2015

Placing Students in Eighth Grade Mathematics: A Case Study of the Decision-Making Process

Donald Joseph Davis
Walden University

Walden University

COLLEGE OF EDUCATION

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Donald J. Davis

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Review Committee
Dr. Maryann Leonard, Committee Chairperson, Education Faculty
Dr. Bruce Keith, Committee Member, Education Faculty
Dr. Warren Braden, University Reviewer, Education Faculty

Chief Academic Officer

Eric Riedel, Ph.D.

Walden University
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Abstract

Algebra 1 is considered an essential course necessary to access higher levels of mathematics. The California accountability system designates this course for completion in 8th grade. In Shelton County, however, placement of 8th graders in this course varied depending upon which school district students attended, resulting in inequitable access. The purpose of this project study was to explain the influencing and constraining factors affecting the decision to place individual students in mathematics courses, and to develop a project to assist local educators in making rational placement decisions. The project study applied administrative theory to investigate related processes of effective decision making and utilized an instrumental collective case study methodology. Eighteen administrators from 9 local districts described their experience as they dealt with the decision to place 8th grade students in Algebra 1. Seventeen completed a semi-structured questionnaire, 9 participated in follow-up semi-structured interviews, and 1 was only interviewed. They key findings that affected placement decisions included that many students entered middle school unprepared for algebra, the local mathematics programs were not coherently designed, and aspects of an effective action-cycle decision-making process were absent. A position paper was developed that offers policy and practice recommendations to remedy these findings. Key recommendations include implementing clear policy on the issue, and pursuing a coherent instructional program comprised of coordinated research-based instruction, student support interventions, and utilization of assessment and placement processes. This project study advances positive social change engaging educational leaders at the site and district level to develop their professional practice and enhance the quality of their organizations' mathematics education program.

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Dedication

I dedicate this work to my wife and companion Kathy Davis who maintained consistent support and encouragement throughout the journey. And to my parents, Delane Shelton and the late Barney Davis, who inspired my devotion to education.

Acknowledgements

I wish to thank my doctoral committee Dr. Maryann Leonard and Dr. Bruce Keith for offering guidance and support throughout the process. I wish to acknowledge the school board in my district who encouraged my professional growth. Finally, my friend and colleague Dr. Lynn Lysko deserves recognition for starting me on this journey and encouraging me to see it through to the end.

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Introduction

The decision to place eighth grade students in Algebra 1 is of great significance in California schools. From 2002 to 2013, this singular mathematics course weighed heavily on a middle school's ability to meet the state's expectations of academic performance. The State of California's accountability system known as the Academic Performance Index (API), sanctioned middle schools for allowing eighth graders to take a course rated below the level of Algebra 1 (California Department of Education, CDE, 2011). This sanction consisted of lowering a school's API score, which the state department of education used to rank and apply further sanctions to schools. When the State Board of Education (SBE) adopted the *Mathematics Content Standards for California Public Schools: Kindergarten Through Grade Twelve* (CDE, 1997), it codified that a full-year algebra course was appropriate for Grades 8 through 12, and made passing Algebra 1 a requirement for high school graduation. Although this framework allowed the Algebra 1 course to be taught through Grade 12, the state's own accountability system required it to be mastered by Grade 8 to avoid the sanction. This disconnect confronted local administrators with placing students in Algebra 1 based either on their actual mathematical aptitudes, or placing these same students according to how the decision ultimately effected their school's API score.

This study examined a central region of California in which access to Algebra 1 in middle school varied greatly from one district to another. A student attending a district with a high percentage of eighth grade students in Algebra 1 was nearly 2.5 times more likely to be enrolled in the course than a student in a district with a history of low Algebra 1 placement (CDE, 2011b). Data also show that the majority of students placed in eighth grade Algebra 1 have performed below the level of Proficiency on the state's end-of-course exam, regardless of their individual district's placement practice.

The purpose of this project study was to develop a rational framework for use in the placement of students in eighth grade mathematics courses. In this study, I researched and analyzed archival evidence and examined the lived experience of local public school administrators. I specifically examined the experience of administrators in nine unified school districts in Shelton County, California who were responsible for placing eighth grade students in mathematics courses. This inquiry was developed to determine what factors lead district decision makers in this county to place eighth grade students in Algebra 1 at the varying degrees shown in the archival evidence, despite the poor outcomes. The study findings are expected to inform school boards, superintendents and other district officials in this region and beyond as they review, update or develop local policies on this issue. Understanding the underlying decision-making processes will facilitate making systemic and programmatic reforms that amend deficiencies in public school students' access to algebra courses.

At the time of this study, California's accountability system rewarded middle schools for having aggressive Algebra 1 placement practices. Not all districts however, adopted an insistent policy for their middle schools, and in many instances evidence of policy have been lacking altogether (Williams, Haertel, Kirst, Rosen & Perry, 2011a). Williams et al. offered that this lack of standard policy had some school officials enrolling individual eighth grade students in Algebra 1 according to the officials own undefined decision-making processes not governed by formal policy guidelines. This suggested that local customs and traditions were considered in the placement decision-making process, rather than a research-based policy approach. This study was designed in part to explain the local decision-making processes used by public school administrators in this county to place students into middle school mathematics courses and whether policy guided the decision.

Similar local placement decisions vary widely, even within the same region, and with schools of similar populations (Williams, Haertel, Kirst, Rosen, & Perry 2011b). Consequently, the exact middle school attended by two different students with similar ethnic and socioeconomic backgrounds and similar mathematical aptitude within a region may significantly affect their access to an algebra course. This creates an inequity that places some students at least one year behind their peers, a significant disadvantage because understanding algebra is essential for learning higher levels of mathematics (Welder, 2011). A potential consequence of this inequity is that students may enter high school enrolled in different mathematics courses based not on their actual aptitude, but on other factors specific to their middle school.

Algebra 1 is sometimes referred to as a gatekeeper course because it prepares students for success in higher academic courses such as Geometry, Advanced Algebra, Trigonometry and Calculus, and it also launches students on a college-preparatory trajectory (Riley, 1997). For this reason, the National Council of Teachers of Mathematics (NCTM) has recommended that all students be taught underlying algebraic principles in the early elementary grades, so as to prepare all students for the rigors of an algebra course (NCTM, 2000). California adopted a similar early-algebra approach to mathematics instruction when it produced its content-standards based mathematics framework (CDE, 1997). This framework has provided an algebra-related sequence thread that begins in kindergarten and culminates in a formal Algebra 1 course in eighth grade. It also has charged school officials with providing an articulated mathematics program that creates equal access to Algebra 1 for all. Historical data show that eighth grade students in this region were placed in the Algebra 1 courses at significantly higher or lower rates depending on their district. In addition, the majority of the students at the study sites failed to demonstrate proficiency at the end of their eighth grade Algebra 1 experience, irrespective of the district.

According to Spielhagen (2006a), students who successfully complete an Algebra 1 course in the eighth grade tend to continue in the study of mathematics longer and complete higher levels of mathematics in high school. Conversely, students who do not complete the course in the eighth grade are less likely to subsequently enroll in advanced mathematics courses in high school, which in turn limit their post-secondary educational options. Algebra readiness is affected by a multitude of factors, such as; teacher preparation (Center for the Future of Teaching and Learning, 2008), professional training (Welder, 2011), and methods of instruction (Morgatto, 2008). The American Institute of Research/California Department of Education study *Gaining Ground in the Middle Grades* (Williams et al., 2011b) did not identify a singular cause for discrepancy in Algebra 1 placement, nor did it determine whether the state's accountability system influenced administrators in their approach to placing students in Algebra 1 in eighth grade. The study found however that academically higher performing schools with higher socioeconomic demographics tend to have a less aggressive Algebra 1 placement practices than do lower-performing lower-socioeconomic schools. The researchers contended that this finding supported a need for further reviews of Algebra 1 placement practices in California. The research completed for this project study respected that assertion by studying the placement practices in this region.

California has placed a premium on eighth grade Algebra 1 in its accountability system known as the State Testing and Reporting (STAR) program. Middle schools with higher percentages of students demonstrating proficiency in the Algebra 1 course receive a higher Academic Performance Index (API), a scoring model that the state has used to rank schools (CDE, 2011a). The State of California Department of Education used five bands to describe the ability levels of students on state exams: Advanced, Proficient, Basic, Below Basic, and, Far Below Basic. Through 2013, students who took the General Mathematics test in lieu of the Algebra 1 exam were considered to be testing below grade level and the schools were penalized with a lower API score. Specifically, if a student scored “Proficient” on the General Math test, the student received API points equal to a student who only scored “Basic” on the Algebra 1 test. This score also impacted the school’s Annual Yearly Progress (AYP) associated with the federal No Child Left Behind Act of 2001 (Public Law 107-110, 2001). Though no federal regulations requiring students to complete the Algebra 1 course in the eighth grade existed, a federal expectation that schools achieve a minimum state API did exist. The federal law placed sanctions, ranging from mandated professional development for teachers to removing the principal and restructuring the school, on schools not showing adequate AYP progress.

2011 STAR report showed that 59.1% of eighth grade students statewide took the Algebra 1 end-of-course exam, while 31.8% of eighth grade students took the General Mathematics test. The remaining students were untested or took an exam for a course considered higher than Algebra 1 (e.g., Geometry or Advanced Algebra). In Shelton County, the 2011 STAR report showed that 54.2% of eighth grade students took the Algebra 1 exam, while 40.2% took the General Math test. The percentage of eighth grade students taking Algebra 1 in the unified school districts of Shelton County in 2011 ranged from a low of 38.5% to a high of 92.9%. This range shows the scale of inequity that existed within a single region of California, in that students in a district at higher end of the scale were much more likely to have access to the algebra course than students living in districts at the lower end. The range also suggested that school officials in this region applied different approaches the Algebra 1 placement decision. Knowing what influenced the school administrators in these school systems in generating such discrepancies served to direct a project to effect change and support educational leaders in effective decision-making.

Definition of the Problem

In the unified school districts of Shelton County in the Central Valley region of California, a variance exists in the percentage of eighth grade students taking the state's end-of-course algebra exam (CDE, 2011b, 2012, 2013). At the time of this study, the middle schools in these districts had varying levels of eighth grade Algebra 1 completion (CDE, 2010, 2011b, 2012, 2013) even though the state promoted Algebra 1 for all eighth grade students (CDE, 1997). Depending on the district, significant numbers of students took a course and a subsequent exam at a level lower than Algebra 1, which resulted in a proportional penalty applied to the school under the state's accountability system. In addition, significant numbers of students who were placed in the Algebra 1 course have performed poorly and received scores that likewise harmed their schools' state assessment results and subsequent rankings (CDE, 2011b, 2012, 2013). For example, in 2011, one of the studied districts had 92.9% of the eighth grade students completing the Algebra 1 course but 74% of these students failed to achieve the proficient level. In this region of California, the lack of a consistent practice by school officials for determining which eighth grade students to place in the Algebra 1course reflects a statewide problem of deficiencies in Local Educational Agencies (LEA) eighth grade policies for placing students in mathematics courses (Williams et al., 2011b).

This research was intended to contribute to the body of knowledge needed to address the issue of student placement in eighth grade mathematics courses. Examining specific factors contributing to the problem lead to a better understanding of the placement decisions and the resulting discrepancy between the percentages of eighth grade students taking Algebra 1 in Shelton County. Possible factors contributing to this problem in Shelton County included limited or omitted district policy on eighth grade mathematics (Williams et al., 2011; Honig & Coburn, 2008), varying perspectives and processes for eighth grade Algebra 1 placement (Evers & Clopton, 2003), inadequate teacher-preparation for teaching algebraic concepts in early grades (Welder, 2011), individual student assessment data that show deficits in student readiness for Algebra 1, and pressure from the accountability system to place students in Algebra 1 (Evers & Clopton, 2003). This increased understanding led to a project that supports leadership decision-making processes that reduce the discrepancy.

Description of Local Setting

The region of California used in this study has been described as the “Appalachia of the West” for its density of high-poverty, high unemployment and low-levels of education (The Economist Newspaper Limited, 2010, January 21). Shelton County is in the center of this region and has significant agricultural land, several small towns, and a few large urban areas. The county has 25 public school systems ranging from small one-school K–8 districts with fewer than 150 students, to semi-rural unified K–12 school districts with 1,500 - 6,000 students, to large urban school districts with over 10,000 K–12 students. In this study, I investigated 9 of the 10 unified school districts. The 10th district was omitted because I am the district’s superintendent. The reason for limiting, or bounding, the research to just the unified school system is due to the assertion by Spielhagen (2006b) that eighth grade math placement decisions follow the students beyond middle school and this affects their access to math courses in high school. Consequently, the decision makers in the unified systems are making decisions that shape their systems beyond eighth grade. While it can be argued that the K–8 systems feed into one or more of the unified systems and have an impact on the high school math programs, the decision makers in the K–8 systems ultimately are not accountable to the unified school district educational program, governance or policy.

All of the districts in this case have significant populations of English Language Learners and low-income students (Ed-Data, 2012), with differences in student demographics from district to district. However, as was suggested in the study by Williams et al (2011a), demographics is not determined to be a universal factor in middle school math placement in California. The researchers allowed that in some instances, administrators considered social issues of access and equality in making placement decisions. Table 1 shows the 2011 demographics of the nine unified school districts by total enrollment, percentage of English Language Learners, percentage of low-income students enrolled in the National School Lunch Program receiving a free or reduced price meal, and the percentage of minority students.

Table 1

2011 School District Enrollment and Demographics as a Percentage of Total Enrollment

2011 School District	Enrollment	ELL%	NSLP%	Minority%
District 1	12,491	31.6	77.5	78.3
District 2	1,535	15.0	48.1	46.3
District 3	2,163	26.9	55.4	55.3
District 4 [a]	30,156	24.6	66.6	71.2
District 5 [b]	2,841	N/A	74.3	74.7
District 6	5,304	10.6	40.3	36.8
District 7	5,873	33.7	63.6	81.7
District 8	2,780	43.2	71.5	80.8
District 9	13,688	26.5	59.6	61.7

Note. ELL = English Language Learners; NSLP = National School Lunch Program Free & Reduced Lunch enrollment.

[a] District 4 is a system composed of an Elementary District and a High School District sharing a common administration. [b] No ELL data available

The data indicated a range in the sizes of the districts and in student demographics. All of the districts have enrolled at least 40%of children from low-income families. By exceeding this threshold, the districts have surpassed the low-income family level established for schools by the Elementary and Secondary School Act of 1965 (Public Law 89-10, 1965) to be eligible to use Title 1 funds for school wide programs (U.S. Department of Education, 2012). Though the districts shared this characteristic common to Central Valley school systems, significant differences existed. These differences provided an opportunity to categorize participant responses not only as an expression of their experience with the phenomenon of decision-making but also according to how their experience compared or contrasted with peers in similar and different school systems. According to Yin (2009), a case study design that involves more than one embedded unit of analysis (i.e., a school district) provides the researcher an opportunity to examine the phenomenon in operational detail, and uncover how the phenomenon was experienced in different settings. The data examined in this study show the similar and contrasting approaches participants engaged in as they dealt with constraining and influencing factors associated with placing middle school students into mathematics courses.

Rationale

Evidence of the Problem at the Local Level

From 2011-2013, the proportions of Shelton County students completing Algebra 1 in the eighth grade varied considerably. A district-by-district review revealed that the percent of students taking the General Math exam rather than the Algebra 1 exam differed from unified district to unified district (CDE 2011, 2012, 2013). Table 2 shows the 2011 percentage of eighth grade students enrolled in various mathematics courses and the percentage of the students enrolled in Algebra 1 who subsequently scored at or above the level of proficient on the state exam.

Table 2

Eighth Grade Enrollment in Math Courses as a Percentage; and, Percent of Algebra 1 Students Scoring Proficient or Above on the 2011 California Standards Test

School District	Gen Math	Geometry or Higher	Algebra 1	Algebra 1 Students Proficient or Above on Algebra 1 exam
District 1	5.5	0.2	92.9	26.0
District 2	21.1	0.8	77.3	24.0
District 3	60.9	0.6	38.5	60.0
District 4	28.9	4.2	64.6	40.0
District 5	49.4	3.4	38.5	42.0
District 6	49.4	11.1	39.3	33.0
District 7	42.3	7.2	49.3	42.0
District 8	15.3	5.8	78.3	17.0
District 9	44.1	6.5	48.3	45.0
Shelton County	40.2	3.5	54.2	42.0
California	31.8	5.6	59.1	47.0

Note. Shelton County and California percentages are for comparison only.

At the time of the study, District 1 had one of the highest percentages of low-income and minority students, but also the highest level of Algebra 1 placement. District 6, by contrast, had the lowest populations of low-income and minority students and the second-to-lowest percentage of students enrolled in Algebra 1. Other inconsistencies were also evident. For example, in one district 38.5% of students took the end-of-course Algebra 1 exam and in another district 92.9%, which illustrates the range of placement in Algebra 1 within one county in one region of the state. Of the 54.2% of eighth grade students who took the Algebra 1 end-of-course exam in Shelton County, only 42% scored proficient or above. Nearly 3 out of 5, eighth grade students placed in Algebra 1, did not demonstrate mastery. The districts with less aggressive Algebra 1 placements tended to have proficiency levels higher than the county average. As was explained earlier however, the middle schools in these districts were penalized for having higher percentages of students completing the below-grade-level General Math course. This suggested that the decision makers in the districts with lower levels of placement in Algebra 1 approached the placement decisions differently than those with higher levels of placement, even as the placement decision potentially impacted their middle schools' state score. As the researcher I sought to examine the variation in mathematics placement and the effect on student outcomes, account for the observed inconsistencies of the decision-making placement process for eighth grade Algebra 1, and provide a framework to support local school administrators' decision-making process with respect to student placement in for eighth grade mathematics course offerings. Tables 3 and 4 show that data in subsequent years had similar variances and poor results:

Table 3

Eighth Grade Enrollment in Math Courses as a Percentage; and, Percent of Algebra 1 Students Scoring Proficient or Above on the 2012 California Standards Test

School District	Gen Math	Geometry or Higher	Algebra 1	Algebra 1 Students Proficient or Above on Algebra 1 exam
District 1	4.5	5.1	88.3	24.0
District 2	17.4	3.6	76.8	21.0
District 3	54.7	1.3	42.0	51.0
District 4	23.7	4.0	67.9	31.0
District 5	62.4	2.0	33.2	35.0
District 6	59.6	9.5	29.9	38.0
District 7	32.7	17.6	48.4	58.0
District 8	17.4	3.1	79.0	42.0
District 9	35.5	4.9	57.8	40.0
Shelton County	38.7	4.3	54.2	41.0
California	31.1	6.4	58.9	49.0

Note. Shelton County and California percentages are for comparison only.

Table 4

Eighth Grade Enrollment in Math Courses as a Percentage; and, Percent of Algebra 1 Students Scoring Proficient or Above on the 2013 California Standards Test

School District	Gen Math	Geometry or Higher	Algebra 1	Algebra 1 Students Proficient or Above on Algebra 1 exam
District 1	3.5	16.3	78.3	13.0
District 2	17.2	4.5	76.9	18.0
District 3	59.0	0.6	39.8	73.0
District 4	30.2	4.6	62.8	23.0
District 5	32.6	3.2	62.4	20.0
District 6	63.4	5.4	30.0	60.0
District 7	6.1	12.7	78.6	20.0
District 8	19.0	0.0	80.5	27.0
District 9	38.5	6.1	53.9	40.0
Shelton County	37.2	5.5	54.9	35.0
California	31.7	6.9	57.9	50.0

Note. Shelton County and California percentages are for comparison only.

Local Educational Agencies (LEA) in this state received the prior year's test data in the summer. The degree to which these data influenced local eighth grade mathematics placement decisions is unknown, and represents a gap in the professional literature. In California, the seventh grade mathematics content standards addressed algebra readiness (CDE, 1997). In all but two districts, the percentage of students placed in Algebra 1 in eighth grade in 2011 were higher that the percentage of students demonstrating mastery in the previous year's pre-Algebra course. Tables 5, 6, and 7 compare the percentage of students achieving the level of proficiency in the previous year's seventh grade pre-algebra course to the percentage of eighth grade students completing the Algebra 1 course the following year.

Table 5

Percentage of Grade 7 Students Achieving Proficient or Above in Pre-Algebra Course in 2010 Versus the Percentage of Grade 8 Students Enrolled in Algebra 1 in 2011

School District	2010 Grade 7 Proficient & Above	2011 Grade 8 Enrollment in Algebra 1
District 1	47.0	92.9
District 2	43.0	77.3
District 3	47.0	38.5
District 4	42.0	64.6
District 5	45.0	38.5
District 6	31.0	39.3
District 7	37.0	49.3
District 8	30.0	78.3
District 9	41.0	48.3
Shelton County	43.0	54.2
California	49.0	59.1

Note. Shelton County and California percentages are for comparison only.

Table 6

Percentage of Grade 7 Students Achieving Proficient or Above in Pre-Algebra Course in 2011 Versus the Percentage of Grade 8 Students Enrolled in Algebra 1 in 2012

School District	2011 Grade 7 Proficient & Above	2012 Grade 8 Enrollment in Algebra 1
District 1	48.0	88.3
District 2	37.0	76.8
District 3	48.0	42.0
District 4	39.0	67.9
District 5	45.0	33.2
District 6	34.0	29.9
District 7	32.0	48.4
District 8	32.0	79.0
District 9	42.0	57.8
Shelton County	43.0	54.2
California	50.0	58.9

Note. Shelton County and California percentages are for comparison only.

Table 7

Percentage of Grade 7 Students Achieving Proficient or Above in Pre-Algebra Course in 2012 Versus the Percentage of Grade 8 Students Enrolled in Algebra 1 in 2013

School District	2012 Grade 7 Proficient & Above	2013 Grade 8 Enrollment in Algebra 1
District 1	39.0	78.3
District 2	37.0	76.9
District 3	52.0	39.8
District 4	41.0	62.8
District 5	45.0	62.4
District 6	37.0	30.0
District 7	40.0	78.6
District 8	32.0	80.5
District 9	45.0	53.9
Shelton County	45.0	54.9
California	52.0	57.9

Note. Shelton County and California percentages are for comparison only.

Tables 5, 6 and 7 show in most districts the percentage of students placed in Grade 8 Algebra 1 exceeds the percent of students who attained proficiency the previous year in the Grade 7 Pre-Algebra. Though the tables do not represent matched cohorts of students, the data reveal an observed variance in the relationship between districtwide seventh grade proficiency and eighth grade placement in Algebra 1. The tables show that in Districts 3and 6, the percentage of students in eighth grade Algebra 1, was significantly less than the percentage of seventh grade students meeting proficiency the previous year. In this research, I examined the practices that affected this variance, and explained the decision-making experiences of the local administrators that contributed to placement that is inconsistent with the measured aptitude of the students. In Section 3, I developed a project that assists administrators in making mathematics placement decisions.

Data Sources

A researcher who has gathered a rich volume of meaningful evidence will build a "thick description" of the phenomenon being investigated (Hatch, 2002, p. 54). Having a variety of what Hatch called obtrusive and unobtrusive data is appropriate for qualitative research. Obtrusive data are evidences that involve interactions with participants. Unobtrusive data are gathered by the researcher independent from the participants.

For this case study the unobtrusive evidence consisted of the archival records available via the internet that substantiate student demographics, the math course placements of students, and associated results on the California Standards Test (CST) administered to students. The sources include the California Department of Education web site (CDE, 2010, 2011, 2012, 2013), and the Education Data Partnership, which represents a partnership between the CDE, the non-profit independent data analysis organization EdSource, and the state-funded Fiscal Crisis & Management Assistance Team (FCMAT) (Ed Data, 2011, 2012, 2013).

The data used to explain the central phenomenon of this research was principally derived from the participants themselves, who consisted of school district administrators responsible for deciding to place individual eighth grade students in mathematics courses. The source of the data analyzed were the responses to the questionnaire and the responses offered in the follow up in-depth interviews. The questionnaire provided an opportunity for the participant to answer both closed and open-ended prompts, offering their description of the experience. The follow up interview offered the researcher the opportunity to further draw out the lived-experience of the participants. The informal semi-structured interview had common questions for all participants, as well as unique questions meant to probe more deeply into the responses provided on the questionnaire as needed.

Definitions of Terms

The following terms are associated with the research project study:

Academic performance index (API): The API is the current California measure of student achievement in public schools. Students in grade 2 – 11 are administered exams in mathematics, English Language Arts, social studies, and science. Proficiency scores from the exams contribute to the measurement which is an index on a scale of 200 to 1000 points: 800 was the target score for all schools and all sub-populations of students (California Department of Education, 2011).

*Algebra 1**:*** In California, a full year course in algebra in which students learn the symbolic language of mathematics as detailed in the state framework publication *Mathematics Content Standards for California Public Schools: Kindergarten Through Grade Twelve* (CDE, 1997). The course is identified as an eighth grade through 12th-grade course and is required for high school graduation in California.

California Standards Test (CST): A state exam during the time of this study that assessed students' ability according to the content standards associated with a particular grade level or a particular course.

Decision-making: A judgment or series of judgments that affect some course of action (Griffiths, 1959). A purposeful process that occurs in all types of organizations, having a strategy to implement actions and appraise the results (Tarter & Hoy, 1998) .

End-of-course CST: An exam administered during the time of this study to students in California that is associated with a particular course of study, such as a standards-based Algebra 1 course. It differed from a grade-level exam associated with content in that students were expected to be taught at a certain grade level, such as the standards-based seventh grade English / Language Arts course. Eighth grade students in California, who do not complete a standards-based course in algebra, or in a higher mathematics course such as Geometry, take an exam in general mathematics. The General Mathematics CST assesses students' knowledge of sixth and seventh grade mathematics standards; schools receive a penalty when eighth grade students take this exam that reduces the school's subsequent API score.

Grade-level CST: The state exam associated with the content that students are expected to be taught at a certain grade level, such as the standards-based seventh grade English / Language Arts course, or the sixth grade mathematics course.

Heuristics: A general or commonsense set of rules used to guide decisions.

Performance levels on the CST: Student performance on the CSTs is divided into 5 levels or bands: (1) Far Below Basic, (2) Below Basic, (3) Basic, (4) Proficient, and (5)

Advanced. Schools having eighth grade students who took the General Mathematics test in lieu of the Algebra 1 test receive a penalty on the API. Specifically, in the school's API calculation the performance band for those students was lowered by one level.

Satisficing: Making decisions that satisfy rather than decisions that are the best or optimal (Simon, 1993).

Evidence of the Problem in the Professional Literature

With the passage of No Child Left Behind Act of 2001 (PL 107-110, 2001), came the requirement that states adopt, implement and assess standards-based instructional programs. This Act resulted in 50 variations of such programs and no identifiable national eighth grade mathematics scheme (Schmidt, 2002). The number of courses offered in eighth grade varies widely in America. According to the 1995 Trends in International Mathematics and Science Study the eighth grade courses had different names, curricula and outcomes. This lack of coherence is not only evident nationally, but is manifested from school to school (Cogan, Schmidt, & Wiley, 2001). Notably, courses with the same title differed widely in content as well (Schmidt, 2002). While the definition of exactly what is eighth grade mathematics is blurred nationally, the confusion in singling or specifying an approach to this grade level is magnified in California as the state does not stipulate that students take a particular eighth grade mathematics course.

Decisions regarding placement in Algebra 1 or another course are left up to local educators and policymakers in California schools and districts. California as a state system clearly identified a preference for a formal 1-year Algebra 1 course in eighth grade and aligned its accountability system accordingly, but did not mandate that choice on Local Educational Agencies (i.e., school districts). Mixed messages are communicated to local administrators. On the one hand, eighth grade Algebra 1 is held out as the end-product of successful K–8 instructional programs, while on the other hand, the state acknowledges that the federal system does not make a similar claim. Consequently the decision-making process for local administrators is clouded by the lack of coherence. The decision impacts several levels; it affects student performance on state tests (Loveless, 2008; Williams et al., 2011a), influences access to higher mathematics courses (Spielhagen, 2006b), and impinges on the school's ranking according to the state's accountability system (CDE, 2011; Williams et al., 2011b). With such high stakes associated with the decision, educators may look for assistance in the professional literature to guide their process. However, they are confronted with competing views on the subject.

Contrasting arguments exist for placing students into middle school mathematics courses, some in favor of algebra-for-all, and others advocating that an algebra course be delayed for individual students. Morgatto (2008) claimed that eighth grade algebra is not a critical need for all students based on the study of post-secondary experiences of students. Morgatto argued that the algebra-for-all recommendation of the National Council of Teachers of Mathematics (NCTM, 2000) left a number of issues unresolved, including poor teacher preparation, insufficient professional development, and ineffective instruction in primary and intermediate grades. Unless districts and communities embrace the NCTM's vision and correct deficiencies in algebra instruction prior to middle school and high school, Morgatto argued that the mandate for Algebra 1 should be dropped. But the expectation stood, even though many students were notably underprepared for the rigor of Algebra 1 in middle school (Kitterlin-Geller, Jungjohann, Chard, & Baker, 2007; Loveless, 2008). Middle school students show a lack of conceptual understanding necessary to solve algebraic problems, particularly those presented as word problems (Capraro & Joffrion, 2006; Welder, 2011). These researchers contributed student deficiencies in algebra to poor instructional practices rather than a general indictment of middle-school aged students.

Henry (2001) posited a similar notion that roadblocks to early algebra in the United States are not due to a Piagetian theory that children develop through stages and are only able to learn algebra after they have matured beyond the formal operational stage (Piaget, 1972). Rather, Henry argued that student success in algebra is largely a function of the curricular and instructional decisions being made at the state, district, and classroom level. The 2007 National Assessment of Educational Progress (NAEP) revealed that the trend has been to enroll more students in eighth grade Algebra 1 but this choice has not produced higher results (U. S. Department of Education, 2007).

Local decision makers may consider findings from research that show early access to algebra has a profound influence on accessing advanced math courses such as Geometry, Trigonometry and Calculus (Smith, 1996; Spielhagen, 2006b). Smith (1996) for instance, reviewed the transcripts of students who took Algebra 1 prior to high school (n=1,076) and students who took in Algebra 1 in high school (n=5,818); this analysis supported the hypotheses that early algebra-takers were more likely to take a math course their senior year, complete calculus, and score higher on the 12th-grade mathematics achievement test, even when controlling for differences in social background between students, and controlling for the characteristics of 10th-grade academic track, educational aspirations, and the standardized mathematics exam.

Also affecting the decision are the parameters educators set, or fail to set, when making their placement determinations. Some researchers suggested that administrators consider student results on previous state exams when placing students in Algebra 1 (Kriegler & Lee, 2007; Wells & Souza, 2009) noting a predictive nature to the scores. Students with higher CST results in seventh grade tend to have higher levels of success in Algebra in eighth grade. The researchers observed however, that in many systems in California the results of the seventh grade exams are not available to educators in time to inform their placement decision. Others suggest that educators give voice to parents and students (Akos, Shoffner, & Ellis, 2007). As parents and students advocate for placement in a particular course they gain a greater understanding of the expectations for the course and the future ramifications associated with the decision. The policy and practice brief prepared for the CDE by the research organization EdSource (Williams et al., 2011b) concluded that the issue of Algebra 1 in eighth grade remains complex and controversial. The placement of middle school students should be done thoughtfully, and be guided by an informed policy that takes into account student preparation; and the policy, should be evaluated regularly.

Significance

Purpose of the Research Project Study

The purpose of this project study was to develop a rational framework for use in the placement of students in eighth grade mathematics courses. In this study, I researched and analyzed archival evidence and examined the lived experience of local public school administrators. I specifically examined the experience of administrators in nine unified school districts in Shelton County, California who were responsible for placing eighth grade students in mathematics courses. This inquiry was developed to determine what factors lead district decision makers in this county to place eighth grade students in Algebra 1 at the varying degrees shown in the archival evidence, despite the poor outcomes. Understanding the underlying decision-making processes will facilitate making systemic and programmatic reforms that amend deficiencies in public school students' access to algebra courses. The research analysis revealed any deficits, as well as effective strategies, in the placement practices of eighth grade students and brought to light the systemic and programmatic reforms necessary to achieve the state's vision of greater access to algebra for California's students. The study findings are expected to inform school boards, superintendents and other district officials in this region and beyond as they review, update or develop local policies on this issue

Importance to the Local Context

In this research project case study I investigated and described the manner of decision-making related to placement of eighth grade students in the nine unified school districts studied in Shelton County. Several elementary school districts in the county serve only kindergarten through eighth grade students. They too must address the issue of mathematics placement in eighth grade. Like their K–12 counterparts, these districts placed students in Algebra 1 at varying levels and similarly had many eighth grade students performing below the proficiency level on the state's end-of-course exam (CDE, 2011). However, the unified (i.e., K–12) school districts were the focus of this study. The educators in these districts had the responsibility to fashion a K–12 continuum of mathematics education that provided algebraic curricula and articulated a coordinated sequence of math courses. Their decision then, to place students in Algebra 1 in eighth grade, or not to, produced a homegrown effect on their students' education, their schools and district API, and the master schedules of both their middle schools and high schools.

This project study did not involve the decisions of educators in elementary feeder districts, though the findings and subsequent project may inform their decisions as well. Rather, in this study I chose to explain the decision-making of educators in the unified school districts, as the consequences of their choices bears heavily on the entire local K–12 system. These educators were forced to own the impact of their decisions on their students, and reform the educational programs districtwide to accommodate their stance on the Algebra 1 decision. The data show that in this region of California the unified school district educators obviously did not approach the Algebra 1-in-eighth grade matter in a similar fashion (CDE 2010, 2011b, 2012, 2013). In 2011, some districts were quite aggressive compared to others; one district placed over 90% of their eighth grade students in Algebra 1. Other districts had much lower percentages. Yet, many students performed poorly regardless of the high or low extremes of access to Algebra 1. In this research project case study I explain how the educators made these decisions and offer a project that aids them going forward and provides congruence to the decision-making process.

Importance to the Larger Context

On September 12, 2011, Dr. Matt Rosin presented a statewide webinar on the subject of middle school mathematics placement. Conducted by the California Collaborative on District Reform and hosted by the Riverside County Office of Education, the webinar shared recommendations from the publication *Preparation, Placement, and Proficiency: Improving Middle Grades Math Performance* (Williams, Haertel, Kirst, Rosen, & Perry, 2011b). Dr. Rosin, a senior research associate at EdSource, was involved in writing *Gaining Ground in Middle School: Why Some Schools do Better* (Williams, Haertel, Kirst, Rosen, & Perry, 2011a). These publications and the subsequent webinar shared analysis regarding Algebra 1 placement statewide. The research explained the analysis of eighth grade Algebra 1 placement in a sample of California middle schools (n=303). Dr. Rosin noted when considering a sampling longitudinal data of eighth graders (N=69,663) in 2009, that schools differed in how they placed eighth graders into Algebra 1. In particular, Rosin's study revealed that schools serving mostly low-income students tended to place greater percentages of eighth graders into Algebra 1 than did schools serving mostly middle-income students, even if student performance on the previous year's seventh grade CST was lower.

Statewide, many eighth graders at low levels of preparation were placed in the Algebra 1 course. In fact, 27% of the students scoring Far Below Basic, and 33% of students scoring Below Basic, in seventh grade were subsequently enrolled in Algebra 1 the following year; and the researchers discovered that the seventh grade scores were a strong predictor of eighth grade performance. Only 1% of the mentioned Far Below Basic students and 3% of the Below Basic students were able to achieve proficiency on the Algebra exam the following year.

The report offered recommendations for the state. One of these recommendations is to, "Develop systems and evidence-based criteria for more effective and equitable placement into algebra and advanced mathematics courses" (Rosin, September 12, 2011). In this research project case study I advance this recommendation and offer a framework for placing middle-school students in mathematics courses.

Importance to Positive Social Change

Success in algebra is seen as a requisite for accessing higher mathematics (Riley, 1997) and as an essential component of college preparedness. Because of this desired outcome, supporting students' successful matriculation through the levels of mathematics is critical to their futures. However, in Shelton County some students may be marginalized due to an administrative decision that may not have considered their mathematic aptitude, but was based on some other factor or factors.

Walden University is committed to "positive social change", defining it as " a deliberating process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies" (Walden University, 2013). To demonstrate this, the research project case study develops a fair, coherent, and socially just process that assists district educators in placing students in mathematics courses. Marshall and Olivia (2006) called for social justice praxis, translating ideas into action, in the area of scholarship and research, and recognized researchers who developed, "practical tools that faculty, educators and parents can use to move schools and districts toward equity in schooling" (p. 23). A deeper understanding of the decision-making phenomenon in this county that led to divergent access to algebra, access not predicated on preparedness, or guided by policy, led to a project that provides practical guidance to the educational community that is seeking an acceptable, valid and evenhanded placement of eighth grade students in mathematics courses.

Propositions and Guiding Research Questions

Yin (2009) advised that case study researchers present propositions to guide the study, its research questions, methodology, data collection and analysis. A proposition is a statement that frames the study and provides purpose. A study may have more than one proposition. The propositions are based on theory, professional experience, or literature (Baxter & Jack, 2008) and can be used by researchers to limit the scope of the inquiry. Propositions bring structure to a study by focusing the data collection, analysis, and findings on a particular aspect of the theory as it relates to the case. Without propositions the researcher risks being pulled in multiple directions by the iterative aspect of qualitative inquiry.

In this study the central tenet of administrative theory – decision-making – was examined with the intent of explaining the phenomenon as it related to placing eighth grade students in Algebra 1. An intervening factor is the school and district accountability system in which non-completion of Algebra 1 negatively affects a school system's rating. The decision-making phenomenon illicits "how" and "why" questions which are fundamental to explanatory case study research (Yin, 2009). Why did the middle schools in Shelton County have such varying levels of eighth grade placement in Algebra 1? How did administrators in the various districts decide to place eighth grade students in Algebra 1? These questions are linked to the theory undergirding the study, and present evidence to affirm or refute the theoretical proposition.

Theoretical Research Proposition

Some administrators in Shelton County considered factors beyond math aptitude when placing eighth grade students in Algebra 1.

This proposition is supported by theory, as Barnard (1938) in a seminal work on administrative theory concluded that decision-making is the central aspect of administrative behavior; the proposition is supported by literature in that the exhaustive study of Algebra 1 placement in California middle schools (Williams et al., 2011a) found inconsistencies in levels of and approaches to placement. That study suggested factors such as social justice, equity issues, and lack of policy may have influenced the decision-making process. The researchers advised that further inquiry is needed to determine how administrators are approaching this issue.

The theoretical proposition for this study prompted questions that informed the study's data collection and analysis. How did Shelton County administrators make their decisions? These data were linked back to support or refute the proposition. If factors other than math aptitude were offered by participants, then "why" questions would follow: Why did administrators consider these factors? This iterative process is a predominant aspect of qualitative research (Creswell, 2007; Hatch, 2002) and helped focus the study on the phenomenon in question.

This theoretical proposition is also an assumption or outgrowth of historical data, which can be employed when developing a proposition (Baxter & Jack, 2008). In recent years, the percent of eighth grade students completing Algebra 1 has risen significantly in several Shelton County school districts. However, the rate of proficiency has not seen a similar increase. More students are enrolled in the course but a comparative rise in achievement has not been realized (CDE, 2010, 2011b, 2012). If students are not achieving at higher levels, then why are higher numbers of students being assigned to the course? Data will affirm or disaffirm the theoretical proposition. In either case, opportunity arose to explain the phenomenon of higher enrollment in the course but with less than equal rise in achievement.

Guiding Research Questions

This research project case study was designed to account for the phenomenon of administrative decision-making as it related to the placement of eighth grade students in math courses in Shelton County in 2011 and beyond; and, whether or not the decision was influenced by the state's accountability system. Yin (2009) advised that explanatory case study research is primarily concerned with answering "how" and "why" questions. As the participants reveal their lived experience, the researcher synthesizes the information into a narrative that offers an explanation of the phenomenon in context. The following questions were established to guide the research method:

Central Question. How did school administrators in Shelton County unified school districts account for their decision-making experience relative to placing students in eighth grade math courses in the 2010 – 11, 2011 – 12 and 2012 – 13 school years?

Sub Question 1. Why was there such variance in eighth grade mathematics placement in the unified school districts in Shelton County in 2010 – 11, 2011 – 12 and 2012 – 13?

Sub Question 2. How will administrators in Shelton County describe the factors, or constraints, that influenced their decision-making which resulted in the discrepancy of access to Algebra 1 as reported by the CDE?

Sub Question 3. How did the California accountability system influence their decision-making process relative to eighth grade math placement?

Sub Question 4. How will administrators in Shelton County describe their students' overall performance on the end-of-course California Standards Test?

Sub Question 5. What other information or support, if any, would administrators in Shelton County say would help them in making their decision to place students in eighth grade Algebra 1?

Review of Literature

Theoretical Framework: Administrative Theory

Essential to the development of a doctoral study is the placement of the research within a greater body of scholarly work thus giving the research a framework from which to support its assumptions, processes and significance (Hart, 2008). This research project case study is anchored in the growing understanding of administrative theory in education and in particular the associated practices of administrative decision-making. By gaining a greater appreciation of the fundamentals of this theory, its precepts can be applied to more fully understand the process by which administrators in this region of California placed eighth grade students into Algebra 1 at such varying rates. This review of the professional literature includes information gathered from Walden University databases, including EBSCO, ERIC, Proquest and Sage. Internet research was done using Google Scholar as well. Key words and ideas used for the searches included *decision-making, administrative theory, administrative behavior, administration, education, middle school* and *algebra placement*.

Administrative Theory in Education

Daniel Griffiths (1959) proposed to construct a theory of administration as it related to education by drawing on and adapting the traditional methods of theory design. Griffiths restricted the term *theory* to mean, "a set of assumptions from which a set of empirical laws (principles) may be derived" (Griffiths, 1959, p. 45, parenthesis in original). Griffiths posited that like any theory, administrative theory in education could be based "upon a set of concepts, properly defined and relevant to the major theme of the theory" (Griffiths, 1959, p. 38). Griffiths offered three declarative statements regarding the theory of administration:

> (1) Administration is a generalized type of behavior to be found in all human organizations (p. 71);

> (2) Administration is the aspect of directing and controlling life in a social organization (p. 72); and,
>
> (3) The specific function of administration is to develop and regulate the decision-making process in the most effective manner possible (p. 73).

Griffiths theorized that the fundamental role of administration is to ensure effective processes for decision-making. For practicing educational administrators, understanding this precept then can guide their behaviors as they attempt to lead their schools and districts.

Administration as Decision-Making

According to theorists, the central tenet of administration is decision-making (Griffiths, 1959; Litchfield, 1956; McCammy; 1947; Simon, 1947) or, more accurately, the directing and controlling of the decision-making process (Griffiths, 1958). Bernard (1938) established that the role of the Executive is not to make all of the decisions, but rather to ensure that there are effective processes for making decisions in the best interests of the organization. Decisions are defined as "judgments which affect a course of action" (Griffiths, 1959, p. 76):

> The concept *decision-making process* is therefore construed to mean not only the decision but also the acts necessary to put the decision into operation and so actually affect the course of action of an enterprise (p. 76, italics in original).

Evers and Lakomski (2000), Hoy and Miskel (2001), and Lunenburg and Ornstein (2004) each drew on this theme when developing their approaches to administrative practice, intending to provide aspiring and practicing administrators with useful methods for conducting their work. These authors promoted the foundational precept that at the heart of educational administration, and all administration, is the necessity to guide and direct critical decisions. As mentioned earlier, the decision of whether or not to place eighth grade students in Algebra falls within the category of critical, both for the student as it has ramifications on future math coursework (Riley, 1997), and for the school and district as it may have had positive or negative effects on the API (Wells & Souza, 2009).

Models of Decision-Making

Decision-making is pervasive, permeating all aspects of administrative behavior (Lunenburg and Ornstein, 2004). According to Lunenburg and Ornstein, decision-making affects administrative tasks such as planning, coordinating, budgeting, and staffing, and influences the performance of faculty and students. The process of decision-making can be explained by observing two models, (a) classical, and (b) behavioral.

Classical model of decision-making. The classical model of decision-making is considered completely rational (Simon, 1997). The administrator is able to consider all of the reasonable alternatives in order to select the best option, implement it with a coordinated course of actions, and then evaluate the results. The classical model is also called the rational model because of the logical sequence of steps. The model insinuates that the administrator is working with complete knowledge of all the factors and is able to make a corresponding *best* choice, and is making choices directly aligned with the organizational goals and mission. The classical model typically includes the following steps (Griffiths, 1958; Lunenburg & Ornstein, 2004; Tarter & Hoy, 1998):

1. *Identifying the problem*. This step requires that the problem be stated in such a fashion that one clearly understands the current condition in relation to the desired objective (Lunenburg & Ornstein, 2004),

2. *Analyze and evaluate the problem.* This step involves collecting data and analyzing data that explains the nature of the problem (Griffiths, 1958; Tarter & Hoy, 1998),

3. *Goals and objectives are established*. This step involves explicitly declaring the desired outcomes and establishes criteria by which the solution will be judged (Griffiths, 1958; Hoy & Miskel, 1991),

4. *Generating alternatives*. This should be an exhaustive list of options for addressing the problem. These are the potential solutions (Lunenburg & Ornstein, 2004),

5. *Evaluating alternatives*. The administrator examines the effects of each proposed solution (Miner, 1998, 2002; Tarter & Hoy, 1998),

6. *Choosing an alternative (making a decision)*. March & Simon (2004) shared that a good alternative had a high probability of reaping the desired outcomes and low probability of creating negative outcomes. The classical model assumes all alternatives are known.

7. *Implement the decision*. Having decided on the optimal solution for maximum effect the task now falls to implementation. Lunenburg & Ornstein (2004) noted that, for school administrators, implementation of a decision often involves others in the organization to carry out the design.

8. *Evaluating the decision*. Determine to what extent the decision and subsequent actions achieved the desired effect (Griffith, 1958; Hoy & Miskel, 1998; Lunenburg & Ornstein, 2004).

Besides being known as the rational model, this classical approach is also identified as *optimal* and *maximizing* (Hoy & Miskel, 2001; Simon, 1947; Tarter & Hoy, 1998) due to the underlying premise that this sequence of rational, thoughtful steps will produce the best possible solution bringing about the highest level of desired outcomes. The classical model assumes clear goals, complete information and the capacity to implement flawlessly and evaluate with precision. This is seldom the case (Tarter & Hoy, 1998); consequently, other decision-making models and designs have evolved with attention paid to the genuine nature of administrative work in the real world.

Behavior model of decision-making. Administrative theory recognizes that practitioners operate in the real world. They perform the fundamental aspect of their role, decision-making, without the luxury of unlimited time or resources, often lacking access to all relevant information (Hoy & Miskel, 2001). They are also confronted with competing constraints that may limit a preferred course of action (Evers & Lakomski, 2000). Administrative theory has evolved in that the actual or real decision-making processes of administrators have been codified into several non-classical types.

One of these types is known as the administrative model (Simon, 1993; Hoy & Miskel, 2001) which describes a process by which many administrators make decisions. In this process the administrator engages in satisficing (Hoy & Miskel, 2001; Lunenburg and Ornstein, 2004; Simon, 1993; Tarter & Hoy, 1998); where satisficing is understood to be an attempt to find a satisfactory solution that may not necessarily be the best solution. (Hoy & Miskel, 2001). In a true satisficing process the administrator attempts to satisfy as many constraints as possible without creating new or greater problems for the organization. Hoy and Tarter (2010) urged decision makers to "establish criterion for a satisfactory decision before generating and selecting options" (p. 353). Unlike the classical model of decision-making the administrative model assumes that complete rationality is impossible to achieve. Hoy and Miskel (2001) suggested that rationality is limited because there are too many alternatives to completely consider each, and the consequences of each alternative cannot be anticipated. Simon (1947, 1993) also argued that rationality is limited by the administrators' capacity to process the information, and by values that may align with or be contrary to the organization's goals.

Mary Zey (1992) addressed the concept of the behavioral model of decision-making by acknowledging that decisions are constructed from incomplete information, an inability to generate all alternatives, and an acceptance that the perfect solution is not possible. Thus the principle of satisficing, "finding the solution that satisfies the minimal standards of acceptability without exploring all possibilities" (Ornstein & Lunenburg, 2004, p. 189) is established. Administrators are tasked with establishing, formally or informally, criteria for a satisfactory decision. Hoy and Miskel (2001) offered the following pattern of action for the administrative or satisficing model. They noted that the process is cyclical by design:

1. Recognize and define the problem or issues.
2. Analyze the difficulties in the situation.
3. Establish criteria for a satisfactory solution.
4. Develop a strategy for action.
5. Initiate the action.
6. Evaluate the outcomes (p. 319).

The evaluation phase is critical as it will determine the degree of satisficing that has, or has not been attained, which then leads to reframing the problem and instituting changes in action. No ultimate or perfect solutions exist.

Incremental model of decision-making: Muddling through. A decision-making strategy known as the incremental model which Lindblom (1959) described as "muddling through" (p. 79) is evident in schools. School administrators often make decisions not based on satisfying certain criteria or meeting an explicit objective; rather, they move their schools along slowly, incrementally, limiting the comparison of alternatives. The decisions tend not to substantially alter the existing norm, or just slightly so. Experienced administrators who have knowledge of the system, and know the resources available to them, will often use the incremental approach to advance a course of action. Their experience tells them of the likelihood of a decision producing a satisfactory result, thus, they tend to make several small changes over time that eventually produce a desired outcome.

Mixed scanning. The *mixed-scanning* model of decision-making posited by Etzioni (1986, 1967) linked satisficing with incrementalism. In this scenario, the educator is given a broad policy guideline to administer; the decision-making is concentrated on the major goals of the policy and so the decision alternatives are limited to the problem at hand. Etzioni (1989) found that this approach to decision-making combated organizational drift, by keeping the decisions focused on the policy.

