COMPARING ACADEMIC ACHIEVEMENT OF STUDENTS ACCELERATED IN MATHEMATICS TO THEIR NON-ACCELERATED PEERS

By

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CERTIFICATION OF PROJECT WORK

We, the undersigned, certify that this project entitled COMPARING ACADEMIC ACHIEVEMENT OF STUDENTS ACCELERATED IN MATHEMATICS TO THEIR NON-ACCELERATED PEERS by Bryan Bongiovanni, Candidate for the Degree of Master of Science in Education, Curriculum and Instruction in Inclusive Education, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

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Abstract

This thesis investigated the mathematics acceleration policy of a suburban school district and its academic effects on students. This study was conducted using a comparative analysis of accelerated and non-accelerated students from two classes, and comparing and contrasting the teachers' and administrations' beliefs about the acceleration policy. The study was performed using a mixed methodology. The quantitative portion of the study was carried out using de-identified historical data, and a teacher survey with a Likert scale. Qualitative data was collected in the form of face-to-face interviews with school administrators.

The study yielded several results on the academic effects of the mathematics acceleration policy and beliefs about acceleration of the school district's teachers and administration. Students who were accelerated in math were later able to take more advanced math courses than non-accelerated students. Accelerated students out performed non-accelerated students academically, but several non-accelerated students had similar academic achievement to their accelerated peers. Teachers and administrators reported mixed and contradictive data. Several advocated for an open acceleration policy for those few students who meet the established criteria, but also oppose the idea of expanding the current acceleration policy to include students who just missed meeting the acceleration criteria. Results indicated that the acceleration policy appeared to be executed based on the strength of tradition rather than promoting maximum access to challenging math coursework.

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Introduction

In this thesis I investigated the mathematics acceleration policy of a suburban school district. The main question of this study was "How does the academic achievement of middle school students accelerated in mathematics in 7th grade compare to that of their non-accelerated peers?" The main focus was to see if there was any correlation between acceleration in mathematics and academic achievement. The goal of this study was not to disprove the fact that accelerated students perform higher than their non-accelerated peers. The goal was to see if this acceleration policy was excluding students who have the ability to successfully complete accelerated courses. The study was conducted by comparing and contrasting the academic achievement of students accelerated in mathematics to those students who were not accelerated in mathematics. The study tracked the academic achievement of these students from the beginning of their 7th grade year and concluded at the end of their senior or junior year. This study also evaluated and compared how teachers and administrators view acceleration, more specifically the school district's acceleration policy.

A finding of a positive correlation between mathematical acceleration and academic achievement would be beneficial to the field of education. Such a correlation would be important knowledge for administrators and teachers to possess. A focal point of the educational system is to give students the best chance to succeed and maximize their potential. If the results of the study support the theory that academic achievement is tied to mathematical acceleration, it would be imperative to give every student the option to become accelerated. One child should not be afforded a better academic path than another student. Possessing the knowledge of this correlation could lead to a change in the school district's mathematics acceleration policy.

Many school districts have acceleration policies that focus on accelerating only the highest academic achieving students. The issue becomes that there are many students that may not have elite grades but have the ability to complete accelerated courses. A positive correlation between acceleration in mathematics and academic achievement would mean that school districts should expand their acceleration policies to include more students thus allowing students access to greater academic opportunities.

School district acceleration policies determine which students become accelerated. New York State has an acceleration policy that all school districts within the state must abide by. According to NYSED (2014) a student must be offered accelerated opportunities. In New York State 7th grade is the academic year in which students are either accelerated in math. This decision can have a major effect on a student's future. Accelerated students have access to advanced courses, in math as well as other disciplines, which can set them up to attend elite colleges and obtain higher paying jobs. The issue is that most school acceleration policies are rigid and flawed. Some policy flaws include: sole reliance on assessment scores, lofty requirements, lack of parental and student knowledge, and inherent discrimination on the basis of socio economic status and ethnicity.

Such an important decision should not be based on assessment scores alone. Many students are not good test takers and should not be denied acceleration based on this. When deciding if a student should be accelerated the student's entire body of work should be taken into consideration. Acceleration policies that have extremely lofty requirements benefit only a very small portion of the student population. A policy such as this would prevent capable students from becoming accelerated. These students may not have the high assessment scores or grades but may possess the intelligence and motivation to succeed on an accelerated path. One way

schools could gauge a student's motivation would be by providing them with knowledge on the acceleration process and seeing if the student is interested and demonstrates this interest through their work habits.

An important issue is that many schools have vague policies and do not educate the students or parents on the acceleration process. If parents and students were better informed about the acceleration process they would be in a better position to determine if it's something they would like to pursue. A student should not be left off of the acceleration due to a lacking the proper knowledge of the opportunity.

Another problem is that students from low SES families and different ethnic backgrounds are underrepresented in acceleration programs (Wyner, Bridgeland, & Diiulio, 2007). Students from low SES families or from an underrepresented minority group can be just as capable as any other student and should not be held back because of their background. This study revealed a disconnect in how teachers and administrators view the school districts acceleration policy. If acceleration in math correlated to academic achievement the school districts acceleration policies would need to be changed so that more if not all students are placed on the accelerated path in mathematics.

Finding a potential correlation between academic achievement and acceleration would be very beneficial to me as a teacher. One value that I hold in high regard is that every student should be given a fair and equal shot at academic success. If there were a connection between academic achievement and acceleration it would be vital to insure that acceleration policies are just and fair. If more students were placed on an accelerated path, perhaps more of them would succeed.

My main goal as a teacher is to maximize the talent of my students. By closing off acceleration and higher education to our students we are failing them. I chose this topic while having a discussion with a middle school principal. It was apparent that this is a major area of interest in educational research because of its implications. As a teacher it is my job to challenge my students and push them to their limits. By telling them they aren't good enough to become accelerated the school is doing them a disservice. Acceleration is a track that students can get off of at any time during their middle or high school career, but they can only get on at the beginning. After reviewing the associated literature, it is evident that students benefit from being accelerated in mathematics in 7th grade. As a field educators and school districts need to find ways to incorporate more students within mathematics acceleration policies. In New York state is required that school districts provide students with accelerated opportunities.

Literature Review

The context of this study was designed after a thorough review of the professional literature. This review of literature was conducted by examining peer reviewed journal articles, particularly empirical studies. In the following review of literature, specific topics will be examined to assist in providing a foundation for this study. Specifically, these topics will be middle school students, math, and math achievement. Within each topic will be several subtopics. This subtopic for middle school students is self-efficacy. Sub topics for math will include New York State (NYS) common core curriculum for 7th grade, NYS math acceleration policy, the school district's acceleration policy, and accelerated and non-accelerated math tracks for the school district. The sub topic for achievement is acceleration policies. The literature review is concluded with the theoretical framework of self-efficacy and social capital theory. These categories will be the focus of research discussed in the literature review. The research for

this literature review will focus on middle school students, particularly New York State middle school math students.

Middle School Students

Middle school is a critical time for students academically, physically, and socially. In New York State, it is decided at the 7th grade level whether or not a student will be accelerated in math. Studying advanced math in middle school and high school has a major influence on whether or not a student enrolls in a four-year college and earns a bachelor degree (Burris, Heubert, & Levin 2004). Choy, Horn, Nuñez, & Chen (2000) reported that students whose parents never attended college more than doubled their chances of enrolling in four year colleges if they took high school math courses beyond algebra 2. Successful completion of college, in turn, strongly correlates to better employment and financial opportunities. Major academic decisions that will affect the lives of students are being made at the middle school level. Research shows that studying advanced math in middle school and high school strongly correlates with future success. An argument could be made that such a high stake decisions should not be made at this age level. Middle school students are still growing not only physically but cognitively as well.

Jean Piaget conducted extensive research into the cognitive development of children. Piaget was a Swiss born developmental psychologist. One of Piaget's most well known pieces of work is his *Stages of Cognitive Development*. According to Wood (2001) Piaget's stages of development work as a blueprint to describe the process of normal intellectual development. These stages include thought, judgment, and knowledge from infancy to adulthood. The four stages of Piaget's cognitive development theory include: sensorimotor (birth- 24 months), pre-

operational (24 months- 7 years old), concrete operational (ages 7-12), and formal operational (adolescents-adulthood). Piaget did state that not all children pass through the stages at the same rate but that stages are not skipped. Piaget stated that new intellectual abilities, and a more complex understanding of the world mark each stage. Using Piaget's stages of cognitive development as a guideline, students in the 7th grade are at the end of the concrete operational stage and entering the formal operational stage.

According to Woods (2001) Piaget stated that children in the concrete operational stage demonstrate logical, concrete reasoning. During this stage the child's thinking becomes less egocentric and they become increasingly aware of external events. They begin to realize that one's own thoughts are unique and different and may not be shared by others. Children also develop operational thinking during this age but still can't solve a problem with several variables in a systematic way. They can only solve problems that apply to concrete events or objects because abstract, hypothetical reasoning has not developed yet. The Formal Operational stage is when children are able to logically use symbols related to abstract concepts such as algebra and science. Children in this stage can think about multiple variables in a systematic way, formulate hypotheses, think abstractly, and consider possibilities. Woods (2001) remarks that Piaget believed this was the final stage in cognitive development, and that continued intellectual development in adults depends on an accumulation of knowledge.

As Piaget's extensive research indicates middle school aged students are going through a cognitive transition. They are leaving the Concrete Operational stage and beginning the Formal Operational stage. These students are just learning how to think abstractly and use symbols especially in regards to mathematical concepts. If an impactful decision such as whether or not a student gets accelerated in mathematics is made at such an early age, then it must take into

account variables such as cognitive development. This is not the only issue that is created by the practice of acceleration.

Several issues arise from the acceleration practice. Not all middle school students mature at the same rate. A student who is considered a low achiever at the time of the acceleration may be denied the right for acceleration. This student may blossom academically and meet the accelerated criteria at a later date, but not get that opportunity because it is too late. In most cases acceleration is a path that you can get off after you get on, but one that you cannot get on once it passes by. This is due to the fact that students who are not accelerated in math in middle school will not have the opportunity to access advanced math courses, such as Advanced Placement (AP) calculus as high school students because they will run out of time. Middle school can be a complex time for students socially, which may affect their academic performance leading up to the acceleration process.

Self-Efficacy. In a study conducted by Way, Reddy, & Rhodes (2007) students tended to perceive the middle school climate as increasingly negative over time. Increased levels of depression, low self-esteem, behavioral problems and declining levels of well being were reported as middle school progressed. Females reported a sharp decline in peer support. Students from low SES families did report higher levels of teacher support. Kuperminc, Leadbeater, & Blatt (2001) yielded similar results. This study examined the interaction of psychological vulnerabilities and perceptions of school climate to explain the emergence of behavioral and emotional problems. A cross sectional 1-year longitudinal analysis study was conducted using data from 230 female and 230 male sixth and seventh graders in a socially diverse middle school. The results found that schooling affects not only academic and achievement outcomes but also adolescents' psychosocial development. Students with a negative view of the school climate

tended to have social and behavioral issues. These issues then carried over into their academics. The findings by Kuperminc et al (2001) further support the theory that schooling affects not only academic and achievement outcomes, but also a student's psychosocial development. This evidence is further proof that certain variables can affect a student's academic performance besides natural intelligence.

Pajares and Graham (1999) studied the importance of self-efficacy and motivation on task specific mathematics performance in order to explore if these variables change during the first year of middle school. Participants were 273 students in grade 6 from one suburban, public middle school in the South. At this school 6th grade was considered the first year of middle school. The study yielded many results. The first result was that mathematics self-efficacy was the only motivation variable to predict mathematics performance both at the beginning and the end of the year. A second finding was that there was a change in mathematics self-beliefs. By the end of the academic year, students described mathematics as less valuable, and they reported decreased effort and persistence in mathematics. According to Pajares (1999) the results regarding student's decreasing value, engagement, and grades were consistent with those reported by researchers who have documented that student attitudes in mathematics diminish, often along with achievement, during their transition to middle school. Such variables should be taken into account when deciding on the mathematical placement of a student.

Chen (2002) also conducted a study on the predictability and accuracy of self-efficacy beliefs in seventh-grade math students. The research studied the self-efficacy beliefs of 107 seventh-grade mathematics students, particularly focusing on the accuracy and predictability of their beliefs. According to the study self-efficacy played a direct role in predicting students' math performance, post-performance self-evaluation, and post- performance judgments of effort. The

findings did not reveal any gender differences in self-efficacy. The study did find that students' self-efficacy beliefs were correlated to their prior mathematics achievement and performance. Having positive self-efficacy beliefs also stem from self-esteem.

