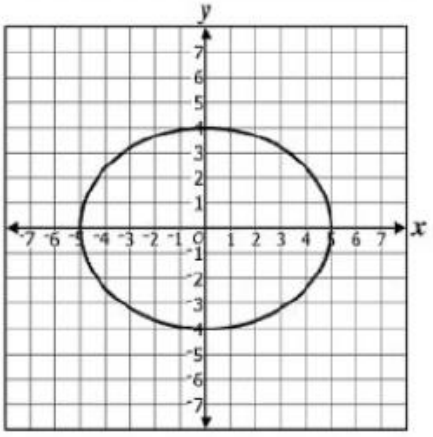


15 **Renee is going bowling.**

- **The cost per game is $2.50.**
- **Renee will need to rent a pair of bowling shoes for $1.50.**
- **She can spend up to $16.00 to bowl and rent a pair of shoes.**

What is the maximum number of games that Renee can bowl?

A 4
B 5
C 6
D 9

16 **What value of x makes this equation true?**

$$3x - 20 = -2x$$

A -20
B -4
C 4
D 20

17 Directions: Click on all the correct answers.

Christopher incorrectly solved an inequality as shown.

Step 1: $-4(x - 7) + 1 \leq -3$
Step 2: $-4(x - 7) \leq -4$
Step 3: $-4x + 28 \leq -4$
Step 4: $-4x \leq -32$
Step 5: $x \leq 8$

Between which two consecutive steps did Christopher make a mistake?

- Step 1
- Step 2
- Step 3
- Step 4
- Step 5

18 Directions: Type your answer in the box.

Solve for n:

$$\frac{3n - 7}{6} = \frac{2n + 5}{3}$$

$n =$

19 **A formula to find the angle measures of an isosceles triangle is shown.**

$$180 = 2x + y$$

Which equation can be used to find x?

A $x = \frac{180 - y}{2}$

B $x = \frac{180 + y}{2}$

C $x = 90 - y$

D $x = 90 + y$

20 **Which expression represents four less than half a number, n?**

A $4 - \frac{1}{2}n$

B $\frac{1}{2}n - 4$

C $\frac{1}{2}(4 - n)$

D $\frac{1}{2}(n - 4)$

21 **What is the value of this expression when $n = -15$?**

$$-2|n + 6|$$

A -42

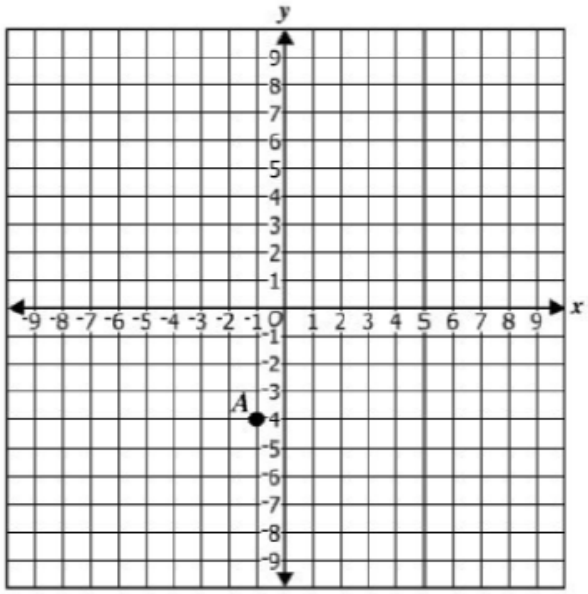
B -18

C 18

D 42

22 Directions: Click on all the correct answers.

Point *A* is an element of a direct variation. Identify each point, other than *A* , that are elements of this direct variation.