Settling on a decision-making process is a challenge for educators as no one-size-fits-all mechanism exists. Tarter & Hoy (1998) and Hoy & Tarter (2010) consistently held that "there is no best way to make decisions, in fact, a large part of the art of successful decision-making rests with the notion of matching the model of decision-making with the appropriate situation" (Hoy & Tarter, 2010, p. 351). The researches advised that decision makers embrace a contingency mind set. No one approach is best, and administrators often have limited information and a finite amount of time in which to decide. With a contingency model, administrators are able to move from one model to another and even re-visit a decision using a subsequent model as circumstances warrant.

Another aspect of decision-making is the role that individual and organizational values play. Spaedy (1990) wrote, "persons wishing to impact society as school leaders must be motivated by a set of deep personal values and beliefs" (p. 157). These values will guide their thinking and affect the decisions they make (Begley, 2004). As administrators develop their core beliefs they rely on them to greater degree when making routine and non-routine decisions (Storey & Beeman, 2009). With respect to the underlying concern of deciding whether or not to place eighth grade students in Algebra, the review of the professional literature did not reveal a decision-making model that best fit this issue. This apparent gap in the professional literature provided an opportunity for a scholarly pursuit to extract from administrators details about the decision to place eighth grade students in Algebra 1 and the degree to which they felt they achieved their intended results.

Implications

An explanation of the decision-making phenomenon related to mathematics placement in Shelton County revealed conflicting notions in educators' minds of what is in the best interest of their students versus what best meets the requirements of a demanding state accountability system. Producing a project to effect change in this arena required an understanding of how the participants proceeded in their efforts, and required an understanding from their perspectives of the challenges and barriers they faced. This research project study determined how decision makers decided on Algebra 1 placement and explained why differences in decision-making existed. It facilitated a collection of ideas and revealed lessons learned from practitioners. It also served to frame effective recommendations guiding administrative behavior regarding mathematics placement.

Summary

In Section 1, I revealed data that indicated a problem existed in a region of California. Specifically, eighth grade students in the unified school districts of Shelton County, California had access to Algebra 1 at varying rates. The review of the professional literature developed the importance of algebra education and presented the problem at the local level and in the context of the broader educational community. Guiding research questions set the direction of the overall study. Administrative theory in education served as the theoretical framework for this research, and the anchored the problem as it related to the central tenet of administrative theory, which is decision-making (Griffiths, 1959). The degree to which eighth grade students were placed in mathematics courses is a function of administrative decision-making. Thus, understanding the phenomenon of decision-making relative to the decision of placing eighth grade students in Algebra 1 in the unified school districts in Shelton County became the focus of this study. The literature review revealed a gap in explicitly linking models of decisions making with the critical decision of Algebra placement.

Overview of Remaining Sections

Section 2 describes the qualitative nature of this research project case study that focused on the lived experience of the unified school district administrators of Shelton County responsible for making and administering the placement decision. An instrumental collective case study methodology is a design that primarily draws on the recommendations of Merriam (1998), Yin (2009), Creswell (2007), and Moustakas (1994). The section includes a description of the data collection process along with assumptions, limitations, scope and delimitations. I described the process of eliciting responses from participants. The data were analyzed and findings are presented as they related to the guiding research questions, the theoretical research proposition, and theoretical framework. A discussion of the findings defines the critical aspects of this problem and informs the project developed to address them.

Section 3 includes a description of the project as it relates to the research questions and the associated findings. A second scholarly review of the professional literature that supports the chosen genre of the project follows. The section includes a discussion on the resources needed to complete the project and a plan for evaluation and possible implications for social change and influencing the broader educational community.

In Section 4, I offer perceived strengths and weaknesses of the project, and recommendations for addressing the problem in different fashions. The section includes my reflections on scholarly work and what I learned through the process that was helpful to me as a practitioner. I also provide a final narrative on the implications of the project on positive social change.

Section 2: The Methodology and Research Findings

Review of Problem and Purpose and Choice of Research Tradition

This study investigated a problem in the unified school districts of Shelton County in the Central Valley region of California. At the time of the study, eighth grade students were being placed in the Algebra 1 mathematics course at varying degrees, but achieving at low levels. The purpose of this project study was to develop a rational framework for use in the placement of students in eighth grade mathematics courses. It was specifically designed to develop this framework using information gathered from qualitative inquiry. Utilizing surveys and interviews, I investigated the decision-making processes of local administrators within nine unified school districts in Shelton County, California.

Through the investigation, I discovered what factors led district decision makers in Shelton County to place eighth grade students in Algebra 1 at such varying degrees, and with such poor outcomes. Understanding more fully the central phenomenon of decision-making informed the development of the rational research-based framework that advises school boards, superintendents and other district officials on possible approaches to take when faced with similar decisions. The framework includes recommended policy and practice reforms that serve to amend deficiencies in students' access to an Algebra 1 course.

In 2011, the percentage of eighth grade students in Shelton County placed in and completing Algebra 1 ranged from 38.5% to 92.9% depending upon the unified district in which the student lived. The range in 2012 was 29.9% to 88.3%, and the range in 2013 was 30.0% to 80.5%. In 2011, all of the districts showed low levels of student proficiency in Algebra 1 on the state assessment regardless of the degree to which students were placed in the course. In 2012, two of the nine districts had achievement levels higher than the state average but also had eighth grade enrollment in Algebra 1below the state average; this combination occurred again in 2013.

This project study occurs at a time in which educators in the State of California are currently considering the direction to make with regard to student placement in eighth grade mathematics courses. The State Board of Education adopted two sets of standards for this grade level, Algebra 1, and the California common core state standards for eighth grade mathematics (CDE, 2010b). In 2015, administrators in Shelton County are faced with deciding which students ought to be placed in Algebra 1 and which students will be placed in the common core course. The state and federal accountability systems will rely on a new assessment system known as the *California Assessment of Student Performance and Progre*ss (CASPP) (CDE, 2014), which will assess the mastery of the common core standards but does not assess Algebra 1. At the time of this study, the new assessment system for Algebra 1 had yet to be determined.

Uncertainty of what test will be administered to eighth grade students in the future and how the assessment will influence the state and federal accountability system magnifies an aspect of the current dilemma. Specifically, it is my concern that administrators will make placement decisions without a certain description of the future accountability system, and lack understanding of how tests and individual students' outcomes will impact public schools' scores. I am concerned that, students placed in an

Algebra 1 course but assessed according to a common core course blueprint may be disadvantaged if they are not taught the content that will be assessed.

It is important for policymakers to know how administrators have made decisions in the past, and to determine what they learned from their processes, so as to inform the direction of a project to support them in their work. Thus it was important to utilize a research design that afforded participants the opportunity to share and explain their experience. The logical approach was qualitative because it provided for a rich description of the phenomenon of the participants' experience in making this high-stakes decision as suggested by Creswell (2007).

Research Tradition

When seeking to uncover the lived experience of participants and produce a rich description of their practice in relation to the problem, Creswell (2003) advised using a qualitative approach for the research methodology. Creswell (2007) promoted this approach for pursuing a deeper understanding of a problem or an issue, and to "understand the context and the settings in which the participants in a study address a problem or issue" (p.40). Interpreting meaning from the collected descriptions of the lived-experience offered by the participants (Creswell, 2007; Hatch, 2002; Lincoln & Guba, 1985; Merriam, 2002; Yin, 2009) is the task. Qualitative research is often concerned with participants' interaction with an issue, problem or concern and such interaction can be viewed as a *phenomenon*, something that is occurring and can be identified and studied (Moustakas, 1994). Merriam and Associates (2002) wrote that phenomenology can be considered at the core of all qualitative approaches. The qualitative aim is to understand what a phenomenon means to the persons who experienced it and can give a description of it (Moustakas, 1994). The phenomenon in this study is decision-making and the factors that may have influenced the decision. The decision at issue is the decision to place students in a particular eighth grade mathematics course. The persons who made the decision and can give a description of it for the purposes of this study are the school and district administrators involved with the decision. Studying the decision from the perspective of those who made it required an approach that gave voice to their thought processes and revealed the issues, circumstances, factors and concerns that influenced their decisions (Creswell, 2007; Moustakas, 1994). The qualitative research method provided an opportunity to explore the phenomenon and interpret meaning from the lived experience of these educators.

Research Design and Approach

Justification of the Design

Several design models exist under the umbrella of qualitative inquiry. Each of the models has a particular focus serving a unique purpose. Creswell (2007) published that based on frequency of use by researchers of social behavior, and the associated purposes of the study, five models emerge as appropriate for most qualitative research. A brief synopsis of the models Creswell espoused is offered: (a) narrative research, to capture a chronological life story of an individual or individuals within a framework that provides context and meaning; (b) phenomenological research, to offer a deep understanding of a phenomenon from the perspective of multiple stakeholders; (c) grounded theory research to generate or construct from the processes, actions or interactions of the participants, a theory or general explanation of a phenomenon; (d) ethnographic research, to describe and interpret the culture of a group that have come to share common beliefs, values and traditions; and, (e) case study research, to understand an issue or problem within a bounded system.

Creswell (2007) posited that the approaches can be considered pure having characteristics that distinguish them from one another. Creswell acknowledged that other qualitative researchers contend similar elements exist in each approach to qualitative design, but Creswell determined that, depending on the purpose and parameters of a study, a clear choice can be made on a qualitative design. The fact that I was concerned about an issue within a single county of California, and the issue could be explained by investigating the processes of a distinct set of individuals, the case study approach emerged as a qualitative design of choice. As the researcher, I sought to explain the phenomenon of administrative decision-making based on the perspectives and shared experiences provided by the participants.

The grounded theory approach was considered but deemed not applicable. Creswell (2007) noted that grounded theory research is guided by the intent to generate a theory by discovering a previously unarticulated schema or process. The grounded-theory researcher uses the data analysis to substantiate or "ground" the new theory. However, this approach was not a suitable design of this research project study because a conceptual framework was established for the study in Section 1, grounding the study in administrative theory. Administrative theory establishes decision-making as the foundational behavior of administration. This case study research will serve to advance or provide deeper understanding of the existing theory within the context of the cases.

Description of the Instrumental Collective Case Study Approach

Case study research involves the study of one or more bounded systems (Yin, 2009). A case is bounded when it is clearly identified. In this study the cases were bounded to unified school districts within one county in California. The cases are further bounded by the identification of the particular participants that provide their experiences. The use of bounded systems focused me on succinct cases: systems and people that were readily and reasonably recognized as having interaction with the issue at hand.

Case study research requires the analysis of multiple sources of information, including interviews, surveys and historical data, which lead the researcher to produce a rich description of the case and associated case-based themes (Creswell, 2007; Merriam, 1998; Stake, 1995). In this study, historical, survey and interview evidence are reviewed. Both Creswell and Stake present multiple types of case study research, three of which are (a) the intrinsic case study, (b) the instrumental case study, and (c) the collective case study. The distinction between intrinsic and instrumental lies in whether the researcher is focused on the case, or, the issue. A case is the particular bounded system: in this study, a case would be the administrators in a unified school district. If the researcher were interested in the interactions of the administrators in the system and what meaning could be derived from their experience then an intrinsic case study model would be designed. Creswell noted that the intrinsic model is narrative and describes what is unusual or unique about that case. If the researcher is concerned with an issue and seeks to derive an understanding of how the case, (i.e., administrators in a school district) dealt with the issue then an instrumental case study model is designed. Stake described the types of case study in this manner, (a) if the case were dominant or of highest importance then the model used would be intrinsic; (b) if the issue was dominant or of highest importance then the instrumental model is designed.

The collective model is not distinctive from intrinsic or instrumental, it is used when more than one case is involved. The two experts, Creswell (2007) and Stake (1995), agreed the collective case study design supports the instrumental model in that the researcher may choose to analyze several cases to better illustrate the issue. Since I was concerned with the issue of decision-making, and several cases were investigated, I followed the recommendations of the cited experts, and employed the instrumental collective case study design. As noted, in this project study the issue is dominant.

Yin (2009) expressed that when focusing on contemporary issues and events, "how" and "why" questions are well situated in the case study approach. Understanding how and why the administrators made the decisions they did related to eighth grade mathematics placement is the issue. Schramm (1971) declared that "the essence of case study, is that it tries to illuminate a decision or a set of decisions: why they were taken, how they were implemented, and what happened as a result" (p.6). Schramm and others asserted that recording why a decision was made and what happened as a result are integral aspects of this qualitative approach (Yin, 2009; Stake, 1995; Schramm, 1971). The issue of placement of students in eighth grade mathematics courses by administrators and the desire to explain the administrators' decision-making experiences that resulted in such variance of placement is appropriate then for an instrumental case study approach.

Moreover, since the percent of eighth grade students placed in Algebra 1 varies depending upon in which district students are enrolled, the opportunity existed to investigate each district and explain why administrators behaved as they did and the effect their decisions had on student placement. Employing an instrumental collective case study approach that examines the "why" and "how" of decision-making in each district related to the central issue uncovered processes that produced such a wide range of access to the Algebra 1 course.

Justification of How the Case Study Approach Derives From the Problem

A critical purpose of the project aspect of this study was to develop a rational framework for use in administrative decision-making that will influence the placement of students in eighth grade mathematics courses. Knowing the circumstances and obstacles administrators faced, as they confronted the issues of eighth grade Algebra 1 placement, and what they learned having lived through the experience was instrumental in shedding light on the issue. Therefore, an instrumental collective case study approach was opted, where the issue studied was decision-making related to the phenomenon of math placement, and the bounded system or collective cases are unified school districts within the county.

Justification of Case Study Over Other Qualitative Approaches

Though the project study was designed to examine and explain the actions and interactions of participants, it was not designed to provide a chronological narrative of the life history of any one particular administrator. Nor did I intend to describe the decision-making processes as influenced by the behaviors of a particular group of people within a certain culture, as would be the case in ethnographic research (Creswell, 2007). In fact, the multiple cases, or collective case nature of this study involved participants from several different systems that were independent from one another. Inasmuch as this study advances administrative theory, it does not construct a new theory as is the task with the grounded theory approach to qualitative research. Hence the decisions to derive a study using the case study approach.

Participants

Criteria for Selection of Participants

Creswell (2007) advised in case study research to identify the maximum variation of participants in order to obtain the fullest or most diverse perspectives relative to the issue. The collective case study of Shelton County unified school districts provided the opportunity to gather data from numerous participants having various perspectives relative to their individual roles. The districts varied in size, geographic area, and student demographics (Table 1) and yielded participants with different titles serving in various positions. The fundamental criteria in selecting a participant, is whether or not the participant had direct experiences associated with the issue or phenomenon (Yin, 2009; Creswell, 2007; Stake, 1995). For this collective case study the participants were site and district level administrators with firsthand experience in making or guiding the decision for the placement of eighth grade students into Algebra 1 courses. Known as a stratified, purposeful sample (Creswell 2003, 2007), the participants included superintendents, assistant and associate superintendents and directors, middle school principals and a middle school vice principal, that worked for nine of the unified school districts in Shelton County.

Superintendents. The superintendent is the chief executive of each district and either provided direction on this issue or relegated the decisions to subordinates. Knowing what involvement, if any, the superintendents had with the phenomenon informed the investigation into the processes within each district.

Assistant superintendents and directors. Depending on the size and organizational structure of a district, assistant superintendents or district-level directors are in place that had line authority or oversight of middle schools. As participants they related their experiences with the Algebra 1 placement decision.

Middle school principals and vice principals. The administrators of the middle school have responsibility for the educational program and operations of the school. In the event that their authority extended to the placement of eighth grade students in Algebra 1, then they too had firsthand experience related to the central issue of the study.

Justification for Number of Participants

In a qualitative study "no direct relationship exists between the number of participants and the quality of the study" (Hatch, 2002, p. 48). However, Hatch advised that the number of participants be suited to meet the needs of the study, and Yin (2009) suggested that the needs of the study are determined by the *straightforwardness* or subtleness of the theory or proposition of the study. According to Yin, a straightforward study proposition would suggest fewer embedded cases and participants are necessary to replicate the theory or affirm the proposition of the study or to produce rival explanations. The theoretical research proposition for this study is straightforward, stating that some administrators in Shelton County considered factors other than mathematical aptitude when placing students in eighth grade mathematics courses. The proposition allows for “some administrators”, that is, more than one. However, to provide for a rich description of the phenomenon, and to explain how and why factors others than math aptitude, if any, influenced decision-making required more than a few participants (Yin, 2009). Knowing how, and why, factors influenced the participants in their decision-making also informs the proposed project aspect of the study. With this understanding I sought participation from a number of administrators with firsthand experience who would either affirm the proposition or provide rival explanations, and support a rich description of the issue.

Size of study. Shelton County has 10 unified districts, nine of which were investigated. (The 10th unified district was omitted from the study, as I am the district superintendent.) I sought to explain the decision-making process of school leaders derived from investigating the lived experiences of administrators associated with the issue both at the district and site levels. To establish depth of inquiry and authenticity (Creswell, 2007), at least one district level administrator in each district, and at least one site level administrator for each middle school in the district was sought. Some of the larger districts have assistant superintendents and directors and more than one middle school. Though the superintendent of the largest school district in the county granted permission for the study, only a district level administrator agreed to participate. In total eighteen administrators participated (N=18) in the study. Participation was done in two phases. In Phase 1, a questionnaire was sent to participants, 17 of 18 participated in the questionnaire (Appendix B). (One participant failed to complete the questionnaire, but agreed to be interviewed) The questionnaire was followed up by Phase 2, a face-to-face interview. Ten participants participated in an in-depth interview that lasted between 45 and 60 minutes.

In some instances superintendents and other administrators were not selected for follow up interviews as their questionnaire responses revealed the extent of their involvement with the phenomenon, and further probing was not necessary. However, the limited aspect of their participation does not suggest that their responses lacked substance, as these district leaders had a firm understanding of the phenomenon being studied and the role they as individual leaders played in the eighth grade mathematics placement decision in their systems. The questionnaire responses of the non-interviewed participants were included in the data analysis.

Procedures for Gaining Access to Participants

Stake (1995) identified several concerns when seeking individuals to participate in a case study. Stake wrote that potential participants be advised of the nature of the study, the primary issue being investigated, the time span, and the burden on the parties. This disclosure provided participants with a clear understanding of the study and their role in it which in turn aided the process of informed consent (Hatch, 2002). Stake further recommended that the researcher detail how and why a particular organization was chosen. For this reason, upon receiving approval from the Walden University

Institutional Review Board (IRB approval # 09-09-13-0068622), I made the initial contact with each school of the nine unified school districts via an email to the superintendent with an attached letter (Appendix D). The letter described the purpose and scope of the study, why the district was chosen, the method of investigation, the extent of involvement by participants, the use of project results and possible benefits to the schools in the districts and requested the superintendent's participation. The letter elicited the superintendent's permission to contact other administrators in the organization seeking their participation. The superintendent was provided a template of a Letter of Cooperation as a Community Partner (Appendix E) which the superintendent could transfer to district letterhead and return to me.

I received a Letter of Cooperation as a Community Partner from each of the superintendents in the districts investigated. The letter of cooperation from the district's superintendent initiated the process of selecting other district level and site level participants. Each assistant superintendent, director, middle school principal and middle school vice-principal received an informed-consent participation letter via emails stating the purpose of the study, why they were chosen as potential participants, the minimal risks involved, and the estimated time that their participation would entail (Appendix F). Participants agreed to participation by return email with the words "I consent". Identities of participants were kept confidential and referred to by pseudonyms such as D1AS1 for District 1 Assistant Superintendent 1.

Methods for Establishing Researcher-Participant Relationships

Having participants share openly and honestly with a researcher is vital in qualitative research (Creswell, 2003, 2007; Hatch, 2002). Gaining the Letters of Cooperation and Community Partnership from superintendents supported access to the participants. The IRB approved letter seeking informed consent thoroughly described to the participants the purpose of the study, why they were chosen, and the two-phase method of participation as well as the minimal risks involved. The methods to secure effective purposeful responses were supported with a survey questionnaire having open-ended inquiries relative to the research question and sub-questions. The survey questionnaire was followed up with face-to-face interviews that allowed for probing and clarifying questions as well as opportunities for participants to extend their responses (Hatch, 2002).

As a fellow superintendent in the county I have forged an acquaintance with a number of other superintendents. Though I have a collegial relationship with these superintendents, as well as with other educators in the county, I have not been involved in any discussions related to the research question, nor have I been included in any policy decisions or conversations of practice in their districts related to the research question. Hatch (2002) argued against researchers in education conducting studies in their own settings. Hatch was concerned that researcher bias is too difficult to overcome. Therefore, the system in which I work and lead was not selected for this study.

Measures for the Ethical Protection of the Participants

All research comes with a level of risk and qualitative research is not immune (Hatch, 2002). The participants need to be aware of potential risks and the steps taken to protect them. The informed consent (Appendix F) application detailed the scope of the study, the expectations associated with their participation, the approximate time commitment, and that participation was voluntary. The informed consent letters also provided that they could be released from the study at any time, and could have all their information redacted without penalty. The questionnaire restated this assurance, and I began each interview reminding participants of the purpose of the study, that their responses would remain confidential, and that they could withdraw at any time. Hatch offered that ability to be released from a study by one's own choosing elevates the ethical treatment of participants.

The participants were informed they had the right to examine their portions of the collected data, as well as review the findings of the research. Participants received a written transcript of their interviews. They had opportunity to revise responses for clarification and provide final approval. Confidentially was maintained throughout the study through the use of pseudonyms. Data collected were stored in a password protected computer hard drive, and all hardcopies secured in a locked file cabinet.

Data Sources and Collection

Creswell (2007) posited that a common thread be evident throughout the study, that links the processes of data collection and analysis with the research questions and the theoretical framework. This study may advance administrative theory by explaining the decision-making phenomena from the perspective of those involved with the central decision of the case; specifically, how local and regional administrators decided to place eighth grade students into Algebra 1 and other math courses. Consequently, data collection must accommodate the description of this phenomenon in a design that accessible to the participants and are appropriate for the qualitative tradition chosen (Fink, 2006). The following sub-sections describe and justify the sources of data and methods used to collect the data.

Description and Justification of Data Sources

Yin (2009) stated that determining the data to be collected is to be derived from the research questions and associated proposition. Since the research questions in this study asked about a particular phenomenon in administrative practice, the source of data should be linked to that practice and those involved with it. Surveys, questionnaires, and interviews are widely accepted as potential data sources in qualitative research (Creswell, 2007; Miles & Huberman, 1994 Stake, 1995; Yin, 2009). These provide the participants opportunity to relay their individual experiences in a format that the researcher uses to codify and establish any patterns, and uncover identifiable themes, that may exist. Other accepted data sources include archival records, observations, and documents. I relied heavily on the recollected lived experience of the participants, thus, it was imperative that the method of collecting evidence assisted them in communicating the phenomenon (Fink, 2006), and assisted me in organizing the data for analysis (Hancock & Algozzine, 2011; Merriam, 1998, 2002). Accordingly the processes for selecting data sources and collecting data in this study supported that end.

Data sources for this study fall into two categories (a) archival data, and (b) personal reflections. The archival data is retrieved from the California Department of Education (CDE) database which houses demographic data of the districts and the associated student data relative to the completion of Algebra 1in eighth grade and their achievement levels. This data served to establish similarities and differences among and between the districts which assisted the analysis of the data in predicting or debunking generalities based on demographics. This data is considered "unobtrusive" (Hatch, 2002, p. 117) as it is not filtered through any bias that may exist with the research participant. It also provided a glimpse into the history of the phenomenon over time, as I could gauge the occurrence of the decision to place students in Algebra 1 from one school year to the next. Archival data for 2011, 2012 and 2013 were collected for each district that identified the degree to which students in these districts completed Algebra 1 and the associated achievement levels on the state test.

Stake (1995) advised that the preferred data sources in case study research are individuals with the most intimate experience with the phenomenon. The participants in this study were all intimately involved with this issue. Their personal reflections were gathered to explain the central phenomenon from their perspectives, and aided me in establishing the generalities, and rival explanations which existed among participants (Hatch, 2002; Yin, 2009). Together the two sources of data converged to provide context and a greater understanding of the collective case (Baxter & Jack, 2008).

Justification for the Choice and Appropriateness of Data Collected

Justification of unobtrusive data. The unobtrusive archival data served to authenticate the problem (Merriam, 1998) that student access to Algebra 1 varied widely among the districts studied. Moreover, the data provided demographic student data for each district as well as achievement data on the state test for Algebra 1. This archival evidence was necessary to address a potential rival explanation that demographics explained the variation in access to Algebra 1. The evidence also supported triangulation of data to support, refute, or build on explanations presented by the participants (Hancock & Algozzine, 2011; Merriam, 1998). The archival data was, and is, available to the public on the California Department of Education website.

Justification for questionnaire. An integral process for gathering information in qualitative research involves participants answering questions posed by the researcher (Rubin & Rubin, 2005). The type of questions asked and the manner in which participants provide responses is the subject of much significance in the literature. Questions can be open-ended or closed, structured or unstructured (Hatch, 2002). The format can be formal, semi-formal or informal (Hatch, 2002; Rubin & Rubin, 2005). This study provided two processes for gathering data from participants, a semi-structured questionnaire (Appendix B) and an informal semi-structured interview (Appendix C).

An effective collection instrument created by the researcher can be a useful tool in collecting information in relation to the research question (Hancock & Algozzine, 2011). The questionnaire in this study provided the participant a format to respond to questions privately and offer their reflections at a time that was convenient for them (Fink 2006).

The questionnaire had a combination of close-ended and open-ended questions to elicit information from participants. An example of the closed-ended question is, “What is your position in the district?” Examples of open-ended questions, “Describe how you were involved in placing eighth grade students in mathematics courses in your school or district?”, and, “What factors did you consider when determining the placement of eighth grade students in Algebra 1?” These questions and others supported the participants’ ability to focus their responses on the phenomenon.

Justification for interviews. Fink (2006) stated that disadvantages exist when participants are asked to complete a questionnaire on their own time, these include: a propensity to procrastinate thinking they have more time than they do to respond, and of course the participant needs to be able to read and write, which is assumed in this study. Yin (2009) also cautioned of a potential break in the chain of evidence when participants are asked to complete only a survey or questionnaire, as the opportunity to clarify and probe would not exist. To address these potential issues, participants were advised that they may be asked to participate in follow up interviews. Creswell (2007), Hatch (2002), and Yin (2009) agreed that interviews provide qualitative researchers direct access to participants, offering a rich source of data relative to the research question and gives opportunity to clarify any uncertainties in responses to the questionnaire.

Hatch (2002) went on to describe interview formats. The structured format has a set of prescribed questions from which the researcher does not deviate, the respondent answers and the researcher records. This supports reliability as the interviews are consistent from one participant to the next, but limits the researcher’s ability to dig deeper if a participant provides a nugget of information critical to the study. The semi-structured format of this study, had pre-determined questions, supporting reliability, and allowed for follow up questions providing flexibility to make additional inquiry had the participant responded in such a way that implied a need for further investigation.

Number of Completed Questionnaires

Seventeen of the 18 participants completed questionnaires. One participant who consented to the study did not complete the questionnaire, though the person was interviewed. The protocols for the study and the Walden University IRB provisions allowed participants to answer or not answer any question posed to them or to limit their involvement to any degree they desire, without consequence. When contacted this participant said that the questionnaire "just didn't get done" but the participant "would be glad to be interviewed". The questions and prompts from the questionnaire were addressed with this participant in the interview. The questionnaires were collected from superintendents (n=5), district level administrators (n=5) and school site administrators (n=7). Each district was represented by at least one questionnaire.

Number and Duration of Interviews

A total of 10 in-depth personal interviews were conducted involving district administrators (n=4) and site level administrators (n=6). Each district was represented in the interview phase. No superintendents were included in the follow up interviews as their responses to the questionnaire were sufficient to explain their involvement with the phenomenon and the extent to which their direction guided the placement. The interviews lasted between 45 and 60 minutes. The participants answered similar questions to one another in their interviews, though probing questions differed depending on their responses on the questionnaire that needed clarification. Additionally, the content of responses to interview questions resulted in further probing and clarification.

How and When Data Were Collected

Data were collected from October, 2013 to February, 2014. For the interview, I reviewed with the participants the purpose of the study and reaffirmed their permission to participate and to be audiotaped. I used an electronic RCA digital recorder to capture their responses. The recorder had a USB extension which I used to upload into the QSR NVivo software on a password protected computer. Having the audio uploaded into QSR NVivo supported the transcription of responses, as I could readily compare the verbatim transcription to the audio recording utilizing two computer screens and the computer speakers. I utilized a personal internet connection to access archival data for the California Department of Education website.

Process for Data Generation, Recording and Keeping Track of Data

Data were generated in two categories, (a) the archival data from the CDE website, and (b) the personal data generated from the participants. I collected the archival data from the internet and made hard copies for easier annotating. I created tables to manage the data, compare districts, and triangulate with the personal information. I maintained the electronic tables in a secure password protected computer, and the hardcopies in a binder kept in a locked file cabinet.

The personal data were generated from the responses to the questionnaire and responses to the questions in the in-depth interviews. The responses to the questionnaire were sent to me by participants via email. I made hard copies of each returned questionnaire and maintained them in a binder which was locked in a file cabinet. The questionnaire responses were electronically transferred verbatim to a Microsoft Word table in a matrix format that aligned each participant's response with the corresponding question on the questionnaire. Participants' identities were kept confidential using pseudonyms: District 1, 2, 3, Assistant Superintendent 1, 2, 3, Principal 1, 2, 3 and so on.

The interview data were gathered via an audio recording device. The audio was uploaded to the QSR NVivo software. A transcription was made matching the audio verbatim and stored on the same password protected computer. Hard copies of the interviews were kept in a binder in a locked file cabinet. The transcriptions and the matching audio supported the coding processes of data analysis which are discussed later.

The Role of the Researcher

In case study design, the researcher assumes multiple roles (Stake, 1995). Stake maintained that the roles evolve, change and take on different levels of importance throughout the course of the research. Creswell (2007) wrote that the researcher is the key instrument in qualitative research. In this proposal I assumed the role of research designer, interviewer, data collector, data transcriber, and data codifier and analyzer. I also interpreted the data and reported the findings. Ultimately, in Section 3, I prepared and advocated a project that is informed by the findings of this study, advances administrative theory, and adds value to administrative practice.

As Creswell (2007) and Hancock & Algozzine (2011) posited, I did not rely on questionnaires and interview questions developed by others, but created the questionnaire and generated interview questions intended to elicit responses that explored the lived experience of the participants with firsthand knowledge of the phenomenon. I developed and utilized an IRB approved protocol for gaining access to participants through a letter to district superintendents (Appendix D), and a return Letter of Cooperation as a Community Partner (Appendix E). Participants received an informed consent form (Appendix F), to which they individually affirmed their consent to participate.

The questionnaire, structured interview questions and follow up prompts were prepared in advance, Rubin & Rubin (2005) explained that, interviews can and should be dynamic with opportunity to ask clarifying and probing questions, which occurred. I acquired permission to audio record the interviews (Appendix F) and the tapes were transcribed verbatim. I used an electronic RCA digital audio recorder. Since the interviews are audio recorded I was able, as Stake (1995) advised, to note impressions based on participant responses. The underlying objective was to understand the "meaning the participants hold about the problem" (Creswell, 2007, p. 39). With the support of Microsoft Excel spreadsheets and Microsoft Word tables I organized, codified, categorized, and analyzed, the questionnaire, interview and archival data.

Data Analysis

Analyzing Case Study Evidence

Both Creswell (2007) and Merriam (1998) asserted that case study can be considered a pure form of qualitative research providing intensive descriptions of the phenomenon and the bounded system under study. In order to achieve the level of description associated with case study, data must be collected, organized, and analyzed in a process that uncovers themes and potential generalities. Yin proposed that every case study "follow a general analytic strategy" and offered a strategy known as "relying on theoretical propositions" as the most preferred strategy of case study analysis as it follows the theoretical propositions that led to the research questions and that led to the literature review (Yin, 2009, p. 126-130). The proposition and research sub-questions provided in Section 1 guided the analysis and supported the structure of the data organization. The research proposition asserts that factors other than mathematics aptitude influenced the eighth grade mathematics placement decision. Qualitative experts agreed that as data are collected, they should be managed and organized in a manner that aids analysis (Creswell, 2007; Merriam, 1998; Stake, 1995; Yin 2009). The research sub-questions offered the structure for organizing the data and eventual findings. The data analysis served to affirm or refute the research proposition and answer the research sub-questions. Reid (1992) provided three phases to support data management: data preparation, data identification and data manipulation.

Data preparation. Data preparation involved typing notes, transcribing interviews and preparing data for identification and manipulation. The data from the personal reflections were collected and managed in two phases. The data from the questionnaire phase was categorized by responses, each question or prompt on the questionnaire representing one category. The responses were placed verbatim in a table using a matrix format according to respondent and category (questionnaire prompt) and awaited identification. The data from the recorded interviews were transcribed and maintained in an electronic word document awaiting identification. The unobtrusive data in this study came from the state's education website and were converted to tables that provided data on each district relative to the research question.

Data identification. The data from the questionnaire response table and the transcribed interview word document were coded in a manner that described their connection to the research sub-questions (Yin, 2009). Merriam (1998) suggested two levels of coding to aid analysis: Level 1 coding that identifies information about the data, and Level 2 coding that provides interpretive constructs related to analysis. In this study, Level 1 coding provided information about the participant (i.e., participant position and school district). The Level 2 coding attached the data units (i.e., phrases or sentences that stand alone as important) to a particular research sub-question as appropriate to aid analysis. Merriam posited that Level 2 coding involves researcher thoughts or hunches about the data which lead to additional probing in the iterative process of gathering data, analyzing, and gathering more data. The Level 2 identification was aided by color coding the data units. Each research sub-question was prescribed a unique color, and each unique data unit from the questionnaire responses and transcribed interview deemed important was color coded in MS Word according to its relationship with a research sub-question. The Level 2 data units maintained their Level 1 participant identification.

Data manipulation. The manipulation of data allows for retrieving sorting, and rearranging data for analysis (Merriam, 1998). According to the format of this study, data manipulation was linked to the research proposition and research sub-questions (Yin, 2009). The manipulation of the data lead to findings of the phenomenon being explained (Richards & Richards, 1994). As noted, the data served to affirm or refute the proposition and answer the research sub-questions. Through manipulation the data emerged in a critical fashion to support analysis, finding common themes and significant revelations as to “how” and “why” the decisions for eighth grade mathematics placement were made. Furthermore the manipulation and subsequent findings informed the Section 3 review of professional literature necessary for the research project study and the eventual project itself.

Coding procedures. The analysis of data in the qualitative tradition is to be conducted, not after, but while the data is collected (Creswell, 2007; Merriam, 1998; Moustakas, 1994). The expectation is that the researcher is involved with the data to the degree that research questions are refined, propositions reworked and interactions with participants evolve to capture emerging themes. Merriam maintained that qualitative analysis is inductive and intuitive, and a researcher may undermine a study by waiting until after all data is collected before beginning analysis. In this study, the data were collected and analyzed simultaneously, in a case study approach, in an iterative effort to explain the decision-making processes of the participants.

Merriam (1998) advised that data be arranged in categories and that these categories in effect answer the research questions. Merriam noted that, as data are received, a researcher should be on the lookout for units of data that later may emerge as important. These units, deemed meaningful, can be assembled to form groups and eventually a response to a research sub-question. In this study the data units are derived from the participants’ responses to the questionnaire prompts and from their answers to the follow-up interview questions. A data unit is a sentence, a phrase, or a longer explanation from a participant that stood alone as important. The unit provided detail or context to that particular person's interaction with the phenomenon, which in this case is the decision to place eighth grade students in mathematics courses. The units were coded as they provided answers and insights from the lived experience of the participants into the research questions. Once the coded data units were gathered under the heading of a research sub-question, the analysis revealed themes that not only provided answers to the research questions but supported a narrative explanation of the phenomenon (Stake, 1995; Yin, 2009).

The questionnaire served as the initial vehicle of personal information collection. The questionnaire data were organized in a Microsoft Word table utilizing a matrix format aligning each participant's response with the corresponding questionnaire prompts (Level 1) (Merriam 1998). The questionnaire responses were then reviewed specifically identifying and coding data units that related to a particular research sub-question (Level 2).

These Level 2 data units were transferred verbatim to a second table aligning the data unit with the corresponding research sub-question while maintaining the Level 1 identification. Similarly, the transcribed interviews were reviewed sentence by sentence, phrase by phrase, identifying Level 2 data units as they related to particular research sub-questions. These Level 2 data units were color coded and transferred verbatim to the research sub-question table to accompany the questionnaire Level 2 data units. The Level 1 identification was again maintained. As this process was concluded final analysis began to provide responses to the research sub-questions.

Finding Patterns, Relationships, and Themes

Having the data organized by research sub-question aided the analysis. According to Merriam (1998) and Hatch (2002) the function of analysis is to reveal relationships or patterns embedded in the data that can emerge as a category or unifying theme. Indeed, themes did emerge in the analysis of the data units extracted from the participants' recollection of their lived experience. As the data were analyzed, the responses that told a similar story, revealed a comparable process, or related a parallel experience formed a theme or category that is explained in the findings related to each research sub-question.

Procedures for Dealing with Discrepant Cases

Just as unifying themes existed in the data, so too were discrepant and unique experiences. This is understandable in a collective case study in which participants from multiple embedded cases shared their reflections (Yin, 2009). The instances of uniqueness aided the explanation of why such a variance in mathematics course placement existed in this county. The discrepant or unique explanations were included in the analysis and explicitly noted in the subsequent findings when they offered substantive information relative to a research sub-question.

Findings

The analysis of the participants' responses is presented in a manner intended to provide a rich description of the lived experience of individuals who had firsthand knowledge of the issue being studied (Creswell, 2003, 2007; Merriam, 1998; Stake, 1995): The issue was the decision-making experiences of the participating administrators who were involved with the placement of eighth grade students into mathematics classes. The embedded cases, (i.e., the nine individual districts in Shelton County) are not the subject of the study; rather they provided a bounded system for the study to be conducted (Merriam, 1998).

Through qualitative research, I examined the lived experience of administrators in this bounded system, a collective case of nine unified school districts, to explain how, and why, the processes they described resulted in such a variance of student placement decisions (Yin, 2009; Stake, 1995). The findings offer an explanation of the variance by illustrating the similarities and differences in their decision-making approaches, and uncovering their thought processes as they endeavored to address the placement issue. Additionally, following a strategy proposed by Yin (2009), the analysis provided further explanatory narrative focused on this study's theoretical research proposition, and theoretical foundation. The proposition asserted that administrators considered factors other than student aptitude when placing students in to eighth grade mathematics courses. The theoretical framework for the study asserted that decision-making is the central tenet of administrative theory (Griffiths, 1959). The analysis affirmed the study's proposition and revealed the connection to administrative theory. The findings are organized in three categories:

1. According to the guiding research questions and the associated themes that emerged (Merriam, 1998) with accompanying quotes or expressed experiences (Stake, 1995), which provide the reader greater context for understanding the phenomenon; and,

2. According to the theoretical research proposition (Yin, 2009); and,

3. According to the associated theoretical framework (Yin, 2009).

Findings by Guiding Research Questions

Central Question: How do school administrators in Shelton County unified school districts account for their decision-making experience relative to placing students in eighth grade mathematics courses in the 2011 to 2013 school years?

The central question in this study sought to uncover how administrators went about the decision-making process in their districts that resulted in the placement of students. The question provided direction in preparing the participant questionnaire and served to concentrate the questions asked in the follow up interviews. The central research question was established to guide the research method and provide a focus for the analysis of the data (Creswell, 2007; Hancock & Algozzine, 2011). The answer to the central question is revealed in the following narrative, which is organized by research sub-question.

Sub-Question 1: Why was there such variance in eighth grade mathematics placements in the unified school districts in Shelton County from 2011 to 2013?

The archival data in the districts studied were presented in Section 1 and revealed a variance in the percent of eighth grade students enrolled in Algebra 1. The variance ranged from 38.5% to 92.9% in 2011. Similarly, the data in the two subsequent school years show the enrollment percentages ranging from 29.9% to 88.3% in 2012, and ranging from 30.0% to 80.5% in 2013. Participant responses to the questionnaire prompts and answers to questions in the follow-up interviews that shed light on this question were coded and gathered together for analysis (Merriam, 1998; Stake, 1995; Yin, 2009). The following represents an explanation of the variance in eighth grade mathematics placement based on themes that emerged in the data. Four broad categories developed in that data, (a) District Autonomy, (b) Site Autonomy, (c) Unique Structures and Circumstances, and (d) Algebra for All Expectations.

District autonomy. The data revealed that each school district in the study operated independently and autonomously from one another. No responses linked a decision made by an administrator from one school or district with that of an administrator in another. Responses centered on the placement practice or placement protocols associated with an administrator's own school or district, without regard to what was occurring in the region. While 15 of the 18 administrators acknowledged specific factors and constraints influencing the placement decision, none of the administrators reported taking into consideration or investigating the placement practices of other schools in the region for the purposes of aligning or adopting protocols. The data do not confirm that autonomy was a conscious decision; however, responses to follow up questions revealed an internal focus to the decision with little interest in the practices of other districts. One principal (D3P) noted having had the opportunity to visit other systems in order to investigate placement practices but chose not to, stating,

> I think there were opportunities afforded to our site, to me. But ultimately what I found was every district has a personality. And the personality I found here is "let's worry about and what the kids in this district needed" (D3P).

Another principal found little to be gained from the exercise of looking at protocols or decision-making practices abroad as little coherence exists,

> Our district is willing to research what other districts, not just in our county are doing, but across the street are doing. So, I feel like we looked at the whole thing, and it's a messy picture (D6P).

One district level administrator (D1AS1) reported that, in their district, they are constantly looking at best practices, “We want to learn from what other districts are doing”, but added, “Sometimes it's hard when other districts around us aren't there yet” referring to a lack of commitment of algebra-for-all students by the eighth grade.

Site autonomy. With the exception of D1, the site principals who participated in the study described varying levels of autonomy with the placement decisions. Principals in D2, D5, D6 and D8 expressed that though there was an expectation in the district that eighth grade students should be accessing Algebra 1, the actual determination of which students would be placed in the course was left up to them. The analysis of the participant data revealed that these principals approached the decision uniquely and based on processes developed at their own sites, either by them or in collaboration with teachers. The principals in D3 and D7 expressed that no declared expectation of algebra existed for their students and they operated with complete autonomy with regards to placing eighth grade students in different mathematics courses. The principal in D7 shared,

> I can't think of a single instance in the last seven years of being principal where I had a recommendation for what to do with math, that it wasn't approved, it wasn't even challenged or questioned (D7P).

This principal attributed this site autonomy to the principal's own belief that most administrators in this principal's district had elementary school experience as teachers and administrators and were not comfortable making mathematics recommendations for secondary schools; this principal noted much less autonomy in English and Language Arts existed.

The principal in D9 expressed the ability to operate autonomously. Though the superintendent (D9S) expressed an expectation of algebra for all existed in this district, the principal did not reveal that it played a significant role in his lived experience, rather, this principal shared that the largest factor that influenced his decision, "was whether or not the students were ready for the pace and rigor of Algebra 1" (D9P).

In a discrepant example illustrating a lack of autonomy, the principal in D1 stated,

> This was a district-wide decision to place 8th graders in Algebra 1; I did not have any influence on this decision (D1P).

The principal in this embedded case provided an account of supporting the district policy though not agreeing with it. In describing the lived experience, the principal often shared being concerned for students and teachers who were mandated to take and to teach a course that the principal believed was not appropriate in all cases.

Unique structures and circumstances. The data revealed in each of the nine unified school districts that circumstances and unique structures existed that affected the decision-making relative to placing eighth grade into mathematics courses. Administrators in each district described situations that either dictated a particular course of action, or limited to some degree the ability to place a student in a particular math class. These situations affected systems differently, in some instances to increase, others to decrease the enrollment of eighth grade students into Algebra 1. The administrators described the influence that scheduling had on their decisions, as well as, the concerns of parents, and the expressed points of view of the high school teachers in their districts.

Scheduling. In 8 of the 9 districts (D2, D3, D4, D5, D6, D7, D8, D9) one or more administrators indicated that either, the school's master schedule, the negotiated collective bargaining agreement on class size, the staffing of math teachers, or the availability of support interventions at a school influenced the placement decision. Notably, scheduling conflicts represented an influencing factor other than math aptitude.

Parental influence. Administrators in two districts (D3 and D6) acknowledged that parental influence affected placement decisions. The administrators shared that parents often pressured administrators to accelerate students into a higher level of math course, and that a community expectation existed that students have an accelerated pathway in mathematics. The Assistant Superintendent (D6AS) shared that this led to the development of an Algebra Contract signed by parents and students acknowledging the rigors and expectations of the course. Similarly, the Principal in D3 discussed conferencing with parents who desired a higher math placement for their students. This principal however, noted an ability to talk parents into accepting a lower math placement in eighth grade.

Expectations for high school. No consistent approach existed in the county for matriculating the placement decisions. In D1 for instance, there was a general understanding that some students would repeat Algebra 1 in ninth grade, even if the student passed the course in eighth grade. The determining factor was the score on the state exam. A student with a passing grade in the class, but scoring "Basic" or below on the CST, would repeat the course in high school. Two administrators noted this provision as a positive factor, supporting this district's decision to be aggressive in the placement of eighth grade students in Algebra 1. To them, students would have opportunity to retake the class the next year after having achieved at least some level of understanding. However, a junior high principal in the district had a different perspective,

> We had a lot of students that were failing algebra, which would affect their GPA, would affect their ability to walk stage, as well as just having self-esteem issues with being in a class and they couldn't do it. And not really having an option to put them somewhere else (D1P1).

In other districts (D2, D3, D6, D7) administrators described a disconnection between the secondary schools within their systems. They presented concerns of high school math teachers who complained that students were coming to 9th grade unprepared. Even though students had completed Algebra 1 in eighth grade, many lacked essential algebraic skills to move on to geometry. This criticism, which is suggested in the archival data as well (Table B), called into question the placement decisions at the junior high schools in these systems.

Algebra for all, or not. The expectation or non-expectation that all middle school or junior high school students experience Algebra 1 distinctively speaks to the degree of variance of eighth grade mathematics placement in Shelton County. The administrators in D1 clearly articulated that all students (with the exception of Special Education students) were expected to take Algebra in their district. Year after year, D1 had the highest percentage of eighth grade students enrolled in Algebra 1. Conversely, D3 administrators voiced unequivocally that Algebra 1 was not an expectation for all of their students, and had among the lowest percentage of students enrolled. In between these extremes lie the other districts in the study.

According to D1AS, the expectation of algebra-for-all in D1 was an outgrowth of the culture of the district leadership when focused on an objective, stating, “We’re relentless.” The objective, according to both district administrators, was to provide Algebra 1 to all students in order to open doors, or provide access, to higher mathematics in high school. They acknowledged that many students repeated algebra in high school,

> We would have them take it in eighth grade, and then those that needed to repeat it, that they would have the opportunity again at ninth grade (D1AS2).

The reality that students repeated Algebra 1 in ninth grade was viewed as a positive aspect of the district by the district administrators, noting that in their opinion students are better prepared having been through the course once before (D1P).

Summary of sub-question 1. Yin (2009) promoted that explanatory case studies serve to reveal the “why” and “how” of the phenomenon. The participants’ responses that provided answers to this sub-question offer a rich description as to why there was such variance in the placement of eighth grade students in mathematics courses in Shelton County, and how the variance occurred. The autonomous nature of local decision-making, coupled with unique structures and circumstances present in the districts studied served to move the processes of eighth grade mathematics placement in distinct ways. While not all structures or circumstances were exclusive to a single system, the way they interacted with decision makers was distinctive and resulted in varying levels of placement into Algebra 1. A single aspect present in one district was a non-negotiable expectation that all students, except those in special education, would take algebra in middle school. This expectation suggests why this district (D1) had the highest percentage of students in Algebra 1 from 2011 to 2013.

Sub Question 2: How will administrators in Shelton County describe the factors, or constraints, that influenced their decision-making which resulted in the discrepancy of access to Algebra 1 as reported by the CDE?

The administrators referred to multiple factors and constraints that influenced their placement decisions. Though not a single factor registered across all districts, similar considerations were mentioned in several systems. The nature of these considerations and the degree to which participants described their influence on placement decisions varied. The following categories reveal the similarity and diversity of influencing factors on the decision-making process experienced by these administrators.

District expectation. In six of the nine districts (D1, D2, D4, D6, D8, D9), administrators described an expectation from the district leadership that increasing levels of students should be placed in Algebra 1 by eighth grade. As mentioned earlier, D1 established Algebra 1 as the default course for all non-Special Education students, though eighth grade students in this district could be provided a Geometry course based a certain criteria. While the “algebra-for-all” position was not articulated as a mandate in the other districts, participants described a clear message for the Algebra 1 course to become the norm. The principal in D2 expressed it this way,

> I was in direct contact with the superintendent the last three years or 2010 through the last school year, the superintendent's position and kind of the unwritten rule was every eighth grader taking algebra (D2P).

One superintendent described the issue as a capitulation to a state requirement, and although this superintendent was not directly involved in placement decisions his framing of the matter influenced the process in the district.

> I knew with the requirement that all eighth grade students were to take algebra that our scores may drop in math because all eighth grade students were not ready to take the course (D9S).

One district (D6) changed course after the 2011-12 school year, with the district expectation for Algebra 1 being reduced. The superintendent (D6S), assistant superintendent (D6AS) and principal (D6P) all presented similar accounts for the change. They agreed that since the state was eliminating the penalty for taking a state exam considered lower than Algebra 1, the pressure to place students in the course had lessened. This evolution of the placement process was expressed succinctly by the superintendent and echoed by the subordinates.

Specific factors, constraints, and student indicators. Absent a clear mandate that all students enroll in Algebra 1, or lacking a well-defined district policy or protocol to follow, administrators described their own decision-making experiences. Expressions of thoughtful design existed in the data, revealing that principals and district administrators strove to develop discriminating criteria to justify their placement decisions. However, the placement decisions were distinct depending on the embedded case being investigated. In all of the districts, except D1, the principals provided the greatest detail in describing the experiences that led to the ultimate decisions. The participants expressed several influences: teacher recommendations, student grades, assessments, teacher quality, the availability of support classes, and social equity.