Alves-Martins, Peixoto, Gouveia-Pereira, Amaral, & Pedro (2002) investigated which strategies are pursued in order to protect self-esteem when it is threatened by a negative self-evaluation of school competence. Participants in the study were 838 secondary-school students from the seventh to the ninth grades. Data was collected using *Harter's Self-Perception Profile for Adolescents*, together with the *Scale of Attitudes towards School*. The results of Alves, et al (2002) yielded significant differences between the self-esteem levels portrayed by successful and unsuccessful students in the seventh grade. The self-esteem gap of these students did show evidence of disappearing into eight and ninth grade. The results also indicated that students with low levels of academic achievement attribute less importance to school-related areas and reveal less favorable attitudes towards school.

A study conducted by Ryan & Patrick (2001) examined classroom social environment and changes in adolescents' motivation and engagement during middle school years. The study consisted of 233 students whom were making the transition from 7^{th} to 8^{th} grade. The study found that prior motivation and engagement were strong predicators of subsequent motivation and engagement, whereas gender, race, and prior achievement were not related to changes in motivation or engagement. A positive classroom environment did yield significant changes in motivation and engagement outcomes. Students' perceptions of teacher support and the teacher as promoting interaction and mutual respect were related to positive changes in their motivation and engagement. In contrast a student perception that the teacher was promoting only performance goals had a positive correlation to a decrease in student motivation and engagement.

Wentzel (1998) also conducted a study on middle school students' supportive relationships with parents, teachers, and peers in relation to motivation at school. The study consisted of 167 sixth grade students and how they perceived support from their parents, teachers, and peers. Peer support was a positive predictor of pro-social goal pursuit, teacher support was a positive predictor of both types of interest and of social responsibility goal pursuit, and parent support was a positive predictor of school-related interest and goal orientations. According to Wentzel (1998) a perceived lack of support from parents and peers led to emotional distress and a lack of interest in school. A lack of motivation and interest in school can lead to a decline in academic achievement in subject areas such as math.

Cognitive ability is an important predicator of academic success but in recent years new variables have emerged as factors in mathematics success and persistence. A study that examined the effects of 3 school-related constructs—motivation, attitude, and academic engagement—on 8th-grade students' achievement in mathematics was conducted by Singh & Udainiya (2009). The study used a nationally representative sample of 8th graders drawn from the National Education Longitudinal Study 1988. Singh (2009) used structural equation models to estimate and test the hypothesized relationships of two motivation factors, one attitude factor, and one academic engagement factor, on achievement in mathematics. The results supported the effects of the two motivational strategies: attitude and academic time spent on mathematics.

Math

The NYS Common Core learning standards were revised and adopted in 2011. The NYS common core introduction of the math learning standards states that:

> "For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is "a mile wide and an inch deep." These Standards are a substantial answer to that challenge. It is important to recognize that "fewer standards" are no substitute for focused standards. Achieving "fewer standards" would be easy to do by resorting to broad, general statements. Instead, these Standards aim for clarity and specificity (NYS Common Core).

In order to support the narrowed focus of the mathematics curriculum NYS has developed curricular modules. These modules were created in order to assist schools and districts with the implementation of the common core learning standards. NYSED has provided curricular modules and units grades P-12 in ELA and math that can be adopted or adapted for local purposes. Curriculum modules in mathematics are marked by an in-depth focus on fewer topics. They integrate the Common Core Learning Standards, classroom reasoning and practice and reflection through extensive problem sets, and high expectations for mastery.

According to the Common Core Curriculum (2014) the time required to complete a curriculum module will depend on the scope and difficulty of the mathematical content that is the focal point of that specific module. Some standards are implemented in several modules so as to build a solid foundation. The modules are based on 150 instructional days instead of 180. The remaining 30 days takes into account test administration and at least 10 days for review. In order to have a smooth curricular transition the school district in which the study will be conducted is

slowly implementing the modules. According to the high school guidance counselor the district currently only uses the modules in 9th grade Algebra. The modules will be used in Geometry at the beginning of next school year. Math modules are not yet used at the middle school level.

New York State acceleration policy states that all school districts within the state must abide by. According to (NYSED a) a student must be offered accelerated opportunities under the following conditions:

> "Public school students in grade eight shall have the opportunity to take high school courses in mathematics and in at least one of the following areas: English, social studies, languages other than English, art, music, career and technical education subjects or science courses" (NYSED a).

> The student will receive credit for the course once he or she passes the course and the associated state proficiency examination or Regent's examination, when available. The credit must be accepted by all New York State High schools. If no appropriate state assessment is available and the student passes a course in the middle, junior high or intermediate school, the course must be approved by the school district superintendent where the middle, junior high or intermediate school is located (NYSED, 2014).

District Acceleration Policy. The acceleration policy for the school (Appendix A) in which this study was conducted begins with the referral process. The policy states:

> If a student has met specific criteria, the process for selecting him or her to replace or supplement one or more of his/her courses with an advanced course may be initiated by certified school personnel, the student, or the parent. Instruction in this course or these courses may take place in the same classroom,

> the same school building or in a building or location where the course is offered. Recommendations for acceleration should be made prior to the start of the school year or as early in that school year as possible.

Recommendation for acceleration can be initiated in three ways. The first way is for school personnel to complete the "*School Personnel Recommendation*", *Form 1* (Appendix B). Students or parents who wish to request acceleration must complete a "*Student/Parent Recommendation*", *Form 2* (Appendix C) and submit it to the Building Principal or Guidance Counselor. According to the acceleration policy forms are available in the main office and guidance counselor offices. Parents or students that are considering applying for acceleration should call the building principal or guidance counselor in order to set up an appointment. The principal or guidance counselor will advise the student and/or parent on acceleration and how to complete the appropriate forms.

According to the school districts acceleration policy school personnel, students, and parents requesting acceleration may submit additional information that they consider important. This information must be submitted at the same time as Form 1 or Form 2 are submitted to the school principal or guidance counselor. The building principal or guidance counselor will collect all acceleration requests. At this time the school principal or guidance counselor will complete *Form 3*, "*Student Information*" (Appendix D). The guidance counselor, Building Principal and other school professionals, which may include the district's Response to Intervention (RTI) team members, will meet with the requesting parties and review all relevant information. Below is a list of the criteria that the school professionals may consider when making an acceleration decision. The criteria may include but is not limited to:

CRITERIA FOR ACCELERATION: Criteria for acceleration may include but not be limited to the following:

1. The student shows keen insights in many areas.
2. The student possesses excellent basic skills and study habits.
3. The student shows a need to be challenged.
4. The student exhibits a desire to know "how" and "why".
5. The student demonstrates a strong work ethic and social maturity.
6. The student exhibits a habit of doing more than necessary and enjoying extra work.
7. The student expresses a desire to be accelerated.
8. The student has earned high scores on any administered IQ and/or achievement tests.
9. The student has an excellent attendance record.
10. The student has earned high scores on AIMS Web and state and local assessments.
11. The student has earned outstanding grades in the area to be accelerated.
12. The student has an uncommon background or knowledge in the subject of acceleration.

Following a review of the recommendation and the criteria listed above, the Building Principal or Guidance Counselor will, “based on the best interests of the child, notify all parties of the decision regarding acceleration.” If the request for acceleration is not approved, the party

making the request may appeal the decision to the Superintendent of Schools. According to the policy each case for acceleration will be made on an individual basis.

The district acceleration policy concludes by stating that:

> Acceleration is not something that takes place over a one year period. Students and parents must realize that the decision to accelerate ahead in course work will affect students, both socially and academically, for the rest of their academic careers. Students who accelerate ahead may need to complete extra schoolwork in order to compensate for gaps in their knowledge base and in order to catch up with the class they are accelerating into. Students who accelerate ahead in course work may also be placed in classes with older students and may need to spend a large portion of their day away from their age appropriate peer group. In addition, the decision to accelerate ahead in course work may affect a student's final high school grade point average and class rank. Accelerating ahead in coursework may not be the best option for every talented student. Other forms of acceleration may include differentiated instruction, lateral enrichment and cooperation with outside agencies and learning institutions. The Fredonia Central School District is committed to assessing each case of recommended acceleration on an individual basis in order to best meet the individual needs of the student.

The school district in which this study was conducted has created a path for accelerated students and a path for non-accelerated students in multiple subjects including mathematics. According to the high school Guidance Counselor the school district has two levels of most core math classes in the high school. These two levels are R and E. For example Integrated Algebra R

meets every other day for one 80-minute block. Integrated Algebra E is for students who struggle in math and need extended time. Integrated Algebra E meets for one 80-minute block one day and a 40-minute block the next day. The math department policy is that if a student is on an accelerated track, they cannot take an E or extended level course. If a student struggles in an R level class it is possible for them to be placed in an E level course the following year, therefore taking them out of the accelerated track. The current math department policy is that only accelerated track students can take AP Calculus or Statistics their senior year.

Table 1

Accelerated/Non-Accelerated Tracks

AIS	NON-ACCELERATED	ACCELERATED
Identified before entering high school	Regular 7th and 8th grade curriculum	Acceleration decision made at end of 6th grade year
Algebra A1 (9th grade)	9th grade Algebra R or E	7th and 8th grade curriculum combined into one year (7th grade)
Algebra A2 (10th grade)	10th grade Geometry R or E	Integrated Algebra R (8th grade)
Applied Math (11th grade)	11th grade Algebra II/Trigonometry R or E	Geometry R (9th grade)
40 minute daily classes	Senior Survey	Algebra II/Trigonometry R (10th grade)
No Advanced Regents Diploma	Introduction to Analysis/Differential Calculus	Introduction to Analysis/Differential Calculus (11th grade)
		AP Calculus (12th grade)

Accelerated and Non-Accelerated tracks are both offered by the school district. If a student is going to be taking an accelerated track, it is decided at the end of a student's 6th grade year. For accelerated students 7th and 8th grade math is combined into one year during the

student's 7th grade year. In 8th grade these students take Integrated Algebra R. This course is usually taken in 9th grade. Entering high school accelerated students take Geometry R as freshmen. In 10th grade they take Algebra II/ Trigonometry. As juniors accelerated students take Introduction to Analysis/Differential Calculus and then AP Calculus or Statistics in 12th grade.

Non-accelerated students take regular 7th and 8th grade math courses. As freshmen these students take 9th grade Integrated Algebra R or E. Sophomore year non-accelerated students take 10th grade Geometry R or E, and as juniors they take Algebra II/Trigonometry R or E. As seniors, non- accelerated students can choose either Senior Survey 1 & II or Introduction to Analysis/Differential Calculus. The student does have the choice if they want to take Senior Survey or Introduction to Analysis/Differential Calculus; however, there may be teacher recommendations, counselor recommendations, Regent's scores or final class averages that influence which class a non-accelerated student takes senior year. For example, if a student passes Algebra II/ Trigonometry with a good grade and does well on the Regent's exam the teacher and counselor would agree to recommend that student for Introduction to Analysis/Differential Calculus. If the student did poorly in Algebra II/Trigonometry and on the Regent's the teacher and counselor might agree to recommend that student for Senior Survey I & II.

There is one more track for non-accelerated students. Students who struggle in math and need extra assistance will be identified entering high school at the end of their 8th grade year. These students are provided with Academic Intervention Services (AIS). Their track is Algebra A1 AIS, 10th grade Algebra A2 AIS, and then Applied Math for their third math credit. Another option for their third math credit is to go to a BOCES program and take Occupational Math. Algebra A1 and A2 are the regular curriculum for a 9th grader but the material is spread out over

two years and gives the students two credits for two years of math. This class meets every day for 40 minutes as opposed to every other day for 80 minutes. This is a very intensive class geared towards helping students become successful with a curriculum that is very challenging for them. Students take the Integrated Algebra regents in January of the second year of the course (Algebra A2) and then again in June of that year in order to give them the best possible regents score, and give them extra opportunities to pass the exam. When placing students on such permanent tracks it is essential that the school district use multiple forms of assessment.

Pajares (1997) conducted a study on the importance of using multiple forms of assessment on self-efficacy and mathematical problem solving. The study consisted of 327 middle-school students who were assessed using two forms of assessment (traditional multiple-choice vs. open-ended fill-in-the-blank). The purpose of the study was to determine whether varying the assessment format would influence students' self-efficacy judgments or alter the relationship between self-efficacy and performance. The results indicated no difference in self-efficacy between the two forms of assessment. Pajares (1997) study did yield that students who took the multiple-choice assessment scored higher than students who performed the open-ended fill-in-the-blank assessment. The students who performed the open-ended assessment had poor levels of calibration. A poor level of calibration means that the students' judgment of their capability did not reflect their actual competence. The finding suggests that students' self-perceptions of their mathematics capability may be less accurate than had previously been reported. A students' familiarity with traditional assessment formats such as multiple choice may create an expectancy of a performance task that is multiple choice in nature. Thusly such expectancy influences self-efficacy judgments regardless of the assessment format (Pajares, 1997).