(-2, -8)	(2, 8)	(8, -1)
(-2, 0)	(4, -1)	(8, 0)

Appendix D: Algebra I Released SOL Post-Test (Post-RSOL 3)

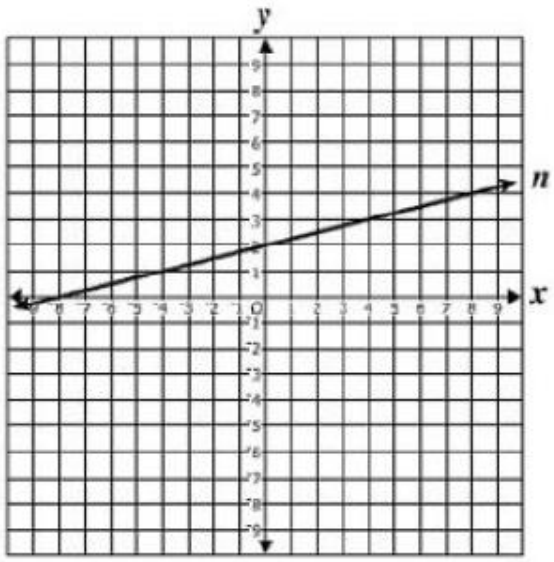
1 **Pierre solved an inequality as shown.**

Step 1: $-8 \geq n + 3$
Step 2: $-8 + (-3) \geq n + 3 + (-3)$
Step 3: $-11 \geq n + 0$
Step 4: $-11 \geq n$

What property justifies the work between Step 3 and Step 4 ?

A Inverse property of addition
B Identity property of addition
C Addition property of inequality
D Commutative property of addition

2 **The graph of line n is shown.**



Which number is closest in value to the slope of line n ?

A -4

B $\frac{-1}{4}$

C $\frac{1}{4}$

D 4

3 **What value of p will make this equation true?**

$$\frac{6p + 4}{6} = \frac{4p - 8}{3}$$

A -10
B -6
C 2
D 10

4 Directions: Type your answer in the box.

What is the slope of the line represented by this equation?

$$3x + 5y = -7$$

Slope =

5 **The formula shown can be used to find A, the amount of money Raul has in his savings account.**

$$A = P + Prt$$

Raul wants to find r, the rate of interest his money earns. Which equation is correctly solved for r?

A $r = APt$
B $r = A - 2Pt$
C $r = \frac{A}{2Pt}$
D $r = \frac{A - P}{Pt}$

6 **A representation of a function is shown.**

$$f(x) = -4x + 2$$

What are the x-intercept and the y-intercept of this function?

A x-intercept of $(0, -2)$ and y-intercept of $\left(\frac{-1}{2}, 0\right)$

B x-intercept of $(0, 2)$ and y-intercept of $\left(\frac{1}{2}, 0\right)$

C x-intercept of $\left(\frac{-1}{2}, 0\right)$ and y-intercept of $(0, -2)$

D x-intercept of $\left(\frac{1}{2}, 0\right)$ and y-intercept of $(0, 2)$

7 Directions: Type you answer in the box.

What is the value of this expression when $a = 64$ and $b = -5$?

$$-2\sqrt[3]{a} + b^2$$

8 **Which equation represents the pattern shown in the table?**

x	y
-3	-10
-2	-7
-1	-4
0	-1

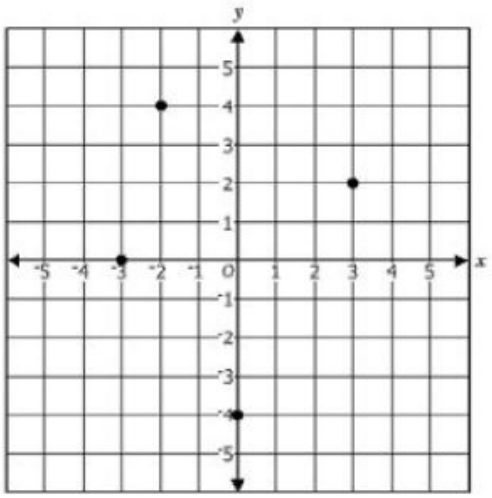
A $y = -3x - 19$
B $y = -x - 13$
C $y = x - 1$
D $y = 3x - 1$

9 Directions: Click on a box to choose each ordered pair you want to select. You must select all correct ordered pairs.

Using the ordered pairs shown, select each relation containing three ordered pairs with a domain of { −1, 2, 4 }.