Teacher recommendations. In D3, D5, D6, D7, D8 and D9, recommendations of teachers were described as an influencing factor in the placement of individual students. The process varied, in some instances, teachers presented lists of names of students they believed were ready for Algebra 1; and, in the embedded case of D3, explicit identification of students who were not ready. In other instances teachers discussed individual students with administrators. For these six districts, teacher recommendation was not the final arbitrator of the decision, but used in conjunction with other factors. In D1, D3, D6, D7 and D8, the principals noted that their teachers presented recommendations with regards to the general appropriateness of Algebra 1 as a course offering in the eighth grade, expressing that not all students were ready for Algebra 1. In the case of D1, a degree of internal confliction existed, as this principal

(D1P), along with teachers at the school had some disagreement with the district's mandate of algebra-for-all.

Only in D7 did the principal report that teachers expressed belief that a greater percentage of students would benefit from taking Algebra 1 in eighth grade. It caused the principal to redesign the mathematics program and allow teachers to support the growth in Algebra 1.

> I had three teachers who didn't mind staying well after contract hours to get that done because they saw the results and they were truly there for results (D7P).

When it came to teacher recommendations regarding the direction that schools should take concerning Algebra 1, with the exception of the middle school in D7, teachers favored a more restrictive process. The principal in the algebra-for-all district (D1) noted an effort to address the concerns of teachers,

> And so we had a lot of conversations with teachers, because some teachers did not really believe that all eighth graders should be in algebra (D1P).

The D5 superintendent and principal both shared that many seventh grade students in their district attended a summer program called ARCHES (Alliance of Regional Collaborative to Heighten Educational Success) that provided summer enrichment instruction in algebra. Students received an algebra recommendation at the end of the program which aided the principal's decision-making, "I used teacher recommendations, CST (California Standards Test) scores and ARCHES recommendations" (D5P).

Grades. In the instances where teacher recommendations were expressed as a discriminating factor, the administrators also noted student "grades" as influencing the decision. The administrators did not establish how the grades were used, however. For example, one principal (D3P) shared that when "poor grades" were coupled with a low CST score, and a teacher's recommendation, the student was placed in a class lower than Algebra 1.

Assessments or lack thereof. Some administrators noted assessments as a factor supporting the placement decision, while others offered the lack of assessments as a constraining factor. Foremost in use as an influencing factor was the students' previous scores on the CST. Administrators in 7 of the 9 districts (D3, D4, D5, D6, D7, D8, and D9) shared that the CST was used to support the placement decision. None of the administrators said that the CST was the sole factor for Algebra 1 placement. However, a decision existed in D4 to use a CST cut score when determining which algebra students would also receive an algebra support intervention class. The availability of intervention or support classes was seen as an influencing factor in this district, and others, to promote and justify greater access to Algebra 1.

One principal in D9 shared the experience of questioning the use of CST scores for placement decisions, "We never used an official CST score as a guideline, because we quickly realized that it wasn't always the best indicator" (D9P1). This principal discussed that when starting as principal at this school, the practice was to give a school developed placement exam to seventh grade students. Students would either be placed in an Algebra Readiness class, or in an Algebra 1 class, depending on the results on the placement exam. This principal believed too many students were placed in the Algebra Readiness class that provided too little exposure to algebraic concepts. Therefore, this principal worked with teachers to develop another option called Algebra Essentials. They still administered the placement exam, but considered other factors as well, (i.e., teacher recommendations and grades), when placing students into an eighth grade mathematics course. The students in the Algebra Essentials class took the end-of-year Algebra 1 CST even though they did not experience the full Algebra 1 course.

Students in this class would use the same algebra textbook and pacing guide as those students in Algebra 1 but would not be expected to "keep up" with the pace. They would not complete the necessary chapters by the end of the year, but would be allowed to take the end-of-year Algebra 1 CST since they had exposure to Algebra the entire school year (D9P1).

In the other middle school in D9 the assistant principal (D9AP2) shared a more concrete placement protocol using the CST, and indicated a lack of a formal district policy, stating,

> School policy for placement in 2012-2013 was any student who scored "proficient or advanced" on the Math CST would be enrolled into Algebra 1. Students that scored "basic" could be placed in Algebra 1, if their seventh grade teacher recommended them and they were also taking support math intervention in-lieu of an elective. There is no formal district policy (D9AP2).

The principal in D8, a district identified as having an expectation of Algebra 1 in eighth grade, referred to the use of a combination of the CST score and district benchmarks. Students that scored "Basic" or below on the seventh grade CST and were also below 50% on the benchmarks were placed in Algebra Readiness; all others at his school were placed in Algebra 1. The only other reference to a district placement test was in D6. This district provided a placement test to sixth-grade students to determine who would accelerate to Algebra 1 in seventh grade.

Teacher quality. Administrators in D3, D4, D6 and D7 each shared that a constraint they experienced in developing an algebra pathway for their students was the quality of their teaching staff. They expressed that some of their teachers were not able to teach algebra well, and it limited their ability to place students. Specifically, the access to Algebra 1 in eighth grade was constrained by the spaces available for students in the classrooms of teachers deemed capable to teach the course. This limitation was compounded, they felt, because the remaining teachers would often be responsible for teaching math to seventh graders. If not taught well the seventh grade students may not attain some of the measures used to make the eighth grade Algebra 1 placement decision. In D8, the principal expressed a perceived attitude from teachers that affected student outcomes, stating,

> They were giving a lot of failing grades but it was just, you know, that was the way it went. And I think that the teachers had more of, hey, kid's problem, not ours. We're teaching algebra. They're not getting it (D8P).

As noted previously, D8 was a district with an expectation that students would access Algebra 1 in eighth grade. The district's position contrasted with the perceived attitude of teachers, and caused this principal to doubt the effectiveness of his school's ability to serve students, "Once they [students] got to seventh and eighth [grade], they just started tanking" (D8P). This principal and the principal in D1 (D1P) both admitted placing students in Algebra 1, "against my better judgment."

Support classes. Administrators in districts D1, D4 and D7 noted the ability to place students in additional support classes to aid the acquisition of algebra. The support class was provided in lieu of an elective course offering. Students received additional instruction aimed at supporting students to understand the underlying principles of algebra and number sense. Both assistant superintendents (D1AS1, D1AS2) in D1 expressed the availability of support classes as a justification for the algebra-for-all mandate in their district. Students perceived as needing support were mandated to take the support class. Though districts D4 and D7 had support classes, there were limitations; specifically, funding and staffing. The administrators in this district admitted that not all students who needed the intervention received it. The lack of support interventions was mentioned by administrators in D6 and D8 as inhibiting constraints that kept students from algebra. These administrators acknowledged that having support interventions would have aided their placement decisions.

Social equity. The district level administrators in D1 and D4 noted that limiting access to Algebra 1 in eighth grade adversely affects students' ability to access higher level math courses in high school. Unlike in D3 and D6, where the district and site administrators discussed the need to have accelerated pathways in math for certain students based on parental and community expectations, the assistant superintendents in D1, believed that all students should have access to Algebra 1.

> It was the belief in [District 1] that we wanted to provide students the opportunity to have access to as many higher level mathematics classes as possible. Having students placed in Algebra I in eighth grade opened more opportunities for the higher level math courses (D1AS2).
>
> It was more of the other philosophical approach that we want every door to be open for kids as they go through. That algebra is accessible for eighth grade students (D1AS1).

The principal in D1 however, did not affirm the policy, and discussed how many students were ill-served by being placed in the Algebra 1 class, even with supports.

> I think looking at how the kids are performing now in the classes, the placement of all of our eighth graders in Algebra 1 may not have been the best decision in the sense that, many of the kids didn't have the requisite skills, they hadn't passed pre-algebra, or hadn't learned all of those skills in order to be successful in algebra (D1P).

The D4 district administrator described the movement toward and the acceptance of Algebra 1 access for all students as a “shift” that school personnel were experiencing over time.

> The philosophical shift was occurring slowly but surely so that college preparatory classes at the high school would be accessible to all students (D4DA).

The assertion was that as more teachers and administrators in D4 accepted that Algebra 1 was appropriate, and should be available to more eighth grade students, an added benefit would occur to the students in high school.

Summary of sub-question 2. In additional detail, administrators described the influences of multiple factors and constraints on their decision-making process. Many described the effect the expectation of the district regarding student placement in Algebra 1, whether explicitly expressed or simply understood, had on their decisions. Offered as well, were multiple factors and constraints that either promoted or inhibited algebra placement. Participants described the factors and constraints as uniquely affecting their decision in distinctive ways which in turn led to distinctive placement decisions that varied from district to district.

Sub Question 3: How did the California accountability system influence their decision-making process relative to eighth grade math placement?

The effects of the California accountability system on middle school and junior high schools is discussed in Section 1. A penalty was applied to a school's API score for each eighth grade student that did not take the Algebra 1 test, or a test considered higher than Algebra 1 (i.e., Geometry) (CDE, 2010). Students, who completed a yearlong course in Algebra 1, generally took the Algebra 1 end-of-course exam. Student scores on the exam were calculated into the aggregate score of the school. All 18 administrators acknowledged understanding how the accountability system worked. They described in varying detail how student results on the math tests affected their schools' data and the impact of the penalty on their schools' Academic Performance Index (API) scores. The administrators fell into two camps when it came to whether the state's accountability system influenced their decision. Some said it did, others said it did not. The API of a school could be negatively affected in two ways, (1) more students in Algebra 1, but scoring poorly on the CST; or (2) not assigning students to Algebra 1, leaving them to take the General Mathematics CST and absorbing the penalty, which is applied to eighth grade students taking a state test considered lower than Algebra 1. The following data represent whether or not the state's accountability system, or more specifically the API-effect, was a factor in the placement decision.

API was not an influencing factor. One of the five superintendents (D3S) participating was adamant that the accountability system did not influence placement decision, responding to the questionnaire,

> We try to place all students appropriately based on their performance/ability level vs. cramming them all into a mold predetermined by an adult (D3S).

This sentiment was echoed by the principal (D3P) who affirmed that the impact on API did not influence the decision. There was a divide in districts D1 and D9 between the site and district office concerning the API penalty and its influence on decision-making; the principal in D1 believed that the impact on API moved the district administrators toward the algebra-for-all position; conversely, the superintendent in D9 expressed API implications did influence the district expectation to place more students in Algebra 1, however, an administrator at one of the sites in the district expressed the opposite view and described how other factors, primarily teacher recommendation, influenced the decision. Principals in D5 and D7 both declared that there were no API considerations when placing eighth grade students into eighth grade math classes, and they, absent a district position, operated in an autonomous fashion to place students.

API was an influencing factor. In several districts, administrators admitted that the API-effect influenced their decisions. One superintendent commenting on the API, and the district's expectation for students to be placed in Algebra 1, said "It had everything to do with it" (D6S). Another superintendent expressed it this way, "I believe the state's accountability system influenced the placing of a majority of eighth grade students in Algebra. It influenced my position" (D8S).

Administrators in D1, D2, D4, D6, D8 and D9 shared that the API impact influenced their decisions and processes for eighth grade math placement. As mentioned before, in D1 and D9, there were differences of opinion on this matter. Nevertheless, as this is a qualitative study seeking to understand the lived experiences of the participants who had firsthand knowledge of the phenomenon, the expressions of "yes, it did" and "no, it didn't" are viewed equally objectively. The assistant superintendent in D6 commented,

> The previous impact on API for students not taking Algebra 1 in eighth grade caused us to make Algebra 1 in eighth grade our default pathway for many years. The eighth and ninth grade penalty strongly impacted placement in our district (D6AS).

The scoring impact of the Algebra 1 placement decision was also expressed as a factor in the school's strategy to address ongoing Program Improvement (PI) status. The federal government considers a school's API progress as one of the measures to move the school out of PI status. Schools are to show progress over time in math outcomes as one on the measures to exit PI status. The impact of the API penalty on non-algebra students was noted as a consideration in D2 and D4, so they placed more students in Algebra 1.

How administrator's dealt with influencing pressure of the API-effect was typically expressed by some with a level of regret. Three principals believed their decisions were not in the best interest of students (D1P, D8P, and D9P); administrators in D1, D2, D4, D5, D6, D8 and D9 acknowledged knowing that students they placed in Algebra 1 would perform poorly, not only in the class but on the test as well. The D5 superintendent shared, "We knew our test scores could suffer from placing more eighth grades into Algebra 1" (D5S). The D5 principal concurred, "Last year I doubled the amount of Algebra students and my scores in both areas, Algebra 1 and General Math, dropped significantly" (D5P). In D9, the principal commented that the API applied "pressure" to place eighth grade students in Algebra 1 that normally should not have been placed there, but the principal was able to mitigate this influence by developing an Algebra Essentials course at his school. One principal (D6P), in discussing the impact of the state's accountability system shared an internal conflict that this principal felt had to be overcome: whether or not to hold back students ready for the Geometry course in order to bolster the Algebra 1 scores.

Summary of research sub-question 3. With regards to the state accountability system and its influence on the placement decision, the participants described their experience in one of two ways (a) it influenced the decision; or (b) it did not influence the decision. Administrators in a majority of the districts studied affirmed that the state's accountability system and the effect that algebra placement could have on their schools'

API scores influenced their decision. Administrators in one district noted that due to the State Board of Education decision to undo the penalty associated with the General Mathematics test in 2013, the district relaxed its expectation for students to be complete Algebra 1 in middle school.

Sub Question 4: How will administrators in Shelton County describe their eighth grade students' overall performance on the end-of-course California Standards Test?

Administrators had the opportunity to describe the performance of the students in their systems relative to the placement in eighth grade mathematics. As the decision makers reflected on the outcomes students produced in their schools and districts, a few categories of descriptions emerged. Administrators acknowledged that eighth grade students performed poorly in Algebra 1. However, in some instances, this acknowledgment was moderated with references to mitigating circumstances, such as a lack of interventions or potentially high scoring students being siphoned off into geometry courses. In other instances, administrators offered positive descriptions of their students' results. The following analyses represent themes that emerged in the data associated with student performance.

Students performed poorly. Administrators in D1, D2, D5, D6 and D8 described students in their districts as performing poorly. Words and descriptors such as "very weak", "poor results", "lowest scores in the district", and "scores in eighth grade dropped as expected", were offered by participants. In D6, the decision to relax the expectation of Algebra 1 in eighth grade and the resulting outcomes did not change how one administrator described the performance, “we placed fewer students in Algebra 1, still scores were low” (D6AS). Though administrators in these districts attributed student performance to their placement practices, some administrators allowed for additional factors.

Poor student performance, however. In some instances administrators offered descriptions of student performance with qualifying explanations. For instance administrators in D1and D6 attributed poor performance in Algebra 1 in part due to the increase in eighth grade students in Geometry, assuming that these students would have improved their algebra scores. Also, D6P noting the difference in scores, expressed that the outcomes in algebra were dependent on which teacher students been assigned. This assertion was made by D7P as well. One D1 administrator expressed the performance in Algebra 1 as low, but when compared to the performance of students countywide and statewide, the performance was acceptable in light of the fact that, comparatively, a greater percentage of students in D1 were completing Algebra 1.

Positive student performance, however. Some administrators in D1, D3, D4 and D7 provided more positive descriptors of student performance than did their counterparts. The principal in D3 said, “We’re very pleased with our results,” yet, here, as above, the principal qualified the statement “as compared with the state and the county.” The administrators in D1 and D4 described performance as held steady, and marginally better. The D4 administrator shared that “there weren’t enough support classes, and some of the classes weren’t full” (D4DA).

The principal in D7, who worked with a few teachers to expand access to algebra and provided homework support, wrote in the questionnaire,

> We're proud of the number of students in Algebra 1 our advanced/proficient rates as well. In 2012-13, many of our "General Mathematics" students were accelerated by an ambitious group of teachers and pushed students to take the Algebra 1 test (the teachers taught foundational math alongside Algebra to get the students back on grade level). We knew we would take an API hit for this (because of some performance)… but we knew THE STUDENTS WOULD BE BETTER… so we did it.

The principal qualified his statement in the follow up interview when describing student performance clarifying that the positive results were attributable to certain teachers, stating,

> We were definitely getting results, well, at a micro level we were getting results, i.e., I mean I knew that there were a couple teachers that didn't get the results (D7P).

Summary of research sub-question 4. The description of student performance indicates a reflective acknowledgment by administrators that they supposed their placement decisions affected the outcomes of students and the scores assigned to their schools. In some instances administrators also associated other factors to student outcomes.

Sub Question 5: What other information or support, if any, would administrators in Shelton County say would help them in making their decision to place students into eighth grade Algebra 1?

This sub-question determined if administrators had suggestions for improving the decision-making process relative to eighth grade mathematics placement. Upon reflection, what would administrators offer as additional factors or supports would have assisted them in the decision-making process? Also, what, if anything, would they say was missing in their school or district that would assist the process in the future? The administrators offered several programmatic suggestions that they contended would support the decision-making process. The suggestions follow next.

K–12 perspective. When reflecting on aspects missing in their districts, many administrators viewed a lack of a districtwide Kindergarten through 12th grade mathematics perspective as a limiting factor. Administrators in D1, D2, D4, D6 and D8 shared that mathematics was not viewed as a continuum of instruction. “Why didn’t we have the same concern about algebra readiness in fifth and sixth grade?” asked one administrator (D4AS). Developing an “intelligent math pathway” (D8P) is needed, with “better alignment” (D4AS), and greater review of how students are doing in high school (D2P).

> There should be representation all the way across even if it's just a decision that's going to impact middle school math curriculum. We want to hear from Kindergarten through fifth grade and we need to hear from ninth through 12th grade (D3AS).

A desire for greater continuity in instruction and better understanding of what was occurring across the grade levels were expressed as additional factors that would be useful in designing a mathematics pathway of courses.

Improved instruction. The quality of instruction that students received was described by administrators in D1, D3, D4, D6, D7, and D8, as affecting the students' ability to access and be successful in Algebra 1. These administrators asserted that students matriculated through their systems ill-equipped for the rigors of algebra. Administrators from these districts shared that the causes for the perceived poor quality of instruction resulted from low-content knowledge of teachers in the lower grades, and the inability of instructors regardless of grade-level to effectively teach mathematics conceptually.

> I found was that intermediate teachers were not experts in mathematics, and our students were not getting the depth of knowledge that they needed in order to be successful (D1AS2).
>
> My work with data in our district's math continuum has led me to believe that the problems in algebra were profoundly affected by math instruction being so weak in the area of math concept. So, although our second through sixth grade math scores were pretty good, the foundational understandings that would support success in algebra were not as weighty on the test – so weren't a focus for teachers. We have become incredibly weak in teaching math concept (D3AS).

Addressing poor instruction with additional professional development and training was expressed as a potential mitigating strategy by D3AS and D4DA.

More options. The lack of broad course offerings in middle school mathematics was viewed as a limiting factor in D1, D2, D7, D8, and D9. In two instances (D7, D9) the principals made moves to provide additional types of courses for their eighth grade students to take. Not so in the other districts. Three principals (D1P, D2P and D8P) each expressed that they believed students would have been better served if there had been options other than Algebra 1. Also, the lack of existing or sufficient support interventions was viewed by administrators in D3, D4, and D9, as program flaws restricted their decision to place eighth grade students in Algebra 1; according to them had there been adequate support interventions more students would have been assigned to Algebra 1. The superintendent in D6 expressed a level of regret regarding the move to place students in Algebra 1, sharing that another course was preferable,

> We always had a contingent of students (approximately 50%) that were ready for the rigor of a true Algebra I or Geometry class in the eighth grade. The remainder of our students would have been better served in a pre-algebra class so that they could better develop their skills and take Algebra I as a freshman at our high school (D6S).

The prospect of additional course options ran counter to the state's framework for mathematics, which presented Algebra 1 as the grade appropriate course (CDE, 1998).

Student considerations. Administrators in D1, D4, D6, and D7 identified a desire to consider student needs. Specifically, in D1 and D6, an appeal was expressed to know more about middle-school aged student brain development. The petition came from teachers in these districts who were skeptical about the push for middle school algebra and questioned if it were appropriate developmentally for eighth grade students. Whereas the D1P thought this was a legitimate concern of teachers, the D6AS did not buy the concern, seeing it as a deflection. However, noting the call from teachers to know more about adolescent minds, D6AS admitted that having the research at hand could have been used to garner support, presuming the research was affirming of algebra readiness.

The impact that algebra has on the social and emotional development of students was offered as another influencing factor to be considered when placing eighth grade students into mathematics courses. "What are we doing to kids?" asked D4DA. An assistant superintendent in D1 admitted that the social and emotional impact on students had not been a consideration in the algebra-for-all policy; however, this administrator (D1AS1) expressed that believing this should have been a consideration, mirroring the principal's position (D1P).

The principal in D7 discussed the students' commitment to completing independent work as an indicator of readiness for the rigor of Algebra 1. Students at his school simply were not completing homework and this was viewed by this principal and the teachers as a barrier to accessing algebra. The principal (D7P) perceived the lack of homework completion as a dysfunction of the students' home lives that could be addressed at school. As a result, this principal collaborated with teachers and created in-school homework time for math.

Teacher representation. Administrators in D1, D2, D4, D6 and D8 expressed the need for greater teacher input into the mathematics pathway of courses in their district, the process for placing students, and the development of the instructional program. The specifics of the representation were not well defined, yet, it was definitely a need felt in their systems. In D1, an assistant superintendent said, "Well, definitely you want your teachers to be part of that decision-making" (D1AS2). This administrator suggested articulation on planning and pacing occurring vertically among several grade levels, "so that the left hand knows what the right hand is doing and there isn't this blame factor that we have had in the past." Increasing mathematics articulation between teachers across grade levels and schools within a district was presented as a potential supportive factor in making future decisions by administrators in D1, D2, D4, D6 and D8. D6AS added that articulation would be helpful across the county.

Summary of research sub-question 5. The data revealed that, upon reflection administrators could identify additional factors and considerations they believed would have aided their processes of decision-making relative eighth grade mathematics placement and be additive to the process in the future. The administrators described,

- a need for greater continuity in the mathematics instructional program districtwide,
- improving the quality and effectiveness of instruction in the early grades as well as in middle school,
- providing more course options for students,
- taking into consideration student brain development and student social and emotional needs, and

- seeking greater teacher representation in the development of the mathematics pathway as additional considerations for eighth grade student placement in mathematics.

Findings by Research Proposition and Associated Theoretical Foundation

Yin (2009) advised anchoring data analysis to the research theoretical proposition and the associated theoretical framework. Babbie (2004) and Tomchin (2006a) agree that constructing analysis in this fashion supports the face validity of the research as it provides a common sense linkage of evidence to the research problem and associated literature review. This research was grounded in administrative theory in education which purports that decision-making is the central behavior of administration (Bernard, 1938; Griffiths, 1959; Simon, 1993). The research proposition, which theorized that factors other than math aptitude influenced administrative decision-making in placing students in eighth grade math classes, was derived from administrative theory and supported by the professional literature. The following analysis offers results connected to the research proposition and to administrative theory.

Affirming the Theoretical Research Proposition

The study's theoretical research proposition asserted that some administrators in Shelton County considered factors beyond math aptitude when placing eighth grade students in Algebra 1. The lived experiences of the administrators participating in this study revealed that indeed in all of the districts investigated, factors and constraints other than student aptitude existed and influenced the decision to place students into eighth grade math courses. In all of the districts, examples of considerations beyond an objective measure of student mathematical aptitude were offered. Even in districts in which the Academic Performance Index (API) effect on a school's state ranking was not offered as an influencing factor, considerations such as equity, staffing, teacher quality and parental influence were discussed as affecting the decision.

The analysis of the guiding research questions revealed that a student's likelihood of accessing Algebra 1 in eighth grade in Shelton County in 2011, 2012 and 2013, had as much or more to do with the district in which the student happened to live, as it did the aptitude the student had in mathematics. Recall that the above analysis answering the "how" and "why" research questions and explaining the variance in Algebra 1 placement revealed factors that influenced the placement process. Table 8 presents the non-math aptitude influencing and constraining factors offered by participants, when at least one administrator described the factor as impacting the decision to place students in Algebra 1.

Table 8

Non-Math Aptitude Factors Influencing Eighth Grade Mathematics Placement by District

Factor Influencing Decision	District
Availability or Lack of Support Classes	D1, D4, D6, D7, D8
Parental Influence	D3, D6
Scheduling	D2, D3, D4, D5, D7, D8, D9
Social equity in access to Algebra 1	D1, D4
State Accountability System	D1, D2, D4, D6, D8, D9
Teacher Quality	D3, D4, D6, D7

The decision-making experiences as described by the participants revealed that influencing and constraining factors existed beyond mathematical aptitude that impacted their decisions, thus the research proposition is affirmed.

Findings Relative to Administrative Theory

In Section 1, the review of the profession literature on administrative theory in education suggested that the process of decision-making can be explained by observing two models, (a) classical, and (b) behavioral. The classical model is completely rational (Simon, 1997). In this model, the administrator follows a logical sequence of steps, has complete information, considers all alternatives in order to select the best course of action aligned with the organization's goals, and implements the action accordingly and evaluates the results. The behavioral model on the other hand differs from the classical model in that the administrator is operating in the real world, without the luxury of unlimited information, time and resources and is confronted with various constraining factors (Hoy & Miskel, 2001; Evers & Lakomski, 2000).

The data analysis in this research revealed that the participants exercised aspects of the behavioral, or non-classical, types of decision-making processes. The behavioral models of decision-making are not pure processes as there is no one-size-fits-all approach (Hoy & Tarter 1998; Tarter & Hoy, 2010), and the following analysis associates the administrative behavior of the participants with the behavioral models of administrative decision-making discussed in Section 1.

Administrative model: Satisficing. A behavioral model of decision-making known as the administrative model (Hoy & Miskel, 2001; Simon, 1993) places emphasis on the process of “satisficing” where satisficing is understood to be an attempt to find “a satisfactory solution rather than the best one” (Hoy & Miskel, 2001, p. 318). In this process the administrator attempts to satisfy as many expectations as possible, while at the same time, mitigating constraints without creating new or greater problems for the organization. The administrative model of decision-making assumes that complete rationality is unattainable (Hoy & Miskel, 2001; Hoy & Tarter, 2010; Simon 1947, 1993), and no ultimate or perfect solution exists. Table 9 shows evidence suggesting that the satisficing strategy was utilized by participants. The evidence illustrates the types of expectations and constraints that an administrator within a district attempted to satisfy or mitigate.

Table 9

Expectations and Constraining Factors that Administrators Attempted to Satisfy or Mitigate

District	District Expectations	Constraining Factors
D1	District algebra for all Equity of access Expectations of high school staff State Accountability System Support classes provided	Internal conflict of site principal Teacher reservations of student preparedness
D2	District algebra for all State accountability system	Ineffective articulation with high school Scheduling
D3	Parental expectations Teacher recommendations	Ineffective articulation with high school Poor teacher quality Scheduling Teacher reservations of student preparedness
D4	District algebra for all Equity of access State accountability system Support classes for Algebra 1	Scheduling Poor teacher quality
D5	Summer algebra prep Teacher recommendations	Scheduling
D6	District algebra for all Parental expectations State accountability system Teacher recommendations	Ineffective articulation with high school Lack of support classes Poor teacher quality Scheduling Teacher reservations of student preparedness
D7	Support classes Teacher recommendations	Ineffective articulation with high school Poor teacher quality Scheduling
D8	District algebra for all State accountability system Teacher recommendations	Internal conflict of site principal Lack of support classes Scheduling Teacher reservations of student preparedness
D9	District algebra for all State accountability system Support classes Teacher recommendations	Internal conflict of site principal Scheduling

The descriptions of how and why the administrators addressed these issues are discussed in the analysis of the research sub-questions. The analysis associated with research sub-question #4, revealed the participants' reflections on the student outcomes in their districts as a result of their decisions. Additionally, the analysis of research sub-question #5 describes participant suggestions for improving the processes going forward. These reflections coincide with the evaluation of results found in both the classical, and behavior models of decision-making (Hoy & Miskel, 2001; Lunenburg & Ornstein, 2004).

Incremental model: Muddling through. Another model of behavioral decision-making evident in three districts was the incremental model, described as "muddling through" (Lindblom, 1959, p. 9). In this process the administrators moved their school along incrementally, making changes over time as the situation in their view warranted adjustments, and the adjustments could be implemented without overly stressing the organization. For instance, the administrators in District 6, moved away from the Algebra-for-all eighth graders stance. They noted that student outcomes in Algebra 1were poor and the administrators acknowledged that state's accountability system had influenced them in making the placements. After the 2010 school year their approach shifted and fewer students were placed in Algebra 1.

The incremental model was evident in D7 and D9 as well. The site principals in these systems shared that they had high levels of autonomy when constructing the mathematics pathway in their schools. The pathways developed overtime, with differing levels of Algebra 1 access. In D7, the math program promoted greater access to Algebra

1 as support classes and interventions were implemented and students experienced success. In D9, the principal implemented pre-algebra type courses that did not align with Algebra 1 completely but served to provide instruction in essential concepts. The archival data suggests that tinkering with placement decisions occurred during a three-year span (Table 2; Table 3; Table 4) in all of the districts. Even the most aggressive district, with regards to Algebra 1 placement (D1), experienced fewer students placed in Algebra 1 overtime.

Evidence of Quality and Procedures for Accuracy and Credibility

Reliability and Validity

In order for research to be deemed reliable the design would yield the comparable data if it were repeated by other researchers (Babbie, 2004) and would generate similar interpretations (Kirk & Miller, 1986). For research to be deemed valid the design would ensure that the data collected addressed the concern, issue, or phenomenon they were intended to address (Babbie, 2004) and the subsequent findings considered trustworthy (Lincoln & Guba, 1985). Authors noted the distinct linkage between reliability and validity (Creswell, 2007; Kirk & Miller, 1986; Yin, 2009) or more succinctly they detailed the affect that reliability has on validity. Yin and Creswell placed reliability as one of the criterions or tests of validity, essentially agreeing with Guba (1981) that reliability is a qualification of validity. In this study, elements that supported a valid design and protected against threats to reliability were present. These elements included provisions for construct validity, internal validity, and external validity, as well as, procedures that strengthened reliability. Each is explained below.

Construct Validity and Chain of Evidence

Yin described construct validity as "identifying the correct operational measures for the concepts being studied" (Yin, 2009, p. 40). Yin was concerned that the researcher had defined the phenomenon well, described the issue thoroughly, and then selected appropriate measures that specifically addressed the matter. Construct validity is enhanced when multiple sources of data converge upon the issue (Creswell, 2007; Yin, 2009). The central phenomenon studied in this research was the various paths that administrators took in making local placement decisions for eighth grade students in mathematics and the various impacts these decisions had on school and district outcomes. The design increased construct validity by examining multiple sources of evidence relevant to the problem. In this study, archival evidence presented unobstructed objective data (Stake, 1995) regarding each school district's actual placement of eighth grade students in Algebra 1 and the associated outcome. Participants with firsthand experience with the issue were provided an opportunity to describe their experience via a questionnaire with open-ended questions and prompts. Additionally, the evidence included responses given in a semi-structured interview that allowed deeper probing and follow-up questions for clarifying participants' knowledge of the issue and reflections on their involvement.

Face validity. Babbie (2004) presented that face validity is achieved when the research is constructed in a common-sense manner. The evidence should sensibly appear to address the research questions. The validity of this research is demonstrated "on its face" (Trochim, 2006a, para 5) by the systematic linkage of the evidence to the research questions and to the review of the professional literature on administrative theory.

Chain of evidence. While defining construct validity, Yin (2009) also promoted that a chain of evidence is established to increase reliability. The chain of evidence established in this study flows from

(a) The problem, supported by the review of professional literature that revealed the variations in local math placements and various associated outcomes, and

(b) The guiding research questions that asked how and why the administrators made their math placement decisions, and

(c) The theoretical research proposition that asserted some Shelton County administrators considered factors beyond math aptitude when placing eighth grade students in math courses, and

(d) The theoretical framework for the research which associated the behaviors of the participants with administrative theory in education.

Yin advised that the chain continue by obtaining evidence from a research protocol that retrieves archival data, and, documents the participants' own firsthand descriptions of their experience, both of which occurred in this study. This evidence was organized in matrices which aided the iterative analysis associated with the guiding research questions; moreover, the evidence was analyzed in relation to the research proposition and the theoretical foundation for the study. Ultimately the chain of evidence culminated in a report of findings.

Internal Validity

Internal validity asks whether or not researchers are actually measuring or observing what they are intending to measure or observe (Lewis-Beck, Bryman, & Liao, n.d.; Merriam, 1998). The concern is, that the researcher is unknowingly observing another factor all together, a factor that has neither been considered nor referenced anywhere in the study. Yin (2009) asserted that internal validity is a major interest in an explanatory case study in which a researcher is explaining how and why (*x*) caused (*y*) or, in this research, how and why the various paths to math placement (*x*) caused various outcomes in placement (y). Yin wanted to know if any other possible factors other than (x) influenced or caused (y). Is the researcher on the lookout for (*z*)? If not, then there exists a potential threat to validity. In this study, the potentiality of multiple factors (x's and z's) was addressed in the review of the professional literature: social equity, the state's accountability system, lack of policy, and high expectations for students. These are among the anticipated factors that may have led some administrators to administrate as they did. The research protocol, with its open-ended questions and opportunity for participant reflection, allowed for the potential revealing of these as well as other unforeseen factors.

Inference. Yin (2009) promoted another aspect to internal validity: inference. Is the researcher making the correct inference when the phenomenon was not actually observed? At some point, when reviewing and analyzing evidence from questionnaires, interviews, and archival data, I eventually drew inferences and presented conclusions. To support the validity of the inferences, I followed the strategies of pattern matching, explanation building, and addressing rival explanations. Pattern matching, as discussed earlier, determined whether responses from the various participants produced a common theme. When this occurred, then inductively I drew an inference from the similar descriptions of the experience. Patterns coincided with the theoretical proposition and with research questions, and explanations began to be built. Yin (2009), Stake (1995), and Hatch (2002) all presumed that the explanation be an iterative process.

The earliest stage of the process began at the causal link offered in the theoretical proposition (Yin, 2009). In this study, the theoretical proposition asserted that factors other than mathematics aptitude were considered when administrators made decisions on how eighth grade students would be placed in mathematics courses. Depending on what evidence the protocols produced the explanation either continued down that road suggested in the proposition, or, the proposition was refuted and another explanation was developed. The evidence in this study affirmed the proposition. Additionally, the review of the professional literature presented multiple factors that may have influenced the decision-making processes. The research questions were developed and the research protocols constructed in such a way as to elicit evidence from the participants that, upon analysis, determined which influencing or constraining factors, if any, existed to persuade their decision-making. As developed in the construct validity section, the description of the chain of evidence in this study served to validate the logical development of the explanations. Three other strategies employed in this study that supported internal validity were triangulation, member checking, and peer examination (Hatch, 2002; Merriam, 1998).

Triangulation. Triangulation, as discussed earlier in this section is an essential aspect of qualitative research. Do the multiple sources of information unite around a common theme? Triangulation strengthened the case study design (Yin, 2009). Through triangulation "converging lines of inquiry" (p. 115) developed to support the findings. The data from the questionnaires, the evidence from the archival data, and the responses from the interviews, were triangulated, validating the explanations offered in this collective case.

Member checking. This study utilized the strategy of member checks allowing the participants to voluntarily review the data collected (Merriam, 1998). The verbatim transcriptions of the interviews were returned to the individual participants for their review. When participants may have disagreed with the way their own responses were recorded, they had the opportunity to clarify. All of the interviewed participants confirmed the accuracy of the transcriptions and offered no corrections.

Peer examination. This strategy to support internal validity is offered by Merriam (1998) as a way to allow another set of eyes to review the process and make recommendations regarding the data collection, analysis, and emerging inferences. I had a colleague who has earned a Doctor of Education degree from Walden University serve as my peer examiner. Dr. Lysko had supervised contact to my data, as well as unfettered access to my analysis. I asked this colleague to challenge my assertions as well as my processes in order to produce a report that accurately explains the collective case.

External Validity

Generalizing. External validity provides that the research will produce quality findings one can generalize to a broader population, that is, from this case to another case (Lewis-Beck, et al., n.d.; Yin, 2009). Generalization was aided in this collective case study due to the multiple-embedded-units nature of the design. Since several districts were under review, an argument can be made that the findings will have greater transferability. Yin (2009) warned not to give too much emphasis to anyone embedded unit, otherwise the holistic value of the case may be lost, and it is the holistic aspect of the collective case that creates a compelling narrative.

Limitations. Generalizing beyond the case is not always advisable as limitations exist to the similarities one can expect to find from case to case (Creswell, 2003; Guba, 1981). The sufficiency of evidence and the associated analysis this research elicited provides an opportunity for the reader to compare the context and the findings with the reader's own situation (Lewis-Beck, et al., n.d.). Wilson (1979) and Walker (1980) refer to this ability of readers to apply the study's findings to their unique circumstances as user or reader generalization (as referenced in Merriam, 1998).

Reliability

The extent to which the data collected is reliable affects that extent to which the analysis and findings are valid (Kirk & Miller, 1986; Merriam, 1998). The data collection instruments should elicit the type of information they are intended to elicit from the multiple participants in the study (Babbie, 2004). This consistency is essential to the process (Lincoln & Guba, 1985). Since human behavior is not static and memories evolve, it can be assumed that participants will recall events in unique ways. Thus, having protocols that focused the participants on a particular issue was necessary (Merriam, 1998; Stake, 1995). For this reason, the interview protocol in this study was semi-structured. Each interviewed participant had a few follow-up questions that were the same. The intent was to focus the participants on reflecting upon their decision-making processes as they related to the central issue of eighth grade math placement. If the responses went to some other decision, then the protocol allowed for unstructured questions that re-directed the participant back to the issue at hand. The data are reliable as long as they relate to the problem under investigation (Babbie, 2004). The instruments and protocols were designed in such a way as to optimize the participants' responses around this aspect of their lived experience.

Intended information. Questionnaire, survey, or interview questions and prompts are considered reliable if they elicit the responses and provide the information that they are intended to provide (Yin, 2009). To assist in achieving intended reliability, I posed multiple questions that were directly linked to the theoretical proposition and research questions. Questions and prompts such as,

- Describe your involvement and experience in placing eighth grade students into math courses in 2010 – 11, 2011 – 12, and 2012 – 13.
- Describe any factors, or constraints, that influenced your decision to place students into eighth grade math courses in 2010 – 11, 2011 – 12, and 2012 – 13.

- Has, or did, your process for placing students into eighth grade math courses changed since placing students in 2010 – 11, 2011 – 12, and 2012 – 13? If so, why did the process change? And, how did the process changed?

Piloting. The instrument also must reliably produce the intended data from one participant to the next (Fink, 2006; Creswell, 2007; Yin, 2009). To determine the reliability of the instrument, the researcher will compare and contrast responses. Fink (2002) proposed an additional check for quality, piloting the questionnaire. Piloting provides an opportunity for the researcher to test the data collection instrument prior to the study to determine whether the instrument provides the information it is intended to provide. The questionnaire was piloted by a colleague with a Doctor of Education degree from Walden University who had direct experience with the phenomenon.

Discussion of Findings

The participants in this study shared their lived experiences relative to the research problem, revealing why, and how, they dealt with a complex issue in educational leadership, namely, the administrative decision of placing eighth grade students in mathematics courses (Williams et al., 2011). These decisions occurred during a time of high-stakes accountability on all public middle schools in California. The state utilized a scoring system that punished middle schools for not having eighth grade students complete an Algebra 1 course and take a standardized end-of-course exam. The archival evidence showed in this region a wide variance in the Algebra 1 placement decisions (CDE, 2011b, 2012, 2013). Though the placement decision affected the state's Academic Performance Index (API) of each participant's middle school, the data analysis uncovered an overall lack of consistency in the administrative decision-making thinking from district to district. The issue itself did not vary among the nine unified school districts studied within this region of California; the approach to the issue however, did vary. The guiding research question sought to explain how Shelton County administrators accounted for their decision-making experiences that led to the observed variance in Algebra 1 placement. The associated sub-questions uncovered factors that influenced the participants' decisions. The questions revealed what affect, if any, the accountability system had on their thinking, and how the participants viewed their students' outcomes. Participants provided examples of support structures and information they believed were lacking in their districts and would have been helpful in making decisions and useful in informing future decisions. These concerns, as well the study's findings, are examined in the following discussion.

Discussion Relative to Administrative Theory in Education

The findings associated with the theoretical framework established for this project study revealed that administrators employed two models of non-classical behavioral decision-making as they attempted to address the issue of eighth grade placement in mathematics courses,

- the administrative or "satisficing" model (Evers & Lakomski, 2000; Hoy & Miskel, 2001; Hoy & Tarter, 2010, Simon, 1993), and/or,
- the incremental or "muddling through" model (Lindblom, 1959).

The participants faced the issue of assigning students to mathematics courses, when they believed many of their students were not ready to tackle. The issue proved more problematic as factors, external and internal, further complicated the placement decision. Factors such as, the state accountability system, district expectations for placement, teacher quality, teacher course recommendations, lack of student support options, scheduling, and parental expectations, bore on the participants as they developed their placement strategies. These administrators adopted practices that either (a) satisfied as many constraining factors as possible without causing additional problems for their school systems, or, (b) over time they revised their schools' instructional programs to accommodate students and alleviate the stress that the placement problem was having on their schools, or (c) a combination of (a) and (b).

Missed steps. The review of literature on administrative theory in education exposed a gap in the literature regarding a specific decision-making model relative to the question of eighth grade placement in mathematics courses. Nevertheless, the review of models did offer general strategies for effective decision-making. The process of effective decision-making, in the behavioral model offered by Hoy & Miskel (2001), suggested following multiple steps in a cyclical design from defining the problem, to analyzing the difficulties, to establishing criteria for a satisfactory solution, to developing a strategy for action, to initiating actions, to evaluating results. The findings relative to administrative theory showed that aspects of the cyclical design were lacking in our participants' approach to decision-making.

***Establishing solution criteria*.** Though the participants described the problem, and understood the difficulties, particularly the expectations and constraints that they attempted to satisfy or mitigate by their decisions, and they developed and implemented strategies, and evaluated outcomes, there was one aspect of the decision-making process absent in their behaviors: establishing criteria for a satisfactory solution. Hoy & Miskel (2001) offered this as a component of an effective satisficing model. Establishing the criteria for a satisfactory solution provides a measureable target by which to evaluate the actions. The administrators failed to articulate a target for the placement of students in Algebra 1 and they did not establish a goal for reasonable student outcomes. Absent a criterion for success these administrators could not evaluate their processes, and the cycle for effective decision-making was lost.

Policy and values. Two other contributors to effective decision-making in the behavioral model are policy and values. Administering in a behavioral model can be supported by concentrating on major goals associated with policy (Etzioni, 1967, 1986). Outside of D1, in which district administrators articulated a clear stance on Algebra 1 in eighth grade for all students excluding those in special education, there was a lack of a clear focus on the algebra question in the remaining districts. The archival evidence revealed a wide variance in Algebra 1 placement, and the analysis of sub-question #1, revealed instances where district expectations for algebra existed, but not a clear policy or non-negotiable stance. Absent a clear policy, or guidelines for practice, these administrators were left to develop the education program for mathematics according to their own devices.

Individual and organizational values also play a role in decision-making (Begley, 2004; Senge, 1990; Spaedy, 1990; Storey & Beeman, 2009). The evidence showed a level of internal conflict with administrators in D1, D8 and D9. These administrators acknowledged making decisions and implementing actions they believed were not in the best interests of students. Begley offered that values guide administrators' thinking and affect the decisions they make. Holding fast to values was espoused in D1 and D3, though these districts were at opposite ends of the spectrum in Algebra 1 placement. Absent a clearly articulated organizational belief on this issue, these administrators operated from personal beliefs, in some instances conflicting with the district stance on placement, or with the state's accountability system.

Discussion Relative to Instructional Program Coherence

Williams, Haertel, Kirst, Rosen and Perry (2011a) suggested that some school administrators placed eighth grade students in Algebra 1 according to their own undefined decision-making processes. This study affirmed that suggestion, and found no evidence in any of the districts studied that a formal policy existed governing decision-making relative to this issue. Moreover, this study revealed what Williams et al. implied, namely, that customs, traditions, and local operational considerations guided mathematics placement decisions, as did multiple factors beyond a student's mathematical aptitude. A student's likelihood of attaining Algebra 1 in eighth grade in Shelton County was heavily influenced by the district in which the student resided, and the factors unique to the student's middle school. The demographic data showed variance in socio-economic and ethnic make-up of our districts, and similar to what the American Institute of Research (Williams et al., 2011b) and Dr. Matt Rosin (Rosin, 2011) discovered, Algebra 1 placement tended to be higher in the lower socio-economic, higher minority schools. The most aggressive Algebra 1 placements in this study occurred in Districts 1 and 8, which had the highest percentages of low-income and minority students.

Evers & Clopton (2003) posited that multiple factors contribute to the variance in placement decisions. This research bears out that contention. One of the first major contributing factors was the absolute autonomy districts had in addressing Algebra 1 placement. This autonomy led to an absence of regional consistency in approaching the issue. While the state promoted algebra-for-all in its framework, and prior to 2013, punished middle schools in its accountability system for placement decisions lower than Algebra 1, no defining processes were offered in the state mathematics framework to coherently guide a statewide approach to placement (Bitter & O'Day, 2010), in fact Algebra 1 was codified in the state framework as an eighth grade to twelfth-grade course and required for high-school graduation, and not required for promotion to the ninth grade.

None of the participants acknowledged ever considering how neighboring districts approached this issue, relying rather on their own thinking to guide their processes. As mentioned, prior to 2013, the State Board of Education (SBE) left no ambiguity in its preference for students attaining Algebra 1 in eighth grade, but the SBE left the process and decision for placing students in Algebra 1 totally in the hands of local agencies (Domina, McEachin, Penner, & Penner, 2014). District autonomy is reasoned as preferable in instituting educational policy and instructional program reforms (Huberman, Parrish, Arellanes, Gonzalez, & Scala, 2012; Sykes, O'Day & Ford, 2009), however, Hargreaves and Fullan (1998) and Bitter and O'Day (2010) suggested that to achieve higher-order change effecting states and nations, coherent governmental leadership over the long term is required. Eighth grade algebra-for-all is a higher-order change viewed by some to be essential on a student's pathway to Advanced Mathematics and college readiness (Adelman, 1999; Gamoran & Hannigan, 2000) yet viewed by others to be an overreach not absolutely necessary for accessing higher mathematics later in a student's high school and collegiate experience (Bitter & O'Day, 2010; Liang, Heckman & Abedi, 2012; Loveless, 2008; Morgatto, 2008). In the absence of a clear statewide mandate of placement, and in an atmosphere of a competing narrative on the importance of requiring Algebra 1 in the eighth grade, leaders in local agencies were left to approach this problem according to their own professional thinking and individual decision-making processes.

Outside of District 1, superintendents and district administrators did not mandate placement decisions. Site administrators in four districts acknowledged an expectation that eighth grade students in their schools should be enrolled in Algebra 1, but this expectation was tacit in nature and site administrators operated with autonomy in making the decision. Marzano and Waters (2009) noted that this loosely coupled (Weick, 1976, 1982) approach to leadership is less effective than a coordinated well-resourced plan for implementing an instructional program. They and others promoted a concept of instructional program coherence (Madda, Halverson, & Gomez, 2007; Newmann, Smith, Allensworth, & Bryk, 2001), in which guiding principles and explicit instructional program goals (Robinson, 2007) are clearly articulated districtwide and supported by district administration and school board action. Instructional program coherence, an organizational model that defines clear purposes for decisions and offers a roadmap for achieving stated goals, was lacking in districts. Principals in two of the districts shared that no expectation regarding student access to Algebra 1existed in their districts either overtly or tacitly and they too acted with autonomy. The absence of coherence was increasingly evident as participants considered the structures and circumstances unique to their school and district. Administrators described the varying impact that scheduling, teacher recommendations, teacher quality, parental influence, availability of support intervention classes, and the analysis of student measures such as grades, assessments and previous outcomes on state exams, had on their decision processes. As administrators faced these multiple concerns and metrics that influenced student placement in eighth grade mathematics, each had to plan and administer their school's instructional program without a clear organizational approach to the algebra question.

Though a gap existed in the professional literature explicitly indicating that the state's accountability system influenced administrators in the decision to place eighth grade students in Algebra 1, this study offered firsthand accounts of administrators admitting that the system's scoring mechanism and its effect on their school's outcomes, did, in fact, influence their decisions. This influence resulted in a moral dilemma for some, as they acknowledged not making decisions in the best interest of students. Moral purpose (Fullan, 2003) and organizational values are presented as essential components of an instructionally coherent and aligned school system and essential in guiding administrative processes (Sergiovanni, 2005, 2007; Watkins & McCaw, 2007). Absent a clearly articulated coherent organizational approach to mathematics education in their districts our administrators suffered through the problem in varying degrees of isolation, operating according to their own approach to the decision.

Discussion Relative to Participant Reflections

The questionnaire and follow up interview provided participants opportunity to reflect on their decision-making experience. Participants offered suggestions regarding additional information, support and desired attributes they have for their districts' mathematical educational programs, attributes they believed would have helped them in making sound decisions, and would inform future decisions regarding the question of placing students in mathematics courses. The suggestion of developing a Kindergarten through 12th-grade perspective of mathematics education was offered and is consistent with research that supports a coordinated continuum of mathematics instruction beginning in the early grades and continuing through high school (National Council of Teacher of Mathematics, 2014), and supports the aforementioned instructional program coherence that undergirds administrative decisions (Newmann et al., 2001). Participants expressed to me concerns about their district's approach to mathematics and the missing alignment of instruction that their students experience (Huberman et al., 2012), the lack of an intelligent mathematics pathway (Morgatto, 2008), and limited professional conversation articulated across the grade levels regarding the impact that instruction in the early grades has on middle school placement decisions (Watts, Duncan, & Siegler, 2014).