Achievement

A growing debate within the topic of math acceleration is if there is any correlation between math acceleration and academic success. A study conducted by Ma (2005) researched this question. Using data from the Longitudinal Study of American Youth (LSAY) the study examined whether early acceleration into formal algebra at the beginning of middle school promoted evident growth in different mathematical areas. The different mathematical areas included: basic skills, algebra, quantitative literacy, and geometry as well as stable growth across all of these areas. The LSAY contained a sample of 51 pairs of middle school and high schools. These schools were drawn through a stratified sampling framework from a national population of middle and high schools. Approximately 60 seventh graders were randomly selected from each sampled school and these seventh graders were studied for six years. The sample contained a total of 3,116 students in the seventh grade, 2,798 in the 8th grade, 2,748 9th grade students, 2,583 tenth graders, 2,409 11th graders, and 2, 215 students in the 12th grade. These students were then tracked as the initial group of 7^{th} grade student's progressed through the grades.

Rates of growth were estimated for the four mathematical areas. Results were broken down into three categories. The three categories are the impact of early acceleration, student characteristics, and school characteristics on rates of growth in the four mathematical areas. According to the findings low achieving students who were accelerated into formal algebra advanced faster than not only low achieving students who were not accelerated but also high achieving students who were not accelerated (Ma, 2005). The rates of growth of low accelerated students were comparable to the levels of high achieving accelerated students. Early acceleration also promoted stability of growth across mathematical areas, and this stability was not dependent on student and school characteristics. All low achieving students showed similar potential to take

advantage of early acceleration regardless of their individual, family, and school characteristics (Ma, 2005).

Many researchers propose acceleration as a viable option for curricular and instructional differentiation for gifted students according to VanTassell-Baska (1992). Yet schools and educators generally use acceleration very conservatively or not at all according to Colangelo, Assouline, & Gross (2004), particularly with gifted low-income or minority students (Wyner, Bridgeland, & Diiulio, 2007). These students are often underrepresented in many accelerated programs. A study conducted by Lee, Olszewski-Kubilius, and Peternal (2010) looked at the efficacy of academic acceleration for gifted minority students. The study supported the use of acceleration for gifted minority students in math. The methodology of the study was in the form of teacher and student interviews.

The study involved 30 students in grades 4 through 9 and seven teachers. All students had participated in project EXITE for 1 to 6 years. Project EXITE, a collaborative program of Northwestern University through its center for Talent Development. Students are accepted into Project Excite based on teacher nomination or parent nomination and scores on achievement tests. Student participants were divided into two cohorts. These cohorts were students who were accelerated in math and students who had not yet been accelerated. Seventeen students in grades 6 through 9 made up the acceleration group. These students were accelerated by 1 or 2 years. Acceleration occurred between fifth and eighth grades. The pre-accelerated students were in grades 4 through 6 and had not been accelerated at the time of the interview.

The results of Lee, et al (2010) yielded the following. The gifted minority students in this study viewed taking accelerated math courses as exciting and beneficial for both high school and

college. The students liked the challenge of taking advanced courses. Working ahead and having a leg up in school infused the students with a special feeling of being gifted and talented. According to the study ethnicity did not factor into whether or not they believe a student warranted being accelerated. According to the teachers acceleration provides necessary challenges for students, makes them commit to schoolwork, and enhances their academic achievement. No negative peer pressure resulting from acceleration was found. Many researchers believe that motivation and learning strategies such as the kind these students felt and experienced may play just as important a role in academic achievement as natural intelligence.

A report by Wyner, et al (2007) investigated how America is failing millions of high-achieving students from low-income families. The report discusses new and original research on this population. The findings come from three federal databases that during the past 20 years have tracked students at the elementary school, high school, college, and graduate school levels. The report found that students from low-income families are experiencing an unequal start. Among first-grade students performing in the top academic quartile, only 28 percent are from low-income families, while 72 percent are from higher-income families. More than one million K-12 children who qualify for free or reduced-price lunch rank in the top quartile academically. According to the report in elementary and high school, lower-income students neither maintain their status as high achievers nor rise into the ranks of high achievers as frequently as higher-income students. Results such as this lead to high dropout rates for students from low-income families.

Wyner, et al (2007) found that high-achieving lower-income students drop out of high school or do not graduate on time at a rate twice that of their higher-income peers (8 percent vs. 4 percent) but still far below the national average (30 percent). Dropout rates lead to unfulfilled

potential in college, graduate school, and, perhaps most importantly, careers. The report found that the relationship between high-achieving lower-income students and the disparities between them and their higher-income academic peers persists through the college years. The findings indicated that 54% of low-income students received a bachelor's degree compared to 78% of students from higher-income families. Similarly, 47% of high achieving students from high-income families receive graduate degrees while only 29% of high achieving students from low-income families receive graduate degrees. As students from low-income families fall behind their peers their motivation may be negatively affected.

A study that examined how motivation, cognitive learning strategies, and intelligence predict long term growth in students' academic achievement over a five year span was conducted by Murayama, Pekrun, Lichtenfeld, and Vom Hofe (2012). The study sample consisted of 3,530 German students in grades 5-10. Motivation, intelligence, and learning strategies were measured through annual assessments and self-reporting. Results of the study yielded numerous findings. One finding was that the initial level of achievement was strongly related to intelligence, with motivation and cognitive strategies playing a much smaller role. As the years went by intelligence played a lesser role in academic achievement and motivation and cognitive strategies were greater predictors of growth. These findings further support the findings that motivation and learning strategies are just as important as intelligence. Some school districts only allow students with a high level of academic achievement to become accelerated. Some schools allow parents to be involved in the acceleration decision while other schools do not. Policies like these can prevent students who may not be high achievers yet, but are hard workers from having the opportunity to be accelerated.

Acceleration Policies. Colangelo, Assouline, Marron, Castellano, Clinkenbeard, Rogers, & Smith (2010) discuss the guidelines for developing an academic acceleration policy. According to the article each school district should have a written acceleration policy stating that acceleration is an appropriate and effective intervention for select, highly ability students who have demonstrated high performance in one or more academic areas. According to Colangelo, the Dean of Gifted Students at the University of Iowa, acceleration policy should be characterized by accessibility, openness, and equity. The policy should provide guidelines for the implementation of acceleration, including administrative matters. This will ensure fair and systematic use of accelerative opportunities and recognition for participation in those accelerative programs. School policies that follow these guidelines help ensure that all students have an equal opportunity to become accelerated.

A study conducted by Fuligni (1995) investigated the long-term effects of seventh- grade ability grouping in mathematics. The study examined the long-term correlates of being placed in an ability-grouped mathematics class on entry into junior high school. Results revealed some negative and no positive correlates at the tenth-grade level for low-ability students placed in low-ability classrooms compared with their peers placed in ungrouped classrooms. Conversely, a number of positive correlates of ability grouping were found for medium- and high-ability students. In Conclusion the study found that ability grouping benefitted medium and high ability students, but harmed low ability students.

Another study that examined the effects of grade level ability grouping in mathematics was performed by Cleary & Chen (2009). The study examined grade level, achievement group, and math-course-type differences in student self-regulation and motivation in a sample of 880 suburban middle-school students. In order to assess group differences in student self-regulation

and motivation an analysis variance was used. Linear regression analysis was used to identify variables that best predicted students' use of regulatory strategies. A key of Cleary (2009) was that although seventh graders exhibited a more maladaptive self-regulation and motivation profile than sixth graders, achievement groups in seventh grade (high, moderate, low) were more clearly differentiated across both self-regulation and motivation than achievement groups in sixth grade. The pattern of achievement group differences also varied across math course type, as self-regulation and motivation processes more consistently differentiated achievement groups in advanced classes than regular math courses. A final finding was that task interest was shown to be the primary motivational predictor of students' use of regulatory strategies during math learning. Ability grouping is just one school policy that can have long-term effects on academic achievement.

A study conducted by Useem (1991) assessed the ways in which parental involvement and school policies condition student's mathematics placement in middle school and secondary grades. The study consisted of interviews with 52 administrators in 26 school districts across the Boston area. Interviews with parents and teachers from two of the districts were also conducted. The total number of students accelerated varied from district to district. Four of the 26 communities had fewer than 15% of students fast tracked, 9 had between 15%-23%, 13 schools had more than 23%, while only 3 schools had between 40%-50% of their 8th graders in algebra. Some districts pumped students into the accelerated path while other schools had policies that acted as filters to discourage students from getting on the fast track. In addition to school policies, parental involvement helped determine course selection and ability group placement. There was a high correlation between parental SES and students' ability placement. Parents with

a higher SES tended to be well educated and more knowledgeable about the acceleration process and course offerings.

The major findings from Useem (1991) were that school policies have a great effect on the number of students who are accelerated. Some districts have a clear, objective policy based often on a single test score. If a student achieves certain scores on standardized tests they are accelerated. Students who do not meet the criteria are not accelerated. These schools often will not be receptive to parental input. Other schools have a more flexible approach. In these settings acceleration is based on numerous criteria such as grades, student interest, and parental involvement. There are not rigid cut scores for tests, and acceleration is decided on a student- by –student basis. This study also found that parent's involvement and SES were tied together. Parents with a higher SES often took a more active approach in their child's education and were more aware of the acceleration process and course sequences.

A school that took on a completely different approach was South Side Middle School. South Side Middle School is a diverse suburban school in the Rockville Centre School District in New York State. In 1995 South Side began to provide accelerated math instruction for all of its students. Burris, Heubert, & Levin (2004) conducted a six year longitudinal study on what math courses these students subsequently took and their level of achievement in math. The study was further broken down into the effects on certain subgroups. These subgroups were low SES students, African American and Latino students, initial low achievers, average achievers, and high achievers.

The study found that by every measure, students benefited from studying accelerated math in heterogeneous groups. There was a significant increase in the percentage of students

who took math courses beyond Algebra 2 in high school. In addition these benefits applied to every subgroup. The percentage of students from a low SES who completed trigonometry increased from 32 to 67 percent, African American and Latinos completion of trigonometry increased from 46 to 67 percent, initial low achievers increased from 38 to 53 percent, average achievers from 81 to 91 percent, and initial high achievers from 89 to 99 percent (Burris et al, 2004). The higher standards did not discourage lower level achievers and in fact, pushed them to overachieve. This form of universal acceleration significantly cut down on the achievement gap between low SES students and high SES students because students were all given the same opportunity. Many researchers believe that grouping higher achieving students into heterogeneous groups will impair their learning because they are not being challenged. This study showed the initial high achievers continued to achieve at a high level and continued on the accelerated path throughout high school.

A study that found similar evidence about high achievers was conducted by Swiatek and Benbow (1991). Within this study, gifted students, identified by the *Study of Mathematically Precocious Youth* who underwent acceleration in their education were longitudinally compared across several domains with a group of equally gifted students who were not accelerated. These groups were matched for gender and ability and were studied for 10 years starting at age 13. At age 23 few significant differences were found between the groups for the individual academic and psychosocial variables. Both groups reported impressive academic achievements, as well as high personal satisfaction with school and self. When academic variables were considered as a group the performance of accelerates was slightly higher than that of the non-accelerates. The findings of this study do not support the concern that gifted students may be negatively affected by acceleration.

Another study that focused on school districts either encouraging or discouraging students' enrollment in advanced mathematics was conducted by Finn, Gerber, and Wang (2002). This study used data from the transcripts of more than 22,000 graduates of 305 public high schools. The study had three main objectives. The objectives were: to identify patterns of mathematics courses taken by U.S. high school graduates; to see if school course offerings and course requirements differ according to school's location, size, and socioeconomic status; and to find the impact of course offerings and graduation requirements. Findings were that school policies and practices play a big role than school demographics in determining the courses that students take. The findings indicate that how a school structures and carries out their acceleration policy affects acceleration more than school size, location, and SES.

Theoretical Framework for Self-Efficacy and Social Capital Theory

The theoretical framework for this research question was based on two theories. These theories are self-efficacy and social capital. According to Bandura (1994) self-efficacy is defined as, "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations required to attain designated types of performances" (p. 391). Bandura also defined self-efficacy as the extent or strength of one's own ability to complete tasks and reach goals. Bandura (1994) also states that perceived self-efficacy is concerned with "people's beliefs in their ability to influence events that affect their lives" (p. 71). Self-efficacy is the core belief and foundation of human motivation, performance accomplishments, and well being (Bandura, 2006). Self-efficacy has a positive correlation to social capital theory.

According to Bourdieu (1986) the volume of social capital possessed by people depends on the size of the network of connections that they can mobilize on the volume of economic,

cultural and symbolic capital possessed by each individual in the network. Social capital and SES have similar variables and are interrelated. In other words, if a student has a high level of social capital then they will also have a high SES and vice versa. Variables that contribute to levels of social capital and SES include parental involvement, family income, level of parental education, and family structure.

According to a study conducted by Wentzel (1998) a perceived lack of parental support led to emotional distress and a lack of interest in school. Lack of parental support decreases a student's social capital. This lack of interest in school can have a negative effect on the student's grades. Students who come from high-income families tend to have high levels of social capital. Their parents are more involved, highly educated, and can provide more resources for their child than a low-income family can.