(-3, -1)	(4, -2)
(-1, 0)	(3, 4)
(-2, 2)	(2, 3)

10 **What is the range of this relation?**



A $\{ x \mid -3 \leq x \leq 3 \}$
B $\{ -3, -2, 0, 3 \}$
C $\{ y \mid -4 \leq y \leq 4 \}$
D $\{ -4, 0, 2, 4 \}$

11 **This relation is an inverse variation.**

$\{ (-1, 8), (4, -2), (-2, 4) \}$

Which equation represents this relation?

A $y = -3x + 5$
B $y = -2x$
C $y = \frac{-x}{8}$
D $y = \frac{-8}{x}$

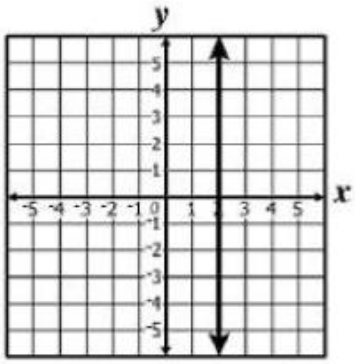
12 **Which relation is a function?**

A { (−3, 3), (5, 5), (−3, 2), (5, 3) }

C

Domain	Range
4	3
5	4
2	5
4	6

B



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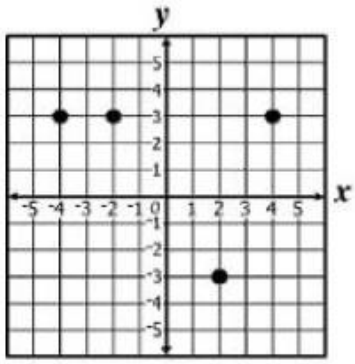
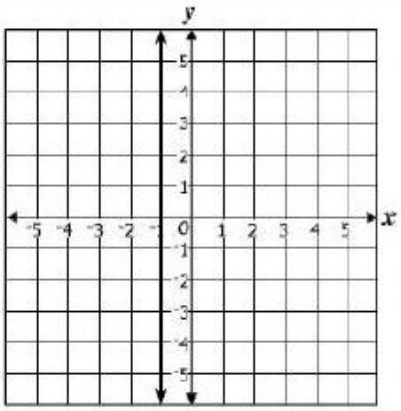


13 **Which graph appears to show a relationship that is NOT a function?**

A



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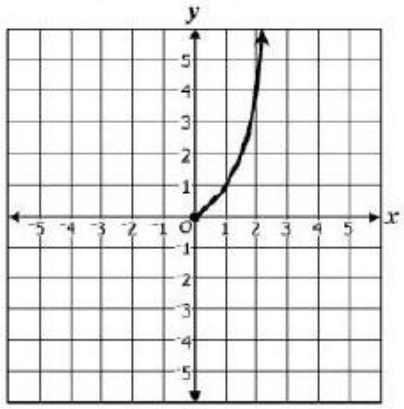

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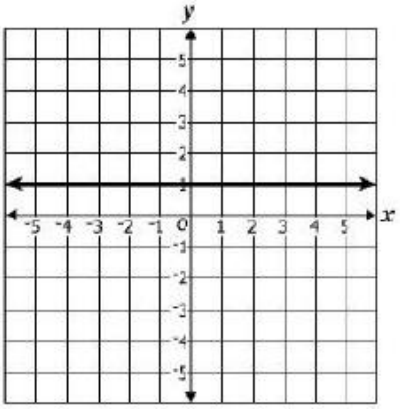

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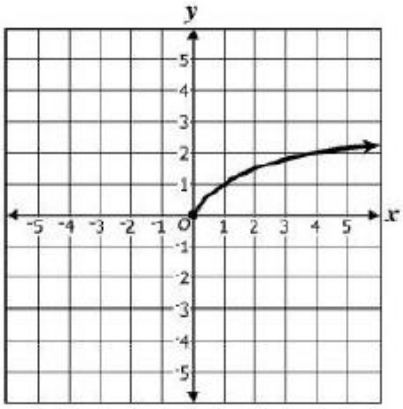