Administrators in six districts promoted improved instruction as a requisite attribute of an educational system preparing students for the rigor of algebra. Research suggests, that internalizing core mathematical concepts understood as essential for success in Algebra 1 is an outcome of quality instruction (Kobrin, Larson, Cromwell, & Garza, 2014). Participants in my study believed that many students entered their middle schools ill-equipped for algebra content. Triangulating this belief, with the administrators' descriptions of their students' outcomes, and the archival evidence of outcomes on state tests of their students as seventh graders, suggested their perceptions of poor instruction were justified. These participants further proposed addressing professional development needs districtwide leading to effective mathematics instruction (Cobb & Jackson, 2011), with particular emphasis on providing meaningful professional development in the early and intermediate grades. This is supported by the National Mathematics Advisory Panel (U.S. Department of Education, 2008) which identified instructional improvements in early grades to support student access to algebra content. The panel recommended that,

> Teachers must know in detail the mathematical content they are responsible for teaching and its connections to other important mathematics, both prior to and beyond the level they are assigned to teach (p. 37).

Participants in five districts offered that a one-size-fits-all approach to middle school mathematics does not serve students well. These participants preferred mathematic course offerings that included options for students, such as pre-algebra and essential mathematical skills and concepts, and incorporated support interventions for students struggling in their math classes. Researchers argued that while eighth grade algebra-for-all may have led to increased percentages of students completing Algebra 1 in middle school (Liang, Heckman & Abedi, 2012), students did not show commensurate increases in completing higher level math courses in 10th grade, suggesting that the effects of the one-size-fits-all intensification of curriculum diminished over time (Domina, Penner, Penner, & Conley, 2013). A less constrained curriculum (Domina, Penner et al., 2013) providing opportunities for students to access mathematics courses more in line with their interests and abilities is offered by Morgatto (2008) and Loveless (2008) as a superior strategy. Conversely, Spielheagen (2010) maintained that algebra instruction in eighth grade levels the playing field for all students. As noted in the findings, principals in two districts oversaw the development of additional courses, specifically support interventions, and variations of the Algebra 1 course, which supported, in their view, the appropriate placement of students.

Also, in five districts, administrators believed that teachers were underrepresented in several important areas including, the development of the mathematics pathways, the planning and pacing of courses, and in the decision to place students. Shared decision-making (Murphy, 2005) is seen as an effective strategy in school leadership, as it fosters greater commitment to the organizational effort. Furthermore, shared decision-making is supported in the instructional program coherence model offered by Newmann et al. (2001) as it fosters staff agreement and "collective responsibility" (p. 301) on the agreed upon goals of the instructional program.

Summary

Summary of Qualitative Method

Though other qualitative approaches were discussed for this research, the case study design surfaced as the appropriate choice for this methodological tradition. Of the case study designs offered, the collective case with multiple embedded units emerged as the most practical (Yin, 2009). As noted, the case study approach can take two directions, one being an in-depth investigation of an organization or system, the other being an in-depth investigation of an issue (Stake, 1995). This collective case study focused on the issue of administrative decision-making relative to the placement of eighth grade students into mathematics courses. Thus, in this case study, the issue was dominant and drove the direction of the study, classifying the case study as instrumental (Stake, 1995). This section also identified participants and their relationship to the issue; and, it established protocols for their selection and ethical protection. Data collection methods suitable for case study were presented as was a detailed description of the process of data analysis used in this research. Also discussed were the assurances of validity and reliability, both of which are essential to qualitative research. The section described the effect of reliability on validity and the efforts to collect data from multiple sources that are directly related to the issue, a fundamental aspect of validity.

Summary of Findings

The data were analyzed and findings were reported in two fashions. First, according to the guiding research questions and the associated themes that emerged (Merriam, 1998) with accompanying quotes or expressed experiences (Stake, 1995), which provided the reader greater context for understanding the phenomenon. Second, findings were reported according to the theoretical research proposition and the associated theoretical framework (Yin, 2009). The summary of the findings are similarly offered.

Summary of findings for research sub-question #1: Describe why there was a variance in Algebra 1 placement. The participants described four factors that created the variance in the percentages of eighth grade students placed in Algebra 1 in Shelton County.

> ***District autonomy.*** The administrators in the nine unified school districts acted independently of one another and did not seek outside consultation from peers in other systems in the placement decision.
>
> ***Site autonomy.*** Site administrators described varying levels of autonomy with regards to Algebra 1 placement.
>
> ***Structures and circumstances.*** The participants described unique structures and circumstances in their districts and at their school such as, constraints of scheduling, parental influence, and high-school expectations for incoming freshmen students.
>
> ***Expectations.*** Participants described the degree to which algebra-for-all existed as an expectation in their district. This expectation was not uniform throughout the region, and the data revealed that, over time, the expectation diminished.

Summary of findings for research sub-question #2: Describe factors and constraints that influenced the decision to place eighth grade students in Algebra 1. The analysis revealed the following influencing and constraining factors:

District expectations. The data revealed, among the districts, varying degrees of expectation that eighth grade students should be placed in Algebra 1. In six of the nine districts, participants described an expectation that increasing numbers of eighth grade students should be placed in Algebra 1.

Specific factors. Several factors influencing the placement decision were offered by participants: teacher recommendations, student grades, student assessments, availability or lack of support intervention classes, teacher quality, and social equity in access to Algebra 1 in eighth grade.

Summary of findings for research sub-question #3: Describe the effect of the state accountability system had on the decision to place eighth grade students in Algebra 1. All of the participants understood the mechanics of the state accountability system and the impact that the decision to place, or not place, eighth grade students in Algebra 1 would have on their middle schools' Academic Performance Index (API) scores. In six of the nine districts, participants shared that the API-effect influenced their decision to place eighth grade students in Algebra 1. Principals in three districts expressed that, in some instances, their decision to place eighth graders in Algebra 1 was not in the best interest of students.

Summary of findings for research sub-question #4: Describe your students' overall performance on the state tests. The participants offered reflections on their students' performance. In five of the nine districts administrators described their students' performance as low, weak, or poor. Administrators in these districts attributed the poor performance in some degree to their aggressive Algebra 1 placement decisions. Other explanations for poor performance were offered, such as performance being a function of which teacher the student had been assigned, and that some potentially high-performing students had been siphoned off to the Geometry course. In four of the districts, positive descriptions of student performance were offered. The participants qualified these positive reflections however, noting that students performed well considering the obstacles they faced, such as, lack of support interventions, and poor teacher quality.

Summary of findings for research sub-question #5: Describe what information or support would help in making mathematic course placement decisions. The participants described the following information and supports that would help in making the decision to place eighth grade students in mathematics courses:

K–12 perspective. The district needs clear and explicit continuum of mathematics instruction throughout the grade levels.

Improved instruction. Having effective mathematics instruction delivered in the primary and intermediate grades will positively affect students' access to algebra content in middle school.

Consider student needs. The district needs to allow student mathematical aptitude and identified strengths and deficits to be considered when placing individual students into math courses.

More course options. Having more options in course offerings will help in placing students appropriately.

Teacher representation in mathematics pathway. Provide for teacher input into the mathematics pathway of courses.

Summary of findings associated with the theoretical research proposition. The proposition asserted that factors other than mathematical aptitude influenced some administrators in Shelton County in placing eighth grade students in Algebra 1. The data analysis revealed that six non-math aptitude factors influenced some administrators in placing students (Table 4). Specifically,

- The availability, or lack, of support intervention classes influenced the decision of administrators in five districts;
- Parental concerns influenced administrators in two districts;
- Scheduling constraints influenced administrators in seven districts;
- Social equity in access to Algebra 1 influenced administrators in two districts;
- The state accountability system influenced administrators in six districts; and,
- Teacher quality influenced administrators in four districts.

Based on this analysis, the theoretical proposition was affirmed.

Summary of findings associated with the theoretical framework. The data were analyzed according to aspects of administrative theory presented in Section 1. Specifically, the administrative model of satisficing (Hoy & Miskel, 2001) was evident in that in each of the districts' administrators described expectations and constraints that they attempted to satisfy or remedy via their decisions (Table 5). Additionally, the incremental model (Lindblom, 1959) of administering was evident in three districts, as administrators described how the placement decision evolved overtime as they made incremental adjustments to their middle school educational program relative to mathematics. The adjustments resulted in a diminishing the aggressive approach to Algebra 1 placement.

Summary of Discussion of Findings

This project study explained how the participants accounted for the observed variance in eighth grade placement in Algebra 1 in this region of California. The study aided participants in revealing the influencing and constraining factors that informed their decisions to place eighth grade students in mathematics courses, including the influence of the state's accountability system. The study tied the administrative decision-making strategies of participants to decision-making approaches suggested by researchers and scholars of administrative theory in education. The discussion revealed missing aspects of the decision-making models provided for in the professional literature. Specifically absent, (a) established criterion for success, (b) established policy or guidelines for practice, and (c) articulated organizational belief on the issue.

In addition, the study supported participants in surfacing underlying deficits that existed in their districts' and schools' educational programs relative to mathematics instruction, and the lack of coherence to an organizational framework for mathematics instruction that leads to successful student access to algebra content. Finally, the study provided opportunity for real-world practitioners to reflect on their decisions, and offer suggestions they believe to be helpful in addressing the gaps in programs and practice that led to observed variance in Algebra 1 placement, and poor student outcomes.

Key Findings that Inform Project

The findings and associated discussion suggest that the decision-making processes of participants were hindered by the lack of a clearly articulated and adequately implemented approach to mathematics education in their districts. The discussion of findings revealed three complex challenges these educators faced, and continue to face, in appropriately placing eighth grade students in mathematics courses, these challenges are:

- Many eighth grade students in these systems are not prepared for the rigor of the mathematics content prescribed for their grade-level;
- The local instructional programs for mathematics are not coherently designed to support students' access to grade-level standards, nor in providing appropriate course alternatives based on the students' identified mathematical aptitude; and,
- Essential elements of effective decision-making were absent (i.e., established criterion for success, established policy or guidelines for practice, and articulated organizational belief on the issue).

These challenges served as the primary inspiration for the project portion of this study.

Outcomes

The guiding question for this project study determined how school administrators in Shelton County unified school districts accounted for their decision-making experiences relative to placing students in eighth grade math courses in the 2011 to 2013 school years. Their collective description of the experience revealed why such variance in access to the Algebra 1 course existed in this region. The theoretical proposition asserted that factors other than math aptitude influenced the math-placement decision of some administrators. The research sub-questions #2 and #3 addressed this assertion and the data analysis affirmed the proposition. The participants described expectations and constraints that they attempted to satisfy or mitigate in their decision-making processes. In three instances, participants described how they adjusted their process overtime. These actions reflect behaviors found in decision-making models associated with administrative theory in education (Orenstein & Lunenburg, 2004), the theoretical framework established for this research. However, aspects of the cyclical design of effective decision-making (Hoy & Miskel, 2001), and the guidance of a clear policy, and well-articulated beliefs were absent across all of the systems.

Through the analysis of sub-question #4 (how well did your students perform?), the outcomes revealed participants' reflections on the student achievement in their systems that resulted from their decisions, both the perceived good results and the poor results. The analysis of sub-question #5 (what supports do you need?) revealed the participants suggestions for helping to improve the decision-making process relative to placing eighth grade students in mathematics courses.

In Section 3, a project is offered that serves to support administrators in making decisions relative to mathematics eighth grade mathematics placement with research-based recommendations developed from the discussion of the findings and a review of the professional literature.

Section 3: The Project

Introduction

The purpose of this project study was to develop a rational framework for use in the placement of students in eighth grade mathematics courses. This framework was based on data collected as a part of an extensive qualitative inquiry conducted with local administrators on their decision-making processes within nine unified school districts in Shelton County, California. Knowing what factors led district decision makers in Shelton County to place eighth grade students in Algebra 1 at such varying degrees, and with such poor outcomes, serves to inform school boards, superintendents and other district officials as they review, update or develop local policies on this issue. This improved understanding of the underlying decision-making processes was designed to lead to systemic and programmatic reforms that amend deficiencies in California middle school students' access to an Algebra 1 course. This section provides a description of the project, the associated goals, as well as, a rationale for choosing and developing the project in light of the key findings presented in Section 2.

In Section 2, I showed how I used the case study method of qualitative research to investigate and explain the decision-making processes of local district and school administrators relative to the placement of individual eighth grade students into mathematics courses. The analysis showed that the placement varied significantly by school and district, and the approaches the school officials used to decide on placement varied as well. I asked the district and school administrators to discuss the approaches they used to make the placement decision, and to describe any influencing and constraining factors associated with the decision.

Their description of the issue and the sharing of their lived experience showed that multiple factors beyond student aptitude influenced their decisions. The analysis of their lived experience showed that in most districts no formal policy existed to guide their decisions, no explicit value statement or district belief on the issue was articulated, and the decision-making processes described by the participants lacked attributes associated with research-based models of decision-making. These findings led me to develop the project outlined in this section.

The review of the professional literature in Section 3 illustrates that the content, and construction, of the project is informed by the study's analysis and by relevant research. The plans for implementing the project, the needed resources, associated timelines, and roles and responsibilities are offered as well. This section provides a design for project evaluation, and a discussion on the project's implications for social change in the local educational context as well as the larger educational community.

Description and Goals

The project developed to address the problem of this study was a position paper that provides policy and practice recommendations. These recommendations are intended to guide local educational agencies in achieving greater instructional program coherence in mathematics education, and to lead to improved student access to algebra content in middle school and support appropriate placement decisions. The position paper containing policy and practice recommendations was constructed according to advices offered by scholars, authors, institutions of higher learning, and organizations dedicated to influencing policy development in education and other social issues (e.g., Food and Agriculture Organization of the United Nations, n.d.; Johnson-Sheehan & Paine, 2010; Tsai, 2006; University of Maryland, 2015; Young & Quinn, 2002). While drafting the position paper, I followed the format of position papers and policy briefs from the National Council of Teachers of Mathematics (NCTM), and the Consortium for Public Research in Education (CPRE) to guide the paper's layout and construction. The position paper includes findings from this research, as well as relevant research related to instructional program coherence.

The goals of this project were:

Goal 1. Increase the understanding and implementation of instructional program coherence in mathematics.

Goal 2. Increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses.

Goal 3. Measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solutions.

Rationale for Project Genre

The key findings from this research include identifying three challenges these educators faced, and continue to face, in appropriately placing individual eighth grade students in mathematics courses. These challenges can be summarized as:

- Many eighth grade students in these systems are not prepared for the rigor of the mathematics content prescribed for their grade-level;
- The local instructional programs for mathematics are not coherently designed to support students' access to grade-level standards, nor provide appropriate course alternatives based on the students' identified mathematical aptitude; and,
- Essential elements of effective decision-making were absent (i.e., established criterion for success, articulated organizational belief on the issue, and established policy or guidelines for practice).

At the time of this study, these challenges existed in a climate of transition as the local districts transitioned to the common core state standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The grade-level expectations in the common core state standards (CCSS) assume eighth grade students have the propensity to understand algebraic content and will master many of the standards previously associated with the Algebra 1 course (Sacramento County Office of Education, 2010). The most recent version of the California State Mathematics Framework (CDE, 2013) available at the time of this study did not offer middle-school alternatives in the progression of courses based on a student's observed deficits in mathematics. As a result the studied administrators continued to confront a problem of placing individual students appropriately in mathematic courses when their students were not equipped to be successful. Thus, the purpose of this project study remains relevant in supporting administrators faced with this problem.

In the research-as-problem-solving paradigm, Archbold (2010) asserted that dissertation processes serve as opportunities to address authentic problems, issues, and situations that practitioners face in their professional lives. The goal of this paradigm is improving the organizations and communities they studied. Archbold (2008) claimed that doctoral research may be motivated to improve practice, solve problems and improve organizational performance. Researchers have maintained that it is insufficient for research to uncover the complexities of real-world problems in education or other fields and draw conclusions, but also to present recommendations, which are based on the findings of research and connected to professional literature (Archbold, 2010; Willis, Inman, & Valenti, 2010). These recommendations go beyond research implications and are intended to guide changes that improve the condition of an organization. Archbold called this a practical contribution, which problem-based research can deliver to various types of organizations and to professional practice. This position paper was intended to provide a practical contribution to educators pursuing the goals of the project in their school systems.

In this position paper I followed the recommendations of Johnson-Steehan and Paine (2010) and Powell (2010) and developed a persuasive argument proposed to motivate the intended audience into implementing a course of action to address the issues associated with the placement of middle school students into mathematics courses. The argument is supported by the summary of research findings, and a review of the professional literature. The intended audiences for this position paper are local unified school district administrators and other stakeholders responsible for the educational program decisions that lead to the placement of students in eighth grade mathematics courses. The problem this position paper addresses is the incoherent practices that led to the variance in placement and the resulting poor student outcomes observed throughout this region. The actions this position paper recommends are researched-based processes that address the core issues of decision-making and system incoherence uncovered in the research. The recommendations lead to greater instructional program coherence and effective decision-making.

Developing a project that provides a rational framework guiding administrators in various Shelton County school systems into making appropriate eighth grade mathematics course-placement decisions required a project genre that accommodated decision makers at multiple levels, (i.e., district and site), in multiple school districts. Unlike a professional development workshop that serves to train professionals in a job-specific strategy (Cobb & Jackson, 2011), a position paper provides background information, reasoning, and recommended actions to the broader audience of stakeholders, those associated with vision casting, policy making, program developing and monitoring, and project delivery (Jones & Walsh, 2008; Young & Quinn, 2007).

As educators strive within their school systems to bring coherence to the instructional program in mathematics, having a singular document to reference supports the common voice and shared vision associated with high-functioning systems (Collins, 2001; Marzano, 2002; Senge, 1990) and aids reform efforts (Elmore, 2000; Hargreaves & Fullan, 1998). A position paper that defines the problem and provides solutions is accessible to each member of the professional team implementing the recommended actions.

Another project genre I considered was a curriculum plan. However, developing a specific curriculum for teachers to deliver, with accompanying teacher training, may support student access to mathematics standards for a particular grade level (Cobb & Jackson, 2011), but will not address the systemic issue associated with this problem, namely the lack of coherence that led to eighth grade placement decisions that participants lamented were not in the best interest of their students. Curriculum plans addressing the "topic" of instructional program coherence, and effective decision-making, for those in administrative credential programs may be additive, but would not provide timely guidance for the decision makers in this collective case study to address their situations. These participants face the issue in real-time and must pursue actions to remedy the causes. A position paper that offers policy and practice recommendations intended to remedy existing systemic deficits represents timely support. Thus, a curriculum plan was not selected for the project.

An alternative type of project genre I considered was a policy evaluation report. While this study did uncover in most districts a general lack of explicit policy guiding placement decisions, it was not a policy evaluation study. For this study, I employed qualitative methods to explain why and how the discrepancies in placement occurred in the embedded cases, consequently a policy evaluation report, though informative, is not an appropriate outcome for a case study that did not perform a thorough analysis of school district policies. Consequently, as with the curriculum plan genre, the policy evaluation report was eliminated as an appropriate project to address the problem.

Review of the Professional Literature

The review of professional literature in Section 1 supported the use of administrative theory in education as the framework for this project study, which posits decision-making as the central tenet of administrative behavior. Furthermore, the review of scholarship in Section 1 revealed the variance in mathematics placement decisions made by administrators in placing eighth grade students in Algebra 1, both in the state and in the geographical region studied. The literature suggested multiple factors influencing administrative practice which produced the observed variance in student access to the first-year algebra course. The following review of recent professional literature provides a scholarly foundation for the position paper containing policy and practice recommendations addressing the findings derived from this study. The key research terms were: position paper, writing policy papers, instructional coherence, organizational values and mathematics education. The search was supported by ERIC, Google, Google Scholar, ProQuest and SAGE.

Appropriateness of Addressing the Problem Through the Position Paper

Professional writing that addresses an issue or problem has various designations, referred to as white papers, argument essays, policy briefs, or position papers. Similarities exist in these types of papers. They each provide a summary or background of the issue with accompanying synthesis of relevant research, tackle competing positions, and offer recommended actions in addressing the issue. The underlying theme is to promote a solution or solutions to a problem (Archbold, 2010). A position paper complements research by providing benefit to the community in which the research was conducted (Archbold, 2008; Barnett & Muth, 2008). An example is the study performed by Eileen Donnelly (2014) who discovered deficiencies in providing online learning opportunities for students in a Mid-Atlantic university. The outcomes of Donnelly's research led to a position paper offering the university strategies to address the deficiencies and promote growth in online learning for its students. Likewise, Mayre Smith (2013) studied the effects that insufficient support for new teachers in a small rural Georgia high school had on longevity in the teaching profession. Mayre authored a position paper recommending the design and implementation of an effective mentoring program for the school to address the lack of support teachers new to the profession experience, with the goal of reducing teacher turnover.

One type of professional position paper, the policy brief, serves to communicate the need for change on important issues in education and provides recommended research-based actions for improvement (National Education Policy Center, 2015). The Consortium for Policy Research in Education (CPRE) a consortium of seven research institutions of higher learning relies heavily on policy briefs informed by research to influence educational reform in our nation. For instance, Supovitz and Christman (2003) authored a policy brief for CPRE in which they presented the research on two distinct reform models intended to foster communities of instructional practice for the purpose of improving instruction delivered to students – one model developed in Cincinnati public schools, and the other in Philadelphia. While both models improved relationships among teachers, only in certain subsets of schools in both cities was instructional practice improved. The researchers drew on what they learned in the study to offer these school systems and the broader educational community explicit recommendations focused on creating professional learning communities that desire improving the effective delivery of instruction. In like fashion, the position paper developed for this project study includes a synopsis of the research and offers rational policy and practice recommendations intended to address the key findings associated with the problem.

Similar to deciding upon a qualitative approach and methodological design for a study, the project-based researcher also determines the approach and design of the project to address the problem; if the approach is a professional paper, then the researcher must settle on the design or construct of the professional paper to produce. Just as a case-study qualitative design may have elements of other qualitative methods, phenomenology, ethnography, and historical narrative (Creswell, 2007) a position paper may contain elements associated with other types of papers. In general, the term "position paper" is widely used to describe a professional paper, however, a narrower interpretation of a position paper is that it is particular, standalone, type of writing, which identifies opposing positions on an issue and presents the author's stance, or position, and the author's recommended actions (Johnson-Sheehan & Paine, 2010). This more exacting definition of a position paper requires a lying out of opposing viewpoints and strives to convince the audience that the author's opinions supporting a particular view are reasoned and logical, and the conclusions are valid (Stewart, 2010). The position paper written for this project, provides opposing views on the appropriateness of a one-sized-fits-all mathematics placement, and promotes a particular position. However, the goals of the project are broader than settling the placement question alone, thus the paper requires a more expansive approach.

As mentioned earlier, professional papers are called by different names. The white paper, for instance is a professional paper that may be used to promote an author's position on an issue, or a solution to a problem. Stelzner (2010) discussed the British White Paper of 1922, also known as the White Paper of Winston Churchill, in which Churchill addresses the political conflict in Palestine offering policy recommendations for the British government, as an example of a white paper intended to influence a governmental body. Stelzner suggested that white papers, though rooted in governmental policy, are often "used in marketing to introduce new and innovative products, particularly in technology to persuade key decision makers in migrate towards a particular solution" (p 1). The position paper written for this project presents an argument intended to persuade educators towards a course of action addressing certain issues of mathematics education.

A third type of professional paper, the policy brief, is a document that either presents (a) a neutral balanced review of an issue and offers key decision makers policy options to consider, or (b) the brief takes on an advocacy role promoting a particular course of action (Food and Agriculture Organization of the United Nations, 2011; Young & Quinn, 2008). Policy briefs provide an avenue for researchers to influence decision makers by linking evidence of research to systemic challenges, suggesting changes in policy or practice, based on the research findings, to improve the performance of the organization (Jones & Walsh, 2008; Young & Court, 2004). There is agreement that a policy brief be concise and focused, with limitations on jargon and length, taking into account that key influencers and those responsible for decisions may not have time to delve into the intricacies of and issue, and may not be experts in the field. Several universities, and institutions and organizations concerned with public policy provide guidelines for writing policy briefs (Global Debate & Public Policy Challenge n.d.; International Development Research Center, n.d.; Overseas Development Institute, 2009; Tsai, 2006; UC Davis, 2011; Young & Quinn, 2002). Guidelines used to inform the policy brief aspect of the position paper development for this project study are presented later in this report.

Of the three professional papers presented (a) the position paper, (b) the white paper, and (c) the policy brief, it is the policy brief – subject to guidelines provided by organizations, universities and scholars – which offered a clear link of research to policy. Archbold (2010), and, Jones and Walsh (2008) explicitly supported the communication of dissertation outcomes informing policy recommendations. Though the term “position paper” is used for this project, the document will include elements closely aligned with the attributes of a white paper, a position paper, and a policy brief.

The following review of professional literature addresses how theory and research support the content of the position paper in addressing the project goals.

Professional Literature Informing Goal 1

Increase the understanding and implementation of instructional program coherence in mathematics. Newmann et al. (2001) defined instructional program coherence as a, "set of interrelated programs for students and staff that are guided by a common framework for curriculum, instruction, assessment, and learning climate that are pursued and sustained over time" (p 297). By defining coherence in this fashion they distinguished it from instructional programs that are fragmented, limited in scope, and insufficient to support enduring improvements in school systems. Newmann et al. further shared that when school leaders implemented coherent instructional reform efforts, attending to the interrelationship between curriculum and the quality of delivered instruction, addressing the interplay between student assessment and instructional interventions, and committing resources to train and equip teachers in effective pedagogy, then student achievement outcomes were increased.

Factors of coherence. Newmann et al. suggested that strong program coherence is evident when the following three conditions are met:

1. A common instructional framework guides curriculum, teaching, assessment, and learning climate. The framework combines specific strategies and materials to guide teaching and assessment (p. 299).
2. Staff working conditions support the implementation of the framework (p. 299).

3. The school allocates resources such as funding, materials, time, and staff assignments to advance the school's common instructional framework and to avoid diffuse, scattered improvement efforts (p. 300).

A scholarly review of seminal and current professional literature regarding these three attributes of coherence is offered below, and informed the position paper developed to address the problem of this study.

Common instructional framework and the opportunity to learn. Educational psychologist John B. Carroll (1963) first introduced the concept of Opportunity to Learn (OTL) as the amount of time that a student needs to spend on learning a task. With "time" being understood as the time a student is actually engaged in learning, not simply the elapsed time. Carroll further posited that the time necessary to learn a new skill or concept for the purpose of transferring and applying that learning to new situations is influenced by the quality of instruction the learner is receiving from the teacher, and the alignment of the curriculum the teacher is employing to the actual task or concept the student is attempting to learn. Carroll argued that the amount of time needed to learn increased by whatever amount necessary to overcome poor quality instruction. Marzano (2000) promoted in his meta-analysis that OTL had greater effect on student learning than other school-level factors, (i.e., monitoring progress of student achievement, pressure to achieve or high expectations, parent involvement and school leadership). Three aspects of OTL emerge as predictive for improved student outcomes, each of which plays a role in a coherent instructional program

(Elliott, 2014; Kurz, 2011):

- Time,
- Content, and
- Quality of instruction.

Time. Researchers contend that the duration and quality of instructional time effects student learning (Bloom, 1974; Carroll, 1963; Corey, Phelps, Ball, Demonte & Harrison, 2012; Frederick & Walberg, 1980; Vannest & Parker, 2010). Instructional time is characterized by Carroll (1963) as the amount of time needed for a student to learn a particular task that is taught by a teacher, and time as a variable, differs widely based on the particular needs of the learner and a host of other factors, such as aptitude of the learner, quality of teaching, and the learning environment. Carroll posited that the degree of learning is a function of the ratio of the time actually spent learning and the time needed to learn, and provided this formula:

$$\text{Degree of learning} = f\left[\frac{\text{Time actually spent learning}}{\text{Time needed to learn}}\right]$$

The formula promotes an optimal 1:1 ratio, that is, all the minutes required to learn are actually spent on effective learning activities. If the actual minutes spent on effective learning activities are fewer than the minutes needed the optimal ratio is not attained.

Frederick and Walberg (1980) suggested that when controlling for other variables, the actual time spent learning new material may be the best predictor of student success. As stated earlier, the time devoted to instruction is not elapsed time, but the actual time students are actively engaged in instruction that leads to demonstrated learning (Bloom, 1974; Smith, 2000). Bloom called this “time on task” (Bloom, 1974, p. 685), and recorded that time on task is highly predictive of learning achievement. Time-on-task is an effective in-school correlate that promotes learning in charter schools (Berends, Goldring, Stein, & Cravens, 2010; Garrison & Holifield, 2005). Lavy (2010) demonstrated that in developed countries, time-on-task produces a significant effect in student learning; countries with one-hour more instruction in mathematics per week had increased math scores.

The effective use of instructional time to increase math achievement is promoted by the National Council of Teachers of Mathematics (NCTM) (Larson, 2011), and the positive effects of increased time dedicated to math instruction is documented in research (Berends et al., 2010; Borg, 1980; Denham & Lieberman, 1980; Desimone & Long, 2010; Fitzpatrick, Grissmer, & Hastedt, 2011; Garrison & Holifield, 2005; Lavy, 2010; Vaughn, Wanzek, Murray, & Roberts, 2012; Smith, 2000). When establishing a coherent approach to mathematics instruction protecting instructional time is a foundational attribute of educational leadership (Grissom, Loeb, & Masters, 2013; Hallinger, 2010; Hallinger & Murphy, 1985; Leithwood, Anderson, Mascall, & Strauss, 2010; Robinson, 2007; Smith, 2000). Protecting instructional time is understood as establishing daily schedules in which math instruction is guaranteed, providing additional time for students needing support interventions, planning sufficient mathematic courses in master schedules, and buffering instruction, or, limiting interruptions of instructional time (Larson, 2011; Leithwood et al., 2010).

Strategies to increase instructional time for mathematics in schools include lengthening the school day (Bellei, 2009), providing more days of instruction prior to testing (Marcotte & Hansen, 2010), and increasing the duration of in-school intervention support in which students with learning deficits receive additional instruction in mathematics during the school day (Vaughn et al., 2012). Of these suggestions, increasing in-school instructional support in mathematics for students is viewed as a necessity (Bitter & O'Day, 2010; Larson, 2011) in affording struggling students access to rigorous algebra content. Desimone and Long (2010) noted that taken together, increased instructional time and a quality instructor, shows promise in reducing achievement gaps between African-American and low socio-economic students and their higher achieving counter parts.

Content. Kurz (2011) observed that a district striving to achieve a coherent instructional framework in mathematics will attend to the curricula taught to students through the grade levels. As Newmann et al. (2001) described, program coherence includes the interrelation of instruction and curriculum. The mathematics curriculum developed for schools, is routinely aligned with state standards for mathematics instruction. However, Schmidt (2008, 2012) posited that in U.S schools, the state standards and associated curriculum often lacked focus on the most essential mathematical concepts, particularly in the early grades.

Schmidt (2008) suggested that often the content of mathematics curriculum lacked coherence. Schmidt described coherence as following "the structure of the discipline being taught" (Schmidt, 2008, p. 23), structure being the articulation of the content over time, in a logically sequenced fashion that leads to intended performance in the discipline (Schmidt, Houang, & Cogan, 2002). Schmidt noted that nations outperforming the U.S. on the Third International Mathematics and Science Study (TIMSS) utilized more focused, rigorous, and coherent instructional content. Schmidt's criticism of the mathematics instruction in the U.S as being unfocused, undemanding and incoherent, is echoed by Bitter and O'Day (2010) who promoted the creation of a K-12 mathematics curriculum, that focuses on key standards beginning in the early grades in order to prepare students for Algebra 1. The National Mathematics Advisory Panel (U. S. Department of Education, 2008) described effective curricular content as:

> A focused, coherent progression of mathematics learning, with an emphasis on proficiency with key topics, should become the norm in elementary and middle school mathematics curricula. Any approach that continually revisits topics year after year without closure is to be avoided (p. xvi).

The Advisory Panel in its final report explicitly offered fluency with whole numbers, fluency with fractions, and proficiency with particular aspects geometry and measurement (i.e., perimeter and area of geometric shapes, properties of three dimensional shapes, volume and surface area, and relationships of similar triangles) as key topics for elementary and middle grade levels that contribute to algebra readiness.

Others have broadened the scope of key mathematical topics that should be taught in early grades to include opportunities to experience algebraic processes (Blanton, 2008; Blanton, Stephens, Knuth, Gardine, Isler, & Kim, 2015; Carpenter, Levi, Berman, & Pligge, 2005; Kaput, 1998) demonstrating that young students have capacity for algebraic reasoning. Blanton et al. (2015) conducted a study with third-grade students (N=106) in a school district that was using an arithmetic-focused curriculum with no treatment of algebraic concepts. The researchers instituted an early algebra intervention with a sub-group of students in two intact classrooms at one school in the district (n=39), and did not provide the algebra intervention to students in four intact classrooms at the same school (n=67). They found that students in the intervention group significantly improved their ability in several conceptual areas that are foundational to algebraic reasoning. These areas included the ability to:

- Think relationally about the equal sign,
- Represent unknown quantities in meaningful ways with variable notation,
- Recognize the underlying structure of fundamental properties in equations and use this to justify their thinking,
- Think beyond particular instances to consider whether generalizations were true across a broad domain of numbers,
- Both produce and comprehend variable representations of generalized claims, and
- Generalize and symbolically represent functional relationships between co-varying quantities. (p. 71).

This study suggested that as early as third grade students can develop critical algebraic thinking skills, which will serve them in accessing algebra content in middle school and beyond.

Identifying and delivering a coordinated curriculum that leads to the acquisition of foundation algebraic skills and concepts, is a requisite aspect of a coherent mathematics program intended to increase middle school student access to algebra and high school student access to advanced mathematics concepts (Larson, 2011; Porter, 2002; Slavin, Lake, & Groff, 2009: U.S. Department of Education, 2008). Curriculum, or content, is a factor of instructional program coherence over which district decision makers have a great degree of control (Slavin et al., 2009). Schmidt (2012) advised policymakers, “Addressing content standards and content coverage provides a very straightforward form of intervention, one that holds considerable promise” (p. 141). This suggested that administrators pursuing coherence seek curriculum and instructional materials which are aligned to the content standards according to the grade levels.

As administrators consider the curriculum for their district’s mathematics program, the concept of appropriate mathematics learning progressions come into play. Learning progressions are identified as the successive levels of knowledge through which students progress in order to understand increasingly complex mathematical concepts (Daro, Mosher, & Cochran, 2011; Kobrin, Larson, Cromwell, & Garza 2014; National Research Council, 2001) and explicit progressions support coherence in instructional programs (Foster & Wiser, 2012). In developing the progressions of the common core state standards (CCSS) in mathematics (Common Core Standards Writing Team, 2013) the writing team considered what it called “the structure of mathematics” (p. 6), and developed a series of papers titled the *Progressions Documents*. These documents served to inform educators of the structure of mathematics, illustrating how fundamental concepts of arithmetic and geometry taught in early grades support algebraic thinking in later grades (Kanold, Briars, & Fennel, 2011). The progression documents detailed the sequencing of math instruction in order for students to attain higher levels of competency leading to college and career readiness in mathematics. Potential curriculum choices can be checked according to these progressions documents to facilitate alignment with the CCSS (Korbin et al., 2014). Similarly, the Silicon Valley Mathematics Initiative (2015) provided scope and sequence charts of the CCSS, to inform administrators and others charged with making content decisions for their districts.

Quality of instruction. Another critical component of addressing the Opportunity to Learn is the quality of instruction that students receive (Bloom, 1974; Carroll, 1963; Cobb & Jackson, 2011; Desimon & Long, 2010; Levpuscek & Zupancic, 2009; Newmann et al., 2001; Marzano, 2003; Schmidt, 2012). Marzano described quality instruction as a "teacher-level factor" (Marzano, 2003, p. 10), noting that effective instructional strategies, classroom management and the use of the curriculum are under the direct control of the teacher. His meta-analysis of research on teacher quality suggested that teacher quality has a greater effect on student achievement than school-level factors, such as having a guaranteed-viable curriculum and monitoring of instruction by administration.

Improving the quality of instruction in mathematics school wide and districtwide is aided when an effective common instructional approach is pursed (Newmann et al., 2001). Disjointed, or autonomous approaches to instructional delivery in mathematics, even when considered by teachers as innovative, do not promote student achievement to the degree as well-coordinated, researched-based strategies used school wide (Berends et al., 2010). Achieving the use of effective instructional practices school wide is advanced when the professional culture of the school supports consistent training, practicing, monitoring and peer-to-peer professional conversation regarding specific methodology (Childress, Elmore, Grossman, & Johnson, 2007; Coggshall, Rasmussen, Colton, Milton, & Jacques, 2012). Judith Warren Little (2012) contended that focused and unrelenting review and examination of instructional practice by the practitioners is essential in furthering a coherent approach to instruction. Little observed that this aspect of professionalism is all too often missing in schools. Explicitly identifying effective instructional strategies and supporting their appropriate implementation is seen as a critical aspect of site and district level leadership that is committed to improving student achievement (Coggshall et al., 2012; Little, 2012).

Barriers to a coherent instructional approach include lack of content knowledge by teachers (Darling-Hammond, Newton, & Wei, 2013; Kanold, Briars, & Fennell 2011; Schmidt, 2012; Sykes, Bird, & Kennedy, 2010), insufficient training in pedagogy (Cobb and Jackson, 2012; Sykes et al., 2010), poor follow-through of monitoring and feedback (Hill & Grossman, 2013), and teacher isolationism (Little, 2007). The content knowledge barrier for teachers entering the profession can be addressed through the teacher preparation and credentialing processes (National Research Council, 2010; Darling-Hammond & Bransford, 2005). However, shoring up content knowledge deficits for practitioners becomes the responsibility of local school district personnel (Cobb & Jackson, 2012; Kanold et al., 2011; Marrongelle, Sztajn, & Smith, 2013). This shoring up is necessary to achieve school wide use of effective instructional strategies in mathematics.

Continual learning by adults charged with delivering instruction is an attribute of a system striving for improved teacher quality (Ball, Sleep, Boerst, & Bass, 2009). This requires ongoing training with routine procedures for monitoring and providing feedback to teachers on the explicit aspects of their personal delivery of instruction (Cobb & Jackson, 2012; Elmore, 2000). Schools in which teachers function autonomously, similar to independent contractors, having limited experience with effective feedback mechanisms are less likely to achieve improvements in instruction (Little, 2007). This speaks to the need of school leaders to develop those mechanisms as strong features of their schools.

Newmann et al. (2001), and Cobb and Jackson (2011, 2012), further identified attributes of a coherent instructional framework in their research. Newmann et al. recognized as evidence of coherence, the general coordination of increasingly complex curriculum, instructional strategies, and use of assessments, as well as, providing support opportunities for struggling students. Cobb and Jackson extended the attributes with regards to mathematics instruction. They advised that educators establish goals for students' learning and work from a detailed understanding of quality instruction aimed at achieving those goals. They claimed that a detailed vision of quality instruction includes specific strategies designed for a particular phase of a lesson, and provides direction for the training needs of teachers. These attributes serve to guide direction for school and district administrators seeking to bring coherence and alignment to their mathematics education program.

Additional supports for students. Another aspect of a coherent instructional program in mathematics is the inclusion of instructional supports for struggling students (Newmann et al., 2001; Cobb & Jackson, 2011; Vaughn et al., 2012). Instructional supports often include supplemental instructional time, in addition to the time dedicated to the core grade-level class, attending to the observed deficits in skills and conceptual understanding (Durwood, Krone, & Mazzeo, 2010). However, Loveless (2008, 2009) argued that placing struggling or underprepared middle-school students in a grade-level course as the only option, and then doubling their time in math instruction to address deficits, served more to promote a de-tracking, social-equity agenda than to provide appropriate instruction to students. Loveless found that schools which resisted the de-tracking one-size-fits all approach to middle school mathematics instruction had more students attaining proficiency and fewer students at the failing levels.

Welner (2009) argued Loveless's analysis as flawed, and research suggests that placing students in a lower-track for mathematics increases the chance of students dropping out of high school (Weblow, Urick, & Duesbery, 2013). Yet, researchers are confronting the appropriateness of the one-size-fits all approach to middle school mathematics courses (Domina, McEachin, Penner, & Penner, 2014; Nomi, 2012). The intended consequence of raising math achievement statewide in California by promoting Algebra 1 in eighth grade was not achieved (Liang, Heckman, & Abedi, 2012). Armed with data, locally and state wide, which indicate placing students in mathematics courses before they are ready for the content is not advisable nor does it promote coherence in the mathematics program (Loveless, 2009). A coherent approach provides instructional support in addition to the core, when students' deficits are not profound to the degree they limit the students' access to the concepts taught. Moreover, a coherent program recognizes that student aptitude on both ends of the spectrum warrants providing course options suited to the needs of the low-performing and high-performing students.

Importance of assessment. Identifying low-performing students, students needing intervention, and high-performing students, are functions of a well-aligned and coordinated system of assessment (Cobb & Jackson, 2011; Newmann et al., 2001). Newmann et al., and Cobb and Jackson, included assessments as an integral aspect of a coherent instructional framework; others asserted that effective assessment systems measure the students' progress toward attaining the intended curriculum and inform the content of intervention, and identify students who are struggling (Earl, 2007; Konrad, Helf, & Joseph, 2011). Earl (2007) noted that reforming the purpose and scope of assessments provides educators with leverage to meet the multifaceted challenge of providing feedback to students, informing teachers of modifications to make in their instruction, and in updating the design of mathematics programs. A coordinated assessment system is helpful in determining the quality of the mathematics program district wide.

Regarding the placement of middle-school students into math classes, specifically, the research suggests that state-level standardized math assessments in Grades 6 and 7, by themselves have limited success in predicting student achievement in an eighth grade Algebra 1 course (Huang, Snipes, & Finkelstein, 2014). These researchers found that layering on an algebra-readiness assessment provided greater predictability. Huang et al. (2014) expressly recommended the Mathematics Diagnostic Testing Project (MTDP) assessment be administered in Grade 7, to inform placement decisions. The found coupling outcomes on the Grade 6 California Standards Test (CST), with performance on the Grade 7 MDTP, indicated greater probability of eighth grade students being successful in Algebra 1. Specifically, they noted eighth grade students that had a scale score of 367 or higher on the Grade 6 CST and showed mastery of 5 out of 7 topics on the Grade 7 MDTP, had a greater than 80% chance of achieving proficiency on the Algebra 1 CST.

Supportive working conditions. Implementing a coherent instructional framework is advanced when teachers are supported in learning and applying specific strategies that best support the intended curriculum (Cobb & Jackson, 2011; Newmann et al., 2001). Newmann et al. suggested that as administrators and teachers pursue a common framework of instruction, the professional development provided to staff must be focused on the materials and strategies associated with the framework. Providing well-aligned professional development, in a sustainable on-going fashion, dedicated to the content and materials teachers are using in their classrooms, with attention paid to explicit strategies of instruction to teach the intended curriculum, contributes to a supportive working condition and to increases in student achievement (Newmann et al., 2001; Polly, Wang, McGee, Lambert, Martin, & Pugalee, 2014; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Newmann et al. and Cobb & Jackson agree that an expectation exists among administrators and teachers at schools exhibiting coherence that the common instructional framework is being implemented, and a level of accountability exists including the processes of teacher observation and evaluation (Hill & Grossman, 2103). In developing the coherence framework model for the Public Education Leadership Project (PELP) at Harvard University, Childress et al. (2007) maintained that districts must articulate strategies for improvements in what they call the "instructional core" (p. 2). Specifically, the instructional core represents teacher content knowledge and instruction, student engagement in the learning process, and appropriately challenging curriculum.

Site principals play an essential role in developing a supportive environment in which teachers are encouraged to implement and refine a common instructional framework (Cobb & Jackson, 2012; Elmore, 2000; Katterfield, 2013; Newmann et al., 2001; Price, 2011). This environment is enhanced when principals capably communicate a clear vison of effective instruction in mathematics to their teaching staffs. While professional development for teachers is essential for implementing a coherent framework, so too is developing within principals knowledge of sound mathematics instruction (Cobb & Jackson, 2012; Katterfield, 2013). "By observing instruction and providing informed feedback, school leaders can both communicate and hold teachers accountable for improving classroom instruction" (Cobb & Jackson, 2011, p.21). As Newmann et al. explained it is the collective work of both teachers and principals to support the implementation of the instructional framework. When principals develop their understanding of quality instruction, they can provide effective feedback to teachers implementing the strategies.

One other aspect of the supportive environment includes instructional coaching (Cobb & Jackson, 2012; Hill & Grossman, 2013; Knight, 2007, 2009). Instructional coaches are on-site professional developers who assist teachers by modeling effective instructional strategies in authentic environments (i.e., in classrooms with students), observe teachers as they implement the strategies, provide timely feedback, and facilitate professional conversations regarding the common instructional framework (Knight, 2007). Teachers implementing a coherent framework of mathematics instruction, have the daunting task of executing pedagogy, employing coordinated curriculum, and administering and analyzing assessments. School-based instructional coaches assist the teaching staff in attending to these areas of responsibility, as well as, developing reflective practices that press teachers into routines of analyzing the effectiveness of their own instruction (Cobb & Jackson, 2011).

Finally, a supportive working condition for instituting a coherent instructional framework is the inclusion of school-based professional learning communities (PLCs) (Cobb & Jackson, 2011; Hord & Sommers, 2008). PLCs exist to bring together teachers at a site, to collaborate on issues of instruction, curriculum implementation, student assessment, and providing interventions for struggling students (Coggshall et al., 2012; DuFour, DuFour, Eaker, & Many, 2006). PLCs are useful in addressing problems of practice that arise when teachers strive to implement strategies learned in professional development (Horn & Little, 2010). A system that coordinates professional development, instructional leadership, coaching, and professional learning community to advance the implementation of the coherent instructional framework furthers the supportive working conditions that Newmann et al., (2001) and Cobb & Jackson (2011) endorsed.

Allocation of resources. The final aspect of the coherent instructional framework espoused by Newmann et al. (2001) is the allocation of resources dedicated to advancing the instructional framework. Specifically, they championed commitment at the site level to use resources (e.g., funding, materials, time, and staff assignments) to establish the critical factors of coherence, which include coordinated curriculum and student assessments that remain stable over time, professional development that supports effective implementation of instructional agreements, and student support programs (Childers et al., 2007; Newmann et al., 2001). Focusing the allocation of finite resources on the factors associated with a coherent instructional framework, protects the organization from investing in training, materials and curriculum which may me disjointed (Newmann, et al., 2001) or only loosely connected to the instructional program's goals.

Professional Literature Informing Goal 2

Increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses. The review of professional literature in Section 1 revealed decision-making as a central tenet of administrative behavior (Barnard, 1938). The findings of this case study revealed that participants varied in their decision-making relative to the issue of eighth grade student placement in Algebra 1. In most instances, Shelton County site administrators placed students into eighth grade mathematics courses according to their own professional thinking. Though participants did not reference specific models of administrative decision-making, the findings revealed that elements of Simon's (1947) satisficing model, and Lindblom's (1993) incremental, or muddling-through, model existed.

However, decision-making as a process, commands an understanding of its cyclical nature (Hoy & Miskel, 2001). The cyclical nature necessitates that goals are developed, and outcomes are evaluated in relation to those goals, examining the extent to which the solution achieved the objective (Lunenberg & Ornenstein, 2004). The analysis of the data in this case study showed this aspect of decision-making was not sufficiently attended to; neither goals, nor criteria for success, existed in the districts. Rather, administrators entered into decisions by attending to the influencing and constraining factors that confronted them (i.e., district expectations for student placement, social equity issues, teacher quality, parental influence, the state accountability system, student aptitude, and teacher recommendations). A sophisticated decision-making process establishes criterion for success (Marzano & Waters, 2009), such as having a target for a percentage of students attaining proficiency on a standardized exam.

Additionally, administrators are served in their decision-making processes when clear direction is provided in the form of district policy, or practice guidelines (Hoy & Miskel, 2001; Marzano & Waters, 2009). In Shelton County, only District 1 (D1) articulated a clear direction for placement. The district wanted all eighth grade students in Algebra 1 courses or higher, with exceptions for those in special education. This is an example of an algebra-for-all policy (Williams et al., 2011a). While having a policy is additive in the decision-making process, algebra-for-all is not universally accepted as appropriate (Liang, Heckman, & Abedi, 2012; Loveless, 2008). Nevertheless, having a policy gave the site administrators in D1 a direction in which to proceed. California state policymakers desired increasing numbers of students to master algebra content by eighth grade, however, the implemented policy led to significant percentages of students underperforming (Domina, Penner, Penner & Conley, 2013; Domina, McEachin et al., 2014; Kurleander, Reardon, & Jackson, 2008; Liang, et al., 2012). More nuanced recommendations exist in the literature, which are based on reviews of the California experience and allow for decisions other than the one-size-fits-all approach (Liang et al., 2012).

Finally, decision-making is supported when organizational values and beliefs are clearly articulated (Hord & Sommers, 2008; Hoy & Miskel, 2001). Participants in D1 discussed the district's social-equity values in its strategic plan as undergirded their policy of algebra-for-all. They believed access to Algebra 1 was an equity issue. Other participants referenced "the best interest of students" as influencing their decision, or they felt conflicted when their personal internal value of "best interest" was violated when placing lower-aptitude students in Algebra 1. These participants did not reference a clear organizational stance based on a value, such as social-equity, best-interest, or otherwise. Hoy & Miskel (2001) posited that organizational values, once developed, strengthen decision-making.

The following provides greater detail from the professional literature in (a) the importance of organizational values and beliefs, (b) the importance of policy in developing a rational decision-making framework for the placement of eighth grade students into mathematics courses, and (c) the importance of establishing criteria for satisfactory solution (Goal 3). These important components informed the position paper developed for this project study.