A study performed by Wyner, et al (2007) found that these low- income, low social capital families are being failed by the American school system. The students of low-income families are getting off to slower academic starts than their high-income peers. The study found that among first grade students performing in the top academic quartile, only 28 percent are form low-income families. Wyner, et al (2007) also found that in elementary and high school, lower-income students fail to maintain their status as high achievers, nor rise through the ranks of high achievers as frequently as their higher-income peers.

Low levels of social capital also lead to higher dropout rates for students from low-income or non-traditional families. The study by Wyner, et al (2007) found that the dropout rate for higher-achieving low-income students was twice as high as their higher-income peers. Dropout rates are positively related to nontraditional family structure and number of siblings

(Israel et al, 2001). An example of a nontraditional family from the study would be a home with less than two parents.

If a student comes from a family with low social capital their parents tend to not be as proactive for their child. Students who come from a high social capital family will tend to have educated parents who demand more of their child and are more involved in the child's education. This theory is supported by a study conducted by Useem (1991). The study found that there was a high correlation between parental SES and students' ability placement. This was due to the fact that parents from a higher SES tended to be well educated and knowledgeable about school district acceleration policies and course offerings. The study supported that students from high SES families had parents that took a proactive approach in their child's education.

Self-efficacy can have a direct effect on motivation and interest within a school subject. Having low self-efficacy can negatively affect a student's motivation and interest. A student who does not have interest or motivation for a certain subject will not achieve academic success within this subject. According to Bandura (1994) unless people believe that they can produce desired results by their actions, they have little incentive to undertake activities or to persevere in the face of difficulties.

This is why it is important for acceleration policies to take into account more than test scores and teacher recommendation. A student's academic performance may not be a true indication of their academic ability. A student may have the ability to achieve high levels of academic success but if they do not believe in that ability then it will have a negative impact on their academic achievement. These students may have an increase in their self-efficacy as they mature and if they are challenged with accelerated work. Expanding the number of accelerated

students and/or changing the accelerated criteria is the only way to ensure these students are not underserved academically by their schools. Other factors that may serve as potential guides and motivators are rooted in the belief that one can make a difference by their actions. For example if a student does not have belief in their ability to solve math problems then that student will struggle in math, not simply due to the lack of content or skill knowledge but because of ingrained beliefs about personal capacity. Once this student begins to struggle, he or she will lose interest and motivation, which will affect their grades in mathematics. Several variables have been connected to having a correlation with academic self-efficacy.

When students are placed either on an accelerated or non-accelerated math track they are in 7th grade. Middle school students are going through not only an academic transition but also an emotional transition. Research shows that the middle school social climate can have a direct effect on students' self-efficacy. Many middle school students find the middle school social climate to be very stressful, intimidating and negative over time (Way, Reddy, & Rhodes 2007). These feelings can have a negative impact on a student's self-esteem, motivation, and behavior. Kuperminc (2001) found that students with a negative view of the school climate tend to have higher levels of negative social and emotional behaviors.

A student with low self-esteem will not have a high self-efficacy. A study conducted by Alves, et al (2002) found that students with low self-esteem tend to have low levels of academic achievement. The students themselves attributed this to placing less importance on school-related areas and revealed less favorable attitudes toward school. Also, a student in middle school may acquire the belief that it is not popular to do well in school. This belief is supported by a study conducted by Parajes (1999). According to the study students in the 6th grade changed their mathematical beliefs throughout the academic year. By the end of the year the students

described mathematics as less valuable, and reported decreased effort and persistence in mathematics. These results were consistent with those reported by researchers who have documented that student attitudes in mathematics diminish, often along with achievement, during the transition to middle school (Parajes, 2009). Such a belief could have a negative impact on a student's motivation. Both of these impacts would have negative effects on self-efficacy thus lowering academic achievement.

The impact of school climate is not the only factor that can affect self-efficacy. Other variables are SES, gender, having a disability, and ethnicity. Research has indicated that these variables have a direct correlation to student self-efficacy. According to a study conducted by Parajes (1994) gender has a direct effect on levels of self-efficacy. The study found that males had higher performance, self-efficacy, self-concept, and lower levels of anxiety than females. Students who come from low SES families often are given less academic opportunities and have low levels of self-esteem. A study conducted by Wyner, et al (2004) found that educators use acceleration very conservatively or not at all with gifted low-income or minority students. This is important because students have been shown to take advantage of early acceleration regardless of their individual, family, and school characteristics (Ma, 2005). One concern is that students from low-income or minority families have less social capital than their upper class English speaking peers.

When a school district is creating or revising their mathematical acceleration policy self-efficacy and social capital are variables that the district must consider. School districts rely heavily on grades and standardized tests when deciding which students will become accelerated in mathematics. School districts believe that the results of these two categories will show which students have the ability and intelligence to handle acceleration. The issue with this policy is that

self-efficacy and social capital can effect academic achievement regardless of natural ability or intelligence levels. School districts need to take a more holistic view of the student when creating and revising mathematical acceleration policies.

The literature review provides ample evidence that acceleration is a topic with conflicting research. This contradicting research makes this study extremely important to the field of education. Educators and administrators need to know if there is a correlation between math acceleration and academic success. If there is a positive correlation are all student populations equally represented under school acceleration policies? Do members of the school district feel that the acceleration policy is properly implemented and fair? These are the questions that need to be answered and form the foundation for the study's methodology.

Methodology

The purpose of this study was to see if students who were accelerated in mathematics in the 7th grade have higher levels of academic achievement compared to their non-accelerated peers. A second purpose of this study was to compare and contrast the acceleration beliefs of teachers and administrators. If acceleration does correlate to higher levels of academic achievement through higher GPA's, math Regents scores, and course selection, it is imperative that more students have the opportunity to become accelerated. In this section the methodology of the study will be explained. The methodology was comprised of 5 components: setting, participants, design, data collection, and data analysis.

Setting

This study was conducted in a suburban school district in Western New York. All of the data was collected from this specific school district. The topic was based on the recommendation

of the school district's middle school principal. According to the 2012 NYS Census 11,047 individuals resided in this suburb. Located in the suburb is a State University. The University's registrar office states that 5,231 undergraduate students were enrolled in 2014. The addition of the college enrollees raises the population to above 16,000. One-Third of the suburbs population is college students and faculty while school is in session. The median resident age for New York is 42.4 years of age. The median resident age for this specific suburb is 22.8 according to City Data (2012). The suburb has a median household income of $38,884 compared to the NYS median average of $55,246.

Many of the students who attend the school district have parents who teach or work at the University. The presence of a University most likely correlates to the area's high education level. According to City Data (2012), 93.4% of the population over 25 years of age has an education level of high school or higher. A bachelor's degree or higher is held by 38.6% and 19.3% have a Graduate or professional degree. The NYS 2011-2012 Report Card indicates that the school district had 1,521 students in grades K-12. Free or reduced lunch services were provided to 31% of the student population. The ethnicities of the students are as followed: Caucasian (87%), Hispanic or Latino (8%), Asian (2%), Multiracial (2%), and African American (1%).

The graduating class of 2011-2012 had 107 students. Of those 107 students 103 (96%) received a NYS Regents Diploma, and 62 of those 103 (58%) received a NYS Regents Diploma with Advanced Designation. Upon graduation 86% of the class went on to attend a two or four year college program. During the 2011-2012 school year the district had 135 teachers on staff. Every teacher held a valid teaching certificate and none were teaching out of their certified area. A Master's Degree, plus at least 30 hours or a doctorate was held by 21% of the teachers on

staff. The students and teachers of this suburban school district will serve as the participants of this study.

Participants

The participants for the study were members of the 7th grade classes from the 2007-2008 and 2008-2009 school years. The class of 2008 graduated in 2014 and the class of 2009 were seniors entering the 2014 school year. According to the 2007-2008 NYS Report Card (NYSED b) this school district had 114 students enrolled in the 7th grade. Of these students 53 of them were female while 63 of them were male. In 2008-2009 128 students were enrolled in the 7th grade. Of these students 56 were female and 72 male. For both school years 26% of the middle school population was eligible for free or reduced lunch. In 2007-2008 92% of the student population in the middle school was white and 91% in 2008-2009. The remaining 8-9% of the population consisted of Hispanic or Latinos, Asian, and African American. Other participants in the study will be middle school and high school math teachers, the middle and high school principals, and middle and high school counselors.

Design

The main question that this study addressed is how the achievement of middle school students accelerated in math in 7th grade compared to that of their non-accelerated peers? This question was answered in the form of a comparison study. The methodology was mixed. Quantitative data was collected in the form of de-identified historical data and a *Likert scale teacher survey* (Appendix E). This data contained test scores, GPA's, evidence of persistence in math and course selection. Qualitative data was collected in the form of an *open ended principal and guidance counselor interview* (Appendix F). Once the de-identified historical data was

collected the seventh grade classes of 2007-2008 and 2008-2009 were compared. The first step was to separate the seventh grade class of 2008 into two cohorts. One cohort was students who were accelerated in math in 7th grade and another cohort was students who were not accelerated in math in 7th grade. The same step was conducted for the 7th grade class of 2009. The next step was to go through the data and track the academic achievement of the two groups. The 2008 class was tracked through their senior year and the 2009 group through their junior year of high school.

The qualitative portion of the study was conducted using face- to- face interviews. An interview conducted with the middle school and high school principals, and guidance counselors consisted of 10 open-ended questions. The questions pertained to the school districts math acceleration policy.

In order to assess how the middle school and high school math teachers felt about the district's math acceleration policy they were asked to fill out a 7 question Likert scale survey. This survey provided information on the knowledge that the math faculty possessed in terms of the school district math acceleration policy, its effectiveness, and any recommendations they had in regards to improving the policy. The middle school and high school principals and guidance counselors were asked to complete the survey as well. Comparing de-identified historical data of accelerated and non-accelerated students, coupled with a teacher survey, and principal and counselor interview provided the design for the study.

This design was chosen for several reasons. A comparison format was chosen because the data collected was easily collected and compared between those students who were accelerated in mathematics in 7th grade and those who were not accelerated. The data was de-identified

because this was confidential information. Another reason was the age of the students. The students in this study were either seniors or juniors in high school. This means that there was at least five years of collected data that was used to track the students. Using data for a period of 5 years gave the study more reliability as opposed to a shorter study.

De-identified historical data was chosen because it gave the most objective measures of the chosen participants while also providing information on all of the categories. The data displayed which students were accelerated, which students weren't accelerated, which mathematics courses each cohort went on to take, how many students stay accelerated, regents scores, and courses taken. This data provided insight into a potential correlation between acceleration and academic achievement. Collecting data on the two 7th grade classes gave the study more reliability and validity because there were more students being tracked and compared. Breaking down the data in these cohorts provided insight into which types of students were accelerated. This was important because all students deserve a fair opportunity at becoming accelerated.

An open-ended interview format for was chosen for the middle school principal and guidance counselors because it provided more insight than other potential options. Having an open ended format allowed the principal and guidance counselors to elaborate on key issues pertaining to the acceleration policy as well as go into greater detail about the acceleration process. In contrast a checklist would have provided data but not in depth analysis. A Likert scale survey was utilized because it allows data collection and analyses to be more efficient.

Teachers were more willing to fill out a Likert scale survey as opposed to a 10 question open-ended questionnaire. A Likert scale survey provided a more functional way to analyze the

data. The use of this form of scale allowed data to be analyzed at a more efficient pace, which offered the opportunity to survey more teachers thusly increasing the sample size. Increasing the level of efficiency created an avenue for a mixed methodology to be performed which increased the validity of the study.

The middle and high school principal, as well as the middle school and high guidance counselors, were asked to complete the survey as well. By having the principal and guidance counselors complete the survey more data was collected. The results of the teacher surveys were compared to the results of the principal and guidance counselor surveys. By comparing this data a potential divide between the teachers and implementers of the policy could potentially be discovered.

Data Collection

The data collected for this study was in the form of de-identified historical data, Likert scale responses, and extended responses to open-ended, face -to -face interviews. The data was collected in three different ways. The de-identified historical data was collected by contacting the school district, requesting the historical data necessary for the study, and retrieving the data. The school district was willing to share this data, I believe, because the middle school principal had proposed this study. I examined data for two classes of 7th grade students, specifically, the students who finished 7th grade in 2008 those who finished this grade in 2009. Once these classes were identified data was also collected which tracked their progress through middle and high school. The students who were 7th graders in 2008 were tracked through graduation. The students who were 7th graders in 2009 were tracked through their junior year in high school.