14 **What is $f(-8)$ for the function f ?**

$$f(x) = \frac{11(x - 24)}{2}$$

A -56
B -88
C -176
D -352

15 **Travis would like to buy some toys to donate to charity. He plans to buy 9 dolls at d dollars each, 2 toy cars at c dollars each, and 3 train sets at t dollars each. Which expression represents the total cost, in dollars, of these items that Travis wants to buy?**

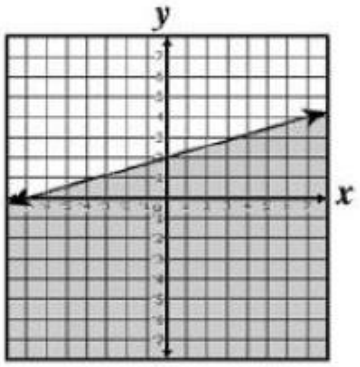
A $9c + 2t + 3d$
B $9d - 2c - 3t$
C $9d + 2c + 3t$
D $9c - 2t - 3d$

16 **Which inequality represents all the solutions of $9(4x - 8) < 4(6x + 9)$?**

A $x < -3$
B $x > -3$
C $x < 9$
D $x > 9$

17 **Which graph best models $y \leq \frac{2}{7}x - 2$?**

A



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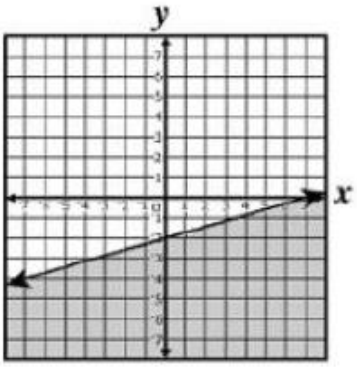

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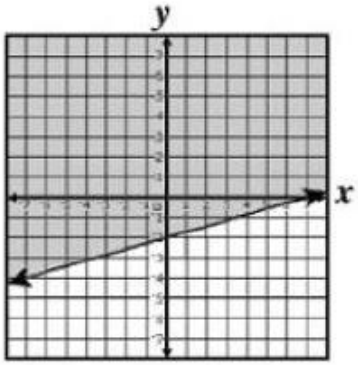

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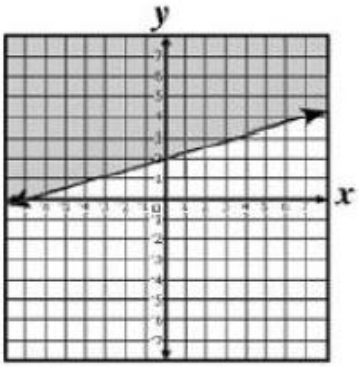


18 **The table shows the relationship between corresponding values of x and y.**

x	y
−6	−3
−3	−2
3	0
6	1
9	2

To determine the y -value —

A add 3 to the x -value
B subtract 3 from the x -value
C divide the x -value by 3 and add 1
D divide the x -value by 3 and subtract 1

19 **Which equation represents the horizontal line passing through (7, 5) ?**

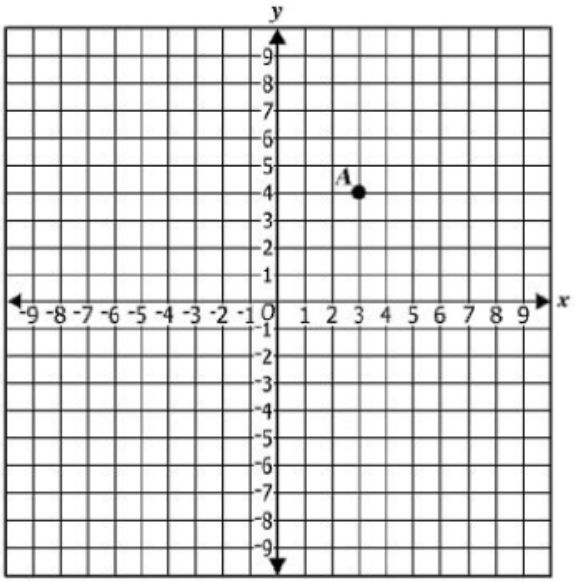
A $x = 5$
B $y = 5$
C $x = 7$
D $y = 7$

20 **The length, l, of a rectangle is 3 times its width. The perimeter of the rectangle is greater than 48 centimeters. Which inequality expresses all the possible lengths, in centimeters, of the rectangle?**

A $l > 6$
B $l > 12$
C $l > 18$
D $l > 36$

21 Directions: Click on a box to choose each point you want to select. You must select all correct points.

The graph of the equation representing a direct variation passes through point *A* .