The importance of having clearly articulated values and organizational beliefs on this issue. Placing eighth grade students into mathematics courses proved to be a complex issue facing the participants. Their decisions had consequences for their students, their schools, and their districts. Their students were affected by either the lack of access to Algebra 1, which in turn limits access to future mathematics courses (Long et al., 2012), or, by being placed in Algebra 1 without possessing the requisite skills to be successful and risk failure (Clotfelter, Ladd, & Vigdor, 2012). Their schools were affected either by conforming to the state's algebra-for-all policy and accepting that many students would underperform, which negatively impacted the school's Academic Performance Index (API), or not conform to the state policy and accept the punitive impact on the school's API score. Their districts were affected in that the school's individual API was included in the district's overall API score.

When faced with complex issues in education, Simon (1947) believed that administrators will and should strive to find satisfactory solutions in an administrative or "satisficing" model of decision-making. The quandary for the decision makers in the project study, was finding satisfactory solutions to the issue that had ramifications beyond the student and the classroom, but to the school and district as well. Hoy & Miskel (2001) noted that when faced with decisions that pit one concern against another, finding a satisficing solution is difficult. To address the difficulty in the satisficing approach, organizational core values are assumed to be present and play an integral role in the deciding process (Hoy & Miskel, 2001; Mueller, 2013; Simon, 1947; Watkins & McCaw, 2007). An organization's value is a core tenet of the organization, a guiding principle, which is deemed highly important to stakeholders and provides direction for a decision (Mueller, 2013; Watkins & McCaw, 2007). As noted in the analysis of findings, the participants did not reference a particular organizational value when making their placement decision, other than what was expressed in District 1 (D1); for D1 it was a social-equity value that drove their algebra-for-all placement practice.

In education, it is not uncommon for organizational values, and belief statements, to be developed, or refashioned, when districts undergo strategic planning (Lunenburg & Ornstein, 2004). Strategic planning is a process in which district leadership and other stakeholders (i.e., faculty, staff, parents, community members and students) meet to fashion the school district's mission and vision statements, and identify core values and beliefs. The process often defines the district objectives for teaching and learning for the upcoming school year and a few years beyond (Marzano & Waters, 2009). Mueller (2013) offered that circumstances, or issues, arise that may challenge core values, requiring a clear interpretation of how the value applies to those circumstances or issues. The issue in this case study was the placement of eighth grade students into mathematics courses. Should the decision have been based on the state accountability system, or, on student mathematical aptitude, or, on the other influencing factors revealed in the analysis? This question represents the satisficing dilemma that the participants faced, for which Simon (1947) and others (Frick, 2011; Hoy & Miskel, 2001) suggested requires an organizational value to reference in finding a solution.

In the position paper developed for this project study, I provided suggestions for organizational value and belief statements that speak to the importance of mathematics education, the belief that all students can learn mathematics at high levels if taught well and provided support, and the value of a developing a coherent instructional framework.

- The district leadership values mathematics education and understands the important role it plays in students' lives and in the nation's economic well-being.
- The district leadership believes all students can learn mathematics at high levels, if taught well, and provided instructional support.
- The district leadership believes that as a student's mathematics ability increases in early grades, the opportunity for the student to access higher levels of mathematics increases in upper grades.
- The district leadership understands that student readiness for grade-level mathematics content is contingent on the learning experiences in previous grades, and therefore pursues a coherent instructional program in mathematics.

The importance of having clear policy and guidelines for practice. Sound decision-making is supported when clear policy has been established on an issue (Hoy & Miskel, 2001). When policy is present and communicated, administrators have a keen awareness of district expectations (Marzano & Waters, 2009). In this case study, the district policy for eighth grade mathematics placement in several districts was absent or not clearly articulated to administrators. The only exception was in District 1, where algebra-for-all was nearly absolute and communicated as such. California promoted the eighth grade algebra policy in its framework (CDE, 1997), but left adherence to the policy a function of local decision-making.

The motivation behind policy is to influence the practice or work of individuals in an organization (Coburn & Stein, 2006; Centre for European Studies, n.d.). A policy communicates an issue, presents why the issue is important, describes expectations or desired outcomes associated with the issue, and provides processes or practices (i.e., actions) to support the policy's implementation (Cobb & Jackson, 2011; Marzano & Waters, 2009). When policy is absent, people operate according to their own devices (Williams et al., 2011a), without knowing well the expectations they are expected to meet. For this reason, Hoy & Miskel (2001) recommend that decision makers are best-served to formulate a policy to contend with an important issue.

Researchers suggested that educational guidelines intended to bring revisions to student access to various mathematics courses has three elements: the what, the why, and the how of policy (Cobb & Jackson, 2012). The "what" identifies the intended goals for the district, and determines which students are targeted. The "why" provides the rationale for the policy. The "how" comprises the recommended processes for achieving the goals. The following paragraphs provide research-based policy recommendations regarding student placement in mathematics courses, and will address the "what", "why", and "how" elements of policy.

What is the issue, and what are the district's expectations? The archival data in this case study publicized a variance in the percent of eighth grade students accessing the first-year algebra course in this region of California. The analysis revealed that the observed variance in placement was largely based on the school district in which the students happened to live. No evidence suggested that districts collaborated on placement practices, and middle school principals in several districts acted autonomously when placing students into mathematics courses. Regardless of the degree to which eighth grade students were placed in Algebra 1 in this region of California, whether high percentages or low percentages, many students failed to reach proficiency on the California Standards Test (CST) end-of course exam.

California's eighth grade algebra-for-all policy increased the percent of students completing Algebra 1 in eighth grade. Statewide cohort data show increases in eighth grade Algebra 1 from 26% in 20032006, to 51% in 20082011 (Liang & Heckman, 2013). However, the policy did not produce commensurate increases in the percentages 9th, 10th and 11th-grade students completing Geometry, Algebra II, and Pre-calculus mathematics courses (Liang & Heckman, 2013; Terry & Rosin, 2011). Only modest enrollment increases, between 2% and 6%, in these courses were realized. This contradicts the assertion of researchers that Algebra 1 in eighth grade promotes greater acquisition of higher mathematics in courses in high school (Adelman, 1999; Long et al., 2012; Riley, 1997). The data showed more students repeating the Algebra 1 course in high school than matriculated into higher levels of mathematics (Fong et al., 2014; Liang & Heckman, 2013). For some, this constituted a failed state policy, or at least a failure on achieving the academic gains the policy intended to produce (Domina et al., 2013; Loveless, 2008, 2009; Rosin, Barondess, & Leichty, 2009; Schmidt, 2012; Stein, Kaufman, Sherman, & Hillen, 2011), which the California State Board of Education reversed when it no longer punished middle schools for having students complete courses lower than Algebra 1 (State Board of Education, 2013). The policy of sanctions and punishments did not produce increases in higher course attainment (Laing et al., 2012; Laing & Heckman, 2013; Terry & Rosin, 2011). Administrators are well served to understand that a major outcome of mandating Algebra 1 in eighth grade, was repeating Algebra 1 in ninth grade (Domina et al., 2104; Terry & Rosin, 2009).

Articulating a district position on eighth grade mathematics placement assists administrators in developing rational processes for placing students (Cobb & Jackson, 2011; Waterman, 2010). A position on placement, other than a one-size-fits-all position, is endorsed by multiple researchers (Faulkner, Crossland, & Stiff, 2013; Loveless, 2008; Nomi, 2012; Waterman, 2010). A stated policy that promotes educational options, other than a single algebra course, and places students according to an analysis of their readiness for content, is preferable to a mandated algebra-for-all position (Loveless, 2009). Paradoxically, a policy at the local level that considers student readiness, and provides options for placement, conflicts with policy advisors who seek equity in opportunity (Mehan, 2015).

The equity issue is concerned that low-performing students may be overrepresented in ethnic and low socio-economic populations and thus are tracked into a mathematics' pathway that limits opportunity for higher-level courses (Loveless, 2011;

Mehan, 2015). However, placing underprepared students into heterogeneous algebra courses has had the effect of increasing failure rates, and lowering the achievement of high performing students (Loveless, 2009; Nomi, 2012; Waterman, 2010). The greater the disparity in mathematical ability within a classroom, the greater the challenge becomes for teachers to meet the needs of all their students (Nomi, 2012). Evidence suggests that eighth grade students who are successful in Algebra 1 have greater success in college (Rosin et al., 2011). Yet, in California, college admission requirements for the state university systems identify Algebra 1 as the first course, of a three-course requirement that includes Geometry, and Algebra II, or their equivalents (University of California, 2015). Thus, delaying the algebra course to the ninth grade does not disqualify a student from achieving the admissions requirement. Moreover, the admissions requirement provides district decision makers flexibility in making eighth grade placement decisions, allowing for a course below first-year algebra, knowing that students can take the course in ninth grade.

Researchers suggest that in coherent systems of mathematics education, students are placed in appropriately rigorous courses according to their readiness, with intervention supports as needed for struggling students (Bitter & O’Day, 2010; Larson, 2011; Stein, Kaufman, Sherman, & Hillen, 2011). Measuring the success of this expectation occurs on two fronts:

- Measuring the adherence to processes for determining student readiness for a course (e.g., analyzing assessment data, analyzing student work, and reviewing grades in previous courses); and,

- Measuring student learning in the courses in which they are placed (e.g. analyzing assessment data associated with the course content, and analyzing student work) (Huang, Snipes & Finkelstein, 2014).

Establishing targets for the measurements provides the success criterion necessary to evaluate the policy's effectiveness (Hoy & Miskel, 2001). For instance, a process expectation for placement may establish a target for the percent of students matriculating into eighth grade being placed in mathematics classes according to a student-readiness matrix (i.e., at least 90% of incoming eighth grade students have been placed in mathematics courses according to the student-readiness matrix). The matrix includes readiness indicators established by the district (e.g., topic scores on the Grade 7 Mathematics Diagnostics Testing Program assessment of algebra readiness, cut scores on the state standardized tests, analysis of student work of essential sub-skills, a review of student grades in previous mathematics courses, as well as teacher recommendations). Similarly, after students are placed, evaluating the appropriateness of the placement decision requires establishing success criteria on student achievement. These targets are locally established as well (e.g., scores on local content-aligned assessments, analysis of student work, and analysis of summative state tests). For instance, policymakers may establish a score of 70% or higher on a local assessment as evidence that a student is appropriately placed, and establish a target of having at least 80% of students appropriately placed to deem the policy successful.

Why is the issue important? The ramifications of middle-school student placement in mathematics classes are significant. Eighth grade students placed in algebra classes without appropriate considerations of readiness has led to failure and repeating courses in high school (Liang & Heckman, 2013). Students who repeat Algebra 1 in high school also tend to perform poorly (Fong et al., 2014). Research suggests that a sounder approach is to provide instruction to eighth grade students, which is appropriately rigorous and addresses deficits in essential algebraic concepts for the students that need it (Bitter & O'Day, 2010; Larson, 2011). Learning algebraic concepts is essential to accessing higher mathematics, but researchers disagree on whether the access is contingent upon, if the algebra is learned in eighth grade or in ninth grade (Finkelstein, Fong, Tiffany-Morales, Shields, & Huang, 2012; Fong et al., 2014; Loveless, 2009; Terry & Rosin, 2011). Establishing a local policy that puts to rest the algebra-in-eighth grade mandate, and considers the needs and readiness of the student, will guide a district in developing a coordinated and articulated pathway of mathematics courses – a pathway that allows for options other than Algebra 1 in eighth grade and still lead students to college admissibility (Bitter & O'Day, 2010; Clotfelter et al., 2012; Finkelstein et al., 2012; Liang & Heckman, 2013).

This issue continues to take on political implications. In February 2015, California State Senator Mitchell, and Assembly Member Jones-Sawyers, introduced Senate Bill 359 (2015), the California Mathematics Placement Act of 2015. If enacted, the bill mandates placement policy for students leaving eighth grade and entering ninth. The legislators considered the high rate of students repeating eighth grade coursework in ninth grade as an unfair practice, which the bill describes as disadvantaging students in competing for college admission. The bill requires a transparent statewide placement policy, which mandates the use of multiple measures for the placement of students, including "diagnostic placement tests, statewide assessments, pupil grades, and pupil work" (p. 2). While this bill is intended to address ninth-grade placement, the ramifications on eighth grade decisions are apparent. The tendency to have students repeat in high school, what was taught in eighth grade, is now confronted with a proposed legislative remedy.

What is the recommended policy, and what are the recommendations on how to implement it? Goal 2 of this project study is to increase the understanding of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses. Decision-making is improved when a policy on the issue is developed and articulated (Hoy & Miskel, 2001). As presented earlier, organizational values, when clearly articulated, provide direction and undergird decisions made in a complex environment (Mueller, 2013). Cobb & Jackson (2012) noted that policies should have embedded in them suggestions for practice. Based on the above review and synthesis of the professional literature, the recommended policy statement below is provided, and (a) includes declarations of values and beliefs, (b) addresses placement decisions, and, (c) proposes commitments for attaining instructional program coherence in mathematics (Bitter & O'Day, 2010; Cobb & Jackson, 2011, 2012; Hoy & Miskel, 2001; Larson, 2011; Marzano & Waters, 2009; Mueller, 2013; Newmann et al., 2001).

Recommended Policy Statement With Associated Commitments to Actions

> The district leadership values mathematics education and understands the important role it plays in students' lives and in the nation's economic well-being.

The district leadership believes that as a student's mathematics ability increases in early grades, the opportunity for the student to access higher levels of mathematics increases in upper grades.

The district leadership believes all students can learn mathematics at high levels, if taught well, and provided instructional support.

The district leadership is committed to providing students appropriately rigorous mathematics education and places students, eighth grade or otherwise, into mathematics courses accordingly. The placement decision considers data from student diagnostic assessments and standards-based exams, and a review of student work. There are options for placement; this is not a one-size-fits-all-placement policy.

Adherence to the policy is not altered solely because of the potential impact of a state or federal accountability system. Rather, the policy is reviewed based on student needs, and in a cyclical fashion, changes are made based on the analysis of progress, or lack, toward district adopted learning goals, and mathematics course completion.

The district leadership understands that student readiness for grade-level mathematics content is contingent on the learning experiences in previous grades, and therefore pursues a coherent instructional program in mathematics.

The district leadership understands that a coherent instructional program in mathematics requires the following commitments:

Opportunity to learn (OTL). A commitment to providing the requisites for OTL in mathematics every day in all grades: Time, content, and quality instruction.

Time. A commitment to ensuring and protecting instructional time for mathematics education.

Content. A commitment to researching and obtaining curricular materials aligned according to a logical progression of increasingly complex mathematical content, which leads to acquisition of the California Standards for Mathematics.

Instruction. A commitment to a vision of high-quality instruction. The vision identifies explicit practices in instruction that lead students to the mathematics learning goals.

Assessments. A commitment to a coordinated assessment system that measures students' progress toward the learning goals, informs instruction by signaling student misunderstanding, and diagnoses student readiness for coursework. The assessments also identify students for course remediation, intervention, and acceleration.

Interventions. A commitment to providing supports for students struggling with content. The supports include interventions, such as, additional time in-class and before and after school to attend to observed in-class misunderstandings of mathematic content; a standalone course to remediate observed deficiencies in understanding; a support intervention course taken concurrently with the core grade-level course that addresses misconceptions, and front-loads, (i.e., previews) content the student will encounter in the core course.

Supportive working conditions and strong district and school instructional leadership: A commitment to developing a supportive work environment that couples accountability with professional learning opportunities; with routines of professional interactions that communicates expectations for ambitious instruction.

Professional development (PD). A commitment to PD for teachers and administrators organized around understanding critical math content, delivering specific effective pedagogy, implementing instructional materials, and analyzing assessment data to inform instruction.

Instructional coaching. A commitment to instructional coaching that provides: on-site modeling of instruction by those with instructional expertise; observation and feedback on instructional practice; and, facilitated reflective opportunities for teachers, to thoughtfully critique their own mathematics instruction.

Professional learning communities (PLC). A commitment to PLC at each school site. The PLC includes teachers, administrators and instructional coaches, and provides ongoing professional conversation regarding the status and implementation of the coherent instructional program of mathematics. In PLC teachers discuss, rehearse, and adjust instructional practices. In PLC teachers review materials, plan instruction, and seek solutions to problems associated with practice. In PLC administrators and instructional coaches participate as learners and to provide support.

Strong district and site instructional leadership: A commitment from the district to develop clear, shared goals for student learning, and, establishes explicit expectations for ambitious instruction. A commitment to equip site administrators with greater understanding of effective instructional practices in mathematics, and with processes for facilitating productive professional relationships leading to improved instruction. A commitment from site administrators to provide feedback on instruction that communicates district expectations and focuses on the PD teachers have received. It is the collective work of both teachers and principals to support the implementation of the instructional framework

Allocation of resources: A commitment to allocating district resources, money, staff, and time, to implement this policy.

Professional Literature Informing Goal 3

Measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solution.

The importance of having a criterion for a satisfactory solution. As presented in Section 1, and discussed in Section 2, Hoy & Miskel (2001) presented a general pattern for decision-making in education that supports the administration of complex tasks, they identified this process as an "action cycle" (p. 321),

- Recognize and define the problem or issue.
- Analyze the difficulties in the situation.
- **Establish criteria for a successful solution** (emphasis added).
- Develop a strategy for action.
- Initiate a plan for action.
- Evaluate the outcomes.

Though this pattern appears sequential, Hoy & Miskel, maintained that it is also cyclical. The findings of this case study revealed that the participants understood the issue, and the inherent difficulties, and they took action. However, the analysis revealed they did not follow a cyclical process of evaluating their outcomes in relation to a goal. The questionnaire, interview, and archival data exposed that students were placed into mathematics courses according to strategies that varied district to district. What was not evident was the development of criteria for determining whether the placement solutions were successful. Districts experiencing success in student achievement show evidence of stakeholder collaboration on explicit goals for instructional practice and student learning (Little, 2012; Marzano & Walters, 2009).

Determining what constitutes a satisfactory or acceptable solution, is a determination made by educational leaders who are tasked with dealing with complex issues (Lunenburg & Orenstein, 2004). Accordingly, decision makers analyze the issue and its difficulties, develop the success criteria, and then pursue a course of action.

Alternative approaches are considered, (Lunenburg & Orenstein, 2004), and decision makers form judgements on which approach is most apt to produce the objectives – the success criteria (Hoy & Miskel, 2001; Lunenburg & Orenstein, 2004). The participants of this study described the issue as complex, with multiple factors constraining or influencing their professional thinking. The analysis of data showed that the issue was not restricted to middle schools; rather, middle school educators were left to deal with their district's lack of attention to coherence in its mathematics program in earlier grades.

Moving forward then, to address the eighth grade mathematics placement problem, the complexity of developing a coherent mathematics instructional framework districtwide must be a component of the solution (Cobb & Jackson, 2011). Hoy & Miskel (2001) suggested that decision makers consider the problem and the issues and develop success criterion. With that in mind, and fortified with the above review of professional literature on coherence, I offer in the position paper the following elements of a solution, each requiring criteria for success:

(A) Develop success criteria that measure the improvement of the Opportunity to Learn in all grades.

(1) Establishing and protecting instructional time dedicated to mathematics' instruction, and support interventions.

(2) Implementing curriculum aligned with researched-based learning progressions leading to deep understanding of algebraic concepts.

(3) Improving quality of instruction: implementing common effective instructional strategies school wide, according to grade level and content.

(4) Establish goals for implementation of strategies, including timelines and targets for how often the strategy is observed in practice.

(B) Develop success criteria that measure the implementation of course options and instructional support for students.

(1) Specifically in middle schools: Develop and implement courses that support appropriate placement options and instructional support for students.

(a) A grade-level course aligned with the content standards and learning progressions documents;

(b) An in-school intervention course for the struggling students, taken concurrently with the core course, which shores up essential skills, re-teaches content from the core course, and front-loads important skills necessary for future content in the core course; and

(c) A remedial or below-grade level, course for severely low-performing students focused on essential skills and concepts necessary for student access to algebra content.

(2) Develop additional instructional supports for addressing real-time misunderstanding of content, across all grade levels (i.e., whole class and targeted re-teaching, additional math instruction time before and after school, one-on-one tutoring).

(C) Develop success criteria that measure the implementation of a coordinated system of assessments.

(1) That gauge student progress towards mastery of the learning progressions, and,

(2) Inform instructional support and course placement decisions.

(D) Develop success criteria that measure the improvement of supportive working conditions.

(1) Providing professional development for teachers and administrators associated with content and instructional strategies, including job-embedded re-training as necessary.

(2) Implement structures for observations and feedback on implementation of instructional strategies, which involves peers in the observation and feedback processes.

(3) Institute collaborative PLCs for teachers to discuss mathematics instruction, review course content, and analyze student assessments and student work.

(4) Institute an on-site instructional coaching program, in which the coach

(a) Models instruction,

(b) Observes instructional practice and provides feedback to teachers,

(c) Implements cognitive coaching strategies to support teachers in becoming reflective practitioners

(d) Facilitates collaborative professional discussions on issues of practice.

(E) Develop success criteria that measure the improvement of the allocation of resources.

(1) Demonstrate that resources, including time, money and staff, are allocated to implement the coherent instructional program.

(2) Make accommodations in the master schedule, and in staffing, to support the course options and interventions.

(F) Establish success criteria that measure student achievement in mathematics.

(1) Identify targets for student achievement of the essential skills and concepts associated with algebra readiness.

(2) Specifically at the middle school level, establish targets for student achievement in the courses to which they are assigned.

(G) Establish success criteria that measures student access and completion of mathematics courses in high school.

(1) Identify targets for reducing the rates of ninth-grade students repeating eighth grade coursework.

(2) Identify targets for higher rates of high-school students accessing and successfully completing mathematics courses deemed admissible by the state university systems.

In behavioral decision-making in which administrators are attempting to satisfy as many of the organizational issues as they possibly can (Simon, 1947, 1993), and are addressing issues in a focused and incremental fashion (Lindblom, 1993), it is necessary they assume a cyclical stance (Hoy & Miskel, 2001). By first developing and understanding the goal, the satisfactory achievement objectives, they can then develop the action steps necessary to take their organization in a rational direction (Marzano &

Waters, 2009). As the measurements are analyzed, the decision makers determine what adjustments or alternative actions are necessary to achieve objectives that have not been met. Later in this section an evaluation plan is offered that supports measuring these criteria for satisfactory solution.

This completes the review of the professional literature related to the project genre and the project goals, and the policy and practice recommendations. The following is a description of the position paper, the intended audience, the needed resources, timelines, and roles and responsibilities.

Project Description

The construction of the position paper containing policy and practice recommendations observed recommendations offered by Johnson-Sheehan (2010) in the textbook *Writing Today*, as well as, writing suggestions presented by scholars (Powell, 2012; Tsai, 2006; Young & Quinn, 2002) and policy-advising organizations such as the Food and Agriculture Organization of the United Nations (n.d.), Centre for European Policy Studies (n.d.), Overseas Development Institute (ODI), (Jones & Walsh, 2008). I also reviewed policy papers from the National Council of Teachers of Mathematics, the Overseas Development Institute, and the Consortium for Public Research in Education to serve as models for the position paper. These recommendations and models addressed the scope, purpose and intended audience of the document, as well as provided parameters for the content and length. The focus of the position paper is on improving the way in which administrators and other school leaders approach mathematics education in their school districts. The position paper offers policy language and research-based strategies for achieving instructional program coherence which lead to appropriate eighth grade mathematics placement decisions. Senge (1990) proposed that effective organizations are those whose leaders are seeking to improve and are continuously learning. This project honors that prescription by providing policy and practice recommendations that are relevant, research based, and intended to facilitate deeper professional understanding intentionally designed for real-world application.

Contents of the Position Paper

Executive summary. The position paper developed for this project study includes policy and practice recommendations for educational leaders dealing with student placement issues. Tsai (2006) recommended that an executive summary accompany a position paper that proposes policy language. Oftentimes policymakers are not experts in the field, nor do they have time to delve deeply into complex issues (Penn State University, 2002). An executive summary is a standalone document that offers the reader a summary of the most important aspects of the paper, providing a concise, condensed, analysis of the paper and its recommendations (University of Maryland University College, 2015). The executive summary of this position paper provides a brief overview of the research problem, the major findings that informed the project, the project goals, and the recommended actions to achieve the goals.

Body of the position paper.

Part 1: Introduction. The position paper opens with an introduction explaining the research problem, as well as, the purpose of the study and its importance to the broader educational community. The introduction briefly describes the project goals, and the recommended actions.

Part 2: The case study and major findings that informed the goals of the project. This section of the position paper discusses the parameters of the case study, the research questions, and the participants. The section includes a summary of findings according to each research question. A summary of the discussion of findings is also offered, as are the major findings that informed the project goals.

Part 3: Project. This section of the position paper provides description of the two project goals, and the related theory and research that supports the goals. The project seeks solutions to the study's problem by addressing two fundamental issues: (a) Instructional program coherence, and (b) Missing elements of effective decision-making. The project integrates the scholarly review of professional literature, and builds a case for the appropriateness of the goals in solving the problem.

Part 4: Policy and practice recommendations. In this section, I provide an example of a policy statement and recommend actions for implementing the project. The policy statement example embeds organizational values and belief statements, and stated commitments to actions in pursuing instructional program coherence, and appropriately placing students into mathematics courses.

Part 5: Actions, roles and responsibilities, and timelines. In this section I identify specific actions intended to implement the project and outline the roles and responsibilities for district level administrators, principals, and teachers.

Part 6: Evaluation. In this section, I offer rationale for an evaluation plan, and the types of evaluation. I provide guiding questions to inform the evaluation process.

Part 7: Summary and Conclusion. In the conclusion, I summarize the main points of the paper, reiterate the importance of the project, and restate the justification for the project.

Part 8: References cited: Provided at the end of the position paper is an alphabetical listing of the references cited in the position paper.

Intended audience. In this project study, I was concerned with the administrative decisions in a region of California that supplied a wide variance in the observed placement of students in eighth grade mathematics courses. The position paper is intended to support the professionals in dealing with this issue. The position paper offers policy and practice recommendations that assist district leaders in transforming their mathematics programs districtwide in order to better serve students, and increase the level of appropriate middle-school placement into mathematics courses. The recommendations support ushering in instructional program coherence, which research suggests leads students to higher-levels of mathematical understanding, which in turn informs the placement decisions made by administrators (Finkelstein et al., 2012). However, as noted in the literature reviews the question of placement extends beyond Shelton County (Clotfelter et al., 2012; Domina, McEachin et al., 2014; Laing et al., 2012; Long et al., 2012; Loveless, 2009; Stein et al., 2011; Waterman, 2010). The question of appropriate mathematics course placement continues to draw statewide and national attention of researchers and policy advisors (Clotfelter et al., 2012; Ed Source, 2009; Finkelstein et al., 2012; Long et al., 2012). The intended audience therefore, is not limited to the regional educators represented in this project study. Rather, the intended audiences are unified school district educators and policymakers responsible for delivering a coherent instructional program in mathematics; a program that leads to rational placement decisions, which are in the best interest of students. Specifically, the audiences are governing boards, superintendents, curriculum directors, site administrators, teachers and other stakeholders invested in quality mathematics education and effective administrative behavior.

Special Terms Associated With the Project

Action-cycle decision-making. The action-cycle decision-making model clarifies and revises the satisficing model (Simon, 1947), by explicitly identify six explicit phases including the development of criteria of a satisfactory solution, and evaluating the decision in light of the criteria (Hoy & Miskel, 2001).

Assessments. In the project, assessments are used to measure student progress to learning the grade-level content, and student-readiness for algebra content (Huang, Snipes & Finkelstein, 2014).

Coherent instructional program in mathematics. The district instructional program aligns instruction, content and assessments, with the learning progressions necessary to achieve readiness for algebra content. In addition to the alignment of these areas, a coherent program ensures supportive working conditions to buttress program implementation, and allocation of resources (i.e., time, staff, and resources) focused on achieving program goals (Cobb & Jackson, 2011; Newmann et al., 2001).

Common instructional framework. Effective researched-based instructional strategies implemented grade-level wide, and in some instances school wide (Cobb & Jackson, 2011; Newmann et al., 2001) that promote student learning. These explicit strategies are clearly communicated to teachers and ongoing training and support are provided to ensure implementation.

Instructional coaching. Instructional coaching is an on-site instructional support system in which a teacher-coach models effective instructional techniques, and provides feedback to teachers implementing the strategies. The instructional coach practices questioning techniques with teachers to elicit reflective responses regarding their instructional planning and instructional delivery (Knight, 2007).

Intervention support class. In this project, an intervention support class is a mathematics class that a middle-school student with moderate levels misunderstanding is enrolled into, and is taken concurrently with the grade-level class. In the intervention class the student receives remediation in essential concepts necessary for algebra-readiness, receives support with content introduced in the grade-level class, and, has upcoming content from the grade-level class previewed to support access to the content (Vaughn et al., 2012).

Learning progressions. Learning progressions represent increasingly complex material taught throughout the grade-levels. The progressions in the early grades promote understanding of mathematic concepts essential for accessing algebra content in later grades (Korbin et al., 2014).

Opportunity to learn (OTL). OTL factors are adequate time, appropriate content and quality instruction, and considered necessary for student learning (Carroll, 1963; Marzano, 2003).

Organizational values and beliefs. Organizational values and beliefs are developed by stakeholders and adopted by governing boards. They are considered guiding principles, or foundational tenets of school district, and assist school administrators in navigating complex issues and making decisions (Marzano & Walters, 2009; Mueller, 2014).

Professional development (PD). In this project PD is coordinated training to inform teachers and administrators of the elements of a coherent instructional framework, and to train the implementation of a common instructional framework (Cobb & Jackson, 2011; Marrongelle et al., 2013).

Needed Resources

Resources of time, staff, and revenue are necessary to implement a coordinated, coherent instructional program of mathematics (Newmann et al., 2001). Likewise, instituting a cyclical decision-making model that embraces the heuristics (i.e., general stages) of decision-making in the action cycle posited by Hoy & Miskel (2001), requires a commitment of resources. Each of these stages requires staff time, and mechanisms, to gather and analyze data, present ideas and alternatives, and to appraise the effectiveness of the actions. What follows is a discussion of the resources needed to implement the recommendations as provided in the position paper.

Needed resources for coherent instructional program recommendations. Many of the resources needed to implement a coherent mathematics education program exist in most unified school districts. However, in some cases these existing supports need repurposing to align with Goal # 1, the increased understanding and implementation of instructional program coherence. In their seminal work, Newmann et al. (2001) established that a coherent program in mathematics is evident when three major conditions are operating: (a) "a common instructional framework guides instruction, assessment and learning climate" (p. 299), (b) "staff working conditions support implementation of the framework" (p. 299) and, (c) resources are allocated to advance the instructional framework and not in a scattered or unfocused fashion. The following identifies how existing district assets are purposed to achieve the three major conditions.

Purposing existing supports and assets for Goal 1. Supporting the condition of a common instructional framework (i.e., common instructional strategies which are proven effective for teaching the grade-level content), necessitates the resources at hand be focused on optimizing the three main elements associated with the opportunity to learn (OTL), namely, time, content, and instructional quality (Marzano, 2003). Time is allocated in schools according to a school-year instructional calendar that dictates the number of school days (California Education Code, 2013), and by a local bell schedule that determines the daily minutes of instruction. Effective bell schedules in elementary grades, and master schedules in middle schools (which associate class times with bell schedules), provide adequate time for math instruction. Systems that allocate sufficient time for mathematics instruction of at least one hour per day, and guard the time from interruption show higher levels of student achievement (Frederick & Walberg, 1980; Elliott, 2014). Guarding this time from interruption is viewed as an essential duty of the site principal (Larson, 2011; NCTM, 2000), and promotes a general understanding that mathematics instruction is important.

Gathering and utilizing instructional material and curriculum that are aligned with the grade-level content standards, represents the second aspect of providing OTL. The existing support of having district-level administration in unified school districts assigned to curriculum and instruction is common in the participating school districts. These individuals play a vital role in developing processes of procuring quality classroom content. However, student attainment of conceptual algebraic knowledge is predicated on mastering a coordinated logical progression of increasing complex material (Kanold et al., 2012; Korbin, 2014; Larson, 2011). This compels district-level administrators to research the progressions and evaluate the instructional materials according to the materials adherence to the progressions. District finance officials routinely allocate funds in the district budget to purchase instructional materials. Finance officials can support the development of purchasing protocols that require instructional materials for mathematics to be aligned with the progressions, supports OTL, and advances coherence.

Another aspect of OTL is the quality of instruction. Identifying effective instructional strategies promotes student engagement with essential algebraic concepts that leads to increased learning; and supporting teachers in implementing and refining the strategies in their classrooms (Marrongelle et al., 2013). The existing supports in school districts are the opportunities provided for teacher professional development (PD) and training in instructional delivery, the processes for observation and feedback of instruction that monitors the implementation of PD, and the degree to which the professional culture embraces peer-to-peer conversation regarding the daily practice of instruction (Little, 2007). Site principals play an important role in leading instructional improvements (Cobb & Jackson, 2012). A principal, having a relentless focus on implementation of explicit instructional strategies, represents an internal resource well positioned to increase OTL and advanced coherence in the instructional program.

Student assessment data play an integral role in the coherent instructional program (Newmann et al., 2001). The student data relative to mathematics potentially provide relevant information regarding student aptitude and readiness for grade-level content (Huang et al., 2014), as well as providing evaluation data on the effectiveness of instruction (Cobb & Jackson, 2011). Districts have capacity to develop, or acquire, and administer local assessments, which provide current appraisals of student learning. However, a coherent instructional program presumes that assessments are appropriately aligned to the curricular progressions. This presumption presents a challenge to district instructional leaders to correspondingly develop, or acquire, assessments that measure the students' mastery of increasingly complex material.

A learning climate that supports coherence is a climate that addresses the difficulties students are having in learning the content associated with their grade level. Making a concerted effort to tackle the deficiencies is up to the local educators who have the responsibility to devise and deliver the necessary remediation. The local educators can purpose existing supports to deliver in-class remediation in the form of differentiated instruction, or after class remediation, in the form of extra instruction after school (Vaughn et al., 2012). More intense supports may be required, such as extra-time within the school day, in the form of an intervention class taken concurrently with the core class, or, when necessary instituting a below-level course to address severe deficiencies.

Working conditions that support the implementation of common instructional practices are an essential aspect of a coherent instructional program (Cobb & Jackson, 2011; Newmann et al., 2001). "Supportive conditions" describe a work environment, in which both teachers and administrators are committed to implementing the common instructional practices; hiring, and teacher evaluation practices seeking to effectively execute the instructional framework. The PD activities, and principal-to-teacher, and teacher-to-teacher interactions are fixed on improving instruction, and represent potential existing resources that aid coherence. However, it requires genuine commitment by these individuals to the implementation of the instructional framework. In a supportive environment, as teachers implement common instructional practices, they receive instructional coaching, that models the instructional strategy, provides feedback on implementation, and develops profession reflective practices. In the supportive working climate, site principals develop their own knowledge of effective instructional strategies in mathematics (Cobb & Jackson, 2011, 2012; Kanold et al. 2012) and leverage this knowledge to provide solid feedback, and participate in professional conversations about practice.

Repurposing teacher professional days to support professional learning communities (PLC) reinforce coherence efforts. Instituting PLCs serve to bring together teachers at a site, to collaborate on issues of instruction, curriculum implementation, student assessment, and providing interventions for struggling students (Coggshall et al., 2012; DuFour, et al., 2006). PLCs are useful in addressing problems of practice that arise when teachers strive to implement strategies learned in professional development (Horn & Little, 2010). Through PLC teachers and administrators collaborate in the project implementation and evaluate ongoing actions and student outcomes.

The condition of "allocation of resources" that Newmann et al. (2001) espoused, recommended directing resources (i.e., time, staff, and money) in a focused fashion. Their concerns are disjointed and scattered improvement efforts that derail progress toward a common vision of effective instruction, coordinated assessments, and professional growth. The emphasis of allocation is to focus existing resources on these critical areas, and resist the pull toward other approaches not consistent with the framework.

Purposing existing supports and assets for Goal 2. Another aspect of the project is to address deficient elements in the decision-making experience of the participants. I chose to refer to the satisficing model of decision-making (Simon, 1947), and an associated action cycle presented by Hoy and Miskel (2001), which provides greater clarity to the model. What the analysis of data showed, is that while many of the participants attempted to find satisfactory solutions to the myriad of factors confronting them in the placement of students, they did not reference organizational values and beliefs, nor did they have or develop district policy on the issue. Organizational values and policies are basic assumptions in the satisficing paradigm. Additionally, the paradigm is not a one-time event; rather the decision is subject to evaluation and revision. The existing resources such as district value and belief statements embedded in strategic planning documents, as well as, mission and vision statements can guide decisions. Similarly, policy statements that directly address the issue or provide clarification are additive in the decision-making process.

Utilizing a process, which attends to each phase of the action-cycle, is critical to sound decision-making (Hoy & Miskel, 2001). Absent in the participants' experience were two phases, development of success criterion, and evaluation of the placement decisions relative to the criterion. The existing supports are represented by the capacity of school and district administrators to follow the action-cycle process: define the problem, analyze the difficulties, establish criteria for satisfactory solutions, deliberate and plan the strategies, implement the actions, and appraise the outcomes.

Potential Barriers and Potential Solutions to Barriers

The analysis of data revealed that the issue of placing eighth grade students into mathematics courses was complex. Complicating the issue were several constraining and influencing factors, which were the quality of instruction, student readiness for content, master schedule, state and district expectations, and the autonomy of decision makers to act according to their own devices, to name a few. To address middle-school student placement in mathematics courses required a look back to the students' previous experience. Can middle school administrators place students into classes for which they are not prepared? For the school district leadership, the issue is not isolated at the middle school only; rather it is a systemic issue that concerns the instructional program districtwide. Systemic reform in mathematics is offered in the structure of a coherent instructional program, which begins in the earliest grades and continues throughout graduation. Each aspect of a coherent instructional program in mathematics has potential barriers, as does the implementation of a decision-making action cycle. In this section, I present 12 potential barriers and follow with potential solutions.

Potential barrier 1. Other interests, courses, and activities compete for time dedicated to mathematics instruction.

Potential solution. Instructional program coherence in mathematics entails dedicated instructional time. Governing boards can support the time element by identifying mathematics' achievement as a goal area in the school district's strategic plan for student success. Being a district goal, the administration is tasked to report to the board the actions taken to advance the goal; one of the actions being the dedication of time for mathematics instruction in the daily bell schedule. Likewise, secondary school administrators identify how mathematics courses are accommodated in the school's master schedule, and the time allocated for the core instruction and for in-school support classes.

Potential barrier 2. Teachers desire to use existing mathematics instructional materials which are not aligned to the learning progressions.

Potential solutions. The district-level administrator becomes familiar with the learning progression documents, and determines whether the existing curriculum has sufficient content to address the grade-level standards. When the existing curriculum is insufficient to meet content of the standards, the administrator begins a process of evaluating new instructional materials, this process can elicit the support of teachers and site administrators serving on a curriculum committees tasked with identifying appropriately aligned materials. In California, County Offices of Education provide technical support to school districts and can assist in evaluating instructional materials. The district level administrator can access the California Department of Education *2014 Mathematics Adoption Report* (CDE, 2014) for a list of approved materials.

Potential barrier 3. A logistical difficulty exists in placing support interventions into a school day, or, in the master schedule.

Potential solutions. To ensure support interventions are in the school day, the developers of the bell schedule, and of master schedules, builds the schedules around math instruction. The time for support in the elementary grades, and the sections (classes) are identified in the early stages of building the schedule. In the secondary schools, Student Information Systems (SIS) software programs provide assistance with scheduling challenges, and supports administrators into making scheduling decisions that optimizes student enrollment into support classes and minimizes course conflicts.

Potential barrier 4. Resistance by teachers exists to implementing a common instructional framework, fear of inability to deliver instruction according to the framework, fear of losing teacher autonomy, fear of losing extraordinary practice.

Potential solutions. Begin with a few instructional strategies that are commonly practiced in multiple disciplines, such as checking for student understanding, and providing adequate student response time to teacher questions. These strategies are attainable and can serve as a base for the instructional framework. Reassure teachers that personal instructional strategies they use, and the student outcome data show have proven effective, will be maintained. These strategies may inform the broader instructional plan. Provide training, with ample modeling, of explicit strategies that are effective for teaching grade-level mathematics. Encourage the implementation with supportive feedback, and opportunities for peer-to-peer collaborations focused on the delivery of instruction

Potential barrier 5. Teachers lack conceptual knowledge in mathematics which leads to student misconceptions.

Potential solutions. In unified school districts mathematics teachers in the secondary grades typically have achieved “highly-qualified” status, under the No Child Left Behind Act of 2001. These teachers can provide support and PD training to elementary school teachers who lack conceptual knowledge of mathematics. Additionally, the National Council of Teachers of Mathematics (NCTM) provides conferences, seminars and books on teaching essential algebraic concepts. Increase the commitment to mathematics instruction in teacher preparation programs.

Potential barrier 6. Principals administering school sites are unknowledgeable of effective mathematics pedagogy.

Potential solutions. To meet this barrier, principals participate with teachers in the PD provided on the common instructional framework, and participate in PLC conversations regarding practice. The book, *What Principals Should Know about Teaching and Learning Mathematics* (Kanold, Briars, & Fennell, 2012) provides a chapter on effective research-based instructional strategies.

Potential barrier 7. A lack of instructional coaches exists to support implementation of common instructional practice.

Potential solutions. Until in-house coaches are available, the district invests in outside trainers to share the strategies, model the strategies using students, and assist with monitoring and providing feedback on implementation. Developing in-house coaches is matter of identifying teachers showing good ability with the strategies, and allowing peer-observations of these teachers' practice. Overtime, elevate teachers who have demonstrated expertise to the role of teacher coach.

Potential barrier 8. The professional cultures are unfamiliar with professional learning community (PLC) processes.

Potential solutions. Training, workshops, and books on the subject and practice of PLC in schools are readily available. Initial forays into PLC include data talks, in which teachers analyze and discuss student outcome data on a common assessment; learning walks, in which small group of teachers observe instruction in another teacher's classroom then discuss the effectiveness of the observed strategies. These two strategies serve to establish a culture in which student learning and instructional practice are routine aspects of the professional interactions.

Potential barrier 9. District and school assessment regimen are neither aligned with learning progressions, nor provide measures of student-readiness.

Potential solutions. District leadership can access test materials, and test-question item banks that textbook publishers provide as ancillary resources. Additionally, testing companies associated with the Common Core State Standards provide standards aligned assessment items which districts can use to prepare local exams. California State University, San Diego and the University of California, San Diego, have developed the Mathematics Diagnostic Testing Project (2012) which includes tests of algebra readiness, and made them available to school systems. Teachers can assist districts in preparing assessment questions aligned to the learning progressions.

Potential barrier 10. Processes for monitoring instruction do not produce effective feedback for teachers to inform their instructional practice.

Potential solutions. Provide an instrument that observers use to document the implementation of explicit strategies. Promote the use of the instrument in informal observations and during learning walks. Provide feedback to the teacher based on the observed use of strategies documented on the instrument. Encourage peer-to-peer observation and feedback, and utilize reflective questioning techniques, in which the questioner asks questions regarding practice and respondents reflect and share their experience, that which was good and that which could be better.

Potential barrier 11. Neither organizational value statements, nor policy provide guidance to leaders in making placement decisions.

Potential solutions. Institute a strategic planning process, in which stakeholders from various communities (i.e., administration, teachers, staff, parents, and students), collaborate and identify the stakeholder-held beliefs regarding education. Draft a district policy statement that specifically addresses mathematics’ education.

Potential barrier 12. School leaders lack familiarity with action-cycle of decision-making which impacts the development of satisfactory criterion for success, and evaluating the outcomes.

Potential solutions. Provide coursework in administrative education graduate studies dedicated to administrative theory and decision-making. Provide practitioners training in the cyclical design of decisions. Utilize the methods outlined by Hoy & Miskel (2001) and Lunenburg & Ornstein (2004). Acknowledge that decision-making requires ongoing defining of the issue, analyzing data associated with the issue, establishing success criterion, considering alternative, planning and taking actions and measuring results. Refer to organizational guiding principles and policy to inform decisions on complex issues.

Roles and Responsibilities

Reviewing the position paper is the responsibility of each member of the district leadership team. Implementing the recommendations of the position paper is the responsibility of various administrators, policymakers and educators in the school system. In order to implement the recommended actions, individuals are charged with various responsibilities. The following identifies the responsible actors and their deliverables:

Governing board. The Governing Board is responsible for reviewing its own policy language and revising it to accommodate the proposed guidelines for mathematics instruction. The local board receives training on the purpose and importance of program coherence. Board members participate in drafting the final guiding principles language, which includes value and belief statements that can serve to guide administrators in making decisions. The board ensures that financial resources necessary to implement the program are embedded in the district's adopted budget. The board receives periodic updates on the progress of the program and discusses rationale for revisions before approving changes. The governing board is responsible for adopting an explicit policy statement regarding mathematics instruction and the placement of students into mathematics courses.

District superintendent. The superintendent is responsible for commissioning, or facilitating, a strategic planning process that includes developing guiding principles for the district. These principles may be in the form of vison, mission and value statements. A concern for this project is a policy statement that directly clarifies the school district's commitment to mathematics education, and for placing students into mathematics courses. The superintendent is responsible for the casting the vision for a coherent instructional framework, and oversees the messaging effort in communicating the purpose and goals of coherence to the district and community wide. The superintendent coordinates the development of the program goals, (i.e., the criteria for success). These include goals for processes such as PD, assessments, instructional material adoption, instructional monitoring and feedback, and course options; and goals for student achievement such as, percent of students mastering grade-level standards, percent of students in remedial and intervention supports attaining mastery of essential algebra-readiness content. The superintendent oversees the evaluation process and reporting of progress to the governing board.

District level administrators. District level administrators responsible for curriculum adoption and instruction, have different titles depending on the district size and organizational structure. These include titles such as associate superintendent, assistant superintendent, and director of curriculum and instruction. These administrators are responsible for defining and communicating the attributes of a coherent instructional framework in mathematics. They coordinate the training for teachers and principals in effective instruction in mathematics that is researched-based practices according to grade-level content; coordinate the review and acquisition of instructional material aligned with the learning progressions; coordinate the training of teachers in the learning progressions; coordinate the district mathematics assessment regimen including assessments for student-readiness for algebra content; coordinate the analysis and reporting of assessment data; support site principals in developing PLC for mathematics instruction; support site principals in implementing on-site instructional coaching processes; and support site principals in developing effective practices for monitoring and feedback of instruction, including peer-to-peer observation and feedback. These individuals also collaborate with principals on the course options and placement decisions for students in accordance with the program goals and guiding principles. The district-level administrators develop processes for gathering information necessary for project evaluation, and assist in the project evaluation. The district-level administrators draft project evaluation reports.

Chief business official (CBO). The executive in charge of budget development and business operations ensures that protocols for purchasing instructional materials include evaluating the materials according to the learning progressions. Likewise, the

CBO ensures that the funds committed to staffing and training are aligned with the program goals. The CBO collaborates with the district level and site-level administrators to determine how to optimize finite fiscal resources to fund the program. The CBO converses with the superintendent and governing board to determine funding priorities, and conveys suggestions for accommodating the program requirements.

Site administrators. Principals and vice principals are responsible for leading the reform efforts at the school site. They are responsible for collaborating with district-level administrators to coordinate on-site PD for (a) learning progressions, (b) the importance of coherent instructional programs, (c) effective instruction, (d) peer observation and feedback, and (e) PLC processes. The site administrators receive the same training as teachers, and become increasingly familiar with explicit instructional strategies. They participate in PLC meetings, and facilitate data discussions of student achievement in mathematics. They institute instructional coaching as a professional aspect of their schools. They establish instructional time in mathematics and guard it from interruption. Middle school principals are particularly responsible for placement decisions. They develop course options for middle school students which include opportunity for remediation and intervention. They evaluate the processes for placing students, and the progress on learning goals and communicate their findings to the district leadership. The site administrators assist district-level administrators in gathering information for project evaluation, and assist in the evaluation.

Teachers. The responsibilities of teachers are to gain understanding of the importance of a coherent instructional program and their role in implementing the instructional framework (i.e., honoring the dedicated time for math instruction, delivering content with curriculum and materials that are appropriately aligned with the learning progressions, and utilizing common research-based instructional strategies appropriate for the grade-level or course). Teachers participate in PD for learning progressions, content knowledge, instructional strategies, and PLC processes. The PLC processes include collaboration on lesson plans, analysis and discussion of student assessment data and student work, professional dialogue regarding the delivery of instruction, peer-observation-and-feedback of instructional practice, and involvement in the instructional coaching model. Teachers serve on curriculum review and selection teams (Law, 2011) and contribute to the evaluation of the program goals. Teachers assist in the gathering of data for project evaluation, and assist in the evaluation.

Stakeholders: parents, students, community members. The success of the project involves the various stakeholders. Parents, community members, and students, join with the superintendent, teachers, administrators and staff to serve on the strategic planning team. This team collaborates on the development of the guiding principles and learning goals for the district and forwards the recommendations to the governing board. The stakeholder members are solicited from various populations including parent groups (i.e., Boosters clubs and Parent Teachers Association) and from advisory committees (i.e., School Site Councils, Superintendent Advisory Committee, English Learners Advisory Committee) and randomly at-large to ensure a diverse representation. Likewise, students are chosen from school clubs and leadership bodies, as well as at-large. For strategic planning purposes, students from Grades 6 to 12 are recommended.

Students have additional responsibility to engage with the instruction, give their best effort, and self-advocate by seeking assistance from teachers for misunderstanding of material.

Implementation and Timelines

I have developed a project that proposes systemic reforms to address the issue of appropriate middle school mathematics placement and the decisions that face middle school and district level administrators. This project is multi-faceted, involving numerous participants, and requires a complex coordination of resources, planning and evaluation. Following the action-cycle decision-making (Hoy & Miskel, 2001), I advise in the position paper the following four-year implementation plan:

Year 1. "Recognize and define the problems or issues, analyze the difficulties in the existing situation, establish criteria for a satisfactory solution" and begin to "develop a strategy for action" (Hoy & Miskel, 2001, p. 319).