Several categories were examined within the data as the students were tracked. These categories were GPA, Regents scores, persistence in math, and course selections. Each cohort was examined and then broken down into each category. Next the findings for the accelerated cohort were compared to the findings of the non-accelerated cohort. This allowed data to be collected on which cohort had the higher average GPA, higher Regents Math scores, which group stayed with mathematics courses longer, and which courses were taken and offered within each cohort. Once this data was collected for the 7th grade class of 2008 the same process was conducted for the 7th grade class of 2009.

A survey was passed out to math teachers, the middle and high school principals, and guidance counselors in order to report what they felt about the acceleration policy. The survey had a 5-point Likert scale. The points on the Likert scale were: (1) strongly disagree (2) disagree (3) No opinion (4) Agree (5) strongly agree. The teacher read the statement and then circled what they thought about the statement. For example the teacher read the statement "All student populations are served, including (low SES, ELL, at-risk, males, and females) within the current acceleration policy" and then circled what they thought. If they strongly agreed with the statement they circled (5) strongly agree. If the teacher strongly disagreed with the statement they circled (1) strongly disagree.

The survey was placed in the teachers' school mailboxes and they were asked to complete it by a pre-determined date. An envelope was left in both the middle school and high school offices for collection of the surveys. The teachers could hand in their survey anonymously any time before the deadline. In order to conduct the principal and guidance counselor interviews dates and times were scheduled. During the scheduled times a face-to-face interview was conducted. The principal and guidance counselors were also asked to fill out the Likert scale

survey at this time. The interviews last between 15-20 minutes. I recorded the responses by writing them down and taking notes.

Data Analysis

The de-identified historical was collected and analyzed in several ways. The two 7th grade classes were labeled by graduation year. The 7th grade class of 2008 was labeled class of 2014, and the 7th grade class of 2009 was labeled class of 2015. The first step was to break down the 2014 and 2015 classes into students who were accelerated and those who were not accelerated. The next step was to track the students throughout either their senior year (class of 20014) or junior year (class of 2015).

The accelerated groups were tracked for GPA, Regents scores, persistence in mathematics, and math courses taken. Next, the same procedure was conducted for the non-accelerated students. The non-accelerated students were further disaggregated into non-accelerated students who completed or were currently enrolled in Intro/Differential Calculus. This group of non-accelerated students completed just one less class (AP Calculus) than the accelerated students, making them a comparable group. Non-Accelerated students did not include AIS students or students who chose alternative math credits such as accounting. Once this data was collected, the accelerated students, the non-accelerated students, and the non-accelerated students who completed Intro/Differential Calculus for the class of 2014 were compared, and then the accelerated students, the non-accelerated students, and the non-accelerated students who were enrolled in Intro/Differential Calculus from the class of 2015 were compared. The final step was to compare the findings between the two classes to see if there were any similarities, differences, and patterns. Persistence in math was calculated by

seeing how many students within each class completed more than the 3 required mathematics credits and then turning that ratio into a percentage. Breaking down the data into these categories provided data, could identify a certain patterns of who was and who was not accelerated.

The surveys were comprised of 30 possible points and were analyzed holistically and by statement. For example if a teacher circled (5) strongly agree five times and (1) strongly disagree once, their holistic score was 26 out of 30. This score was accumulated by adding the six strongly agrees together and then adding the strong disagrees (5+5+5+5+5+1=26). Once the holistic score for each individual was calculated the scores were compared and averaged together.

Each statement was also analyzed. This was done by adding the responses for a certain statement and averaging them together. For example if 10 surveys were conducted and 7 teachers circled (5) strongly agree for the statement "All student populations are served, including (low SES, ELL, at-risk, males, and females) within the current acceleration policy", and three circled (4) agree the total for that statement would be 47. Since each question was worth five points and 10 surveys were conducted 50 possible points would be available for that statement. Since the statement received 47 out of a possible 50 points it would be concluded that overall the respondents felt very strongly that all student populations were well served. This data allowed for a comparison between teachers, and between teachers and the principal and guidance counselors.

The face- to- face interviews were analyzed individually and then compared. The interviews were analyzed by reading each participant's response to each question. This allowed their responses to each question to be recorded. The next step was to compare and contrast the

responses for each individual question. By comparing and contrasting the responses, any potential themes, patterns, similarities, and differences between administrators could be detected.

Having multiple forms of data, allowed for different aspects of this study to be analyzed. Allowing more aspects to be analyzed increased the validity of the study. The analysis of the data provided a wealth of findings. These findings answered many of the questions that were asked during the onset of the study while providing leads into areas of future research.

Findings

In this section the findings of the data are provided. The findings in this study were broken down into the three sources of data. The three sources of data were teacher/administrator surveys, administrator interviews, and de-identified historical data. The findings of each source of data are explained individually and then compared.

Teacher Perceptions of the math acceleration policy

Table 2

Teacher Survey Results

Teacher	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Total
#1	5	5	4	5	5	5	1	25
#2	4	4	2	3	4	2	2	19
#3	2	3	3	4	4	2	2	18
#4	4	2	3	2	4	2	1	17
#5	4	2	2	1	4	4	1	14
#6	5	4	3	2	5	5	1	20
#7	5	1	2	2	3	2	1	14
#8	1	4	3	5	5	1	1	19
#9	2	3	2	1	2	2	1	11
#10	4	2	2	1	3	2	1	13
#11	2	2	2	1	3	4	1	11
Mean	**3.6**	**2.9**	**2.5**	**2.5**	**3.8**	**2.8**	**1.2**	
			Mean	**Median**	**Mode**			
			16.5	**17.5**	**11,14,19**			

Table 2 displays the survey scores for all of the teachers that completed the survey. The total amount of possible points on the survey was 30 points, with each of the six questions being worth 5 points. Originally the total was 35 points but question 6 was eliminated from the total score. By eliminating question 6, participant scores could be placed on a spectrum. A score of 30 would indicate the participant had high policy knowledge, believed acceleration should be an open policy, and felt the current acceleration policy was fair in terms of access and equality. In contrast a score of 5 would indicate low policy knowledge, belief in a closed acceleration policy, and that the current acceleration policy is not fair in terms of access and equality. The mean total score for all of the surveys was 16.5 with a median score of 17.5, and modes of 11, 14, and 19.

As table 2 shows the highest mean teacher scores were for questions 1 and 5. These two questions dealt with policy knowledge. Question 1 asked the participant if they would be able to clearly describe the school district's mathematics acceleration policy. Question 5 asked if parents or legal guardians have open communication with school officials in regards to the acceleration policy.

The two equity questions yielded mean scores of 2.5 (question 3) and 2.9 (question 2). Question 2 asked if all student populations are served within the current acceleration policy. A mean score of 2.5 lands directly in the middle of "disagree" and "no opinion." Question 2 dealt with student evaluation and if it was fair, objective, and systematic. A mean score of 2.9 is only .1 away from a response of "no opinion." The lowest overall mean score was calculated for question 7. Question 7 was an access question that asked if all students should be accelerated due to the fact that research indicates it is beneficial. A mean score of 1.2 is just above the "strongly disagree" response, and was the lowest score by 1.3 points. When asked if an acceleration policy should be an open policy, allowing more students to become accelerated, the mean score was 2.5, which is in the middle of the "disagree" response and the "no opinion response.

Middle school teacher perceptions of the math acceleration policy.

Table 3

Middle School Teacher Survey Results

			Middle School Teachers					
Teacher	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Total
#2	4	4	2	3	4	2	2	19
#3	2	3	3	4	4	2	2	18
#4	4	2	3	2	4	2	1	17
#5	4	2	2	1	4	4	1	14
#6	5	4	3	2	5	5	1	20
#7	5	1	2	2	3	2	1	14
#8	1	4	3	5	5	1	1	19
Mean	**3.6**	**2.9**	**2.6**	**2.7**	**4.1**	**2.6**	**1.3**	
				Mean	Median	Mode		
				17.3	18	14,19		

Table 3 displays the survey results for the middle school math teachers. The middle school teachers had a mean score of 17.3, a median score of 18 and modes of 14 and 19. The mean and median scores of the middle school teachers were both higher than the mean and median scores in Table 2. Questions 1 and 5, which pertained to policy knowledge had the highest combined mean score of 7.7. The two equity questions (numbers 2 and 3) had a combined mean score of 5.5. Questions 4 and 7 were both access questions and yielded the lowest combined mean score of 4.0. As the results indicate the highest to lowest scores were policy knowledge, equity, and access.

High school teacher perceptions of the math acceleration policy.

Table 4

High School Teacher Survey Results

			High School Teachers					
Teacher	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Total
#1	5	5	4	5	5	5	1	**25**
#9	2	3	2	1	2	2	1	**11**
#10	4	2	2	1	3	2	1	**13**
#11	2	2	2	1	3	4	1	**11**
Mean	3.25	3	2.5	2	3.25	3.25	1	
			Mean	**Median**	**Mode**			
			15	**12**	**11**			

Table 4 shows the survey results of the high school math teachers. The high school teachers calculated a mean score of 15, a median score of 12 and a mode of 11. All three scores are below the scores for all teachers displayed in Table 2. The policy knowledge questions had the highest combined mean score of 6.50. The second highest mean score was for the equity questions with a total of 5.50. The lowest combined mean score was 3, which was for questions 4 and 7 that dealt with access. The mean scores from highest to lowest were, similar to the middle school teacher's. The order from highest to lowest mean score was: policy knowledge, equity and then access.

Comparing middle and high school teachers

Table 5

Comparing Middle and High School Teachers

	Mean	Median	Policy Knowledge	Equity	Access
Teachers	16.5	17.5	7.4	5.4	3.7
Middle School Teachers	17.3	18	7.7	5.5	4
High School Teachers	15	12	6.5	5.5	3

By analyzing Table 5 the middle school and high school math teacher surveys can be compared and contrasted. The mean and median scores for Table 2 that displayed all the teachers' scores were 16.5 and 17.5 respectively. The middle school teachers (Table 3) had a mean score of 17.3 and a median score of 18, which are both higher than Table 2. The high school teachers (Table 4) had a mean score of 15 and a median score of 12 which are both lower than Table 2. Both sets of teachers had the same ranking of mean scores from high to low. Policy knowledge ranked the highest, followed by equity, and then access scoring the lowest. The question with the highest score for both cohorts was question 1 which was a policy knowledge question, and question 7 which dealt with access had the lowest question score for both cohorts. The middle school teachers had a higher policy knowledge score than the high school teachers by 1.1 points. Both the middle school and high school teachers scored a 5.5 on equity based questions. Middle school teachers had a higher access score than the high school teachers by a score of 4 to 3.

administrator/counselor perceptions of the math acceleration policy.

Table 6

Administrator/Counselor Survey Results

Participant	Question1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	**Total**
#1	5	5	4	4	4	4	3	**25**
#2	5	5	5	5	5	1	1	**26**
#3	5	4	4	2	4	2	1	**20**
#4	5	4	4	5	4	1	2	**24**
Mean	**5**	**4.5**	**4.25**	**4**	**4.25**	**2**	**1.75**	
			Mean	**Median**	**Mode**			
			23.8	**24.5**	**N/A**			

Table 6 shows the results of the surveys completed by the administrators and counselors. The administrators and counselors had a total mean score of 23.8, a median score of 24.5, and no mode score. Each participant answered "strongly agree" to question 1. This led to the policy knowledge questions having the highest combined mean score of 9.25. The equity questions combined for the second highest combined mean score with 8.75, and the access questions had the lowest combined mean score with a total of 5.75. Question 7 had the lowest mean score for a question with a score of 1.75. Both principals had higher scores than the guidance counselors. The middle school guidance counselor had the lowest score with the middle school principal having the highest score.

Comparison of Teacher/Administrators Survey Results

Table 7

Comparison between Teachers and Administration

	Mean	Median	Policy Knowledge	Equity	Access
Administration	23.8	24.5	9.25	8.75	5.75
Teachers	16.5	17.5	6.1	5.4	3.7

Examining table 7 allowed the survey scores of the teachers and administrators/counselors to be compared and contrasted. The administrators and counselors had higher total mean and median scores than the teachers. The administrators/counselors total mean score was 7.3 points higher, and had a median score that was 7 points higher. The administrators combined policy knowledge scores were higher with a score of 9.25 compared to 7.4 for teachers. The administrators/counselors had a higher equity score with a total of 8.75 compared to 5.4. Administrators/counselors also had a higher combined access score than the teachers with scores of 5.75 and 3.7 respectively. Both cohorts scored highest in policy knowledge questions, second highest in equity questions, and the lowest in access related questions.

The highest scored question for administrators/counselors was question 1 which was a policy knowledge question, and question 5 for the teachers. Question 5 was also a policy knowledge question. The lowest question score for both groups was question 7, which was an access question. The administrators had higher overall survey scores than the teachers; and the middle school teachers had higher overall scores than the high school teachers. Despite these

differences, it is notable that all groups were similar in the distribution of their scores across the identified themes.

Administrator/Counselor Interviews

The qualitative portion of the study was conducted through face -to- face interviews with the high school and middle school principals, and the high school and middle school guidance counselors. The interview consisted of ten questions and focused solely on the school districts mathematics acceleration policy.