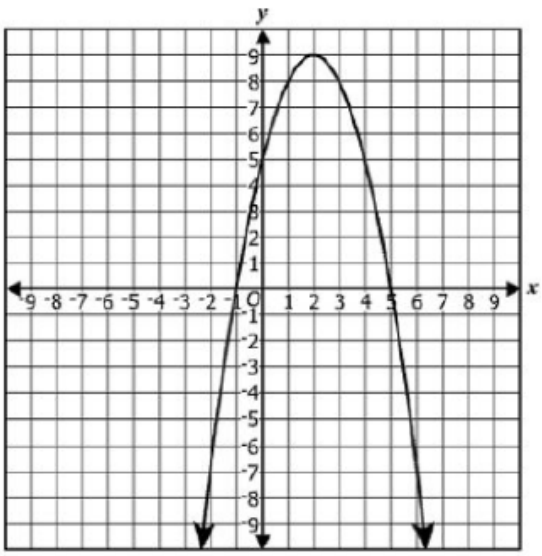


Identify each additional point that is on the graph of this equation.

(−6, −8)	(−3, −4)
(−5, −6)	(4, 3)
(0, 0)	(6, −8)

22 Directions: Click on a box to choose each point you want to select. You must select all correct points.

Identify the *x* – and *y* – intercepts of the relation shown.



- (–1, 0)
- (0, –1)
- (5, 0)
- (0, 5)
- (2, 9)

Appendix E: Semi-Structured Focus Group Questions

Opening: Today you're here because I want to learn about your experiences in the Freshman Bridge Program and your freshman year at high school. I will ask questions throughout our time together. You can answer in any order you want to, just add in and contribute.

1. Describe the Freshman Bridge Program.
2. Tell me about your experience in the Freshman Bridge Program.
3. What were the major differences from middle school you observed during your transition to high school?
4. Tell me about the first semester of your ninth grade year.
5. What was the easiest aspect of your transition to high school?
6. What was the most challenging aspect of your transition to high school?
7. What advice would you give students going into the ninth grade?
8. If we were having the Freshman Bridge program all over again, what would you keep about the program? What would you do differently? Why?
    a. What was most helpful about the Freshman Bridge Program?
    b. What was least helpful about the Freshman Bridge Program?
9. How are things going with your ninth grade teachers?
10. How are things going with your Algebra I class?
11. On a scale of 1 to 10 with 1 being the least important and 10 being the most important, how important is graduating from high school to you? Why?
12. Think about where you see yourself in the next 4 years. Do you see yourself graduating high school? Tell me more.

Appendix F: Algebra I First Semester SOL Standards

Expressions and Operations

A.1 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.

A.2 The student will perform operations on polynomials, including
a) applying the laws of exponents to perform operations on expressions;
b) adding, subtracting, multiplying, and dividing polynomials; and
c) factoring completely first- and second-degree binomials and trinomials in one or two variables. Graphing calculators will be used as a tool for factoring and for confirming algebraic factorizations.

Equations and Inequalities

A.4 The student will solve multistep linear and quadratic equations in two variables, including
a) solving literal equations (formulas) for a given variable;
b) justifying steps used in simplifying expressions and solving equations, using field properties and axioms of equality that are valid for the set of real numbers and its subsets;
c) solving quadratic equations algebraically and graphically;
d) solving multistep linear equations algebraically and graphically;
e) solving systems of two linear equations in two variables algebraically and graphically; and
f) solving real-world problems involving equations and systems of equations. Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.