- Analyze student mathematics data, identify problem areas needing support.
- Evaluate opportunity to learn concerns (i.e., dedicated time for instruction, content, and quality of instruction).
    - Evaluate the use of time dedicated for mathematics instruction.
    - Evaluate current instructional materials according to their alignment with learning progressions.
    - Evaluate the observed instructional practices.
- Specifically for middle schools, document current course offerings in mathematics and processes for placing middle-school students.

- Evaluate current assessment regimen according to its alignment with the learning progressions, and its ability to measure student-readiness for algebra content.
- Investigate researched-based instructional strategies that support the learning of grade-level and course content standards.
- Assemble strategic planning team to review and recommend revisions to the current strategic plan, or draft a new plan. Develop guiding principles that inform district decisions. I have provided examples of guiding principle, and, value and belief statements.
- Develop a policy statement regarding the mathematics education program, and the importance of program coherence. I have provided a policy statement example.
- Establish criteria for satisfactory solutions for the implementation of a coherent instructional program, student achievement, and course completion. I have provided examples of criteria for satisfactory solution.
- Plan for professional development (PD) for the summertime and the following three-years to include
    - The importance of instructional program coherence,
    - The learning progressions that lead to algebraic understanding,
    - The analysis of student assessment data,
    - The use of curriculum and instructional materials, and
    - The processes associated with professional learning community.
- Plan revising assessment regimen to align with learning progressions, and provide data regarding student-readiness for algebra content.

- Plan revisions to dedicated time for mathematics in elementary grades to be instituted in Year 2.
- Begin planning the creation of course options, including in-school interventions and remediation to be instituted in Year 3.
- Deliver PD to administrators on the phases associated with the action-cycle of decision-making.
- Communicate the plans as they develop to teachers, administrators, governing board and strategic planning team.

I use the term “plan”, for preparing for PD, revising assessments, dedicating instructional time, and proposing new course options. In the action cycle, planning is advisable (Hoy & Miskel, 2001) as leaders must deliberate on the plans, consider alternatives, predict consequences, and make their selections on the course of actions which they believe best lead to the satisfactory criteria.

Year 2. In following the action cycle phases in Year 2, the phase of developing a strategy for action continues, and “initiating” certain actions begin.

- Deliver PD on the importance of program coherence.
- Deliver PD on the learning progressions.
- Pilot new instructional material aligned to the learning progressions in certain classrooms.
- Establish protected instructional time for mathematics in elementary grades.
- Deliver PD on effective instructional practices.

- Administer local assessments aligned to the learning progressions mid-year, and at the end of the year.
- Deliver PD on data analysis.
- Monitor implementation of instructional strategies.
- Deliver PD on PLC processes.
- Initiate PLC process on data review of local assessments.
- Provide PD to principals, on effective processes of monitoring instruction and providing feedback to teachers.
- Devise an instrument to document the use of explicit instructional strategies presented in PD sessions. Data collected with the instrument will inform the professional conversations regarding practice.
- Identify teachers to serve as instructional coaches.
- Specifically for middle-school, administer end-of-year algebra-readiness exams to sixth and seventh grade students.
- Specifically for middle-school, prepare a student placement matrix, identifying placement factors that inform the decision to place students into middle-school mathematics courses.
- Receive placement recommendations from sixth and seventh grade teachers for student placement in the following year.
- Acquire instructional materials for Year 3.
- Plan for Year three PD to include
- Training for instructional coaches,

- Ongoing training on instructional strategies,
- Training on use of new instructional materials, and
- Training on peer-to-peer observation and feedback
- Build syllabi for new course options.
- Communicate to teachers, administrators, governing board and strategic planning team the progress made toward program coherence.

Year 3. In this year of the implementation, actions are continuing and appraisals of the program according to the criteria for successful solutions are commencing.

- Provide continued PD for teachers and administrators on instructional strategies.
- Provide training for the instructional coaches.
- Provide continued PLC training to include peer-to-peer observation and feedback.
- Include teachers on learning walks, in which the observation instrument is used to collect data on the implementation of explicit instructional strategies learned in PD sessions.
- Specifically for middle schools, analyze student assessment data, and teacher recommendations, and other factors that are included on the student-placement matrix, and place seventh and eighth grade students into either a grade-level course, or a grade-level course and a concurrent intervention support course, or a remediation course to develop essential skills for algebra readiness. The administrators refer to the district guiding principles and policy statement regarding mathematics education to for further guidance regarding the placement decision.

- Improve the middle-school learning climate for identified students by instituting in-school intervention support course taken concurrently with core course. Support identified students deemed not ready for the core grade-level course by instituting an algebra-readiness course to shore up conceptual misunderstandings and prepare students for algebra content.
- Structure opportunities for grade-level PLC sessions to analyze student assessment data, collaborate on instruction, and discuss the successes and challenges of implementing instructional strategies.
- Institute instructional coaching, having coaches model strategies, and observe instruction and provide individual feedback and support.
- Administer local assessments aligned to the learning progressions mid-year, and at the end of the year. Administer end-of-year algebra readiness assessment to seventh and eighth grade students.
- Evaluate the processes associated with
- Administering assessments,
- Alignment of assessments with learning progressions,
- Providing PD,
- Monitoring and supporting the implementation of instruction strategies,
- The implementation of PLC processes
- The alignment of time, content and instruction with the requirements of the learning progressions, and,
- The appropriate placement of seventh and eighth grade students.

- Communicate findings to governing board, teachers, and strategic planning team.
- Plan for Year 4 PD, assessment processes, data reviews, and reporting.

Evaluations of program elements begin in Year 3. Much of the project demands the institution of processes. Criteria for satisfactory solutions exist for process as well as for student achievement. The local assessments are reviewed for their alignment to the learning progressions, and state exam data from Year 2 are also reviewed, to measure student progress toward the achievement goals. Comparisons of outcome data between local assessments and state assessments are additive, as local educators compare student results to determine reliability of local assessments; determining whether the local assessments reliably predict student outcomes on state assessments. Surveys of teacher and administrators provide information to guide the evaluation of, PD, monitoring of instruction, and the PLC processes.

Year 4. In this year full implementation occurs, and appraisals of effectiveness are conducted to inform future revisions of the project.

- Ongoing PD of the strategies rooted in the common instructional framework.
- Ongoing development and implementation of the instructional coaching model.
- Ongoing PD of effective PLC processes, including peer-observation-and -feedback.
- Continue administration of assessment regimen, including algebra-readiness.
- Continue gathering end-of-year teacher recommendations for placement of middle-school students in mathematics courses.

- Analysis of student outcome data, according to the criteria for satisfactory solution.
- Evaluate outcomes of middle-school student achievement in mathematics courses.
- Evaluate the placement of students in high school mathematics courses. Specifically, for ninth grade evaluate the rates of students repeating eighth grade coursework. Evaluate the rates that high-school students are accessing and successfully completing mathematics courses deemed admissible by the state university systems.
- Continue processes for monitoring implementation of the common instructional framework.
- Consider revising, upgrading and replacing instructional materials which are not deemed aligned with the instructional program and the learning progressions.
- Consider revising, upgrading and replacing assessments that are not aligned with the instructional program and the learning progressions.
- Consider revising processes for monitoring implementation of the common instructional framework.
- Consider revising common instructional framework to institute new researched-based best practices of instruction.
- Consider revising the student-placement matrix used to place students in middle-school mathematics courses.

This concludes the project 4-year action-cycle decision-making process. The actions in Year 4 promote sustainability of the project as action cycle decision-making is cyclical, and asks educational leaders to continually review the quality and effectiveness the educational program, with repeated regard for program coherence.

Project Evaluation Plan

Evaluation in action-cycle decision-making is not solely a summative endeavor, rather evaluation occurs in the early stages, and plays a role throughout the entire project (National Science Foundation, 2002). In this project the earliest stage of evaluation is used to define the problem in the local context. Educators in unified districts determine whether students are successfully completing grade-level courses in mathematics, and if the data prove problems of student mastery exist, particularly in the middle schools (as were shown in this case study), then this project suggested that educators probe for evidence of districtwide problems in instructional program coherence in mathematics. If problems exist in coherence of the mathematics education program, this project proposes developing criteria for satisfactory solutions to the problems, and, preparing and implementing actions to address the problems in order to move the district toward the satisfactory solutions. This project provided suggested actions to achieve the goals. The actions included implementing processes which advance instructional program coherence (Goal 1), implementing policy and practice intended to support administrators in making appropriate middle-school mathematics placement decisions (Goal 2), and, approaches to measure the effectiveness of the reforms in meeting the criteria for satisfactory solutions (Goal 3). The following represents plans for evaluating the project presented in the position paper.

Type of Evaluation

An evaluation is defined by Trochim as the "systematic acquisition and assessment of information to provide useful feedback about some object" (Trochim, 2006, para 4). Trochim suggested that useful feedback provides audiences with important information to inform decisions. For this project, the audiences for the evaluation are the educators and stakeholders involved in the change effort to achieve program coherence, as well as, the appropriate placement of eighth grade students into mathematics courses. Evaluation ought to serve particular purposes (University of Texas, n.d.), in this project the purposes are to (a) gain insight into the issues of mathematics program coherence and student placement, (b) inform improvement to processes and practices that lead to coherence and appropriate placement, and (c) measure the effects of the reforms on meeting the criteria for satisfactory solution.

Two types of evaluations are involved in this project review, formative, and summative (National Science Foundation, 2002; The Pell Institute, 2015; University of Arizona, 2010). Formative evaluations occur during the implementation of the project and are useful in assessing the ongoing activities, providing timely information to improve the project. The National Science Foundation (NSF, 2002) advised that formative evaluation has two components, "implementation evaluation and progress evaluation" (p. 8). Implementation evaluation focuses on the fidelity of the implementation of actions as planned in the project (The Pell Institute, 2015), determining if the actions are occurring as described in the plan (NSF, 2002), and informs decisions on possible alternatives and revisions to the actions. Progress evaluation focuses on progress towards attaining the project's stated goals, providing information to determine if the project is proceeding as planned and the degree to which objectives are being met (NSF, 2002; The Pell Institute, 2015; Trochim, 2006b). Both aspects of formative evaluation are active in this project.

Summative evaluation is concerned with the overall effect of the project, assessing the degree to which the project achieved its goals. Summative evaluation serves to inform the stakeholders as to which goals of the project were achieved and not achieved (The Pell Institute, 2015). The Pell Institute (2015) identified types of summative evaluations: goal-based, targeted outcomes, impact on the larger community, and cost-benefit. Summative evaluations for this project includes goal-based evaluation to determine if Goal 1 (i.e., increase the understanding and implementation of instructional program coherence in mathematics), and Goal 2 (i.e., increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses), were advanced. Moreover, the evaluation associated with Goal 3 (i.e., measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solution) is not only concerned with the satisfactory implementation of the systemic reforms outlined in this project, but also with the measureable effects on improving student readiness for middle-school mathematics, appropriately placing middle-school students into mathematics courses, and the degree to which students are accessing higher-levels of mathematics in high school.

The summative evaluation includes targeted outcomes evaluation, assessing whether the project had demonstrable effects. The evaluation determines the effectiveness of specific district and school processes intended to promote coherence in the mathematics instructional program. The summative evaluation also reviews the revised processes for mathematics placement in the middle school. Ultimately, the summative evaluation measures student acquisition of the learning goals, accessing and successfully completing grade-level courses, and continuing to higher levels of mathematics in high school. This measurement in turn informs the overall effectiveness of the project. Summative evaluations regarding the impact on the larger educational community are not an aspect of the project's evaluation plan, however, advancing program coherence in mathematics, may serve to influence the instructional programs of other disciplines. Cost-benefit evaluation is not an aspect of this project, though project costs may influence project sustainability and revisions.

Measuring Outcomes and Justification of Type of Evaluation Used

Evaluating the project implementation and progress. In this position paper, I presented a project that relies heavily on implementing process-oriented actions. The actions are intended to revise, or develop, research-based processes promoting instructional program coherence, and processes intended to inform the decisions middle-school administrators make in placing students in mathematics courses. In the position paper, I suggested utilizing the *implementation evaluation* aspect of formative evaluation to assess and monitor the project delivery and utilizing *progress evaluation* aspect of formative evaluation to monitor the degree to which the actions are achieving the desired outcomes (NSF, 2002).

Implementation evaluation. Formulating questions, to assess the project's implementation, is an aspect of implementation evaluation (NSF, 2002; The Pell Institute, 2015). In the position paper, I suggested the following examples of questions to guide the implementation evaluation process; these questions are pertinent each year of the implementation:

- Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? Are district leaders attending to the policy guidance?
- Are the processes to promote instructional program coherence initiated? Which processes are moving forward? Which processes are lagging?
- Are the processes to determine student readiness for middle-school mathematics content initiated? Which processes are moving forward? Which processes are lagging?

Progress evaluation. The project includes outcomes for the processes themselves, and outcomes for student learning leading to algebra readiness. The formative evaluation aspect for assessing progress towards these outcomes is called "progress evaluation" (NSF, 2002, p. 9). In the position paper, I suggested the following questions to guide the progress evaluation; these questions are pertinent each year of the implementation:

- Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? How are district leaders attending to the policy guidelines?
- How are the attributes of Opportunity to Learn (OTL) functioning? How is time allotted for mathematics instructions? How are the learning progressions guiding the selection of instructional material? How are instructional strategies presented in professional development (PD) sessions being effectively delivered in classrooms?
- What instructional strategies are included in the common instructional framework? How do they support the learning progressions? How do they differ at grade-levels? How are they implemented and monitored in the classroom? What are teachers experiencing?
- How are the processes for monitoring mathematics instruction and providing feedback being implemented? Are teachers experiencing greater or lesser success with implementing the common instructional framework? Are there data showing increases in student learning in mathematics that are linked to the instructional changes?
- Are local assessments aligned with the learning progressions? How are the data from the assessment analyzed? How are teachers involved in the analysis of student assessment data?
- Are support interventions in place for struggling students? What is the scope of the interventions? How are students accessing the support?

- Which aspects of professional learning community (PLC) are functioning? How are teachers and administrators interacting around problems of practice? Are peer-observations-and-feedback processes producing changes in instructional practice?
- Which aspects of instructional coaching are functioning? How are teachers and instructional coaches interacting to improve the delivery of instruction and promote reflective practice? Are teachers and coaches reporting changes to practice as a result of coaching?
- What have been the PD activities for teachers and administrators related to the goals of the project? How has PD influenced the professional practice and professional culture of the school? How are teachers trained regarding the learning progressions and in using the adopted content?
- What are the changes to the course offerings at the middle school? How have they been implemented? Does evidence show students are mastering the course content?
- How is the process for placing middle-school students into mathematics classes changing?
- What changes are occurring in ninth-grade mathematics placement? Are fewer students repeating eighth grade coursework?
- What is occurring beyond ninth grade? Are more students accessing and successfully completing higher-level mathematics courses?

Analysis of the responses to both the implementation evaluation, and progress evaluation, questions inform the ongoing assessment of the project's effects. Without instituting these two aspects of formative assessment, the project implementers are unable to judge in a timely fashion the fidelity of implementation to the project design; neither are the implementers in a position to judge the system changes (i.e., new or revised processes), or the ongoing effects on student-learning outcomes. On the other hand, having the ability to make judgements allows for implementers to revise pieces of the plan to improve progress towards the project goals. For this reason, in the position paper, I included recommendations to conduct formative evaluations of project implementation, and, progress evaluation towards project goals.

Overall evaluation goals. The overall goal of evaluation is to determine the ability of the project to do what was intended (Trochim, 2006b). For this project, it is determining whether the recommendations presented in the position paper, and applied by implementers, achieved the stated goals of the project. Making this overall determination is a function of summative evaluation (The Pell Institute, 2015; Trochim, 2006b). In the position paper, I suggested two types of summative evaluation goal-based evaluation and target-outcomes based evaluation. I suggested both evaluations to determine whether the overall goals of the project are achieved, or, certain outcomes only. If all the intended outcomes are achieved then both overarching goals of the project are satisfied.

Project implementers are pursuing multiple facets of systems' reform intended to achieve instructional program coherence (Goal 1), which requires coordinating time, content and instruction, aligning assessments, improving professional practice, and achieving greater levels of student learning. Understanding which, if any, of these outcomes were achieved, aids the implementers in making determinations on which aspects to strengthen or revise, and what alternatives they may want to pursue. Project implementers are also pursuing assistance in making decisions when it comes time to place middle-school students into mathematics courses (Goal 2). When students enter eighth grade ready for grade-level content, the placement decision is trouble-free, and the readiness suggests that students are benefitting from the mathematics education program. However, when students are not ready, having developed choices other than the one-size-fits-all options, equips administrators to place students appropriately, while the district improvement efforts are underway.

Ultimately, having data that show the degree to which the reform efforts are realized according to the criteria for satisfactory solutions, and the degree to which students are demonstrating satisfactory success in mathematics courses in middle school and beyond provides clear summative evidence of the effectiveness of the project (Goal 3). Accordingly, in the positon paper, I suggested the following questions to guide the goal-based and target-outcomes based summative evaluations:

- How are the organizational values, and beliefs, and the mathematics education policy statement guiding mathematics instruction districtwide?
- Which characteristics of a coherent instructional program are operating? How well are they operating? Which aspects are not operating well?

- Which aspects of professional practice are operating well, i.e., PLC, instructional coaching, peer observation and feedback, and analysis of student outcome data to inform practice? Do teachers and administrators have a greater appreciation of the importance instructional program coherence?
- Which PD activities resulted in changes to professional practice?
- What opportunities exist for student support in addressing deficits in understanding grade-level content in mathematics?
- Have assessments been developed and administered which are aligned to the learning progressions, and assess student readiness for algebra content? Are the results of the assessments routinely analyzed by district level administration and in PLC, and is the analysis used to inform instruction?
- Do options exist for student placement in middle-school mathematics courses?
- Does assessment data indicate the higher percentages of students are demonstrating higher levels of mastery in grade-level standards districtwide, as compared to the beginning of the project?
- Are higher percentages of students successfully completing grade-level coursework in the middle school?
- Are lower percentages of ninth-grade students repeating eighth grade coursework?
- Are higher percentages of high school students accessing and completing mathematics courses deemed admissible by the state university systems?

The summative evaluation guides implementers in making decisions regarding the future direction of the project (The Pell Institute, 2015). Reporting the summative evaluation to the stakeholders, governing board, administrators, and teachers adds a layer of accountability to the project, and provides opportunity to communicating revisions.

Sample Student Placement Matrix

The California Mathematics Placement Act of 2015, introduced by State Senator Mitchell, and co-authored by Assembly Member Jones-Sawyer, seeks to add language to the California education code addressing student placement in mathematics courses. The current language of the proposed legislation specifically requires:

> Each *governing board of a* local educational agency, as defined, serving pupils in grade 8 or 9, or both, to ~~develop~~ *develop, adopt in a regularly scheduled public meeting,* and implement, a fair, objective, and transparent ~~statewide~~ mathematics placement policy with specified elements. The bill would further require each local educational agency to ensure that its mathematics placement policy is available to each pupil and his or her parent or legal guardian and is posted prominently on its Internet Web site. (California Mathematics Placement Act of 2015, p. 1 italics and strikethrough in original).

When initially proposed, the senator sought to institute a transparent *statewide* mathematics placement policy. The current language (above) removes the statewide expectation for placement, but requires the local governance team to adopt a policy with specified elements. The propose legislation identifies the specified elements for placement thusly,

> Systematically takes current academic objective measures into consideration, such as statewide assessments, pupil grades, and diagnostic placement tests (California Mathematics Placement Act of 2015, p. 2).

The proposed legislation further requires ongoing assessment and reporting to the governing board of students' progress in their mathematics courses to evaluate the appropriateness of their placement. The legislation requires an assessment in the first three months of the academic year for the purpose of reevaluating individual student progress and to determine the appropriateness of the placement. Further, the proposed legislation

> Requires examination of pupil placement data, at least annually, to ensure that there is no disproportionate impact in the course placement of pupils by race, *gender*, ethnicity, or socioeconomic background. The local educational agency shall report the aggregate results of this examination to the governing board of the local educational agency and prominently post the examination results on its Internet Web site. This report may be included as part of the local educational agency's accountability report of its local control and accountability plan (California Mathematics Placement Act of 2015, p. 2, italics in original).

The proposed legislation implies a degree of dissatisfaction this senator and coauthor have with placement practices in California. While initially desiring to address the dissatisfaction via a statewide mandated placement policy, the legislators have amended the proposal allowing local governing boards to develop policy. This project offers policy and practice recommendations specifically related to this issue. One of the practice recommendations is to develop a student-placement matrix to inform eighth grade placement decisions. The sample matrix I have provided includes the specified elements identified in the proposed legislation.

The proposed legislative language specifies statewide assessments and diagnostic placement tests be considered in placement decisions. Huang et al. (2014) asserted that the results on the Grade 7 Mathematics Diagnostics Testing Project (MDTP) assessment are useful in identifying eighth grade students for Algebra 1. They showed that students who mastered 5 of 7 topics on the assessment had a 75% chance of scoring proficient or higher on the eighth grade Algebra 1 test. The MDTP test measures student understanding of

1. decimals and percent,
2. exponents, square roots, and scientific notation,
3. fractions and their applications,
4. integers,
5. literals and equations,
6. data analysis, probability, and statistics, and
7. geometric measurement and coordinate geometry.

The researchers found that topics 1 through 5 were significant predictors of success in eighth grade Algebra 1, and suggested administrators consider these outcomes when placing students in eighth grade mathematics courses. Additionally, coupling the

MDTP results with student results on the Grade 6 California Standards Test (CST) increased the probability of identifying students ready for eighth grade Algebra 1. Specifically, students whose scale score on the Grade 6 CST was 17 points higher than the state's proficiency cut score of 350, had a 75% chance of achieving proficiency in eighth grade Algebra 1. Students that attained 367 or higher on the Grade 6 CST, and demonstrated mastery of topics 1 through 5 on the grade 7 MDTP had an 80 percent probability of achieving proficiency in Algebra 1. Students who scored at the proficient level on the Grade 7 CST showed a 78% chance of attaining proficiency. However, as the researchers noted, Grade 7 CST scores are often not available when placement decisions for the following year are made. The researchers encouraged using MDTP outcomes as they are more readily available, and combining Grade 6 CST with Grade 7 MDTP, had superior predictive qualities than the Grade 7 CST score alone. The researchers noted that as Grade 7 CST score become available in the summer, they can be used to refine placement decisions.

The placement question revolves around whether to assign eighth grade students to the core grade-level course or to a course that is slower. Using assessment data is considered additive in the placement process (Huang et al., 2014). The matrix below is an example of combining assessment data with other key factors when considering placing eighth grade students into their mathematics courses. The proposed legislation specifically identifies student grades as an element for consideration when placing students: Grades are included in the matrix. Furthermore, the matrix includes teacher recommendation as an element, as the study's participants indicated teacher input as additive in making the placement decision. Finally, the matrix allows local educators to include elements such as local benchmark assessments, and analysis of student work to the matrix.

Sample student placement matrix.

Specified elements to consider when placing eighth grade students into mathematics courses	Suggested scores and percent correct for placement in the grade-level course	Suggested scores and percent correct for placement in the grade-level course with concurrent support intervention course	Suggested scores and percent correct for placement in the readiness course
Grade 6 CST Scale Score	367 or higher	350 – 366	<350
Grade 7 MDTP algebra readiness test: Predictive topics (1) decimals and percent (2) exponents and square roots; scientific notation (3) fractions and their applications (4) integers (5) literals and equations Additional topics (6) data analysis, probability, and statistics, (7) geometric measurement and coordinate geometry	Percent correct Predictive topics (1) 75% (2) 75% (3) 75% (4) 66% (5) 70% Additional topics (6) 66% (7) 66%	Percent correct Predictive topics (1) 50% - 74% (2) 50% - 74% (3) 50% - 74% (4) 50% - 65% (5) 50% - 70% Additional topics (6) 50% - 65% (7) 43% - 69%	Percent correct Predictive topics (1) < 50% (2) < 50% (3) < 50% (4) < 50% (5) < 50% Additional topics (6) < 50% (7) < 43%
Grade 7 CST Scale Score	350 or higher	325-349	<325
Math grade earned in Grade 7	B or Higher	C, D	F
Grade 7 teacher recommendation	Teacher recommends student for core class without reservations	Recommendation includes identified topics for remediation	Teacher recommends students for the readiness course
Local elements to consider when placing eighth grade students into mathematics courses: Local Grade 7 assessments (i.e., benchmarks) Analysis of student work (i.e., performance tasks, projects, etc.).	Locally developed	Locally developed	Locally developed

MDTP is Mathematics Diagnostics Testing Project.

Percent correct of MDTP topics for predicted success in Algebra 1 suggested from Huang et al. (2014).

As California transitions from the California Standards Test to another testing model, a similar matrix should be developed that considers outcomes on the new state assessment.

Sample Evaluation Matrix

The actions presented in the position paper are developed to support stakeholders in the participating districts desiring to implement the project and achieve the goals. Project implementers in districts not associated with this case study are advised to determine the degree to which the problem of placement exists in their systems and implement the policy and practice recommendations accordingly. The evaluation matrix below offers a concise overview of the evaluation strategy, with suggested responsibilities, and guiding questions.

Sample evaluation matrix.

Action	Goals	Evaluation Type	When	Responsible Persons	Guiding Questions
Strategic Planning	1, 2, 3	Formative: Implementation Summative	Year 1	All Stakeholder groups	Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? How are district leaders attending to the policy guidance?
Evaluate attributes of Instructional Program Coherence	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches	How are the processes to promote instructional program coherence initiated? Which processes are moving forward? Which processes are lagging?
Evaluate status of Opportunity to Learn (instructional time, content alignment, instructional practice)	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Teachers	How are the attributes of Opportunity to Learn (OTL) functioning? How is time allotted for mathematics instructions? How are the learning progressions guiding the selection of instructional material? How are instructional strategies presented in professional development (PD) sessions being effectively delivered in classrooms?
Content adoption aligned with learning progressions	1, 3	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Teachers	How has the learning progressions influenced the acquisition of curriculum and instructional materials? What challenges in implementations are teachers describing? Has grade-level standards-aligned material leading to algebra readiness been adopted and routinely implemented throughout the K–8 mathematics education program?
Evaluating status of assessment regimen	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration	Are local assessments aligned with the learning progressions? How are the data from the assessment analyzed? How are

					teachers involved in the analysis of student assessment data?
Common instructional framework	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches Teachers	What instructional strategies are included in the common instructional framework? How do they support the learning progressions? How do they differ at grade-levels? How are they implemented and monitored in the classroom? What are teachers experiencing?
Professional development	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches Teachers	What have been the PD activities for teachers and administrators related to the goals of the project? Has PD addressed the following program elements? • Instructional program coherence • Learning progressions leading to algebra readiness • Analysis of student outcome data • Use of curriculum and instructional materials • Processes associated with PLC How has PD influenced the professional practice and professional culture of the school? How are teachers trained regarding the learning progressions and in using the adopted content? How have principals been trained on effective processes of monitoring instruction and providing feedback to teachers?
Instructional coaching model; reflective practice	1, 3	Formative: Implementation & Progress Summative	Year 2-4	District Administration Site Administration Instructional Coaches Teachers	Which aspects of instructional coaching are functioning? How have instructional coaches been trained? How are teachers and instructional coaches interacting to improve the delivery of instruction and promote reflective practice? How are teachers and coaches reporting changes to practice as a result of coaching? Has instructional coaching and reflective practice become a routine aspect of the instructional program?
Professional learning communities (PLC)	1, 3	Formative: Implementation & Progress Summative	Year 2-4	District Administration Site Administration Instructional Coaches Teachers	Which aspects of professional learning community (PLC) are functioning? How are teachers and administrators interacting around problems of practice? Are peer-observations-and-feedback processes producing changes in instructional practice? Have PLC processes become a routine aspect of the professional culture?
Middle school student placement; course options	1, 3	Formative: Implementation & Progress Summative	Year 1-4	District Administration Site Administration Teachers	What information is included on the student placement matrix? Is the placement practice aligned with the district policy? How is the process for placing middle-school students into mathematics classes changing? What are the changes to the course offerings at the middle school? How have they been implemented? How are students assigned to courses? Have new

					course syllabi, curriculum, and instruction been developed? Are the new courses established as regular components of the mathematics education program?
Learning climate: Appropriate course options, and support interventions	1, 3	Formative: Implementation & Progress Summative	Year 1-4	District Administration Site Administration Teachers	Are support interventions in place for struggling students? What is the scope of the interventions? How are students accessing the support?
Identification of criteria for satisfactory solution	2	Formative: Implementation & Progress	Year 1-3	Superintendent District Administration Site Administration Teachers	Have criteria for satisfactory solutions been developed for the following project elements? • Implementing OTL • Implementing common instructional framework • Identifying and implementing content aligned with the learning progressions leading to algebra readiness. • Implementing in-school instructional supports • Implementing course options • Implementing coordinated system of assessments • Improving supportive working conditions including PD, and effective monitoring and feedback of instruction • Instituting PLC processes and Instructional coaching • Allocation of resources to implement the coherent instructional program including master schedule, staffing, new course offerings and support interventions • Targets for student achievement in grade-level and readiness courses? • Targets for course repeaters in ninth grade • Targets for students completing higher-

					level mathematics courses in high school.
Middle-school student achievement	3	Formative: Progress Summative	Year 3,4	District Administration Site Administration Teachers Students	To what degree are students mastering the learning progressions associated with their course assignment? Does evidence show students are mastering the course content? What are the rates of attaining proficiency in the assigned courses? Do the data indicate a trend?
Ninth-grade student placement; achievement	3	Formative: Progress Summative	Year 3,4	District Administration Site Administration Teachers Students	What changes are occurring in ninth-grade mathematics placement? Are fewer students repeating eighth grade coursework?
High-school student access and successful completion of higher-level mathematics courses	3	Formative: Progress Summative	Year 3,4	District Administration Site Administration Teachers Students	What is occurring beyond ninth grade? Are more students accessing and successfully completing higher-level mathematics courses? Do the data indicate a trend?

Key Stakeholders

Several groups potentially benefit from this project. The following discussion describes the potential benefits to various groups that the project evaluation will either affirm or dis-credit:

Governing boards benefit by extending their influence into the educational program by revising and approving organizational values and beliefs statements recommended in the strategic plan document, and adopting a policy statement regarding the mathematics instructional program. Moreover, they benefit from project evaluation reports which inform their decisions regarding the allocation of resources.

Administrators (i.e., superintendents, district-level and site-level administrators) benefit from having a focused project dedicated to addressing the complexity of mathematics education, and the issue of middle-school course placement, which provides suggestions for explicit actions intended to advance the project goals. The project benefits their professional careers by providing an experience to make substantial improvements to the mathematics educational program of their school district. Positive effects of program coherence in mathematics may inform coherence efforts in other disciplines.

Teachers benefit with ongoing professional growth. They become more involved in the development of a coherent program in mathematics, by receiving training regarding coherence; and striving to implement the research-based common instructional practices which are integral to the project's success. They benefit from improving their instructional practice through effective monitoring and feedback, engagement in PLC, and interactions with instructional coaches. A select few teachers will experience professional advancement by becoming the instructional coaches at their school sites.

Parents benefit from participating in the strategic planning process and assisting in developing the recommended language of the guiding principles and the policy statement for mathematics education. All parents benefit by receiving communication regarding the mathematics program their children are experience in school, and in the efforts made to bring coherence. The parents also benefit from receiving their student's assessment outcomes, and having a greater understanding of why their middle-school students are placed into mathematics courses.

The key stakeholders are the students. Students benefit from a coordinated instructional program designed for their learning of the essential concepts for algebra readiness. Moreover, they receive quality instruction that is researched-based, and that their teachers are perfecting. Students are provided assessments results that indicate to them their acquisition of the learning progressions. Students benefit from protected time dedicated to mathematics instruction, and they benefit form support interventions designed to address deficits in their understanding. Students benefit from placement in a middle-school mathematics course that more appropriately meets their academic need, rather than placed according to a statewide policy. Ultimately, the project is deemed successful if higher rates of middle-school students are achieving proficiency in their mathematics courses, lower rates are repeating eighth grade coursework in ninth grade, and higher rates of high-school students are accessing and successfully completing mathematics courses deemed admissible for the state university systems.

Implications

In researching the problem of this project study, I conducted a literature review and an analysis of archival data to determine how the issue was impacting the unified school districts of Shelton County, California, as well as the larger educational community. The following sub-sections provide explanations regarding implications the project has in the local context, the larger educational community context, and for furthering positive social change.

Local Context

In Year 1 of the action-cycle, the implementation plan includes gathering information and defining how the issue is impacting a school district. With regards to the Shelton County school districts, much of this aspect of the implementation plan is already completed for them. As community partners in the study, the school districts have access to the study's findings, as do the participants. Their districts leaderships' task is to refine the definition of the existing issue for their individual districts in light of any changes that have occurred since the collection of data.

The findings related to research sub-question number five, had a significant influence on the development of the project. This sub-question asked the participants, what other information or supports would help them in making the decision to place eight-grade students into Algebra 1? The analysis of the responses indicated a need to bring coherence to their school district's mathematics education program. The analysis revealed that participants desired a districtwide perspective for mathematics, which in part attends to algebra-readiness content in earlier grades. The claims that many students came to the middle-school, ill-equipped for the rigors of algebra content, were born out when the data were triangulated with the outcomes on state tests. This suggested that instruction in early grades was impacting many students' ability to access algebra content in later grades.

A school district pursuing a coherent mathematics instructional program in their schools, addresses both content and instruction (Cobb & Jackson, 2011; Newmann et al., 2001). Other aspects of program coherence are allied with findings in the project study, such as having additional information on student mathematical aptitude, which speaks to the need for a coordinated assessment regimen and analysis; and the need for greater teacher representation in the development of mathematics pathway courses, the process for placing students, and the development of the instructional program. These teacher-level concerns are accommodated in the professional growth aspects (i.e., PLC) of the coherent instructional program (Cobb & Jackson, 2011, 2012).

The findings revealed that some middle-school principals felt they had too few options for placing students into courses. In other districts, principals felt compelled to devise options other than Algebra 1 for their students. A general desire of having options to consider when making placement decisions was expressed across the districts. Included in the desire, is the option for intervention supports for students, which is another aspect of a coherent instructional program (Vaughn et al., 2012). The project provides recommendations for course options and intervention support.

The project study findings suggested that in the local context, the issue of placing eighth grade students into mathematics courses was complicated by the districts' approaches to their mathematics education programs. The findings revealed and substantiated the participants' concerns regarding the mathematics education students receive prior to entering the middle-schools. Additionally, the concerns regarding the quality of mathematics instruction districtwide, the use of assessments to inform program and placement decisions, and the professional involvement of teachers to affect change were brought forth in the findings. The position paper attends to these concerns with a recommended systemic course of action that develop the characteristics of program coherence which were absent in the local districts, as well as, recommendations that support sound decision-making in an action cycle.

The evaluation plan recommendations promote ongoing review and reporting on the progress made in implementing the actions, and measuring the net effect the project is having on student learning and course completion. If the position paper recommendations are successful, the implications for the local systems include improved coherence of program, focused instructional practice, enhanced professional culture, and increased student achievement. These improvements can inform the instructional programs of other disciplines.

Larger Community

The position paper provides research-based recommendations to address the issues relative to the placement of students in eighth grade mathematics revealed through the lived-experiences of the participants. However, as the recommendations address systemic concerns, the position paper or aspects of it may be useful to educators in schools systems across the nation struggling with incoherence in their mathematics instructional programs. The question of placement of eighth grade students into mathematics courses, and the impact the decision had on students and the schools, was not limited to the local community, but was a concern throughout the school systems of California (Clotfelter et al., 2012; Domina, McEachin et al., 2014; Huberman, Parrish, Arellanes, Gonzalez, & Scala, 2012; Liang et al., 2012; Terry & Rosin, 2011). And the algebra-for-all policies have prompted researchers, and policy advisors to weigh-in on the issue often suggesting that the policy was not achieving the desired goals (Domina, McEachin et al., 2014; Liang & Heckman, 2013). The ability of our local districts to advance coherence potentially provides opportunity for other districts to replicate the actions that evaluation measures show to be successful. Furthermore, the recommendations address a myriad of coherence characteristics, some of which districts outside of the local area may choose to implement in piecemeal fashion according to their local need.

In many states, school systems are transitioning to the Common Core State Standards (CCSS) (CCSS Initiative, 2015), which revamp the learning progressions, but still leave much of the algebra content embedded in the eighth grade (Sacramento County Office of Education, 2010) requiring instructional programs that prepare students. Other states are not adopting the CCSS, which possibly leaves their school systems vulnerable to the problem associated with this project study. In either case, the position paper is available to assist local-level educators in these states to address issues complicating the placement decision in their schools.

Social Change

Walden University promotes positive social change as a major aspect of the university's mission. Known as "the Walden Impact", the university encourages their community of students to influence the lives of others through the "deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals and communities alike" (Walden University, 2015). The project recommendations embedded in the position paper further the Walden University ideals of social change on several levels. The project provides explicit ideas and strategies which serve to transform administrators and teachers into more effective educators. As teachers delve into the PLC processes associated with the plan, they are faced with collaborative opportunities for improving practice, not just for themselves, but also their peers, elevating the professional culture on campus. Moreover, some will advance to the position of instructional coach, broadening their sphere of influence, and supporting teachers in their evolution as reflective practitioners (Knight, 2007; Schon, 1987). Administrators develop as systems changers. As administrators tackle the problems of incoherence, armed with a coordinated set of actions, including the development of guiding principles and policy, and corresponding evaluation recommendations, they proceed in a manner consistent with sound decision-making. The position paper presents ideas for processes intended to lead administrators in transforming the professional experiences of their teaching staff, and the learning experiences of their students.

Significant numbers of students in the systems entered middle school unprepared for the mathematics content at their grade-level. Their principals and teachers acknowledged this dilemma, yet placement decisions in some districts served to satisfy factors other than the observed instructional needs of the students. Not being prepared for middle-school content has ramifications on students' access to higher mathematics in later grades, which in turn impacts admissions into college (Finkelstein et al., 2012). The position paper recommendations serve to remedy the dilemma. As students experience the coordinated research-based instruction that a coherent instructional program espouses, and receive support interventions addressing their misunderstandings in mathematics, their outlook for accessing higher mathematics brightens (Vaughn et al., 2012). Increasing access to higher levels of mathematics in this region of California, known as the "Appalachia of the West" (The Economist Newspaper Limited, 2010, p. 30) for its high levels of poverty and low levels of education, will go a long way in changing that distinction.

Section 4: Reflections and Conclusion

Introduction

In the unified school districts of Shelton County in the Central Valley region of California, a variance exists in the percentage of eighth grade students taking the state's end-of-course algebra exam (CDE, 2011b, 2012, 2013). At the time of this study, the middle schools in these districts had varying levels of eighth grade Algebra 1 completion (CDE, 2010, 2011b, 2012, 2013) even though the state promoted Algebra 1 for all eighth grade students (CDE, 1997). Depending on the district, significant numbers of students took a course and a subsequent exam at a level lower than Algebra 1, which resulted in a proportional penalty applied to the school under the state's accountability system. In addition, significant numbers of students who were placed in the Algebra 1 course performed poorly and received scores that likewise harmed their schools' state assessment results and subsequent rankings (CDE, 2011b, 2012, 2013). For example, in 2011, one of the studied districts had 92.9% of the eighth grade students completing the Algebra 1 course but 74% of these students failed to achieve the proficient level.

In this region of California, the lack of a consistent practice by school officials for determining which eighth grade students to place in the Algebra 1course reflects a statewide problem of deficiencies in Local Educational Agencies (LEA) eighth grade policies for placing students in mathematics courses (Williams et al., 2011b). In the qualitative tradition of scholarly research, the case study was designed to examine the lived experience of administrators with firsthand knowledge of the issue in order to explain the observed variance in placement.

The purpose of this project study was to develop a rational framework for use in the placement of students in eighth grade mathematics courses based on extensive qualitative inquiry conducted with local administrators on their decision-making processes within nine unified school districts in Shelton County, California. The key findings of the research, revealed the complexity of the issue, as well as, the affect the school district's program of mathematics education had on placing eighth grade students into courses.

The participants shared learned lessons, and reflected on information and supports they believe could support their placement decisions moving forward. Their reflections revealed a desire to pursue a coherent instructional program in mathematics. The complexity of placing eighth grade students into mathematics courses is compounded when the mathematics education the students experienced prior to middle school is not coordinated and underprepares them for algebraic content (Clotfelter et al., 2012; Schmidt, 2012). Moreover, the discussion of findings relative to the decision-making aspect of administrative theory, informed the project development, in that the proposed rational framework for placement is supported when the decision-making process attends to all phases of the action cycle.

In Section 4, I discuss how this position paper addressed the findings associated with the identified need to improve instructional program coherence in mathematics education in school systems, to facilitate the appropriate placement of students into mathematics courses. Allowing that the findings were based on the study of a particular region in California and limited to the K–12 school districts, I discuss that this project has strengths and limitations according to the scope of the study. However, as brought out in the review of the professional literature, the decision-making issue of determining how to place individual eighth grade students into mathematics courses resonates beyond the studied region and is a concern throughout California. For this reason, I further discuss the potential this position paper has on supporting educators in the broader education community as the face similar this issue.

This position paper promotes broad actions to foster systemic changes in the studied region's K–12 school systems. The recommended actions to advance instructional program coherence are comprehensive and are taken over a recommended 4-year period of time. I discuss possible alternatives to this scheme and note that some implementers may opt to execute certain actions focused on particular attributes of coherence deemed deficient in their systems.

This section includes my reflective analysis of self as a project developer, scholar and practitioner. I discuss why the work was important and what it means to me as a practitioner. I conclude with implications for positive social change, and recommendations for future research.

Project Strengths and Limitations

Strengths. The strength of this position paper is the relevance it has in today's educational setting. Administrators at the study sites and in similar counties continually face the issue of appropriately placing middle-school students into mathematics courses (Finkelstein et al., 2012; Fong et al., 2014). This professional paper defined the problem and provided the study's research to frame the issue for key stakeholders, the complexity of the issue as presented in the paper rings true, even as school systems transition to the common core state standards (CCSS). The importance of pursuing the project goals is clearly communicated to implementers. The paper was written to aid their understanding, and to shed light on the potential benefits awaiting their schools as they advance toward a coherent instructional program (Cobb & Jackson, 2012). The policy and practice recommendations propose research-based actions to guide their systemic reform efforts.

The recommended actions are intended to address each attribute of coherent instructional program described by Newmann et al. (2001). The recommendations may support some district educators differently than others, depending on which attributes of program coherence in mathematics they desire to address. This position paper offers practitioners, explicit suggestions of policy statements, actions, and questions to guide the project evaluation.

Specific deliverables in this position paper are the recommendations for policy and practice, the identified roles and responsibilities of implementers, the suggested timeline for implementation, the sample student placement matrix, and the plan for evaluation. The recommended actions derive from the suggested policy statement for mathematics education, which was derived from the literature.

Limitations. The case study was bounded by unified K-12 school systems. Educators in high school only, or K–8 only, systems may find the position paper not suited for their organizations. However, though the study focused on unified school districts, the benefits of the project (i.e., achieving higher levels of program coherence, and following an action cycle process for decisions) are universal. Educators seeking to optimize resources, develop professional growth, improve assessment relevance, and provide students greater opportunity to learn (Cobb & Jackson, 2011), may find this position paper's recommendations profitable, regardless of grade configuration.

This position paper's broad scope is also a limiting factor. The 4-year implementation plan is long, and implementers may not see the plan through to completion. As the study's findings confirmed, the problem of eighth grade placement in mathematics do not originate at the middle school. Rather, problems of incoherence in mathematics instruction are systemic, and impact student readiness for rigorous content long before they enter the middle school. This position paper recommends districtwide actions, this may be limiting in some systems, as the placement issue does not present itself in the lower grades, though the roots of the problems are developing. Thus, implementers servicing lower grades must make the same commitments as those servicing upper grades.

Recommendations for Alternative Approaches

In 2013, California eliminated the sanction for not placing eighth grade students in Algebra 1. While this removed the accountability pressure to place students in a course for which they are ill-equipped for success, it did not address the other issues complicating the placement decision. The recommendations in this position paper serve to address the problem by instituting systemic reforms to achieve coherence in the mathematics program which leads to improved mathematics education for students (Cobb & Jackson, 2011). Alternative approaches may seek to address individual aspects of instructional program coherence rather than all of the components offered by Newmann et al. (2001). In the action-cycle decision-making process, educators evaluate the status of the current program; however, this project based the recommendations on the study's findings. Implementers in other districts may evaluate the degree of coherence already in existence in their systems, and select aspects of the project to address specific deficits.

Moreover, others may define the problem differently, not in terms of the eighth graders' condition to access the grade-level content, but with the content itself. An alternative project approach may be to question the appropriateness of the content standards and learning progressions, and develop content standards and learning progressions deemed more suitable for students. Some states are not adopting the CCSS, and are pursuing an alternative approach (Association for Supervision and Curriculum Development, 2015). Nevertheless, as long as teachers are providing the instruction, coherence in program design remains a consideration.

Project Development, Scholarship, and Leadership and Change

Reflections on Project Development and Self as a Project Developer

The analysis of the research sub-questions, and in particular sub-question #5, revealed a felt need among the participants for districtwide systems reform in mathematics education. Their ability to appropriately place students into middle-school mathematics courses hinged in some degree on their students' ability to be successful – the archival evidence suggested that significant numbers of students did not show that ability. This reality, which the participants experienced, had profound influence on the policy and practice recommendations offered in the position paper. Developing a rational framework for use in placing students in middle-school mathematics courses was the stated purpose of this project study, however, a framework only concerned with middle-school issues, would not serve districts well in light of the constraining factor of low student readiness for algebra content (Clotfelter et al., 2012). The discussion of findings in Section 2, prompted me to delve into the realm of instructional program coherence. Referencing the seminal work of Newmann et al. (2001), and the subsequent research of Cobb & Jackson (2011), I began to imagine how attaining the characteristics of coherence in the mathematics instructional program, could provide the systems improvements the participants desired.

Administrative theory establishes decision-making as its central tenant (Bernard, 1938). What I discovered in this research suggested that while the participants indeed made substantive placement decisions affecting their students and their schools, they did not follow a particular model of decision-making. Rather, they made satisficing decisions (Simon, 1947), attempting to satisfy as many factors as possible without making matters worse for their organizations, or, they made incremental decisions (Lindblom, 1959), moving their organizations along incrementally, with moderate changes to courses, without a full systems change. Discussing this in Section 2, prompted me to investigate decision-making, and I found the action cycle decision-making model (Hoy & Miskel, 2001). This proposes that after decision makers review and define the problem, they establish criterion for satisfactory solutions, then consider actions and alternatives, and ultimately choose a course of action best believed to achieve the satisfactory solutions. The actions are subject to evaluation and revision. Moreover, the professional literature revealed that organizational values, as well as, having explicit policy guidelines on an issue assist educators in making complex decisions (Etzioni, 1986; Sergiovanni, 2005; Storey & Beeman, 2009). Thus, I determined to add these elements in this position paper, to support administrators. Leaving out organizational beliefs and policy guidelines may have in the end undermined the other recommended reform efforts. Accordingly, in the position paper, I provide an explicit policy position on mathematics education, which includes value and belief statements, and objectives to achieve instructional program coherence.

I learned in the project development process that a difference exists between the intended purpose of the study, and the intended purpose of the project. I discovered that one does not truly know the purpose or direction of the project on the front end of research. I ascertained two purposes exist in project-study research. The first, to study, investigate, examine, or explain a problem. The second is to develop a critical approach to help solve the problem. This dual aspect of project-study beset me throughout the process, as I grappled with the complexity of the problem and what to do about it. Looking back, the purpose of the research was more than to develop a framework for middle-school student placement in mathematics courses. The purpose had two aspects.

The first purpose was analyzing the participants' lived-experience in order to understand and explain the reasons for the observed variance in Algebra 1 placement. Knowing what led to the variance in placement revealed multiple issues, and guided the second purpose of the study, namely, determining how to deal with the issues. Archbold (2010) promoted using dissertation research to prompt action in the real-world, to improve organizations. The purpose of this position paper, what I am calling the second purpose of the dissertation, was to provide a recommended course of action to aid educators who have struggled with the complex issues surrounding middle-school mathematics placement.

Reflective Analysis of Self as a Scholar

Through the doctoral experience I have grown as a scholar. The coursework launched me into a higher level of reading, reading to discover, reading to learn, and reading to enhance my ability to engage in professional dialogue concerning effective leadership in education. I have a better appreciation for the need and responsibility to stay current with relevant research and new approaches for leading and directing school systems. The volume of reading, particularly peer-reviewed scholarly worked, has had an acute effect on me. I find myself going to search engines to find research on many issues outside the focus of this study. Reading and critically reviewing multiple-scores of peer-reviewed articles for the discussion and project aspects of this dissertation has removed any fear or hesitation of going online and searching for actual research versus relying on secondary sources.

The writing demands of doctoral study are ominous. My past writing experiences had no equal to what I have been called to do in this program. I have written a dissertation, and included a position paper intended to persuade practitioners to take bold steps in reforming their instructional programs. The ability to write in this fashion came through the numerous opportunities this dissertation afforded me to write to learn, to re-write, to communicate more concisely, and write again to create a coherent argument. I learned that writing well is hard-work; scholarly writing is an extreme experience. I will continue to practice, and endeavor to continually improve in this area. I have a greater awareness and appreciation of scholars, whose writing in the past I took for granted.

For me, the dissertation process may have been longer than for some. When I was promoted to the position of superintendent, I could no longer pursue the research question I was originally inspired to, as I had determined to investigate a phenomenon in my own district. Rightly, for participant protection, the Institutional Review Board prefers doctoral candidates with institutional authority seek participants outside of their own systems. Thus, I migrated to the question of eighth grade mathematics placement, as it has relevance in all schools systems, including mine. I determined to study this issue from participants' points of view outside of my district, which opened my eyes to how other systems wrestled with the problem. Consequently, as I interviewed participants, my understanding of the complexity of the issue grew, and the potential remedy took on enormity. Delving more deeply into what the literature suggested are the underlying causes of low student readiness for middle-school mathematics, I grew as a scholar, and more fully comprehended the varied circumstances and pressures administrators faced in making placement decisions.