According to all participants interviewed, there are several criteria that are taken into account when making an acceleration decision on a student. Specifically, state and local exams are taken into consideration, 6th grade math grades, and teacher recommendations. According to the high school counselor, students who have grades in the 90's in sixth grade, high state and local exam scores, and a teacher recommendation, will be offered the opportunity to become accelerated. Both counselors and the middle school principal stressed that teacher recommendations are weighed heavily.

According to the middle school counselor and principal when a student is chosen for acceleration, a letter is sent home to their legal guardian(s) over the summer and they are advised on their options. Acceleration begins with a condensed course. In 7th grade the accelerated students takes the 7th and 8th grade curriculum and then the traditional 9th grade curriculum in 8th grade according to both counselors. Once placed on a track the students tend to stay within that track. According to the high school principal there are three tracks that a student will be on entering the high school. These tracks are AIS (academic intervention services), non-accelerated,

and accelerated. Accelerated students have the opportunity to take advanced calculus or statistics their senior year. This option is not available for students on the AIS or non-accelerated paths.

When asked if all student populations were served within the current mathematics acceleration policy the answer was yes. The high school counselor stated, "grades matter, not circumstances. If you are good at math, you are good at math." According to both the high school and middle school principals nobody is excluded and each case is based on what is best for the individual student.

The question of whether or not the process of student evaluation was fair, objective, and systematic yielded a variety of responses. According to the high school principal he would like to say yes but that there is some subjectivity. He said that test data and teacher recommendations are weighed heavily but there is a "gray area." According to the principal the grayest area is when the student or family the student should be accelerated but the data shows that they should not.

The middle school principal stated that the process is "as fair as possible." The main issue according to him is that the long term prognosis is difficult at such a young age. The principal went on to say "some students are missed because they mature at different rates, but we believe the process is as objective as possible."

According to the middle school guidance counselor the process is systematic and "somewhat" objective in that it is difficult with the students being so young. The high school counselor stated that the process is fair, systematic, and objective because the decision is made under the same circumstances for each student. She did go on to say that an issue has been

parents not knowing about the acceleration policy, and then wanting their child to be accelerated after the decision has already been made.

Parents and legal guardians have open communication with school officials about the acceleration policy according the principals and counselors. According to the high school principal most of the communication occurs with the guidance counselors first and then the administration. If the parents or guardians have an issue the faculty will meet, go through the data, and make a decision. The principal said that the school will "err on the side of challenging the student." According to the middle school principal the acceleration policy is accessible to parents but it is not "advertised" due to "lobbying of parents". The high school counselor responded "yes, parent(s) or legal guardian(s) are free to contact the school at any time." According to the middle school guidance counselor the school tries to keep students aware and that a letter gets sent out to those chosen for acceleration over the summer.

Ostensibly, there math acceleration policy does not have a cap on the number of students who can be accelerated, but historically the course has been kept to one section of students. According to the high school principal and middle school guidance counselor the school district tries to keep acceleration to one section of students, which is roughly 25 students. The middle school principal said that the acceleration policy does not have a cap because students are "evaluated on an individual basis." The high school counselor added that there is no cap but the policy "caps itself" with the requirements.

When asked what would occur if a high number of students qualified for acceleration all participants responded that appropriate and proper accommodations would be taken. The middle school principal stated that the school would try to accommodate the students and would have a

meeting with the faculty. According to the middle school counselor the school would review all of the students and could make accommodations if necessary. She went on to say that class size would not be an issue because accelerated classrooms tend to have very few classroom management issues.

According to the school district's mathematics acceleration policy, a student or guardian can appeal the school district's acceleration decision. The high school principal said that when there is an appeal the teachers, counselors, principals, and superintendent discuss it, go through the data, and reach an agreement with the family. A family or student can petition to the school board or the superintendent if they wish to do so, according to the middle school principal. The middle school guidance counselor said that students and parents "absolutely" could speak with faculty and appeal the decision if they disagree with it.

The school will listen to all appeals but that does not mean that they will change the original decision. The newly implemented common core has had an effect on the wishes of some parents of accelerated students according to the middle school guidance counselor. This is due to the fact that when acceleration begins in 7th grade students must take two years of common core content (7th and 8th grade) during their 7th grade year. This has led some parent(s) and guardian(s) to decline acceleration for their child.

Although some research indicates that all students benefit academically from acceleration none of the teachers, guidance counselors or principals surveyed believed that all students should be accelerated. The responses showed concern with workload, tougher content, and maturity. The high school counselor said, "I do not believe that all students should be accelerated due to the fact that many students cannot keep up with the regular content." The high school and middle

school principals as well as the middle school counselor said that there is a system in place to challenge students who are not accelerated. The middle school counselor responded that maturity plays a big role in acceleration and that "differentiated instruction" such as "grouping and alternative assignments" are used to challenge non-accelerated students. The high school principal said that the acceleration policy is a topic of conversation between administration and faculty throughout the year. Rating effectiveness is difficult according to the middle school principal. He said that one way the policy is reviewed by looking at student scores.

The school districts' acceleration policy is always a topic of discussion and is regularly evaluated by the district according to the interviewees. The middle school guidance counselor said that one potential change could be a switch away from block scheduling. With the high school having block scheduling it makes acceleration difficult because students often will have to get accelerated in two subjects. By switching away from block scheduling it may make acceleration easier and allow for more students to become accelerated according to the guidance counselor. By collecting de-identified historical data the study was able to compare how the teachers and administration perceived the math acceleration policy to how the policy actually affects student achievement.

De-Identified Historical Data

The de-identified historical data is provided for the class of 2014 and 2015. The data provided for each class was the regents test scores for Integrated Algebra (A1), Geometry (G), and Algebra II/Trigonometry (A2) and the non-weighted GPA for accelerated and non-accelerated students. The non-accelerated students do not include students who were on the AIS students who chose alternative math credits. The non-accelerated students were further

disaggregated into those who completed *Introduction to Analysis/Differential Calculus*. This provided a group of non-accelerated students who were just one class (AP Calculus) shy of their accelerated peers. This group of students was labeled "Non-Accelerated Intro". Accelerated students were students that also completed all 3 NYS Regents mathematics exams as well as *Introduction to Analysis/Differential Calculus* their junior years, and AP Calculus their senior year. The final piece of data for each class was the percentage of students who persisted with mathematics. In order to graduate a student must take at least 3 mathematics credits. Persistence was calculated by the percentage of students that persisted with math beyond the 3 required math credits.

Class of 2014 historical data.

Table 8

Class of 2014 Historical Data

		Class of 2014				
			A1	G	A2	GPA
Non-Accelerated			85.40%	83.40%	82.30%	85.70%
Accelerated			89.50%	92.10%	91.20%	92.40%
Non-Acclerated-Intro			90.30%	90.70%	90.30%	90.20%

Table 8 displays the de-identified historical data for the class of 2014. There were 11 AIS students and 20 students who chose alternative math credits such as accounting. There were a total of 61 non-accelerated students in the class of 2014 including 9 students that dropped from the accelerated program. This means that at the time of graduation 61 students out of 112 (54%) in the class were not accelerated students. When including AIS and alternative track students 95

out of 112 students, or 85% of the students were not accelerated students. When the class of 2014 began their 7th grade year 26 students were accelerated, by the time of graduation 9 students had dropped into the non-accelerated path leaving 17 students, or 15% of the class as accelerated students.

As Table 8 indicates the accelerated students had the highest level of academic success within the categories researched. Accelerated students had higher scores than the non-accelerated students across the board. The academic gap increased as the students progressed throughout the mathematics curriculum. The difference between the two cohorts was 4.1 points on the Algebra 1 exam, 8.7 points on the Geometry exam, and then 8.9 points on the Algebra 2 exam. The accelerated students had a mean GPA that was 6.7% higher than the non-accelerated students.

The results for the non-accelerated students who completed *Intro to Analysis/Differential Calculus* were closer to their accelerated peers than the other non-accelerated peers. It is interesting to note that this group of students scored higher on the Algebra 1 exam than their accelerated classmates. On the Geometry exam they scored 1.4 points lower than the accelerated group and .9 points lower on the Algebra 2 exam. The accelerated students had a higher GPA than this non-accelerated group by 2.2 points.

The persistence with math for the class of 2014 was 50.8%. 40 non-accelerated students completed more than the required three mathematics credits. This number combined with the 17 accelerated student's gives 57 students that completed more than the three mathematics credits. This equates to 50.8% of the student population that persisted with mathematics beyond the three required credits.

Class of 2015 historical data

Table 9

Class of 2015 Historical Data

		Class of 2015			
		A1	G	A2	GPA
Non-Accelerated		86.20%	85.10%	87.30%	87.10%
Accelerated		91.30%	93.50%	91.90%	92.10%
Non-Acclerated-Intro		88.50%	88.40%	91.50%	88.50%

Table 9 shows the de-identified historical data for the class of 2015. The class of 2015 had 21 students (17% of the student population) who were accelerated at the beginning of their senior year. Six accelerated students had dropped into the non-accelerated accelerated track, including one student that elected to not take AP Calculus. The class consisted of 104 (83% of the student population) non-accelerated students. The non-accelerated cohort for this study did not include AIS students or student who elected not to take AP Calculus in the senior year. The class of 2015 had 20 AIS students (16% of student population), and 24 alternative students (19% of the student population). This means that 41% of the student population was either AIS or alternative track students. Alternative track means that the student enrolled in an alternative course such as accounting to meet one of the required math credits.

The accelerated students had higher scores than their non-accelerated peers in every category. The mean Regent's score in math for the accelerated students was 92.2%, the mean Regent's score for the non-accelerated scores was 86.2%. The accelerated cohort had a GPA of 92.1, which was 5 points higher than the non-accelerated GPA of 87.1%. The largest margin was on the Geometry exam where the accelerated students scored 8.4 points higher than their non-accelerated peers.

The non-accelerated students who were taking *Intro/Differential Calculus* yielded results that were closer to their accelerated peers than the rest of their non-accelerated classmates. This group consisted of 28 students including one student who dropped from the accelerated track. The accelerated students outperformed this group of students in each category but the results were closer. The largest difference was on the Geometry exam where the accelerated students scored 5.1 points higher. The other two exams had a combined difference of 3.2 points, including only a .4 differential on the Algebra 2 exam. The accelerated GPA of 91.2 was 3.6 higher than the 88.5 GPA for this group.

The persistence of math for the class of 2015 was 53.6% of the student population. There were 104 non-accelerated students. Forty-six of these students completed more than the three required mathematics courses. This number was then added to the 21 accelerated students. When this was calculated it showed that 67 of the 125 students, or 53.6%, completed more than the three required mathematics courses for graduation.

Comparing De-Identified Historical Data

The classes of 2014 and 2015 yielded similar results. The accelerated students outperformed their non-accelerated peers in all categories measured (average regents score, and GPA) for both classes. Students who were non-accelerated and completed or were taking *Intro/Differential Calculus* outperformed their fellow non-accelerated peers and had similar score to their accelerated peers. The class of 2014 had 83% of their student population on a track other than acceleration, and the class of 2015 had 85% of students on a track other than acceleration. At the end of the study 16% of the students from each class were accelerated all the way through their high school career. The class of 2014 had 17 accelerated students out of 112

students, and the class of 2015 had 21 accelerated students out of 125 students. Combined the classes had 38 out of 237 (16%) of the student population accelerated in mathematics. The findings of this study have uncovered numerous topics for discussion.

Discussion

During the design of this study, there were many steps that had be taken in order to accurately portray the acceleration policy of the school district as well as the academic achievement of the students. First in order to form a foundation for the study I had to review literature that focused on math, academic achievement, and middle school students. Next, I designed a methodology that would best investigate the mathematics acceleration and its impact on accelerated and non-accelerated students. The methodology was mixed with both quantitative and qualitative data. Quantitative data was collected in the form of teacher surveys and de-identified historical data. The qualitative portion of the study was conducted through face-to-face interviews with principals, and guidance counselors.

Findings in relation to the literature

Using Piaget's Stages of Cognitive Development as a guideline, students in the 7th grade are at the Concrete Operational stage and entering the Formal Operational stage. According to Piaget's research students at this age can demonstrate logical and concrete reasoning. During this stage students are developing operational thinking but still cannot solve a problem with several variables (Woods, 2001). They can only solve problems that apply to concrete events or object because abstract, hypothetical reasoning has not developed yet. It is during this age that students are transitioning to the Formal Operational stage according to Piaget. Students in the formal

operational stage can think about multiple variables in a systematic way, formulate hypothesis, and think abstractly (Woods, 2001).