A.5 The student will solve multistep linear inequalities in two variables, including
a) solving multistep linear inequalities algebraically and graphically;
b) justifying steps used in solving inequalities, using axioms of inequality and properties of order that are valid for the set of real numbers and its subsets;
c) solving real-world problems involving inequalities; and
d) solving systems of inequalities.

A.6 The student will graph linear equations and linear inequalities in two variables, including
a) determining the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined; and
b) writing the equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.

Functions

A.7 The student will investigate and analyze function (linear and quadratic) families and their characteristics both algebraically and graphically, including

a) determining whether a relation is a function;
b) domain and range;
c) zeros of a function;
d) *x*- and *y*-intercepts;
e) finding the values of a function for elements in its domain; and
f) making connections between and among multiple representations of functions including concrete, verbal, numeric, graphic, and algebraic.

Appendix G: IRB Approval Letter

LYNCHBURG COLLEGE EST. 1903

Lynchburg College Institutional Review Board for Human Subjects Research
Research Study Determination Letter

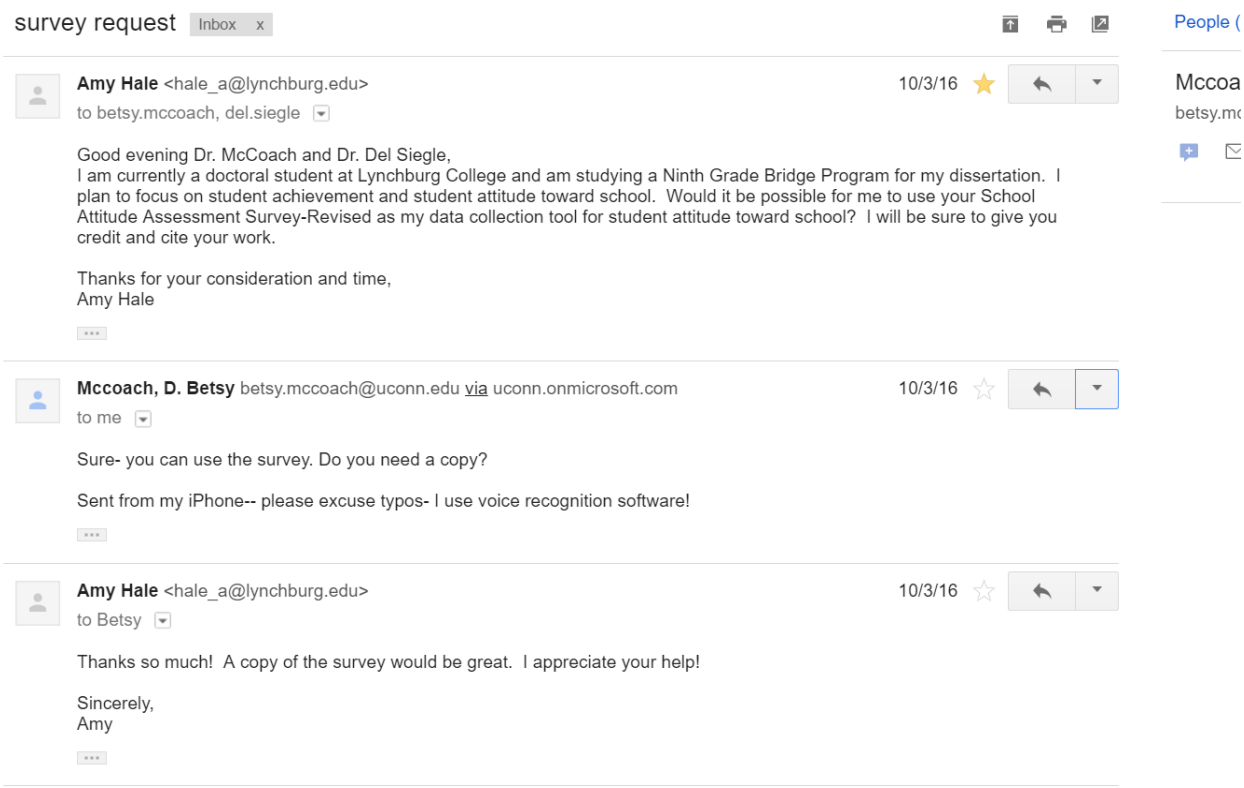
Date:	May 7, 2017
To:	Dr. Mary Ann Mayhew
From:	Institutional Review Board (IRB)
Review Reference No.:	LCHS1617127
LC IRB Approval No.:	**LCHS1617127**
Project Title:	A Freshman Bridge Program: Transition to Success
Final Determination:	Approved
Approval Date:	May 4, 2017
Expiration Date:	May 4, 2018