Reflective Analysis of Self as a Practitioner

This project study has profoundly influenced my practice as an educator. In the past, I had a surface-level understanding of instructional program coherence, and some familiarity with opportunity to learn (OTL). I had instituted aspects of PLC and instructional coaching in schools; however, I did not lead in these areas with unrelenting determination for quality implementation. As the professional literature helped me more fully appreciate the scope of the middle-school placement issue, my motivation grew to find research-based answers to the systemic flaws that magnified the problem's complexity. It is a problem plaguing school systems across the state and nation (Fong et al., 2014; Liang et al., 2013; Nomi, 2012), including the system in which I serve as superintendent. Frankly, I haven't waited for the dissertation to be completed in order to address instructional program coherence in my school district. The work has begun.

Previously, I experienced leading a school as principal in which teachers and administrators collaborated and developed a common instructional framework – one characteristic of a coherent instructional program (Cobb & Jackson, 2011). Having instructional agreements on campus, what we called instructional norms, framed much of our professional activities, and supported the development of a common language of instruction which is deemed an important aspect of quality schools (Schooling, Toth, & Marzano, 2013). Instructional agreements, (i.e., similar instructional strategies used across disciplines), helped foster collegiality and collaboration among teachers at that school, and we believed the agreements benefitted students. The outcome data at this school improved, suggesting our efforts added value, we said with bad grammar, "if we teach better, kids will learn more." I have deeper understanding now. As powerful as a common language of instruction may have been to that school, it is the total package of coherence in instructional program that research suggests holds the greatest benefit for students.

Presently, I am guiding the development of policy, organizational beliefs, curriculum selection, assessment regimens, professional development, data review and so forth, to advance the level of program coherence in mathematics education (and not just mathematics education but in other disciplines as well) to better serve our students.

Reflection on the Importance of the Work

Williams et al. (2011a) suggested that eighth grade students in California were placed in mathematics courses according to no single approach. In their study, the placement numbers showed students in lower-performing schools, with higher populations of low-income and minority students, tended to have more aggressive placement practices i.e., higher percentages of eighth grade students placed in Algebra 1. This suggested to them that schools may be inclined to place students for social-equity and access reasons. They recommended future research to explain placement processes. My research furthered that work. Moreover, my research showed that some administrators in Shelton County felt compelled to place students into mathematics courses based on the potential negative impact the state's accountability system had on their schools. If nothing else, this revelation alone speaks to the importance of this work. Do we really want administrators making decisions regarding the education of children based on how their schools may be perceived when test scores are published?

This project is important as it provided a collection of recommendations that improve a district's overall approach to mathematics education. The intent being, that as the system improves, more students enter middle school prepared for rigorous content, which facilitates appropriate placements. Until such time, the project promotes improving the learning climate by providing options for middle-school mathematics placement, again facilitating appropriate placement decisions.

The importance of instructional program coherence extends beyond mathematics education; it extends to all subject areas. Moreover, the influence of a quality common instructional framework in mathematics potentially encompasses other disciplines as good teaching strategies are employed school wide. In the school system in which I serve, the dissertation work is influencing, not only the mathematics program, but the development of the early literacy program as well. We are striving to bring coherence to reading instruction in the primary grades by identifying what learning activities our teachers should provide, and identifying the supports needed for quality implementation.

Similarly, administrators in the curriculum and instruction division are collaborating with a districtwide collection of experienced teachers from all grades levels to identify local expectations for instruction. Their purpose is to bring clarity in expectations, and communicate to peers the expectations the district has for student production, the evidence of student engagement. The steady mantra is that student production aligned with learning progressions is an outcome of instructional decisions made by teachers.

Implications for Social Change and Directions for Future Research

Implications for Social Change

A social change aspect of the project involves the professional growth of educators, intended to improve their organizations – this goal advances "The Walden Impact" (Walden, 2015). In part, this project aims squarely at principals and teachers, to increase their understanding of, and participation in, professional learning communities. This project emphasizes the purpose of PLC in a coherent system; in this project, PLCs are dedicated to improving practice, and analyzing student outcome data to evaluate the effectiveness of the delivered instruction. Instructional coaching is introduced in the project as an essential element of coherence; coaching is dedicated to model effective strategies and to promote reflective practice. This position paper supports administrators in implementing action-cycle decision-making. The recommendations guide the development of criterion for satisfactory solutions for both processes and student outcomes, and included are suggested questions to guide evaluation.

This position paper includes recommendations for organizational values and policy guidelines which serve to support administrators in their systems improvement efforts. Ultimately, the potential effect this project has on improving the experience of students in mathematics education is a significant positive social gain. This project advances the social justice ideal Marshal and Oliva (2006) promoted. They held that a quality education is a birthright for all children in a democratic society. This project is intended to advance that ideal by providing explicit recommendations for spreading the characteristics of a coherent instructional program in mathematics, which as the literature showed improves the quality of education.

Directions for Future Research

Specifically, in regards to this project, over time, qualitative studies could explore the lived experience of implementers, and reveal the felt positive and negative effects of action-cycle decision-making in reforming a system. If several districts implement the project, a mixed-method design which quantitatively analyzes student outcome data from the various districts, in conjunction with analyzing the unique narratives associated with each district's implementation, may determine if variances in fidelity of implementation has a causal effect on student achievement. Exploring the lived experience of educators as they participate in professional growth aspects of the project, may shed light on the perceived usefulness of PLC as presented in this project.

The implications of this research offer many possible directions for future research. Qualitative researchers could investigate whether factors other than student aptitude influenced administrators making other types of educational placement decisions in science, or language arts. In light of transitioning to common core state standards, researchers can explore whether having organizational values and beliefs, or policy guidelines, serve to support or hinder CCSS implementation. To support student readiness for CCSS mathematics content in middle-school, researchers could quantitatively determine student mastery in early grades of identified essential standards for algebraic understanding, and then in a project-study model propose early interventions to address observed deficits in student understanding. A compelling need exists to study the outcomes on new state assessments and their value in predicting student readiness for mathematics content in subsequent years. Findings may inform a revised student placement matrix.

Conclusion

This scholarly work represents a long journey of discovery, and the creation of a position paper with ambitious recommendations. The project-study dissertation model provides practitioners the opportunity to research, study, write, and ultimately provide the education community practical research-based suggestions to improve professional lives the quality of organizations, and the service to students. This project-study began as an inquiry into an important issue of middle-school administration, and grew into a critical examination of instruction program coherence. The administrative decision-making processes relative to the placement of eighth grade students into mathematics classes hinge on the quality of the mathematics educational program students experience prior to entering middle school. Additionally, the outcomes associated with the middle-school placement influences the mathematics education program in high school. Therefore, unified school districts are well-served to attend to the recommendations in this position paper and pursue the attributes of instructional program coherence for the benefits of their students and their organizations.

References

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns and bachelor's degree attainment.* Washington, DC: U.S. Department of Education.

Akos, P., Shoffner, M., & Ellis, M. (2007). Mathematics placement and the transition to middle school. *Professional School Counseling*, *10(3)*, 238-244.

Allensworth, E., Nomi, T., Montgomery, N., & Lee, V. K. (2009). College preparatory curriculum for all: Academic consequences of requiring algebra and English 1 for ninth graders in Chicago. *Educational Evaluation and Policy Analysis, 31*(4), 367-391.

Association for Supervision and Curriculum Development. (2015). Common *core standards adoption by state*. Retrieved from http://www.ascd.org/common-core-state-standards/common-core-state-standards-adoption-map.aspx

Archbold, D. (2010). "Breaking the mold" in the dissertation: Implementing a problem-based, decision-oriented thesis project. *The Journal of Continuing Higher Education*, *58*(2), 99-107.

Archbold, D. (2008). Research versus problem solving for the education leadership doctoral thesis: Implications for form and function. *Educational Administration Quarterly*, *44*(5), 704-739.

Asquith, P., Stephens, A. C., Knuth, E. J., & Alibali, M. W. (2007). Middle school mathematics teachers' knowledge of students' understanding of core algebraic concepts: Equal sign and variable. *Mathematical Thinking & Learning*, *9(3)*, 249-272. doi:10.1080/10986060701360910

Babbie, E. (2004). The practice of social research (10th edition). Belmont, CA: Wadsworth/Thompson Learning.

Ball, D. L., Sleep, L., Boerst, T. A., & Bass, H. (2009). Combining the development of practice and the practice of development in teacher education. *Elementary School Journal*, *109*(5), 458-474.

Barnard, C. (1938). *The functions of the executive.* Cambridge, MA: Harvard University Press.

Barnett, B. G., & Muth, R. (2008). Using action-research strategies and cohort structures to ensure research competence for practitioner-scholar leaders. *Journal of Research on Leadership Education*, *3*(1), n1.

Baxter, P. & Jack, S. (2008, December). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559. Retrieved from http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf

Begley, P. (2004). *Professional valuation processes: Balancing personal motivations and ethical leadership actions.* Article presented at the 9th Annual Values and Leadership Conference. Promoting the Moral Development of Professional Educators, Children and Youth.

Bellei, C. (2009). Does lengthening the school day increase students' academic achievement? Results from a natural experiment in Chile. *Economics of Education Review*, *28*(5), 629-640.

Berends, M., Goldring, E., Stein, M., & Cravens, X. (2010). Instructional conditions in charter schools and students' mathematics achievement gains. *American Journal of Education*, *116*(3), 303-335.

Bitter, C., & O'Day, J. (2010). Raising expectations for mathematics instruction in California: Algebra and beyond. Policy and practice brief. *California Collaborative on District Reform*. Retrieved from http://cacollaborative.org/sites/default/files/CA_Collaborative_8th_Grade_Algebra.pdf

Blanton, M. (2008). *Algebra in elementary classrooms: Transforming thinking, transforming practice.* Portsmith, NH: Heinemann.

Blanton, M., Stephens, A., Knuth, E., Gardiner, A. M., Isler, I., & Kim, J. S. (2015). The development of children's algebraic thinking: The impact of a comprehensive early algebra intervention in third grade. *Journal for Research in Mathematics Education*, *46*(1), 39-87.

Bloom, B. S. (1974). Time and learning. *American Psychologist*, *29*(9), 682-688.

Borg, W. (1980). Time and school learning. In Denham, C., & Lieberman, A. (Eds.). *Time to learn*. US Dept. of Education, National Institute of Education, Program on Teaching and Learning. Retrieved from http://files.eric.ed.gov/fulltext/ED192454.pdf

California Department of Education. (2014). *2014 mathematics adoption report*. Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/ci/ma/im/documents/mathadoptionrpt2014.pdf

California Department of Education. (2014b). *2014–15 California assessment of student performance and progress (CAASPP)*. Sacramento, CA: Author. http://www.cde.ca.gov/ta/tg/ai/documents/caasppchart14.pdf

California Department of Education. (2013). *Mathematics framework chapters.* Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp

California Department of Education (2013). *2013 STAR test results*. Retrieved from http://star.cde.ca.gov/star2013/SearchPanel.aspx?ps=true&lstTestYear=2013&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education. (2012). *Overview of California's 2011-12 accountability reporting system*. Retrieved from http://www.cde.ca.gov/ta/ac/ay/documents/overview12.pdf

California Department of Education (2012). *2012 STAR test results*. Retrieved from http://star.cde.ca.gov/star2012/SearchPanel.aspx?ps=true&lstTestYear=2012&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education. (2011a). *2010-11 academic performance index reports: Information guide.* Retrieved from http://www.cde.ca.gov/ta/ac/ap/documents/infoguide11.pdf#search=api%20academic%20performance%20index&view=FitH&pagemode=none

California Department of Education (2011b). *2011 STAR test results*. Retrieved from http://star.cde.ca.gov/star2011/ViewReport.aspx?ps=true&lstTestYear=2011&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education (2010a). *2010 STAR test results*. Retrieved from http://star.cde.ca.gov/star2010/SearchPanel.asp?ps=true&lstTestYear=2010&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education (2010b). *California common core state standards: Mathematics*. Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf

California Department of Education. (1997). *Mathematics content standards for California public schools: Kindergarten through grade twelve.* Sacramento, CA: CDE Press. Retrieved from http://www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf

California Department of Education. (1992). *Mathematics framework for California public schools: Kindergarten through grade twelve.* Sacramento, CA: CDE Press.

California Education Code 46200 (2013). Retrieved from http://www.leginfo.ca.gov/cgi-bin/displaycode?section=edc&group=46001-47000&file=46200-46208

California Mathematics Placement Act of 2015. California Senate Bill 359. Retrieved from http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB359

Campbell, J., Reese, C., O'Sullivan, C., & Dossey, J. (1996). *Report in brief: NAEP 1994 trends in academic progress.* Retrieved from http://nces.ed.gov/nationsreportcard//pubs/main1994/97583.asp

Carpenter, T., Levi, L., Berman, P., & Pligge, M. (2005). Developing algebraic reasoning in the elementary school. In Romberg, T., Carpenter, T. & F. Dermock (Eds.), *Understanding mathematics and science matters,* 81-98. Mahwah, NJ: Lawrence Erlbaum Associates.

Carroll, J. (1963). A model of school learning. *The Teachers College Record*, *64*(8), 723-723.

Capraro, M., & Joffrion, H. (2006). Algebraic equations: Can middle-school students meaningfully translate from words to mathematical symbols? *Reading Psychology*, *27(2)*, 147-164.

Centre for European Policy Studies (n.d.). *A guide to writing a CPES policy brief*. Retrieved from http://www.ceps.eu/system/files/article/2010/12/Guide%20to%20writing%20CEPS%20Policy%20Brief.pdf

Center for the Future of Teaching and Learning. (2008). California's approach to math instruction still doesn't add up. *Center for the Future of Teaching and Learning*, Center View. Retrieved from EBSCO*host*

Childress, S., Elmore, R., Grossman, A., & Johnson, S. M. (2007). *Managing school districts for high performance: Cases in public education leadership*. Cambridge, MA: Harvard Education Press.

Cobb, P., & Jackson, K. (2012). Analyzing educational policies: A learning design perspective. *Journal of the Learning Sciences, 21*(4), 487-521. doi:10.1080/10508406.2011.630849

Cobb, P., & Jackson, K. (2011). Towards an empirically grounded theory of action for improving the quality of mathematics teaching at scale. *Mathematics Teacher Education and Development, 13*(1), 6-33.

Coburn, C., & Stein, M. (2006). Communities of practice theory and the role of teacher professional community in policy implementation. In Honig, M. (Ed.) *New directions in education policy implementation: Confronting complexity*, 25-46. Albany, NY: State University of New York Press.

Cogan, Leland S., Schmidt, William H., & Wiley, David E. (2001). Who takes what math and in which track? Using TIMSS to characterize U.S. students' eighth grade mathematics learning opportunities. *Educational Evaluation and Policy Analysis*, **23(4)**, 323. Retrieved from ProQuest Central. (110284269).

Coggshall, J. G., Rasmussen, C., Colton, A., Milton, J., & Jacques, C. (2012). Generating teaching effectiveness: The role of job-embedded professional learning in teacher evaluation. Research & policy brief. *National Comprehensive Center for Teacher Quality*. Retrieved from http://files.eric.ed.gov/fulltext/ED532776.pdf

Collins, P. (2001). *Good to great: Why some companies make the leap…and others don't.* New York, NY: HarperCollins.

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2012). *The aftermath of accelerating algebra: Evidence from a district policy initiative*. Working Paper 69. National Center for Analysis of Longitudinal Data in Education Research. Washington DC: American Institute for Research. Retrieved from http://files.eric.ed.gov/fulltext/ED529166.pdf

Common Core State Standards Initiative. (2015). *Standards in you state*. Retrieved from http://www.corestandards.org/standards-in-your-state/

Common Core Standards Writing Team. (2013). *Progressions for the Common Core State Standards in Mathematics (draft). Front matter, preface, introduction. Grade 8, High School, Functions*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Confrey, J. (2011). *What now? Priorities in implementing the Common Core State Standards for mathematics*. Paper presented at the Friday Institute for Educational Innovation.

Corey, D. L., Phelps, G., Ball, D. L., Demonte, J., & Harrison, D. (2012). Explaining variation in instructional time an application of quantile regression. *Educational Evaluation and Policy Analysis*, *34*(2), 146-163. Retrieved from http://epa.sagepub.com.ezp.waldenulibrary.org/content/34/2/146.full.pdf+html

Craven, M., & Ober, S. (2011). Using position papers to change policy and nursing practice Craven & Ober policy strategists, LLC. *Journal of Infusion Nursing*, *34*(5), 296-297. doi:10.1097/NAN.0b013e3182297156

Creswell, J. (2003). *Research design: Qualitative, quantitative and mixed methods approaches, 2nd ed.* Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J. (2007). *Qualitative inquiry & research design: Choosing from five approaches.* Thousand Oaks, CA: SAGE Publications, Inc.

Darling-Hammond, L., & Bransford, J. (2005). *Preparing teachers for a changing world: What teachers should know and be able to do*. San Francisco, CA: Jossey-Bass.

Darling-Hammond, L., Newton, S. P., & Wei, R. C. (2013). Developing and assessing beginning teacher effectiveness: The potential of performance assessments. *Educational Assessment, Evaluation and Accountability, 25*(3), 179-204.

Daro, P., Mosher, F., & Corcoran, T. (2011). *Learning trajectories in mathematics: A foundation for standards, curriculum, assessment, and instruction*. Philadelphia, PA: Consortium for Policy Research in Education. Retrieved from http://files.eric.ed.gov/fulltext/ED519792.pdf

Davis, Z. (2013). The use of the idea of coherence in descriptions and analyses of school mathematics curricula, textbooks and pedagogy. In Z. Davis & S. Jaffer (Eds.), *Proceedings of the 19th annual congress of the association for mathematics education of South Africa*, Vol. 1. (pp. 35 – 46). Cape Town, South Africa: AMESA.

Desimone, L., & Long, D. A. (2010). Teacher effects and the achievement gap: Do teacher and teaching quality influence the achievement gap between Black and White and high-and low-SES students in the early grades. *Teachers College Record*, *112*(12), 3024-3073.

Domina, T., McEachin, A., Penner, A., & Penner, E. (2014). Aiming high and falling short California's eighth grade algebra-for-all effort. *Educational Evaluation and Policy Analysis*. doi:10.3102/0162373714543685

Domina, T., Penner, A. M., Penner, E. K., & Conley, A. (2013). Algebra for all: California's 8th grade algebra initiative as constrained curricula. *Education*, (*94)*9. 824-6374.

DuFour, R., DuFour, R., Eaker, R., & Many, T. (2006). *Learning by doing: A handbook for professional learning communities at work*. Bloomington, IN: Solution Tree.

Durwood, C., Krone, E., & Mazzeo, C. (2010). *Are two algebra classes better than one? The effects of double-dose instruction in Chicago*. Chicago: Consortium on Chicago School Research.

Earl, L. (2007). Assessment as learning. In Hawley, W. & Rollie, D. (Eds.). *The keys to effective schools: Educational reform as continuous improvement.* (85-98). Thousand Oaks, CA: Corwin Press.

Ed-Data (2012). *District student demographic comparisons*. Retrieved from http://www.ed-data.k12.ca.us/App_Resx/EdDataClassic/fsTwoPanel.aspx?#!bottom=/_layouts/E dDataClassic/profile.asp?reportNumber=16&level=06&fyr=0910&county=50&district=40717.

Elementary and Secondary School Act of 1965. Public Law 89-10. (1965). Retrieved from http://www.gpo.gov/fdsys/pkg/STATUTE-79/pdf/STATUTE-79-Pg27.pdf

Elliott, S. (2014). Measuring opportunity to learn and achievement growth: Key research issues with implications for the effective education of all students. *Remedial and Special Education*, 0741932514551282.

Elmore, R. F. (2000). *Building a new structure for school leadership*. Washington, DC: Albert Shanker Institute.

Evers, C., & Lakomski, G. (2000). *Doing educational administration: A theory of administrative practice.* Kidlington, Oxford, UK: Elseiver Science Limited

Evers, W. M. & Clopton, P. (2003, October 6). California's algebra crisis. *Hoover Daily Report*. Hoover Institution, Stanford University.

Etzioni, A. (1967). Mixed-scanning: A third approach to decision-making. *Public Administration Review.* 27. 385 – 392.

Etzioni, A. (1986). Mixed scanning revisited. *Public Administration Review.* 46, 8-14.

Etzioni, A. (1989). Humble decision-making. *Harvard Business Review.* 67, 122-126.

Faulkner, V. N., Crossland, C. L., & Stiff, L. V. (2013). Predicting eighth grade algebra placement for students with individualized education programs. *Exceptional Children*, *79*(3), 329-345.

Fink, A. (2006). *How to conduct surveys: A step-by-step guide. (3rd edition).* Thousand Oaks, CA: Sage Publications.

Finkelstein, N., Fong, A., Tiffany-Morales, J., Shields, P., & Huang, M. (2012). *College bound in middle school and high school? How math course sequences matter*. Sacramento, CA: The Center for the Future of Teaching and Learning at WestEd.

Fitzpatrick, M., Grissmer, D., & Hastedt, S. (2011). What a difference a day makes: Estimating daily learning gains during kindergarten and first grade using a natural experiment. *Economics of Education Review*. *30*(2), 269-279.

Food and Agriculture Organization of the United Nations. (n.d.). *Writing effective reports.* Retrieved from http://www.fao.org/docrep/014/i2195e/i2195e03.pdf

Fong, A., Jaquet, K., & Finkelstein, N. (2014). *Who repeats algebra 1, and how does initial performance relate to improvement when the course is repeated?* (REL 2015-059). Washington, DC: U.S. Department of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED548534.pdf

Foster, D. (n.d.). *The common core state standards: The transition to the CCSSM and the new assessment consortia*. Silicon Valley Mathematics Initiative. Web page: http://www.svmimac.org

Foster, J., & Wiser, M. (2012). The potential of learning progression research to inform the design of state science standards. In A.C. Alonzo & A.W. Gotwals. (Eds), *Learning progressions in science: Current challenges and future directions* (pp. 3-12). Rotterdam, The Netherlands: Sense Publishers.

Fratt, L. (2006). Eighth grade algebra: Finding a formula for success. *District Administration, 12(6)*, 54, 63-64.

Frederick, W. & Walberg, F. (1980). Learning as a function of time. *Journal of Educational Research, 73*(4), 183-204.

Frick, W. C. (2011). Practicing a professional ethic: Leading for students' best interests. *American Journal of Education*, *117*(4), 527-562.

Gamoran, A., & Hannigan, E. C. (2000). Algebra for everyone? Benefits of college-preparatory mathematics for students with diverse abilities in early secondary school. *Educational Evaluation and Policy Analysis*, *22*(3), 241-254.

Garrison, L. F., & Holifield, M. (2005). Are charter schools effective? *Planning and Changing, 36*(1), 90-103.

Global Debate & Public Policy Challenge. (n.d.). *Writing guidelines: Policy brief.* Retrieved from GDPPC website http://gdppc.idebate.org/content/writing-guidelines-policy-brief

Griffiths, D. (1958). Administration as decision-making. In Halpin, A. (Ed.), *Administrative Theory in Education.*. New York, NY: The Macmillan Company.

Griffiths, D. (1959). *Administrative theory.* Appleton-Century-Crofts, Inc. New York.

Grissom, J. A., Loeb, S., & Master, B. (2013). Effective instructional time use for school leaders: Longitudinal evidence from observations of principals. *Educational Researcher,* 0013189X13510020.

Guba, E. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal*, *29*(1), 75-92. Retrieved from http://www.clemson.edu/ces/cedar/images/1/1a/3-Guba-Trustworthiness-1981.pdf

Hallinger, P. (2010). Developing instructional leadership. In *Developing successful leadership* (pp. 61-76). The Netherlands: Springer.

Hallinger, P., & Murphy, J. (1985). Assessing the instructional management behavior of principals. *The Elementary School Journal*, 217-247.

Hancock, D. & Algozzine, B. (2011). *Doing case study research: A practical guide for beginning researchers*. New York, NY: Teachers College Press.

Hart, C. (2008). *Doing a literature review: Releasing the social science research imagination.* (10th ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Hargreaves, A., & Fullan, M. (1998). *What's worth fighting for out there?* Williston, VT: Teachers College Press.

Hatch, J. (2002). *Doing qualitative research in education settings.* Albany, NY: SUNY Press

Henry, V. J. (2001). An examination of educational practices and assumptions regarding algebra instruction in the United States. In H. Chick, K. Stacey, J. Vincent, & J. Vincent (Eds.), *The future of the teaching and learning of algebra*. Proceedings of the 12th ICMI Study Conference. (vol. 1, (296-304). The University of Melbourne, Australia.

Hill, H. C., & Grossman, P. (2013). Learning from teacher observations: Challenges and opportunities posed by new teacher evaluation systems. *Harvard Educational Review, 83*(2), 371-384.

Hoff, N., Olsen, A. & Peterson, R. (2015). Dropout screening & early warning. University of Nebraska-Lincoln. Retrieved from http://k12engagement.unl.edu/Dropout%20Screening%20%26%20Early%20Warning%203-27-15.pdf

Honig, M. & Coburn, C. (2008). Evidence-based decision-making in school district central offices: Toward a policy and research agenda. *Educational Policy*, *22*(4) 578-608.

Hord, S. & Sommers, W. (2008). *Leading professional learning communities*. Thousand Oaks, CA: Corwin Press.

Hoy, W. & Tarter, C. (2010). Swift and smart decision-making: Heuristics that work. *International Journal of Education, 24(*4*).* 351-358.

Huang, C., Snipes, J., & Finkelstein, N. (2014). *Using assessment data to guide math course placement of California middle school students*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. Retrieved from http://ies.ed.gov/ncee/edlabs

Huberman, M., Parrish, T., Arellanes, M., González, R., & Scala, J. (2012). Raising all boats: Identifying and profiling high-performing California school districts.

International Development Research Centre. (n.d.). *Toolkit for researchers: How to write a policy brief*. Retrieved from International Development Research Centre website: http://www.idrc.ca/EN/Programs/Global_Health_Policy/Tools_and_Training/Documents/how-to-write-a-policy-brief.pdf

Johnson-Sheehan, R. & Paine, C. (2010). *Writing today*. Boston: Pearson.

Jones, N., & Walsh, C. (2008). *Policy briefs as a communication tool for development research*. Overseas development institute (ODI).

Kanold, T. D., Briars, D. & Fennell, F. (2011). *What principals need to know about teaching and learning mathematics*. Bloomington, IN: Solution Tree Press.

Kaput, J. (1999). Teaching and learning a new algebra. In E. Fennema, & T. Romberg (Eds.), *Mathematical classrooms that promote understanding,* (pp. 133-155). Mahwah, NJ: Lawrence Erlbaum Associates.

Katterfield, K. (2013). Setting instructional expectations: Patterns of principal leadership in middle school mathematics. *Leadership and Policy in Schools*, *12*(4), 337-373. doi:10.1080/157000763.2013.792935

King, M.B. & Bouchard, K. (2011). The capacity to build organizational capacity in schools. *Journal of Educational Administration, 49*(7), 653-669.

Kirk, J. & Miller, M. (1986). *Qualitative research methods series 1: Reliability and validity in qualitative research.* Newbury Park, CA: Sage Publications. Inc.

Kitterlin-Geller, L., Jungjohann, K., Chard, D., & Baker, S. (2007, November). From arithmetic to algebra: Teachers can help students make the transition by developing their algebraic thinking early on. *Educational Leadership*, 66-71.

Knight, J. (2009). Instructional coaching. In J. Knight (Ed.), *Coaching approaches and perspectives* (pp. 29-55). Thousand Oaks, CA: Corwin Press.

Knight, J. (2007). *Instructional Coaching: A partnership approach to improving instruction.* Thousand Oaks, CA: Corwin Press.

Kobrin, J., Larson, S., Cromwell, A., & Garza, P. (2014). Establishing parameters for consideration of common core mathematics learning progressions. *Annual meeting of the American educational research association Philadelphia, Pennsylvani*a.

Konrad, M., Helf, S., & Joseph, L. M. (2011). Evidence-based instruction is not enough: Strategies for increasing instructional efficiency. *Intervention in School and Clinic*, *47*(2), 67-74. doi:10.1177/1053451211414192.

Kriegler, S., & Lee, T. (2007). *Using standardized test data as guidance for placement into eighth grade algebra*. Retrieved from http://www.introtoalg.org/downloads/Algebra_eighth_Grade_Paper.pdf

Kurleander, M., Reardon, S., & Jackson, J. (2008). Middle school predictors of high school achievement in three California school districts. *Santa Barbara, CA: California dropout research project,* University of California, Santa Barbara.

Kurz, A. (2011). Access to what should be taught and will be tested: Students' opportunity to learn the intended curriculum. In S. N. Elliott, R. J. Kettler, P. A. Beddow, & A. Kurz (Eds.), *Handbook of accessible achievement tests for all students: Bridging the gaps between research, practice, and policy* (pp. 99–129). New York, NY: Springer.

Larson, M. (2011). *Administrator's guide: Interpreting the common core state standards to improve mathematics education.* Reston, VA: The National Council of Teachers of Mathematics, Inc.

Lavy, V. (2010). *Do differences in school's instruction time explain international achievement gaps in math, science, and reading?: Evidence from developed and developing countries*. National Bureau of Economic Research.

Law, E. (2011). Exploring the role of leadership in facilitating teacher learning in Hong Kong. *School Leadership & Management: Formerly School Organization, 31*(4), 393-410. doi:10.1080/13632434.2011.606268

Lee, J., Grigg, W., & Dion, G. (2007). *The nation's report card: Mathematics 2007*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Leithwood, K., Anderson, S. E., Mascall, B., & Strauss, T. (2010). School leaders' influences on student learning: The four paths. In T. Bush, L Bell, & D. Middlewood (Eds.), *The principles of educational leadership and management,* (pp. 13-30). Thousand Oaks, CA: SAGE Publications, Inc.

Lewis-Beck, M. S., Bryman, A., and Liao, T. F. (n.d.). Reliability and validity in qualitative research. *The SAGE encyclopedia of social science research methods*. Retrieved from: http://srmo.sagepub.com.ezp.waldenulibrary.org/view/the-sage-encyclopedia-of-social-science-research-methods/n846.xml

Levpuscek, M. P., & Zupancic, M. (2009). Math achievement in early adolescence: The role of parental involvement, teachers' behavior, and students' motivational beliefs about math. *Journal of Early Adolescence, 29*(4), 541-570. doi:10.1177/0272431608324189

Liang, J.H. & Heckman, P.E. (2013). An examination of algebra for all through historical context and statewide assessment data. *Journal of Transformative Leadership and Policy Studies, 3*(1), 3-20.

Liang, J. H., Heckman, P. E., & Abedi, J. (2012). What do the California Standards Test results reveal about the movement toward eighth grade algebra for all? *Educational Evaluation and Policy Analysis*, *34*(3), 328-343. doi:10.3102/0162373712443307

Lindblom, C. (1993). *The science of muddling through*. New York, NY: Irvington.

Lindblom, C. (1959). The science of muddling through. *Public Administrative Review. 19*(1). 79-99.

Litchfield, E. (1956, June). Notes on a general theory of administration. *Administrative Science Quarterly, 1*(1), 3-29.

Little, J. W. (2012). Professional community and professional development in the learning-centered school. In Kooy, M. & Van Veen, K. (Eds.). *Teacher learning that matters: International perspectives*, 22-43. New York, NY: Routledge.

Little, J. W. (2007). Professional communication and collaboration. In Hawley, W. & Rollie, D. (Eds.). *The keys to effective schools: Educational reform as continuous improvement.* (pp. 51-66). Thousand Oaks, CA: Corwin Press.

Looney, J. W. (2011). Alignment in complex education systems: Achieving balance and coherence. *OECD Education Working Papers*, No. 64, OECD Publishing.

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal*, *49*(2), 285-322. doi:10.3102/0002831211431952

Loveless, T. (2011). *The tracking wars: State reform meets school policy*. Washington, DC: Brookings Institution Press.

Loveless, T. (2009). Tracking and detracking: High achievers in Massachusetts middle schools. *Thomas B. Fordham Institute*. Retrieved from http://files.eric.ed.gov/fulltext/ED507543.pdf

Loveless, T. (2008). The misplaced math student: Lost in eighth grade algebra. *Special Release: The 2008 Brown Center on American Education.* Retrieved from: http://www.brookings.edu/~/media/Files/rc/reports/2008/0922_education_loveless/0922_education_loveless.pdf

Lunenburg, F. & Ornstein, A. (2004). *Educational administration: Concepts and practices. 4th ed.* Belmont, CA: Wadsworth / Thompson Learning.

Madda, C., Halverson, R., & Gomez, L. (2007). Exploring coherence as an organizational resource for carrying out reform initiatives. *The Teachers College Record*, *109*(8), 1957-1979.

March, J. & Simon, H. (2004). *Organizations.* (2nd ed.). Cambridge, MA: Blackwell.

Marcotte, D. E., & Hansen, B. (2010). Time for school. *Education Next*, *10*(1), 53-59.

Marrongelle, K., Sztajn, P., & Smith, M. (2013). Scaling up professional development in an era of common state standards. *Journal of Teacher Education*, *64*(3), 202-211. doi:10.1177/0022487112473838

Marshall, C. & Oliva, M. (2006). *Leadership for social justice: Making revolutions in education.* Boston: Pearson Education, Inc.

Marzano, R. (2003). *What works in schools: Translating research into action.* Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. (2000). *A new era of school reform: Going where the research leads us*. Aurora, CO: Mid-Continent Research for Education and Learning.

Marzano, R. & Waters, T. (2009). *District leadership that works: Striking the right balance.* Bloomington, IN: Solution Tree Press.

Mathematics Diagnostic Testing Project (2012). *MDTP test levels.* California State University/University of California. Retrieved from http://mdtp.ucsd.edu/Tests.shtml

McCammy, J. (1947). Analysis of the process of decision-making. *Public Administrative Review. 7*(1). 41.

McCoy, L. (2005). Effect of demographic and personal variables on achievement in eighth grade algebra. *The Journal of Educational Research, 98(3),* 131-135. Retrieved from ProQuest Central. (Document ID: 782951041).

Mehan, H. (2015). Detracking: A promising strategy to increase social mobility for underserved youth. In *Opening the doors to opportunity for all: Setting a research agenda for the future*, (pp. 75-82). Washington DC: American Institute for Research.

Merriam, S. (2002). *Qualitative research in practice: Examples for discussion and analysis* (1st ed.). San Francisco, CA: Jossey-Bass.

Merriam, S. (1998). *Qualitative research and case study applications in education: Revised and expanded from case study research in education.* San Francisco, CA: Jossey-Bass.

Merriam, S. & Associates. (2002). *Qualitative research in practice: Examples for discussion and analysis.* San Francisco, CA: Jossey-Bass.

Miles, B. & Huberman A. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage Publications.

Morgatto, S. (2008). Should all students be required to take algebra? Are any two snowflakes alike? *Clearing House, 81*(5), 215-218.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

Mueller, R. (2013). A general model of organizational values in educational administration. *Educational Management Administration & Leadership. 42*(5). 640-656. doi:10.1177/174143213510504

Murphy, J. (2005). *Connecting teacher leadership and school improvement*. Thousand Oaks, CA. Corwin Press.

Musso, J., Biller, R. & Myrtle, R. (2000). Tradecraft: Professional writing as problem solving. *Journal of Policy Analysis & Management*, *19*(4), 635-646.

Nakamura, R. T. (1987). The textbook policy process and implementation research. *Review of Policy Research*, 7(1), 142–154. doi:10.1111/j.1541-1338.1987.tb00034.x

National Council of Teachers of Mathematics. (2014, April). *Algebra as a strand of school mathematics for all Students: A position of the National Council of*

Teachers of Mathematics. Retrieved from http://www.nctm.org/uploadedFiles/Standards_and_Positions/Position_Statements/Algebra_2014-04.pdf

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Authors.

National Education Policy Center. (2015). *Website*. http://nepc.colorado.edu/publications/policy-briefs.

National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common core state standards*. Washington, DC: Authors.

No Child Left Behind Act of 2001. Public Law 107-110 (2001). Retrieved from http://www2.ed.gov/policy/elsec/leg/esea02/index.html

National Research Council. (2001). Knowing what students know: The science and design of educational assessment. In J. Pelligrino, N, Chudowsky, and R, Glaser (Eds.) *Committee on the foundations of assessment. Board on testing and assessment, center for education. Division of behavioral and social sciences and education.* Washington, DC: National Academy Press.

National Science Foundation. (2002). *Evaluation and types of evaluation.* Arlington, VA: Author Retrieved from http://www.nsf.gov/pubs/2002/nsf02057/nsf02057_2.pdf

Newmann, F. M., Smith, B., Allensworth, E., & Bryk, A. S. (2001). Instructional program coherence: What it is and why it should guide school improvement policy. *Educational Evaluation and Policy Analysis, 23*(4), 297-321.

Nomi, T. (2012). The unintended consequences of an algebra-for-all policy on high-skill students effects on instructional organization and students' academic outcomes. *Educational Evaluation and Policy Analysis*, *34*(4), 489-505. doi:10.3102/0162373712453869

Overseas Development Institute. (2009, January). *Targeting tools: writing policy papers.* London, England: Author. Retrieved from http://www.odi.org/publications/5271-writing-policy-paper-brief

Penn State University. (2002). *Preparing a policy issue brief*. Retrieved from https://www.courses.psu.edu/hpa/hpa301_fre1/IBInstructions_fa02.PDF

Piaget, J. (1972). Comments on mathematical education. In H. E. Gruber & J. J. Voneche (Eds.), *The essential Piaget* (pp. 726-732). New York, NY: Basic Books, Inc.

Polly, D., Wang, C., McGee, J., Lambert, R. G., Martin, C. S., & Pugalee, D. (2014). Examining the influence of a curriculum-based elementary mathematics professional development program. *Journal of Research in Childhood Education*, *28*(3), 327-343. doi:10.1080/02568543.2014.913276

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher, 31*(7), 3.

Powell, V. (2012, April). Revival of the position paper: Aligning curricula and professional competencies. *Communications Teacher. 26*(2) 96-103.

Price, H. E. (2012). Principal–teacher interactions: How affective relationships shape principal and teacher attitudes. *Educational Administration Quarterly*, *48*(1), 39-85. doi:10.1177/0013161X11417126

Reid, A. (1992). Computer management strategies for text data. In B. Crabtree & W. Miller (Eds.), *Doing qualitative research*. London: Sage Publications, Inc.

Richards, T., & Richards, L. (1994). Using computers in qualitative research. In K. Denizen & Y. Lincoln (Eds.), *Handbook of qualitative research*. London, England: Sage Publications, Inc.

Riley, R. W. (1997). *Mathematics equals opportunity.* District of Columbia, U.S.: Federal Department of Education. ERIC Document Reproduction Service No. ED 415119

Robinson, V. M. (2007). *School leadership and student outcomes: Identifying what works and why*. (Vol. 41). Winmalee, Victoria, Australia: Australian Council for Educational Leaders.

Rosin, M. (2011, September). *Preparation, placement, proficiency: Improving middle grades math performance.* Webinar hosted by the Riverside County Office of Education.

Rosin, M., Barondess, H., & Leichty, J. (2009). *Algebra policy in California: Great expectations and serious challenges*. Mountain View, CA: EdSource. Retrieved from http://edsource.org/wp-content/publications/pub_algebra_final.pdf

Rubin, J., & Rubin, I. (2005). *Qualitative interviewing: The art of hearing data*. (2nd edition). Thousand Oaks, CA: Sage Publications.

Sacramento County Office of Education. (2010). *Analysis of California standards to common core standards.* Retrieved from http://www.scoe.net/castandards/multimedia/k-12_math_crosswalks.pdf

Schmidt, W. (2012). At the precipice: The story of mathematics education in the United States. *Peabody Journal of Education*, *87*(1), 133-156. doi:10.1080/0161956X.2012.642280

Schmidt, W. (2008). What's missing from math standards? *American Educator*, *32*(1).

Schmidt, W. (2002, November). Missed opportunities: How mathematics education in the U.S. puts our students at a disadvantage and what can be done about it. *Policy report no.7*. The Education Policy Center at Michigan State University.

Schmidt, W., Houang R., & Cogan, R. (2002, Summer). A coherent curriculum: the case of mathematics. *American Educator,* 1–18.

Schramm, W. (1971, December). *Notes on case studies of instructional media projects.* Working paper for the academy of educational development, Washington DC ERIC Document Reproduction Service No. ED092145.

Schoenfeld, A. (2004). The math wars. *Educational Policy, 18*(1), 253-286. doi10.77/0895904803260042

Schooling, P., Toth, M., & Marzano, R. (2013). The critical importance of a common Language of instruction. Blairsville, PA: Learning Sciences International. Retrieved from http://www.marzanocenter.com/files/Common%20Language%20of%20Instruction[1].pdf

Seashore, K., Leithwood, K., Wahlstrom, K., & Anderson, S. (2010). Investigating the links to improved student learning: Final report of research findings. *Learning From Leadership Project*. The Wallace Foundation.

Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. London, England: Random House Business Books.

Sergiovanni, T. (2007). *Rethinking leadership* (2nd edition). Thousand Oaks, CA: Corwin Press.

Sergiovanni, T. (2005). *Strengthening the heartbeat: Leading and learning together in schools*. San Francisco, CA: Jossey-Bass.

Silicon Valley Mathematics Initiative. (2013). *Pearson Gates curriculum maps*. Morgan Hill, CA: Author. Retrieved from http://www.svmimac.org/home.html

Simon, H. (1947). *Administrative behavior.* New York, NY: Macmillan.

Simon, H. (1993). Decision-making: Rational, nonrational, and irrational. *Educational Administration Quarterly, 29(3)*, 392-411.

Simon, H. (1997). *Administrative behavior: A study of decision-making in administrative organizations,* (4th ed.). New York, NY: Free Press.

Slavin, R. E., Lake, C., & Groff, C. (2009). Effective programs in middle and high school mathematics: A best-evidence synthesis. *Review of Educational Research, 79*(2), 839-911. doi:10.3102/0034654308330968

Smith, B. (2000). Quantity matters: Annual instructional time in an urban school system. *Educational Administration Quarterly, 36*(5), 652-682.

Smith, J. (1996). Does an extra year make any difference? The impact of early access to algebra on long-term gains in mathematics attainment. *Educational Evaluation and Policy Analysis*, *18*(2), 141-153.

Spaedy, M. (1990, September). *Reinventing school leadership* (pp. 156-159). Working memo prepared for the Reinventing School Leadership Conference. Cambridge, MA: National Center for Educational Leadership.

Spielhagen, F. (2010). Algebra for everyone? Student perceptions of tracking in mathematics. *Middle Grades Research Journal*, *5*(4), 213-223.

Spielhagen, F. (2006). Closing the achievement gap in math: Considering eighth grade algebra for all students. *American Secondary Education, 34(3)*, 29–42.

Spielhagen, F. (2006). Closing the achievement gap in math: The long-term effects of eighth grade algebra. *Journal of Advanced Academics, 18*(1), 34-59.

Stake, R. (1995). *The art of case study research.* Thousand Oaks, CA: Sage Publications, Inc.

State Board of Education. (2013). *SBE meeting for March 2013*. Sacramento, CA: California Department of Education. Retrieved from http://www.cde.ca.gov/be/ag/ag/yr13/agenda201303.asp

Stefkovich, J., & Begley, P. (2007). Ethical school leadership defining the best interests of students. *Educational management administration & leadership, 35*(2), 205-224.

Stelzner, M. A. (2005). *How to write a white paper: A white paper on white papers*. Poway, CA: Stelzner Consulting.

Stein, M. K., Kaufman, J. H., Sherman, M., & Hillen, A. F. (2011). Algebra a challenge at the crossroads of policy and practice. *Review of Educational Research, 81*(4), 453-492.

Storey, V., & Beeman, T. (2009). Values to action: Utilizing a value informed decision matrix to "jumpstart dialogue and critical self-reflection by school leaders on elements influencing their decision-making process. *Journal of Alternative Perspectives in the Social Sciences. 1*(3), 760-782.

Souza, L., & Wells, S. (2009, June). Research brief: Analysis and prediction of eighth and 9th grade student performance on the CST-Algebra 1. For the Riverside County Office of Education District and School Services Center. *Key Data Systems.*

Sykes, G., Bird, T., & Kennedy, M. (2010). Teacher education: Its problems and some prospects. *Journal of Teacher Education*, *61*(5), 464-476. doi:10.1177/0022487110375804

Tarter, C., & Hoy, W. (1998). Toward a contingency theory of decision-making. *Journal of Educational Administration, 36*(3), 212-228.

Terry, L., & Rosin, M. (2011). *California's math pipeline: Many routes through and around college-prep courses*. Mountain View, CA: EdSource. Retrieved from http://edsource.org/wp-content/publications/pub11-seventhGRadeMathBrief3Update.pdf

The Economist Newspaper Limited. (2010, January 21). The Appalachia of the west. *The Economist Newspaper Limited.* Retrieved from http://www.economist.com/node/15331478

The Pell Institute. (2015). Evaluation approaches and types. *Evaluation toolkit*. Washington, DC: Author. Retrieved from http://toolkit.pellinstitute.org/evaluation-101/evaluation-approaches-types/

Trochim, W. (2006a). Measurement validity types. *Research methods and knowledge base.* Web Center for Social Research Methods. Retrieved from http://www.socialresearchmethods.net/kb/measval.php

Trochim, W. (2006b). Introduction to evaluation. *Research methods and knowledge base.* Web Center for Social Research Methods. Retrieved from http://www.socialresearchmethods.net/kb/intreval.php

Tsai. (2006). *Guidelines for writing a policy brief.* Retrieved from http://www.rhsupplies.org/fileadmin/user_upload/toolkit/B_Advocacy_for_RHS/Guidelines_for_Writing_a_Policy_Brief.pdf

UC Davis. (2011). *Policy brief instructions: The pathway to a focused, jargon-free & visual document*. Retrieved from the http://policyinstitute.ucdavis.edu/files/Policy-Institute-Policy-Brief-Instructions.pdf

University of Arizona. (2010). *Types of evaluation: Program planning and evaluation*. Retrieved from https://extention.arizona/evaluation/content/types-evaluation

University of California. (2015). *A – g guide*. Retrieved from http://www.ucop.edu/agguide/a-g-requirements/c-mathematics/index.html

University of Maryland University College. (2015). *Writing executive summaries*. Retrieved from https://www.umuc.edu/writingcenter/writingresources/exec_summaries.cfm

University of Texas. (n.d.). *Evaluate programs: Program evaluation process*. Retrieved from https://www.utexas.edu/academic/ctl/assessment/iar/programs/plan/why-process.php

U.S. Department of Education (2012). *Improving basic programs operated by local education agencies: Title 1, Part A, Section 1114.* Washington DC: Author. Retrieved from http://www2.ed.gov/policy/elsec/leg/esea02/pg2.html#sec1114.

U.S. Department of Education. (2008). *Foundations for success: The final report of the national mathematics advisory panel.* Washington, DC: Author.

U.S. Department of Education. (2007). *The nation's report card mathematics 2007: National assessment of educational progress at grades 4 and 8.* Washington, DC: Author. Retrieved from https://nces.ed.gov/nationsreportcard/pdf/main2007/2007494.pdf

Useem, E. L. (1991). Student selection into course sequences in mathematics: The impact of parental involvement and school policies. *Journal of Research on Adolescence, 1*(3), 231-250. doi:10.1111/1532-7795.ep11298210

Vannest, K. J., & Parker, R. I. (2010). Measuring time: The stability of special education teacher time use. *Journal of Special Education, 44*(2), 94-106.

Vaughn, S., Wanzek, J., Murray, C. S., & Roberts, G. (2012). Intensive interventions for students struggling in reading and mathematics. A practice guide. *Center on Instruction*.

Walden University. (2015). *The Walden impact*. Retrieved from http://www.waldenu.edu/experience/walden/make-an-impact

Walden University (2013). *Social change*. Retrieved from http://www.waldenu.edu/About-Us/41193.htm.

Walker, R. (1980). The conduct of educational case studies: Ethics, theory and procedures. In T. Dockerell & D. Hamilton (Eds.), *Rethinking educational research*, 30-63. London, England: Hodder & Stoughton.

Waterman, S. (2010). *Pathways report: Dead ends and wrong turns on the path through algebra.* Palo Alto, CA: Noyce Foundation.

Watkins, S., & McCaw, D. (2007). The tipping point: Knowledge failure at the vision, mission, and core values level. In L. Lemasters, & P. Papa (Eds.), *At the tipping point: Navigating the course for the preparation. The 2007 Yearbook of the National Council of Professors of educational administration.* Lancaster, PA: Proactive Publications. Retrieved from http://files.eric.ed.gov/fulltext/ED523723.pdf#page=449

Watts, T. W., Duncan, G. J., Siegler, R. S., & Davis-Kean, P. E. (2014). What's past is prologue relations between early mathematics knowledge and high school achievement. *Educational Researcher, 43*(7). 352-360.

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad*. Dallas, TX: National Staff Development Council.

Weick, K. E. (1976). Educational organizations as loosely coupled systems. *Administrative Science Quarterly*, *21*(1), 1-19. Retrieved from http://vahabonline.com/wp-content/uploads/2014/02/ohnso__wd85c4fwa28v15.pdf

Weick, K. E. (1982). Administering education in loosely coupled schools. *Phi Delta Kappan*, *63*(10), 673-676.

Welder, R. (2011). Improving algebra preparation: Implications from research on student misconceptions and difficulties. *School Science and Mathematics Journal*.

Welner, K. (2009). Non-evidence about tracking: Critiquing the new report from the Fordham Institute. *The Teachers College Record*.