Piaget's research supports that idea that accelerating students at the end of 6th grade is too early. Students at this age have yet to fully develop cognitively. They are still learning how to think abstractly, and use multiple variables to solve a problem (Woods, 2001). These are critical skills that are used in mathematics. It is not fair to make a judgment on a student's ability to become accelerated when they are still developing the necessary skills to be successful in a mathematical setting. Such a crucial educational decision should be made when a student has had the proper amount of time to mature and acquire the necessary cognitive tools. Although cognitive ability is an important predictor of academic success there are other variables that have emerged in recent years that can have a major impact on the academic achievement of students in all subjects, especially mathematics. One of the most often studied variables is that of self-efficacy.

Throughout my review of the literature the term self-efficacy was continually invoked. The common definition of self-efficacy was an individual's belief in the ability to successfully perform a task for a desired outcome (Bandura, 1994). The question then became how does self-efficacy affect academic achievement in mathematics? To me self-efficacy is the most influential variable in a student's motivation and interest in mathematics. I say this because if a student has high self-efficacy it means they have confidence in their mathematical ability. A student with high self-efficacy in mathematics has confidence in their ability to correctly solve mathematical problems correctly (Parajes, 1999).

Through research it became clear that if a student has high self-efficacy in a topic they would be highly motivated and interested in it. Self-efficacy is a major influence because its

positive correlation to motivation and interest has a major impact on academic achievement (Chen, 2002). High self-efficacy means higher motivation and interest which leads to higher academic achievement. For example, if a student beliefs in their mathematical ability they will be more motivated and interested in mathematics. This high level of motivation and interest will lead to higher grades in math. The opposite scenario is when a student has low-self efficacy. Low self-efficacy leads to low levels of motivation and interest.

If a student does not have confidence in their mathematical ability they will not be motivated or interested in mathematics (Parajes, 1999). These low levels of motivation and interest will manifest themselves in low grades in mathematics. Now that it has been established that motivation and interest levels are major influences in academic achievement and that self-efficacy is the catalyst behind these variables a new question is posed. How do school districts and guardians create an atmosphere that is conducive to high levels of self-efficacy?

The literature studied on this research question offered several ways in which school districts and families can help students gain high levels of self-efficacy (Wentzel, 1998). I found the two most influential factors to be parental involvement and school climate. Several studies had findings that showed a positive correlation between parental involvement and academic success (Useem, 1991). Higher levels of academic success lead to higher levels of self-efficacy.

If a parent or guardian is highly involved in their child's education it has a positive impact on academic achievement (Useem, 1991). Parental education and support are also major factors. Parents who are highly educated tend to be more proactive and hands on in their child's education. This approach often affords their child better educational opportunities such as acceleration (Useem, 1991). Just because a parent is involved does not mean they are supportive. Students who reported high levels of parental support enjoyed school more and had higher levels

of self-efficacy (Alves et al, 2002). The critical issue becomes how do school districts meet the needs of students who lack parental support? One way is by creating a positive school climate.

Research indicates that students who have positive feelings towards the school climate tend to enjoy school and have higher self-esteem (Kuperminc et al, 2001). Students who have negative feelings towards the school climate tend to have lower levels of self-esteem and not perform as well in the classroom. There is a positive correlation between parental involvement and the student's view of the school climate (Wentzel, 1998). By finding ways to involve parents in their child's education schools can help create a more positive school climate. Providing services such as counseling and programs such as Positive Behavioral Interventions and Supports (PBIS) within the school are a few ways in which schools can create a positive school climate. Schools must also ensure that all student populations have fair representation in all school policies. In an ironic way accelerating more students, even those who have low self-efficacy could potentially increase their self-efficacy. If more students have the opportunity to tackle advanced placement math, they would see themselves as capable math students and might choose to pursue future study or a career in a math related field. One such policy that could promote and increase self-efficacy would be the acceleration policy.

Teacher/Administration Surveys

Reviewing the teacher surveys generated several interesting findings. Middle school teachers tended to have a more knowledge about the acceleration policy than the high school teachers. This is the case because middle school teachers are more involved in the beginning stages of the acceleration process. By the time students get to the high school the academic track for each student has already been set. Both the middle school and high school teachers had low

scores on questions related to equity. This could mean that the teachers believe that not all students have fair equity within the acceleration process.

The surveys revealed some contradicting views from the teachers. For example several teachers answered, “disagree” to the statement that math acceleration should be capped at a certain number. This would indicate that the teachers believe that access should be available to any number of students. The contradiction comes when asked if acceleration policies should be an open policy, thus allowing more students to become accelerated. Teacher #1 answered, “strongly agree” for the statement that acceleration policy should be an open policy, but then answered “strongly agree” that acceleration in math should be capped at a certain number of students. Several other teachers answered questions in a very similar fashion. All the teachers answered, “strongly disagree” or “disagree” for the statement that since some research indicates that all students benefit from acceleration that all students should be accelerated. The strong opposition to this policy was notable. Acceleration is a track that students can only get on at one point in their academic career. If there is research that indicates that all students benefit in some form from acceleration why not accelerate all students? Teachers showed concern about students being able to handle the content and work load. If a student cannot handle acceleration then there is always the option to withdraw from the accelerated track.

Administrator/Counselor Interviews

I interviewed the principals and counselors for two reasons. The first reason was to gain a more complete understanding of the acceleration policy. The second reason was to provide data to compare to the teachers. The principals and counselors filled out the same survey as the teachers. The principals and counselors all answered, “strongly agree” to the statement that they would be able to describe the acceleration policy in a detailed fashion. This was higher than the

teacher's response to this question, but I expected that individuals in an administrative position would be able to clearly describe the acceleration policy. Whereas teachers did not feel that all student populations were served under the current acceleration policy the principals and counselors felt that they were. Another disconnect between these two groups was that the acceleration policy was fair, objective, and systematic. The teachers tended to disagree with this statement while the principals and counselors agreed.

Teachers also "disagreed" with the notion that an acceleration policy should be an open policy. In contrast the principals and counselors felt that the policy should be open. The principals and counselors also showed inconsistency with their responses. For example, one principal answered, "strongly agree" to an acceleration policy being open but also "strongly agreed" that acceleration in math should be capped at a certain number. One area of strong agreement between both groups was on the idea of accelerating all students. Every participant answered with "strongly disagree" or "disagree". To me if acceleration provides benefits to most if not all then school districts should at least expand the number of students who are accelerated. This way a complete overhaul of the acceleration policy would not be necessary and more students could benefit from accelerated courses.

The face-to-face interviews conducted with the principals and counselors provided greater context for the survey responses. The first was a better understanding of the mathematics acceleration policy. The second was an understanding of how much they understood about the acceleration policy. As I conducted the interviews, it became apparent to me that the middle school principal and guidance counselor had greater knowledge of the mathematics acceleration policy than the high school principal. Both the middle school principal and guidance counselor

were able to give me detailed explanations of the acceleration policy and what the key factors were.

The high school principal at one time stated that it is rare for a student to become accelerated once in high school. The truth is that acceleration in mathematics is a track that can only be joined once, and that is at the beginning of 7th grade. However a student that is accelerated can become de-accelerated at any time during their academic career. I believe it would be beneficial to the school district and the students if all faculty had a clear understanding of the mathematics acceleration policy. According to the interviews and the acceleration policy acceleration is decided on an individual student basis. I believe that this is a better option than just looking solely on cut off scores such as a student having to score a 4 on a state exam. The principals and counselors seemed genuine when they said that parents have open communication with school district and that appropriate accommodation s would be met for students when necessary.

I found that the criteria for acceleration at this school district were objective and fair. There is not one test score that decides if a student is accelerated or not. The students are viewed in a holistic manner. Grades do play a major role in the acceleration process. Both counselors and the middle school principal stated that both in class grades as well as local and state exams are taken into consideration. If the student does well on state and local exams and has an A in 6th grade they would most likely be offered acceleration. Teacher recommendation also plays an integral part in the acceleration decision. I believe this to be good practice because the teacher works with the student all year long and knows more about the student than test scores may indicate. A teacher will know a student's study habits, persistence, and desire to be challenged. All three of these are qualities an accelerated student must possess. I take issue with the fact that

the school district wants to keep acceleration to one section of students. A section of students is traditionally capped at 25 students.

The school district seemed in favor of keeping the accelerated section capped at the traditional 25 students. The results of this study indicate that although 25 students are traditionally accelerated 7-10 students chose to become non-accelerated by the time of graduation or entering their senior year. This drops the number of accelerated students from 25 down to 15-17 students. If the goal is to accelerate 25 students then the data supports that more students should be accelerated. For example if 40 students are accelerated and 15 become non-accelerated by graduation the school is left with their original goal of 25 students. The worst that will happen is that the 15 additional students become non-accelerated and 7-10 of the original 25 become non-accelerated. This would still leave the school with the traditional 15-17 accelerated students. The best case scenario is all 40 students remain accelerated. The school would increase the number of accelerated students and give 15 additional students the opportunity to be accelerated.

De-Identified Historical Data

The de-identified historical data provided quantitative information on the effects of the mathematics acceleration policy on academic achievement. The accelerated students did perform higher academically than their non-accelerated peers. This was an outcome that was expected. The goal of this study was not to disprove the fact that accelerated students perform higher than their non-accelerated peers. The goal was to see if this acceleration policy is excluding students who have the ability to successfully complete accelerated courses. The answer to that question appears to be yes.

When viewing the two cohorts holistically it seems clear that the acceleration policy is working functionally. The accelerated students are outperforming their non-accelerated peers. Does this mean that the right students were chosen for both the accelerated and non-accelerated tracks? Not necessarily. Further disaggregation the data into students who were non-accelerated but completed or were in the process of completing Intro/Differential Calculus proved otherwise. Students who were not accelerated but completed or were enrolled in *Intro/Differential Calculus* are the students who fall one class short of their accelerated peers. Accelerated students are offered AP Calculus and Statistics while non-accelerated students are not. These are students who most likely were on the border of being accelerated in 7th grade but fell short of the established criteria. How did these students measure up to their non-accelerated peers?

This group of students for the class of 2014 actually outperformed their accelerated peers on the Algebra 1 exam, and the combined difference between the Geometry exams and Algebra 2 exams was 2.3 points, with a 2.2-point difference in GPA. When all three math accelerated Regents scores for the accelerated students are averaged together the average is 90.9%. When the scores of the 18 students who were not accelerated but completed Intro/Differential Calculus are added to the accelerated average the total average drops from 90.9% to 90.7%. Is .2% worth excluding 18 students from acceleration? If these students were accelerated the total number of accelerated students from the class of 2014 would increase from 17 to 35.Thirty five students would be 31% of the student population, as opposed to 15%. To me it is much more impressive for a school district to have data showing 35 accelerated students at a 90.7% average regents score as opposed to 17 students at a 90.9% average regents score. Was this just an anomaly from one class of students? The answer again is no.

The class of 2015 yielded similar results. This class had 20 accelerated students, and 21 non-accelerated students who were enrolled in *Intro/Differential Calculus*. The non-accelerated students who were enrolled in *Intro/Differential Calculus* scored on average just 2.8 points lower on each Regents exam. The average Regents score for the accelerated students was 92.2%. When the average of the 21 non-accelerated students was added the average dropped only 1.3 points to 90.9%. By accelerating these 21 additional students, 41 students would have the opportunity to acquire increased knowledge.

The de-identified historical data also provided insight into how many students were on the AIS track compared to the accelerated track. The class of 2014 had 11 students, or 10%, on the AIS track. This class had 17 students or 15% of the students on the accelerated track. The class of 2015 had 20 students on the AIS track and 20 students on the accelerated track, each representing 16% of the student population. To me this projects that theory of a bell curve. This means that a certain number of students will be placed in AIS and a certain number of students will be accelerated. All other students are placed in the middle, or in this case the non-accelerated track. Rigid theories such as this can lead to students being placed on the wrong track in order to even the curve.

Persistence in math was calculated by the number of students who completed more than the three required mathematics credits for graduation. Both the class of 2014 and 2015 had more than 50% of the students complete more than the three required math credits. This shows that the students understand the importance of math in their education as well as exhibiting persistence and interest in it.

Issues with Policy

I take issue with this policy for two reasons that appear to artificially suppress enrollment in accelerated course work in math. The first reason is that setting a one section cap limits the number of students who can become accelerated. The second reason is how the school district disseminates acceleration information.

By setting a limit on the number of students who can be accelerated potentially withholds accelerated opportunities for students that are capable of completing such work. As this study indicated there are several students that had the capability to be on the accelerated track that were not given the opportunity. The class of 201 alone had 27 students that completed Introduction to Analysis/Differential Calculus. This left them one class (AP Calculus) short of their accelerated peers. By abiding by the traditional number of 25 accelerated students the school denied 27 additional students the opportunity to become accelerated. By operating in this fashion the number of students who can be accelerated is greatly diminished. It is understood that certain students would not be able to succeed in an accelerated math track but does not justify limiting math acceleration to one section. By opening up more sections more students would be allowed accelerated services and parental lobbying would also decrease. This transition does not have to occur in one step. The first step could be to open up one additional section.