Thank you for your recent submission to the Lynchburg College Institutional Review Board (IRB) for Human Subjects Research. Your request for review of your research project listed above has been completed. The proposal and related study comply with the standards set by the U.S. Department of Health and Human Services, Code of Federal Regulations, Title 45 CFR Part 46, Protection of Human Subjects, and all applicable federal, state, and institutional policies. If a member of the research team is affiliated with and/or if there is an affiliated research site from which participants are recruited and/or data are gathered, then your study may necessitate review from another entity. It the responsibility of the PI to inquire at other site(s) and with other IRBs regarding reviewability and, if necessary, secure approval from other site(s)/IRB(s) prior to the collection of data.

Please remember that if any modifications are necessary, these changes need to be approved by this Board. The IRB website includes detailed instructions and forms for this process. Investigators must report any adverse events involving subjects to the IRB Director as soon as possible but no later than three working days after the discovery of the occurrence. Approval for this proposal is for **one year; the expiration date is listed above. Investigators must submit a closure form or a renewal request form to the IRB Director following the instructions provided on the IRB website* at least 30 days before the end date of the approval period as stated in the most recent approval letter for the study.** While the LC IRB makes an effort to send reminder correspondence 60-90 days before the end of the approval period, it is ultimately the responsibility of the PI and research team, not the LC IRB, to ensure that this deadline is met. This deadline will allow adequate time for the IRB to review the form so that a decision can be made before the research proposal approval expires. Please feel free to contact me at irb-hs@lynchburg.edu if you have any questions.

*The Lynchburg College Institutional Review Board website is located at http://www.lynchburg.edu/institutional-review-board-irb-human-subjects-research; use menu on left of page to navigate to Submission Instructions and Forms page.

Appendix H: Permission from McCoach to Use SAAS-R



survey request Inbox x

Amy Hale <hale_a@lynchburg.edu> 10/3/16

to betsy.mccoach, del.siegle

Good evening Dr. McCoach and Dr. Del Siegle,
I am currently a doctoral student at Lynchburg College and am studying a Ninth Grade Bridge Program for my dissertation. I plan to focus on student achievement and student attitude toward school. Would it be possible for me to use your School Attitude Assessment Survey-Revised as my data collection tool for student attitude toward school? I will be sure to give you credit and cite your work.

Thanks for your consideration and time,
Amy Hale

Mccoach, D. Betsy betsy.mccoach@uconn.edu via uconn.onmicrosoft.com 10/3/16

to me

Sure- you can use the survey. Do you need a copy?

Sent from my iPhone-- please excuse typos- I use voice recognition software!

Amy Hale <hale_a@lynchburg.edu> 10/3/16

to Betsy

Thanks so much! A copy of the survey would be great. I appreciate your help!

Sincerely,
Amy

People (

Mccoa

betsy.mc

Appendix I: Superintendent Permission Letter

Superintendent Permission Letter

February 20, 2017

To whom it may concern,

This letter serves as official permission for Amy Hale, a graduate student at Lynchburg College, to conduct the doctoral study entitled: A freshman bridge program: Transition to success. I understand the purpose of this research study is to examine the impact of a transitional program on student attitude, student performance in Algebra I, and student achievement from the spring before the ninth grade year to the end of the first semester of the ninth grade year.

The data collection/research may not interrupt core instruction. Consent and assent forms must be distributed and returned by all participants. Also, student participants must not be required to include their names or contact information in any of the research documents. Mrs. Hale is permitted to collect/analyze data including, but not limited to, student surveys, student assessment scores, transcription information, demographic information, and course grades using student numbers.

Sincerely,