This would allow up to 50 students to become accelerated. If a student could not handle acceleration they could always decide to change to the non-accelerated track, but at least they were given a chance. Most parents who appeal acceleration decisions and lobbying for their child are parents of students who are on the border. In other words they fall just short of the acceleration criteria, perhaps on one test score, grade, or the teacher recommendation. By opening up another section these students would be accommodated and afforded the opportunity

to be accelerated, thus decreasing parental lobbying. The middle school principal admitted that the main issue was that the long-term prognosis is difficult at such a young age. The principal continued that, "some students are missed because they mature at different rates, but we believe the process is as objective as possible." Expanding the acceleration policy would eliminate issues such as this and increase the number of students would have access to the level of education they deserve.

The acceleration policy on the district website is brief and provides very little information. The website states, "As required by the Commissioner of Education's Regulations the Fredonia Middle School provides for acceleration in mathematics and other subject areas. Students and parents interested in acceleration should contact the guidance office."

I was told by the middle school principal that the district does not want to advertise the acceleration policy because parents will begin to lobby for their child to be accelerated. The middle school guidance counselor said that a letter goes out to the parents of accelerated students over the summer. This letter states that the child has been chosen for acceleration.

Implication for Future Research

This study created several implications for future research. More research needs to be conducted in more diverse areas. This would provide further data with a more diverse student population. A diverse student population would provide insight into how math acceleration policies affect students from different ethnicities, genders, and SES.

The next step for this study would be to disaggregate the students into gender, ethnicity, and SES. This would provide insight into how these variables potentially affect acceleration. Conducting interviews with the school district math teachers would provide them an opportunity

to voice their recommendation and thoughts. Tracking individual accelerated and non-accelerated students would afford the opportunity to see how each student progressed and compared academically to one another. Lastly I would like to conduct the study at a school district that was willing to expand their math acceleration policy. Doing so would provide further data that may support the expanding of math acceleration policies.

Limitations

A small sample was one of the limitations of this study. Further research with a larger population would be beneficial because it would provide more reliability. A second limitation was that this school district is not very diverse. A lack of diversity may indicate few acceleration barriers while a more diverse student population may experience several barriers. Another limitation was the New York State acceleration requirement.

The acceleration policy of New York State and this school district may be very different than other schools and states. This could make comparing the results to other schools difficult. A final limitation was location. This study was conducted in a small suburban school district. Many of the students have parents associated with the University. This may have led to increased parental involvement and student expectations. If the study was conducted in a large urban school district or a small suburban or rural school district without a University significantly different results may have been yielded.

The methodology used for the study was chosen because it was the most appropriate in order to properly conduct the study. Although it was the most appropriate methodology it still provided some limitations. The de-identified historical data did not include gender, ethnicity, or SES. These variables could have given the study a more in depth dimension. Having an

anonymous survey provided privacy for the participants but created a limitation in the data collection process. Of the 13 teachers that were asked to complete surveys only 11 were returned.

Policy Recommendations

There is no perfect acceleration policy. There are going to be students that are passed over, and students who are selected that drop out. The goal of an acceleration policy should be to give as many qualified students as possible the opportunity to become accelerated. The question becomes how do schools decide which students are qualified at such a young age? What does "qualified" mean to the district? Delaying the acceleration decision in not an option. Students need to be accelerated in 7th grade because they need to take two years of math in 7th grade. The best recommendation is to accelerate more students. Students only have one shot to become accelerated but they can get off the track whenever they chose. Instead of accelerating the traditional one section of 25 students, the school could aim to accelerate 40 students and create two sections. If I were a teacher/administrator I would rather give the student an opportunity to succeed rather than deny them the opportunity in a misguided attempt at shielding them from potential failure.

What are the possible problems associated with accelerating more students? One could be that all of the extra 15 students drop down to the non-accelerated section? Then the school would still be left with the original 25 students that would over time become 15-20 accelerated students after a few more of them drop to non-accelerated. The best case scenario is that the students succeed and instead of having 25 accelerated students, or fifteen after the traditional attrition, the school has thirty or forty accelerated students. As the study showed there is a high rate of

persistence in math in this school. Students understand its importance and are hard working. They deserve the chance to reach their full potential.

I do not believe the school district is oblivious to these facts. I do believe that their mathematics acceleration policy is based on tradition instead of challenging students. Tradition is to accelerate one section of 25 students. At the end of the day a certain number of students are accelerated, a certain number are placed in AIS, and everybody else is in the middle. This is the way the policy has always been, so why change it? The policy needs to be changed because the school districts view of acceleration does not address our country's current need to produce more students skilled in high levels of mathematical thinking. The district believes that acceleration is for the select few who can complete the accelerated work at an accelerated level. It appears as if the district would rather accelerate fewer students in order to assure that their accelerated scores look exceptional. What about the students who can complete the accelerated work at an average level? In this acceleration policy they fall between the cracks. This student is not given the opportunity to take AP Calculus because in 6^{th} grade they got a B+, or they were number 26 on the accelerated list instead of number 25.

The high school principal stated, "acceleration battles are already fought by the time students get to the high school." What the high school principal seems to not recognize is that his school's data reporting is directly affected by these acceleration decisions made at the middle school level. As a principal the accountability data of your school looks better if you have more students accelerated than not accelerated, and if you have more students accelerated than in AIS. The current acceleration position of the school seems to be that it is better to have a 95% Regents average from the accelerated students, even if that means only accelerating 15 students, instead of accelerating 40 students an having a Regents average of 88%. Students who could benefit

from acceleration are being excluded and left behind. The school district must begin putting the needs of their students and the needs of the community and country for skilled mathematical thinkers above their traditional approach to sorting students into rigid mathematical tracks.

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(NYSED b) New York State Report Card. (2014). https://reportcards.nysed.gov P-12: NYSED - New York State Education Department.

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Appendices

Appendix A: School District Acceleration Policy

If a student has met specific criteria, the process for selecting him or her to replace or supplement one or more of his/her courses with an advanced course may be initiated by certified school personnel, the student, or the parent. Instruction in this course or these courses may take place in the same classroom, the same school building or in a building or location where the course is offered. Recommendations for acceleration should be made prior to the start of the school year or as early in that school year as possible.

To initiate a recommendation, school personnel must complete "School Personnel Recommendation", Form 1, and submit it to the Building Principal or Guidance Counselor. Students or parents who wish to request acceleration must complete a "Student/Parent Recommendation", Form 2, and submit it to the Building Principal or Guidance Counselor. Forms are available in each building's main office and each building's guidance office. Parents or students considering application for acceleration should call the building principal or guidance counselor and make an appointment. The principal or counselor will advise the student and/or parent on acceleration and the proper procedures for completing and submitting the forms.

School personnel, students, and parents requesting acceleration may submit additional information and recommendations they consider important. All additional information must be submitted at the time Form 1 or Form 2 is submitted to the building office or guidance office. The Building Principal or Guidance Counselor will collect all requests for acceleration. He will complete Form 3, "Student Information." The Guidance Counselor, Building Principal and other school professionals, that may include the School's RTI Team members, will meet with all concerned parties and review all relevant information.

A. CRITERIA FOR ACCELERATION: Criteria for acceleration may include but not be limited to the following:

1. The student shows keen insights in many areas.
2. The student possesses excellent basic skills and study habits.
3. The student shows a need to be challenged.
4. The student exhibits a desire to know "how" and "why".
5. The student demonstrates a strong work ethic and social maturity.
6. The student exhibits a habit of doing more than necessary and enjoying extra work.
7. The student expresses a desire to be accelerated.
8. The student has earned high scores on any administered IQ and/or achievement tests.
9. The student has an excellent attendance record.
10. The student has earned high scores on AIMS Web and state and local assessments.
11. The student has earned outstanding grades in the area to be accelerated.
12. The student has an uncommon background or knowledge in the subject of acceleration.

Students who have lived in a culture that speaks another language and who are fluent in that language may be placed at an advanced level of Foreign Language instruction that is deemed appropriate for the child. Students transferring into the district from a school where they received previous instruction in a language or subject area that is beyond the instruction of their peer group may also be placed at an advanced level that is deemed appropriate.

Following a review of the recommendation and the criteria listed above, the Building Principal or Guidance Counselor will, based on the best interests of the child, notify all parties of the decision regarding acceleration. If a request for acceleration is not approved, the person making the request may appeal the decision to the Superintendent of Schools. Each case for acceleration will be considered on an individual basis. Other criteria may be considered as it is deemed relevant by the group reviewing the case for acceleration. In addition to the criteria listed above, consideration of acceleration, particularly in the areas of the arts, may include student interviews, student auditions and recitals and a review of student portfolios. Students transferring into the district from a school where they received previous instruction in a course that is beyond the instruction of their peer group may also be placed at an advanced level that is deemed appropriate.

Acceleration is not something that takes place over a one year period. Students and parents must realize that the decision to accelerate ahead in course work will affect students, both socially and academically, for the rest of their academic careers. Students who accelerate ahead may need to complete extra school work in order to compensate for gaps in their knowledge base and in order to catch up with the class they are accelerating into. Students who accelerate ahead in course work may also be placed in classes with older students and may need to spend a large portion of their day away from their age appropriate peer group. In addition, the decision to

accelerate ahead in course work may affect a student's final high school grade point average and class rank.

Accelerating ahead in coursework may not be the best option for every talented student. Other forms of acceleration may include differentiated instruction, lateral enrichment and cooperation with outside agencies and learning institutions. The Fredonia Central School District is committed to assessing each case of recommended acceleration on an individual basis in order to best meet the individual needs of the student.

Appendix B: School Personnel Referral Form

SCHOOL PERSONNEL
ACCELERATION RECOMMENDATION

Student Name _____

Staff Member's Name and Title _____

Course(s) for acceleration. List in order of preference:

1. _____
2. _____

Statement of Endorsement: (Please address each item specified in the Criteria For Acceleration)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Staff Member's Signature _____ Date _____

Appendix C: Student/Parent Acceleration Recommendation Form

STUDENT/PARENT
ACCELERATION RECOMMENDATION

Student's Name _____ Date _____

Parent's Name _____ Grade Level _____

Course(s) for acceleration. List in order of preference:

1. _____
2. _____

Parent statement of recommendation or student statement of reasons:
(Please address each item specified in the Criteria For Acceleration)

_____

_____

_____

_____

_____

_____

_____

_____

Student's Signature: _____ Date _____

Parent's Signature: _____ Date _____

Appendix D: Student Information Acceleration Form

STUDENT INFORMATION
ACCELERATION

Student Name _____ Date _____

Person(s) Making Request _____

Subject(s) Requested for Acceleration:

1. _____
2. _____

Parent Name _____

Address _____

_____

Phone _____

Academic Record: Record scores on the following tests:

1. State Exam Scores: _____

2. Achievement Test Scores: _____

3. Current Report Card Grades_____

Other relevant information: _____

_____

_____

Acceleration Committee Members: _____

_____

Acceleration Committee Recommendation: _____

Committee Chairman Signature _____ Date _____

THIS FORM MUST BE COMPLETED BY THE MIDDLE SCHOOL GUIDANCE COUNSELOR WITHIN TWO WEEKS OF THE INITIAL REFERRAL.

Form 3

Appendix E: Teacher/Administrator Survey

Acceleration for All?

1: Strongly Disagree 2: Disagree 3: No opinion 4: Agree 5: Strongly Agree

If asked you would be able to clearly describe the school districts mathematics acceleration policy.

1 2 3 4 5

All student populations are served, including (low SES, ELL, at-risk, males, and females) within the current acceleration policy.

1 2 3 4 5

The process for student evaluation for acceleration is fair, objective, and systematic.

1 2 3 4 5

An academic acceleration policy should be an open policy, thusly allowing more students to become accelerated.

1 2 3 4 5

Parents or legal guardians have open communication with school officials about the acceleration policy.

1 2 3 4 5

Acceleration in math should be capped at a certain number of students.

1 2 3 4 5

Since research indicates that all students benefit from acceleration, all students should be accelerated.

1 2 3 4 5

Appendix F: Administration Open Ended Interview

Acceleration Investigation

1. Please describe the school districts mathematics acceleration policy

2. Are all student populations served, including ELL, at-risk, low socioeconomic status, profoundly gifted, and twice exceptional?

3. Is the process of student evaluation fair, objective, and systematic?

4. Do parents or legal guardians have open communication with school officials about the policy document

5. Are both categories of acceleration (grade-based and content-based) specified?

6. Is the process of obtaining acceleration services detailed?

7. Is acceleration in math capped to a certain number? If so, what happens when more students than the designated number qualify for acceleration?

8. Can a student or guardian appeal the schools acceleration decision?

9. Research indicates that all students benefit academically from acceleration. What are your thoughts on accelerating all students?

10. Is the acceleration policy regularly evaluated for effectiveness?