Wells, S., & Sousa, L. (2009). *Research brief prediction of 8th and 9th grade CST-Algebra I performance from 6th and 7th grade CST performance*. Riverside Office of Education. Key Data Systems.

Werblow, J., Urick, A., & Duesbery, L. (2013). On the wrong track: How tracking is associated with dropping out of high school. *Equity & Excellence in Education*, *46*(2), 270-284. doi:10.1080/10665684.2013.779168

White, A. L. (2009). *Counting on: A diagnostic and remedial mathematics intervention for middle years students*. Paper presented at the Improving science and mathematics literacy: Theory, innovation, and practice conference, Penana, Malaysia. Retrieved from http://www.merga.net.au/documents/MERGA33_White.pdf

Williams, T, Haertel E., Kirst M.W., Rosen, M., & Perry M. (2011a). *Preparation, placement, proficiency: Improving middle grades math proficiency. Policy and practice brief.* Mountain View, CA: EdSource.

Williams, T, Haertel E., Kirst M.W., Rosen, M. & Perry M. (2011b). *Gaining ground in the middle grades: Why some schools do better.* Mountain View, CA: EdSource.

Willis, J., Inman, D., & Valenti, R. (Eds.). (2010). *Completing a professional practice dissertation: A guide for doctoral students and faculty*. IAP.

Wilson, S. (1979). Explorations of the usefulness of case study evaluations. Evaluation Quarterly, 3(3), 446-459. doi:10.1177/0193841X7900300307

Yin, R. (2009). *Case study research.* Thousand Oaks, CA: Sage Publications, Inc.

Young, E., & Quinn, L. (2002). *Writing effective public policy papers: A guide for policy advisers in Central and Eastern Europe.* Budapest, Hungary: Local Government and Public Service Reform Initiative.

Young, J., & Court, J. (2004, October). Bridging research and policy in international development: An analytical and practical framework. *RAPID briefing paper*. London: Overseas Development Institute. Retrieved from http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/198.pdf

Zey, M. (1992). *Decision-making: Alternatives to rational choice models.* Thousand Oaks, CA: SAGE Publications, Inc.

Appendix A: Position Paper

Placing Middle-School Students in Mathematics Courses: Supporting Placement Decisions by Pursuing a Coherent Instructional Program.

Donald Joseph Davis

Table of Contents

Executive Summary

The complexity of appropriately placing middle-school students into mathematics classes is experienced by educators throughout our state and nation. The issue of placement is confounded by numerous influencing and constraining factors, beyond the individual student's aptitude to access grade-level mathematics content. Factors such as, teacher quality, lack of placement options, district expectations, availability or lack of support interventions, parental influence, limitations of master scheduling, and the state accountability system, all weigh in on the placement decision. Often, attending to these factors, deflect educators attention from pursuing a quality coherent instructional program districtwide.

Students are entering middle-school with varying degrees of readiness to receive instruction in algebra (Fong, Jaquet, & Finkelstein, 2014), and in recent years, state policies encouraged algebra-for-all (Domina, McEachin, Penner, & Penner, 2014; Bitter & O'Day, 2010; Loveless, 2008). In California, placement data indicated an observable variance in the placement of eighth grade students into Algebra 1, and for significant numbers of students' subsequent, low-performance as well. Additionally, the data show significant percentages of students repeated Algebra 1 in ninth grade (Fong, et al., 2014; Kurlaender, Reardon & Jackson, 2008). Reducing the practice of inappropriately placing middle-school students into classes based on factors outside of student aptitude, and increasing student readiness for algebraic content are outcomes of a well-designed mathematics education program.

This position paper is informed by the findings of a case study of nine unified school districts in the Central Valley region of California, which explained the decision-making processes of local administrators that led to the observed variance in placement. The major findings of the study are:

- Many eighth grade students in these systems are not prepared for the rigor of the mathematics content prescribed for their grade-level;
- The local instructional programs for mathematics are not coherently designed to support students' access to grade-level standards, nor in providing appropriate course alternatives based on the students' identified mathematical aptitude; and,
- Essential elements of effective decision-making were absent (i.e., established criterion for success, established policy or guidelines for practice, and articulated organizational belief on the issue).

The practitioners offered suggestions for systemic changes, they believe will improve their districts' mathematics education program, and support sound decisions in placing middle-school students into mathematics courses. In addition to their suggestions, this position paper is informed by professional literature associated with instructional program coherence and effective decision-making. The goals of this position paper are to support effective placement decisions by,

Goal 1. Providing explicit recommendations that lead to greater understanding and implementation of a coherent instructional program in mathematics; and, Goal 2. Providing explicit recommendations intended to develop educators in implementing action cycle decision-making.

Goal 3. Providing evaluation strategies to measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solutions.

The recommendations include:

- A four-year implementation plan to advance instructional program coherence in mathematics.
- Suggested responsibilities assigned to district and site level administrators, teachers, parents and students.
- Suggested actions that develop two essential characteristics of instructional program coherence: (a) common instructional framework (alignment of instruction, content, and, assessments), and (b) supportive working conditions.
- Suggested actions that promote professional growth of educators, to improve instructional delivery, and reflective practice.
- Suggested actions for student support.
- Suggested actions specifically for middle-school administrators to aid appropriate placement decisions.
- Suggested organizational value and policy statements to guide decision makers in developing instructional program coherence in their districts, and for influencing placement decisions.

- Suggested processes to aid the evaluation and revisions of the recommended actions.

The intended audiences of the position paper are the governing boards, district and site level administrators and teachers, of the school districts which served as community partners in this research. However, other interested stakeholders, policymakers, and administrators from districts beyond the scope of this study may find the recommendations useful in reforming instructional programs.

Placing Middle-School Students in Mathematics Courses: Supporting Placement Decisions by Pursuing a Coherent Instructional Program.

Introduction

In the unified school districts of Shelton County in the Central Valley region of California, a variance exists in the percentage of eighth grade students taking the state's end-of-course algebra exam (CDE, 2011b, 2012, 2013). At the time of this study, the middle schools in these districts had varying levels of eighth grade Algebra 1 completion (CDE, 2010, 2011b, 2012, 2013) even though the state promoted Algebra 1 for all eighth grade students (CDE, 1997). Depending on the district, significant numbers of students took a course and a subsequent exam at a level lower than Algebra 1, which resulted in a proportional penalty applied to the school under the state's accountability system.

In addition, significant numbers of students who were placed in the Algebra 1 course have performed poorly and received scores that likewise harmed their schools' state assessment results and subsequent rankings (CDE, 2011b, 2012, 2013). For example, in 2011, one of the studied districts had 92.9% of the eighth grade students completing the Algebra 1 course but 74% of these students failed to achieve the proficient level. In this region of California, the lack of a consistent practice by school officials for determining which eighth grade students to place in the Algebra 1course reflects a statewide problem of deficiencies in Local Educational Agencies (LEA) eighth grade policies for placing students in mathematics courses (Williams, Haertel, Kirst, Rosen, & Perry, 2011).

In the qualitative tradition of scholarly research, a project study was designed to examine the lived experience of administrators with firsthand knowledge of the issue in order to explain the observed variance in placement. The broader purpose of the project study developed to develop a rational framework for use in the placement of students in eighth grade mathematics courses based on extensive qualitative inquiry conducted with local administrators on their decision-making processes within nine unified school districts in Shelton County, California. The key findings of the research, revealed the complexity of the issue, as well as, the affect the school district's program of mathematics education had on placing eighth grade students into courses. The participants shared learned lessons, and reflected on information and supports they believe could support their placement decisions moving forward.

Their reflections revealed a desire to pursue a coherent instructional program in mathematics. The complexity of placing eighth grade students into mathematics courses is compounded when the mathematics education the students experienced prior to middle school is not coordinated and underprepares them for algebraic content (Clotfelter, Ladd, & Vigdor, 2012; Schmidt, 2012). Moreover, the discussion of findings relative to the decision-making aspect of administrative theory, informed the project development, in that the proposed rational framework for placement is supported when the decision-making process attends to all phases of the action cycle. The goals of this position paper are to support effective placement decisions by,

Goal 1. Providing explicit recommendations that lead to greater understanding and implementation of a coherent instructional program in mathematics; and, Goal 2. Providing explicit recommendations intended to develop educators in implementing action cycle decision-making.

Goal 3. Providing evaluation strategies to measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solutions.

Action cycle decision-making involves several phases of implementation, including, defining the problem, establishing criterion for satisfactory solutions, considering alternative actions, deciding on and implementing actions, evaluating outcomes, and revising the actions.

The Case Study

This study involved nine unified school districts in Shelton County (pseudonym), in the Central Valley region of California. The study showed that eighth grade placement varied greatly among these districts; placement was largely determined by factors associated with the school district in which students happened to reside. Local administrators managed multiple influencing and constraining factors unique to their systems – factors other than student aptitude – when making placement decisions. In other words, home addresses played a significant role in eighth grade student access to Algebra 1. Administrators in each district acted autonomously from one another, in dealing with the complexity of the issue.

Following a recommendation for qualitative research by Yin (2009), a research proposition was developed asserting that some administrators in Shelton County considered factors beyond math aptitude when placing eighth grade students in Algebra 1. The proposition and administrative theory, which identifies decision-making as its central tenet (Barnard, 1938) undergirded the qualitative inquiry. The findings served to affirm the research proposition, and provided impetus to develop research-based recommendations to address the complex issue of middle-school student placement in mathematics courses. The following summarizes the research findings according to the research questions, research proposition, and the theoretical framework:

Summary of findings for research sub-question #1: Describe why there was a variance in Algebra 1 placement. The participants described four factors that created the variance in the percentages of eighth grade students placed in Algebra 1 in Shelton County.

- District autonomy. The administrators in the nine unified school districts acted independently of one another and did not seek outside consultation from peers in other systems in the placement decision.
- Site autonomy. Site administrators described varying levels of autonomy with regards to Algebra 1 placement.
- Structures and circumstances. The participants described unique structures and circumstances in their districts and at their school such as, constraints of scheduling, parental influence, and high-school expectations for incoming freshmen students.

- Expectations. Participants described the degree to which algebra-for-all existed as an expectation in their district. This expectation was not uniform throughout the region, and the data revealed that, over time, the expectation diminished.

Summary of findings for research sub-question #2: Describe factors and constraints that influenced the decision to place eighth grade students in Algebra 1. The analysis revealed the following influencing and constraining factors:

- District expectations. The data revealed, among the districts, varying degrees of expectation that eighth grade students should be placed in Algebra 1. In 6 of the 9 districts, participants described an expectation that increasing numbers of eighth grade students should be placed in Algebra 1.

- Specific factors. Several factors influencing the placement decision were offered by participants: teacher recommendations, student grades, student assessments, availability or lack of support intervention classes, teacher quality, and social equity in access to Algebra 1 in eighth grade.

Summary of findings for research sub-question #3: Describe the effect of the state accountability system had on the decision to place eighth grade students in Algebra 1. All of the participants understood the mechanics of the state accountability system and the impact that the decision to place, or not place, eighth grade students in Algebra 1 would have on their middle schools' Academic Performance Index (API) scores. In six of the nine districts, participants shared that the API-effect influenced their decision to place eighth grade students in Algebra 1. Principals in three districts expressed that, in some instances, their decision to place eighth graders in Algebra 1 was not in the best interest of students.

Summary of findings for research sub-question #4: Describe your students' overall performance on the state tests. The participants offered reflections on their students' performance. In five of the nine districts administrators described their students' performance as low, weak, or poor. Administrators in these districts attributed the poor performance in some degree to their aggressive Algebra 1 placement decisions. Other explanations for poor performance were offered, such as performance being a function of which teacher the student had been assigned, and that some potentially high-performing students had been siphoned off to the Geometry course. In four of the districts, positive descriptions of student performance were offered. The participants qualified these positive reflections however, noting that students performed well considering the obstacles they faced, such as, lack of support interventions, and poor teacher quality.

Summary of findings for research sub-question #5: Describe what information or support would help in making mathematic course placement decisions. The participants described the following information and supports that would help in making the decision to place eighth grade students in mathematics courses:

- K–12 perspective. Districts have clear and explicit continuum of mathematics instruction throughout the grade levels.

- Improved instruction. Having effective mathematics instruction delivered in the primary and intermediate grades will positively affect students' access to algebra content in middle school.

- Consider student needs. Allowing student mathematical aptitude and identified strengths and deficits to be considered when placing students into math courses.

- More course options. Having more options in course offerings will help in placing students appropriately.

- Teacher representation in mathematics pathway. Provide for teacher input into the mathematics pathway of courses.

Summary of findings associated with the theoretical research proposition. The proposition asserted that factors other than mathematical aptitude influenced some administrators in Shelton County in placing eighth grade students in Algebra 1. The data analysis revealed that six non-math aptitude factors influenced some administrators in placing students. Specifically,

- The availability, or lack, of support intervention classes influenced the decision of administrators in five districts;

- Parental concerns influenced administrators in two districts;

- Scheduling constraints influenced administrators in seven districts;

- Social equity in access to Algebra 1 influenced administrators in two districts;

- The state accountability system influenced administrators in six districts; and,
- Teacher quality influenced administrators in four districts.

Based on this analysis, the theoretical proposition was affirmed.

Summary of findings associated with the theoretical framework. The data were analyzed according to aspects of administrative theory. Specifically, the administrative model of satisficing (Hoy & Miskel, 2001) was evident in that in each of the districts' administrators described expectations and constraints that they attempted to satisfy or remedy via their decisions. Table 1 shows the expectations and constraining factors.

Table 1

Expectations and Constraining Factors that Administrators Attempted to Satisfy or Mitigate

District	District Expectations	Constraining Factors
D1	District algebra for all Equity of access Expectations of high school staff State Accountability System Support classes provided	Internal conflict of site principal Teacher reservations of student preparedness
D2	District algebra for all State accountability system	Ineffective articulation with high school Scheduling
D3	Parental expectations Teacher recommendations	Ineffective articulation with high school Poor teacher quality Scheduling Teacher reservations of student preparedness
D4	District algebra for all Equity of access State accountability system Support classes for Algebra 1	Scheduling Poor teacher quality

(table continues)

D5	Summer algebra prep Teacher recommendations	Scheduling
D6	District algebra for all Parental expectations	Ineffective articulation with high school Lack of support classes

(table continues)

	State accountability system Teacher recommendations	Poor teacher quality Scheduling Teacher reservations of student preparedness
D7	Support classes Teacher recommendations	Ineffective articulation with high school Poor teacher quality Scheduling
D8	District algebra for all State accountability system Teacher recommendations	Internal conflict of site principal Lack of support classes Scheduling Teacher reservations of student preparedness
D9	District algebra for all State accountability system Support classes Teacher recommendations	Internal conflict of site principal Scheduling

Additionally, the incremental model (Lindblom, 1959) of administering was evident in three districts, as administrators described how the placement decision evolved overtime as they made incremental adjustments to their middle school educational program relative to mathematics. The adjustments resulted in a diminishing the aggressive approach to Algebra 1 placement.

Summary of Discussion. This study explained how the participants accounted for the observed variance in eighth grade placement in Algebra 1 in this region of California. The study aided participants in revealing the influencing and constraining factors that informed their decisions to place eighth grade students in mathematics courses, including the influence of the state's accountability system. The study tied the administrative decision-making strategies of participants to decision-making approaches suggested by researchers and scholars of administrative theory in education. The discussion revealed missing aspects of the decision-making models provided for in the professional literature. Specifically absent,

- Established criterion for success,
- Established policy or guidelines for practice, and
- Articulated organizational belief on the issue.

In addition, the study supported participants in surfacing underlying deficits that existed in their districts' and schools' educational programs relative to mathematics instruction, and the lack of coherence to an organizational framework for mathematics instruction that leads to successful student access to algebra content. Finally, the study provided opportunity for real-world practitioners to reflect on their decisions, and offer suggestions they believe to be helpful in addressing the gaps in programs and practice that led to observed variance in Algebra 1 placement, and poor student outcomes.

Key Findings that Inform Project Recommendations

The findings and associated discussion suggest that the decision-making processes of participants were hindered by the lack of a clearly articulated and adequately implemented approach to mathematics education in their districts. The discussion of findings revealed three complex challenges these educators faced, and continue to face, in appropriately placing eighth grade students in mathematics courses, these challenges are:

- Many eighth grade students in these systems are not prepared for the rigor of the mathematics content prescribed for their grade-level;
- The local instructional programs for mathematics are not coherently designed to support students' access to grade-level standards, nor in providing appropriate course alternatives based on the students' identified mathematical aptitude; and,
- Essential elements of effective decision-making were absent (i.e., established criterion for success, established policy or guidelines for practice, and articulated organizational belief on the issue).

The intent of this positon paper is to provide policy and practice recommendations that remedy the key findings reported above. The following section of this position paper provides a description of the two project goals, and the related theory and research that supports the goals. This project offers solutions to the key findings, by addressing two fundamental issues:

- Instructional program coherence, and
- Missing elements of effective decision-making.

This project integrates the scholarly review of professional literature, and builds a case for the appropriateness of the goals in solving the problem.

The Project

In the research-as-problem-solving paradigm, Archbold (2010) asserted that dissertation processes serve as opportunities to address authentic problems, issues, and situations that practitioners face in their professional lives. The goal of this paradigm is improving the organizations and communities they studied. Archbold (2008) claimed that doctoral research may be motivated to improve practice, solve problems and improve organizational performance. Researchers have maintained that it is insufficient for research to uncover the complexities of real-world problems in education or other fields and draw conclusions, but also to present recommendations, which are based on the findings of research and connected to professional literature (Archbold, 2010; Willis, Inman & Valenti, 2010). These recommendations go beyond research implications and are intended to guide changes that improve the condition of an organization. Archbold called this a practical contribution, which problem-based research can deliver to various types of organizations and to professional practice.

This position paper provides a practical contribution to educators pursuing the goals of the project in their school systems. To provide context and aid understanding for the recommended actions, special terms are defined. Also, a review of professional literature is provided to build a case for the appropriateness of the goals in solving the problems identified in the key findings.

Special Terms Associated with Policy and Practice Recommendations

Action cycle decision-making. The action cycle decision-making model clarifies and revises the satisficing model (Simon, 1947), by explicitly identify six explicit phases including the development of criteria of a satisfactory solution, and evaluating the decision in light of the criteria (Hoy & Miskel, 2001).

Assessments. In the project, assessments are used to measure student progress to learning the grade-level content, and student-readiness for algebra content (Huang, Snipes, & Finkelstein, 2014).

Coherent instructional program in mathematics. The district instructional program aligns instruction, content and assessments, with the learning progressions necessary to achieve readiness for algebra content. In addition to the alignment of these areas, a coherent program ensures supportive working conditions to buttress program implementation, and allocation of resources (i.e., time, staff, and resources) focused on achieving program goals (Cobb & Jackson, 2011; Newmann et al., 2001).

Common instructional framework. Effective researched-based instructional strategies implemented grade-level wide, and in some instances school wide (Cobb & Jackson, 2011; Newmann et al., 2001) that promote student learning. These explicit strategies are clearly communicated to teachers and ongoing training and support are provided to ensure implementation.

Instructional coaching. Instructional coaching is an on-site instructional support system in which a teacher-coach models effective instructional techniques, and provides feedback to teachers implementing the strategies. The instructional coach practices questioning techniques with teachers to elicit reflective responses regarding their instructional planning and instructional delivery (Knight, 2007).

Intervention support class. In this project, an intervention support class is a mathematics class that a middle-school student with moderate levels misunderstanding is enrolled into, and is taken concurrently with the grade-level class. In the intervention class the student receives remediation in essential concepts necessary for algebra-readiness, receives support with content introduced in the grade-level class, and, has upcoming content from the grade-level class previewed to support access to the content (Vaughn, Wanzek, Murray & Roberts, 2012).

Learning progressions. Learning progressions represent increasingly complex material taught throughout the grade-levels. The progressions in the early grades promote understanding of mathematic concepts essential for accessing algebra content in later grades (Korbin, Larson, Cromwell, & Garza, 2014).

Opportunity to learn (OTL). OTL factors are adequate time, appropriate content and quality instruction, and considered necessary for student learning (Carroll, 1963; Marzano, 2003).

Organizational values and beliefs. Organizational values and beliefs are developed by stakeholders and adopted by governing boards. They are considered guiding principles, or foundational tenets of school district, and assist school administrators in navigating complex issues and making decisions (Marzano & Walters, 2009; Mueller, 2013).

Professional development (PD). In this project PD is coordinated training to inform teachers and administrators of the elements of a coherent instructional framework, and to train the implementation of a common instructional framework (Cobb & Jackson, 2011; Marrongelle, Sztajn, & Smith, 2013).

Professional Literature Informing Goal 1

Increase the understanding and implementation of instructional program coherence in mathematics. Newmann et al. (2001) defined instructional program coherence as a, "set of interrelated programs for students and staff that are guided by a common framework for curriculum, instruction, assessment, and learning climate that are pursued and sustained over time" (p 297). By defining coherence in this fashion they distinguished it from instructional programs that are fragmented, limited in scope, and insufficient to support enduring improvements in school systems. Newmann et al. further shared that when school leaders implemented coherent instructional reform efforts, attending to the interrelationship between curriculum and the quality of delivered instruction, addressing the interplay between student assessment and instructional interventions, and committing resources to train and equip teachers in effective pedagogy, then student achievement outcomes were increased.

Factors of coherence. Newmann et al. suggested that strong program coherence is evident when the following three conditions are met:

1. A common instructional framework guides curriculum, teaching, assessment, and learning climate. The framework combines specific strategies and materials to guide teaching and assessment (p. 299).

2. Staff working conditions support the implementation of the framework (p. 299).

3. The school allocates resources such as funding, materials time and staff assignments to advance the school's common instructional framework and to avoid diffuse, scattered improvement efforts (p. 300).

A scholarly review of seminal and current professional literature regarding these three attributes of coherence is offered below, and informed the position paper developed to address the problem of this study.

Common instructional framework and the opportunity to learn. Educational psychologist John B. Carroll (1963) first introduced the concept of Opportunity to Learn (OTL) as the amount of time that a student needs to spend on learning a task. With "time" being understood as the time a student is actually engaged in learning, not simply the elapsed time. Carroll further posited that the time necessary to learn a new skill or concept for the purpose of transferring and applying that learning to new situations is influenced by the quality of instruction the learner is receiving from the teacher, and the alignment of the curriculum the teacher is employing to the actual task or concept the student is attempting to learn. Carroll argued that the amount of time needed to learn increased by whatever amount necessary to overcome poor quality instruction. Marzano (2000) promoted in his meta-analysis that OTL had greater effect on student learning than other school-level factors, (i.e., monitoring progress of student achievement, pressure to achieve or high expectations, parent involvement and school leadership). Three aspects of OTL emerge as predictive for improved student outcomes, each of which plays a role in a coherent instructional program

(Elliott, 2014; Kurz, 2011):

- Time,
- Content, and
- Quality of instruction.

Time. Researchers contend that the duration and quality of instructional time effects student learning (Bloom, 1974; Carroll, 1963; Corey, Phelps, Ball, Demonte & Harrison, 2012; Frederick & Walberg, 1980; Vannest & Parker, 2010). Instructional time is characterized by Carroll (1963) as the amount of time needed for a student to learn a particular task that is taught by a teacher, and time as a variable, differs widely based on the particular needs of the learner and a host of other factors, such as aptitude of the learner, quality of teaching, and the learning environment. Carroll posited that the degree of learning is a function of the ratio of the time actually spent learning and the time needed to learn, provided this formula:

$$\text{Degree of learning} = f\left[\frac{\text{Time actually spent learning}}{\text{Time needed to learn}}\right]$$

The formula promotes an optimal 1:1 ratio, that is, all the minutes required to learn are actually spent on effective learning activities. If the actual minutes spent on effective learning activities are fewer than the minutes needed the optimal ratio is not attained.

Frederick and Walberg (1980) suggested that when controlling for other variables, the actual time spent learning new material may be the best predictor of student success. As stated earlier, the time devoted to instruction is not elapsed time, but the actual time students are actively engaged in instruction that leads to demonstrated learning (Bloom, 1974; Smith, 2000). Bloom called this “time on task” (Bloom, 1974, p. 685), and argued that time on task is highly predictive of learning achievement. Time-on-task is an effective in-school correlate that promotes learning in charter schools (Berends, Goldring, Stein, & Cravens, 2010; Garrison & Holifield, 2005). Lavy (2010) demonstrated that in developed countries, time-on-task produces a significant effect in student learning; countries with one-hour more instruction in mathematics per week had increased math scores.

The effective use of instructional time to increase math achievement is promoted by the National Council of Teachers of Mathematics (NCTM) (Larson, 2011), and the positive effects of increased time dedicated to math instruction is documented in research (Berends et al., 2010; Borg, 1980; Denham & Lieberman, 1980; Desimone & Long, 2010; Fitzpatrick, Grissmer, & Hastedt, 2011; Garrison & Holifield, 2005; Lavy, 2010; Vaughn, Wanzek, Murray, & Roberts, 2012; Smith, 2000). When establishing a coherent approach to mathematics instruction protecting instructional time is a foundational attribute of educational leadership (Grissom, Loeb, & Masters, 2013; Hallinger, 2010; Hallinger & Murphy, 1985; Leithwood, Anderson, Mascall, & Strauss, 2010; Robinson, 2007; Smith, 2000). Protecting instructional time is understood as establishing daily schedules in which math instruction is guaranteed, providing additional time for students needing support interventions, planning sufficient mathematic courses in master schedules, and buffering instruction, or, limiting interruptions of instructional time (Larson, 2011; Leithwood et al., 2010).

Strategies to increase instructional time for mathematics in schools include lengthening the school day (Bellei, 2009), providing more days of instruction prior to testing (Marcotte & Hansen, 2010), and increasing the duration of in-school intervention support in which students with learning deficits receive additional instruction in mathematics during the school day (Vaughn et al., 2012). Of these suggestions, increasing in-school instructional support in mathematics for students is viewed as a necessity (Bitter & O'Day, 2010; Larson, 2011) in affording struggling students access to rigorous algebra content. Desimone and Long (2010) noted that taken together, increased instructional time and a quality instructor, shows promise in reducing achievement gaps between African-American and low socio-economic students and their higher achieving counter parts.

Content. Kurz (2011) observed that a district striving to achieve a coherent instructional framework in mathematics will attend to the curricula taught to students through the grade levels. As Newmann et al. (2001) described, program coherence includes the interrelation of instruction and curriculum. The mathematics curriculum developed for schools, is routinely aligned with state standards for mathematics instruction. However, Schmidt (2008, 2012) posited that in U.S schools, the state standards and associated curriculum often lacked focus on the most essential mathematical concepts, particularly in the early grades.

Schmidt (2008) suggested that the content of mathematics curriculum often lacked coherence. Schmidt described coherence as following "the structure of the discipline being taught" (Schmidt, 2008, p. 23), structure being the articulation of the content over time, in a logically sequenced fashion that leads to intended performance in the discipline (Schmidt, Houang, & Cogan, 2002). Schmidt noted that nations outperforming the U.S. on the Third International Mathematics and Science Study (TIMSS) utilized more focused, rigorous, and coherent instructional content. Schmidt's criticism of the mathematics instruction in the U.S as being unfocused, undemanding and incoherent, is echoed by Bitter and O'Day (2010) who promoted the creation of a K-12 mathematics curriculum, that focuses on key standards beginning in the early grades in order to prepare students for Algebra 1. The National Mathematics Advisory Panel (U. S. Department of Education, 2008) described effective curricular content as:

> A focused, coherent progression of mathematics learning, with an emphasis on proficiency with key topics, should become the norm in elementary and middle school mathematics curricula. Any approach that continually revisits topics year after year without closure is to be avoided (p. xvi).

The Advisory Panel in its final report explicitly offered fluency with whole numbers, fluency with fractions, and proficiency with particular aspects geometry and measurement (i.e., perimeter and area of geometric shapes, properties of three dimensional shapes, volume and surface area, and relationships of similar triangles) as key topics for elementary and middle grade levels that contribute to algebra readiness.

Others have broadened the scope of key mathematical topics that should be taught in early grades to include opportunities to experience algebraic processes (Blanton, 2008; Blanton, Stephens, Knuth, Gardine, Isler, & Kim, 2015; Carpenter, Levi, Berman, & Pligge, 2005; Kaput, 1998) demonstrating that young students have capacity for algebraic reasoning. Blanton et al. (2015) conducted a study with third-grade students (N = 106) in a school district that was using an arithmetic-focused curriculum with no treatment of algebraic concepts. The researchers instituted an early algebra intervention with a sub-group of students in two intact classrooms at one school in the district (n=39), and did not provide the algebra intervention to students in four intact classrooms at the same school (n=67). They found that students in the intervention group significantly improved their ability in several conceptual areas that are foundational to algebraic reasoning. These areas included the ability to:

- Think relationally about the equal sign,
- Represent unknown quantities in meaningful ways with variable notation,
- Recognize the underlying structure of fundamental properties in equations and use this to justify their thinking,
- Think beyond particular instances to consider whether generalizations were true across a broad domain of numbers,
- Both produce and comprehend variable representations of generalized claims, and
- Generalize and symbolically represent functional relationships between co-varying quantities. (p. 71).

This study suggested that as early as third grade students can develop critical algebraic thinking skills, which will serve them in accessing algebra content in middle school and beyond.

Identifying and delivering a coordinated curriculum that leads to the acquisition of foundation algebraic skills and concepts, is a requisite aspect of a coherent mathematics program intended to increase middle school student access to algebra and high school student access to advanced mathematics concepts (Larson, 2011; Porter, 2002; Slavin, Lake, & Groff, 2009: U.S. Department of Education, 2008). Curriculum, or content, is a factor of instructional program coherence over which district decision makers have a great degree of control (Slavin et al., 2009). Schmidt (2012) advised policymakers, “Addressing content standards and content coverage provides a very straightforward form of intervention, one that holds considerable promise” (p. 141). This suggested that administrators pursuing coherence seek curriculum and instructional materials which are aligned to the content standards according to the grade levels.

As administrators consider the curriculum for their district’s mathematics program, the concept of appropriate mathematics learning progressions come into play. Learning progressions are identified as the successive levels of knowledge through which students progress in order to understand increasingly complex mathematical concepts (Daro, Mosher & Cochran, 2011; Kobrin, Larson, Cromwell, & Garza 2014; National Research Council, 2001) and explicit progressions support coherence in instructional programs (Foster & Wiser, 2012). In developing the progressions of the common core state standards (CCSS) in mathematics (Common Core Standards Writing Team, 2013) the writing team considered what it called “the structure of mathematics” (p. 6), and developed a series of papers titled the *Progressions Documents*. These documents served to inform educators of the structure of mathematics, illustrating how fundamental concepts of arithmetic and geometry taught in early grades support algebraic thinking in later grades (Kanold, Briars, & Fennel, 2011). The progression documents detailed the sequencing of math instruction in order for students to attain higher levels of competency leading to college and career readiness in mathematics. Potential curriculum choices can be checked according to these progressions documents to facilitate alignment with the

CCSS (Korbin et al., 2014). Similarly, the Silicon Valley Mathematics Initiative (2015) provided scope and sequence charts of the CCSS, to inform administrators and others charged with making content decisions for their districts.

Quality of instruction. Another critical component of addressing the Opportunity to Learn is the quality of instruction that students receive (Bloom, 1974; Carroll, 1963; Cobb & Jackson, 2011; Desimon & Long, 2010; Levpuscek & Zupancic, 2009; Newmann et al., 2001; Marzano, 2003; Schmidt, 2012). Marzano described quality instruction as a “teacher-level factor” (Marzano, 2003, p. 10), noting that effective instructional strategies, classroom management and the use of the curriculum are under the direct control of the teacher. His meta-analysis of research on teacher quality suggested that teacher quality has a greater effect on student achievement than school-level factors, such as having a guaranteed-viable curriculum and monitoring of instruction by administration.

Improving the quality of instruction in mathematics school wide and districtwide is aided when an effective common instructional approach is pursed (Newmann et al., 2001). Disjointed, or autonomous approaches to instructional delivery in mathematics, even when considered by teachers as innovative, do not promote student achievement to the degree as well-coordinated, researched-based strategies used school wide (Berends et al., 2010). Achieving the use of effective instructional practices school wide is advanced when the professional culture of the school supports consistent training, practicing, monitoring and peer-to-peer professional conversation regarding specific methodology (Childress, Elmore, Grossman, & Johnson, 2007; Coggshall, Rasmussen, Colton, Milton,

& Jacques, 2012). Judith Warren Little (2012) contended that focused and unrelenting review and examination of instructional practice by the practitioners is essential in furthering a coherent approach to instruction. Judith Warren Little observed that this aspect of professionalism is all too often missing in schools. Explicitly identifying effective instructional strategies and supporting their appropriate implementation is seen as a critical aspect of site and district level leadership that is committed to improving student achievement (Coggshall et al., 2012; Little, 2012).

Barriers to a coherent instructional approach include lack of content knowledge by teachers (Darling-Hammond, Newton, & Wei, 2013; Kanold, Briars, & Fennell 2011; Schmidt, 2012; Sykes, Bird, & Kennedy, 2010), insufficient training in pedagogy (Cobb and Jackson, 2012; Sykes et al., 2010), poor follow-through of monitoring and feedback (Hill & Grossman, 2013), and teacher isolationism (Little, 2007). The content knowledge barrier for teachers entering the profession can be addressed through the teacher preparation and credentialing processes (National Research Council, 2010; Darling-Hammond & Bransford, 2005). However, shoring up content knowledge deficits for practitioners becomes the responsibility of local school district personnel (Cobb & Jackson, 2012; Kanold et al., 2011; Marrongelle, Sztajn, & Smith, 2013). This shoring up is necessary to achieve school wide use of effective instructional strategies in mathematics.

Continual learning by adults charged with delivering instruction is an attribute of a system striving for improved teacher quality (Ball, Sleep, Boerst, & Bass, 2009). This requires ongoing training with routine procedures for monitoring and providing feedback to teachers on the explicit aspects of their personal delivery of instruction (Cobb & Jackson, 2012; Elmore, 2000). Schools in which teachers function autonomously, similar to independent contractors, having limited experience with effective feedback mechanisms are less likely to achieve improvements in instruction (Little, 2007). This speaks to the need of school leaders to develop those mechanisms as strong features of their schools.

Newmann et al. (2001), and Cobb and Jackson (2011, 2012), further identified attributes of a coherent instructional framework in their research. Newmann et al. recognized as evidence of coherence, the general coordination of increasingly complex curriculum, instructional strategies, and use of assessments, as well as, providing support opportunities for struggling students. Cobb and Jackson extended the attributes with regards to mathematics instruction. They advised that educators establish goals for students' learning and work from a detailed understanding of quality instruction aimed at achieving those goals. They claimed that a detailed vision of quality instruction includes specific strategies designed for a particular phase of a lesson, and provides direction for the training needs of teachers. These attributes serve to guide direction for school and district administrators seeking to bring coherence and alignment to their mathematics education program.

Additional supports for students. Another aspect of a coherent instructional program in mathematics is the inclusion of instructional supports for struggling students (Newmann et al., 2001; Cobb & Jackson, 2011; Vaughn et al., 2012). Instructional supports often include supplemental instructional time, in addition to the time dedicated to the core grade-level class, attending to the observed deficits in skills and conceptual understanding (Durwood, Krone, & Mazzeo, 2010). However, Loveless (2008, 2009) argued that placing struggling or underprepared middle-school students in a grade-level course as the only option, and then doubling their time in math instruction to address deficits, served more to promote a de-tracking, social-equity agenda than to provide appropriate instruction to students. Loveless found that schools which resisted the de-tracking one-size-fits all approach to middle school mathematics instruction had more students attaining proficiency and fewer students at the failing levels.

Welner (2009) argued Loveless's analysis as flawed, and research suggests that placing students in a lower-track for mathematics increases the chance of students dropping out of high school (Weblow, Urick, & Duesbery, 2013). Yet, researchers are confronting the appropriateness of the one-size-fits all approach to middle school mathematics courses (Domina, McEachin, Penner, & Penner, 2014; Nomi, 2012). The intended consequence of raising math achievement statewide in California by promoting Algebra 1 in eighth grade was not achieved (Liang, Heckman, & Abedi, 2012). Armed with data, locally and state wide, which indicate placing students in mathematics courses before they are ready for the content is not advisable nor does it promote coherence in the mathematics program (Loveless, 2009). A coherent approach provides instructional support in addition to the core, when students' deficits are not profound to the degree they limit the students' access to the concepts taught. Moreover, a coherent program recognizes that student aptitude on both ends of the spectrum warrants providing course options suited to the needs of the low-performing and high-performing students.

Importance of assessment. Identifying low-performing students, students needing intervention, and high-performing students, are functions of a well-aligned and coordinated system of assessment (Cobb & Jackson, 2011; Newmann et al., 2001). Newmann et al., and Cobb and Jackson, included assessments as an integral aspect of a coherent instructional framework; others asserted that effective assessment systems measure the students' progress toward attaining the intended curriculum and inform the content of intervention, and identify students who are struggling (Earl, 2007; Konrad, Helf, & Joseph, 2011). Earl (2007) noted that reforming the purpose and scope of assessments provides educators with leverage to meet the multifaceted challenge of providing feedback to students, informing teachers of modifications to make in their instruction, and in updating the design of mathematics programs. A coordinated assessment system is helpful in determining the quality of the mathematics program district wide.

Regarding the placement of middle-school students into math classes, specifically, the research suggests that state-level standardized math assessments in Grades 6 and 7, by themselves have limited success in predicting student achievement in an eighth grade Algebra 1 course (Huang, Snipes, & Finkelstein, 2014). These researchers found that layering on an algebra-readiness assessment provided greater predictability. Huang et al. (2014) expressly recommended the Mathematics Diagnostic Testing Project (MTDP) assessment be administered in Grade 7, to inform placement decisions. The found coupling outcomes on the Grade 6 California Standards Test (CST), with performance on the Grade 7 MDTP, indicated greater probability of eighth grade students being successful in Algebra 1. Specifically, they noted eighth grade students that had a scale score of 367 or higher on the Grade 6 CST and showed mastery of 5 out of 7 topics on the Grade 7 MDTP, had a greater than 80% chance of achieving proficiency on the Algebra 1 CST.

Supportive working conditions. Implementing a coherent instructional framework is advanced when teachers are supported in learning and applying specific strategies that best support the intended curriculum (Cobb & Jackson, 2011; Newmann et al., 2001). Newmann et al. suggested that as administrators and teachers pursue a common framework of instruction, the professional development provided to staff must be focused on the materials and strategies associated with the framework. Providing well-aligned professional development, in a sustainable on-going fashion, dedicated to the content and materials teachers are using in their classrooms, with attention paid to explicit strategies of instruction to teach the intended curriculum, contributes to a supportive working condition and to increases in student achievement (Newmann et al., 2001; Polly, Wang, McGee, Lambert, Martin, & Pugalee, 2014; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Newmann et al. and Cobb & Jackson agree that an expectation exists among administrators and teachers at schools exhibiting coherence that the common instructional framework is being implemented, and a level of accountability exists including the processes of teacher observation and evaluation (Hill & Grossman, 2103). In developing the coherence framework model for the Public Education Leadership Project (PELP) at Harvard University, Childress et al. (2007) maintained that districts must articulate strategies for improvements in what they call the "instructional core" (p. 2). Specifically, the instructional core represents teacher content knowledge and instruction, student engagement in the learning process, and appropriately challenging curriculum.

Site principals play an essential role in developing a supportive environment in which teachers are encouraged to implement and refine a common instructional framework (Cobb & Jackson, 2012; Elmore, 2000; Katterfield, 2013; Newmann et al., 2001; Price, 2011). This environment is enhanced when principals capably communicate a clear vison of effective instruction in mathematics to their teaching staffs. While professional development for teachers is essential for implementing a coherent framework, so too is developing within principals knowledge of sound mathematics instruction (Cobb & Jackson, 2012; Katterfield, 2013). "By observing instruction and providing informed feedback, school leaders can both communicate and hold teachers accountable for improving classroom instruction" (Cobb & Jackson, 2011, p.21). As Newmann et al. explained it is the collective work of both teachers and principals to support the implementation of the instructional framework. When principals develop their understanding of quality instruction, they can provide effective feedback to teachers implementing the strategies.

One other aspect of the supportive environment includes instructional coaching (Cobb & Jackson, 2012; Hill & Grossman, 2013; Knight, 2007, 2009). Instructional coaches are on-site professional developers who assist teachers by modeling effective instructional strategies in authentic environments (i.e., in classrooms with students), observe teachers as they implement the strategies, provide timely feedback, and facilitate professional conversations regarding the common instructional framework (Knight, 2007). Teachers implementing a coherent framework of mathematics instruction, have the daunting task of executing pedagogy, employing coordinated curriculum, and administering and analyzing assessments. School-based instructional coaches assist the teaching staff in attending to these areas of responsibility, as well as, developing reflective practices that press teachers into routines of analyzing the effectiveness of their own instruction (Cobb & Jackson, 2011).

Finally, a supportive working condition for instituting a coherent instructional framework is the inclusion of school-based professional learning communities (PLCs) (Cobb & Jackson, 2011; Hord & Sommers, 2008). PLCs exist to bring together teachers at a site, to collaborate on issues of instruction, curriculum implementation, student assessment, and providing interventions for struggling students (Coggshall et al., 2012; DuFour, DuFour, Eaker, & Many, 2006). PLCs are useful in addressing problems of practice that arise when teachers strive to implement strategies learned in professional development (Horn & Little, 2010). A system that coordinates professional development, instructional leadership, coaching, and professional learning community to advance the implementation of the coherent instructional framework furthers the supportive working conditions that Newmann et al., (2001) and Cobb & Jackson (2011) endorsed.

Allocation of resources. The final aspect of the coherent instructional framework espoused by Newmann et al. (2001) is the allocation of resources dedicated to advancing the instructional framework. Specifically, they championed commitment at the site level to use resources (e.g., funding, materials, time, and staff assignments) to establish the critical factors of coherence, which include coordinated curriculum and student assessments that remain stable over time, professional development that supports effective implementation of instructional agreements, and student support programs (Childers et al., 2007; Newmann et al., 2001). Focusing the allocation of finite resources on the factors associated with a coherent instructional framework, protects the organization from investing in training, materials and curriculum which may me disjointed (Newmann, et al., 2001) or only loosely connected to the instructional program's goals.

Professional Literature Informing Goal 2

Increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses. The review of professional literature in Section 1 revealed decision-making as a central tenet of administrative behavior (Barnard, 1938). The findings of this case study revealed that participants varied in their decision-making relative to the issue of eighth grade student placement in Algebra 1. In most instances, Shelton County site administrators placed students into eighth grade mathematics courses according to their own professional thinking. Though participants did not reference specific models of administrative decision-making, the findings revealed that elements of Simon's (1947) satisficing model, and Lindblom's (1993) incremental, or muddling-through, model existed.

However, decision-making as a process, commands an understanding of its cyclical nature (Hoy & Miskel, 2001). The cyclical nature necessitates that goals are developed, and outcomes are evaluated in relation to those goals, examining the extent to which the solution achieved the objective (Lunenberg & Ornenstein, 2004). The analysis of the data in this case study showed this aspect of decision-making was not sufficiently attended to; neither goals, nor criteria for success, existed in the districts. Rather, administrators entered into decisions by attending to the influencing and constraining factors that confronted them (i.e., district expectations for student placement, social equity issues, teacher quality, parental influence, the state accountability system, student aptitude, and teacher recommendations). A sophisticated decision-making process establishes criterion for success (Marzano & Waters, 2009), such as having a target for a percentage of students attaining proficiency on a standardized exam.

Additionally, administrators are served in their decision-making processes when clear direction is provided in the form of district policy, or practice guidelines (Hoy & Miskel, 2001; Marzano & Waters, 2009). In Shelton County, only District 1 (D1) articulated a clear direction for placement. The district wanted all eighth grade students in Algebra 1 courses or higher, with exceptions for those in special education. This is an example of an algebra-for-all policy (Williams et al., 2011a). While having a policy is additive in the decision-making process, algebra-for-all is not universally accepted as appropriate (Liang, Heckman, & Abedi, 2012; Loveless, 2008). Nevertheless, having a policy gave the site administrators in D1 a direction in which to proceed. California state policymakers desired increasing numbers of students to master algebra content by eighth grade, however, the implemented policy led to significant percentages of students underperforming (Domina, Penner, Penner & Conley, 2013; Domina, McEachin et al., 2014; Kurleander, Reardon, & Jackson, 2008; Liang, et al., 2012). More nuanced recommendations exist in the literature, which are based on reviews of the California experience and allow for decisions other than the one-size-fits-all approach (Liang et al., 2012).

Finally, decision-making is supported when organizational values and beliefs are clearly articulated (Hord & Sommers, 2008; Hoy & Miskel, 2001). Participants in D1 discussed the district's social-equity values in its strategic plan as undergirded their policy of algebra-for-all. They believed access to Algebra 1 was an equity issue. Other participants referenced "the best interest of students" as influencing their decision, or they felt conflicted when their personal internal value of "best interest" was violated when placing lower-aptitude students in Algebra 1. These participants did not reference a clear organizational stance based on a value, such as social-equity, best-interest, or otherwise. Hoy & Miskel (2001) posited that organizational values, once developed, strengthen decision-making.

The following provides greater detail from the professional literature in (a) the importance of organizational values and beliefs, (b) the importance of policy in developing a rational decision-making framework for the placement of eighth grade students into mathematics courses, and (c) the importance of establishing criteria for satisfactory solution (Goal 3). These important components informed the position paper developed for this project study.

The importance of having clearly articulated values and organizational beliefs on this issue. Placing eighth grade students into mathematics courses proved to be a complex issue facing the participants. Their decisions had consequences for their students, their schools, and their districts. Their students were affected by either the lack of access to Algebra 1, which in turn limits access to future mathematics courses (Long et al., 2012), or, by being placed in Algebra 1 without possessing the requisite skills to be successful and risk failure (Clotfelter, Ladd, & Vigdor, 2012). Their schools were affected either by conforming to the state's algebra-for-all policy and accepting that many students would underperform, which negatively impacted the school's Academic Performance Index (API), or not conform to the state policy and accept the punitive impact on the school's API score. Their districts were affected in that the school's individual API was included in the district's overall API score.

When faced with complex issues in education, Simon (1947) believed that administrators will and should strive to find satisfactory solutions in an administrative or "satisficing" model of decision-making. The quandary for the decision makers in the project study, was finding satisfactory solutions to the issue that had ramifications beyond the student and the classroom, but to the school and district as well. Hoy & Miskel (2001) noted that when faced with decisions that pit one concern against another, finding a satisficing solution is difficult. To address the difficulty in the satisficing approach, organizational core values are assumed to be present and play an integral role in the deciding process (Hoy & Miskel, 2001; Mueller, 2013; Simon, 1947; Watkins & McCaw, 2007). An organization's value is a core tenet of the organization, a guiding principle, which is deemed highly important to stakeholders and provides direction for a decision (Mueller, 2013; Watkins & McCaw, 2007). As noted in the analysis of findings, the participants did not reference a particular organizational value when making their placement decision, other than what was expressed in District 1 (D1); for D1 it was a social-equity value that drove their algebra-for-all placement practice.

In education, it is not uncommon for organizational values, and belief statements, to be developed, or refashioned, when districts undergo strategic planning (Lunenburg & Ornstein, 2004). Strategic planning is a process in which district leadership and other stakeholders (i.e., faculty, staff, parents, community members and students) meet to fashion the school district's mission and vision statements, and identify core values and beliefs. The process often defines the district objectives for teaching and learning for the upcoming school year and a few years beyond (Marzano & Waters, 2009). Mueller (2013) offered that circumstances, or issues, arise that may challenge core values, requiring a clear interpretation of how the value applies to those circumstances or issues. The issue in this case study was the placement of eighth grade students into mathematics courses. Should the decision have been based on the state accountability system, or, on student mathematical aptitude, or, on the other influencing factors revealed in the analysis? This question represents the satisficing dilemma that the participants faced, for which Simon (1947) and others (Frick, 2011; Hoy & Miskel, 2001) suggested requires an organizational value to reference in finding a solution.

In the position paper developed for this project study, I provided suggestions for organizational value and belief statements that speak to the importance of mathematics education, the belief that all students can learn mathematics at high levels if taught well and provided support, and the value of a developing a coherent instructional framework.

The district leadership values mathematics education and understands the important role it plays in students' lives and in the nation's economic well-being.

The district leadership believes all students can learn mathematics at high levels, if taught well, and provided instructional support.

The district leadership believes that as a student's mathematics ability increases in early grades, the opportunity for the student to access higher levels of mathematics increases in upper grades.

The district leadership understands that student readiness for grade-level mathematics content is contingent on the learning experiences in previous grades, and therefore pursues a coherent instructional program in mathematics.

The importance of having clear policy and guidelines for practice. Sound decision-making is supported when clear policy has been established on an issue (Hoy & Miskel, 2001). When policy is present and communicated, administrators have a keen awareness of district expectations (Marzano & Waters, 2009). In this case study, the district policy for eighth grade mathematics placement in several districts was absent or not clearly articulated to administrators. The only exception was in District 1, where algebra-for-all was nearly absolute and communicated as such. California promoted the eighth grade algebra policy in its framework (CDE, 1997), but left adherence to the policy a function of local decision-making.

The motivation behind policy is to influence the practice or work of individuals in an organization (Coburn & Stein, 2006; Centre for European Studies, n.d.). A policy communicates an issue, presents why the issue is important, describes expectations or desired outcomes associated with the issue, and provides processes or practices (i.e., actions) to support the policy's implementation (Cobb & Jackson, 2011; Marzano & Waters, 2009). When policy is absent, people operate according to their own devices (Williams et al., 2011a), without knowing well the expectations they are expected to meet. For this reason, Hoy & Miskel (2001) recommend that decision makers are best-served to formulate a policy to contend with an important issue.

Research suggests that educational guidelines intended to bring revisions to student access to various mathematics courses has three elements: the what, the why, and the how of policy (Cobb & Jackson, 2012). The "what" identifies the intended goals for the district, and determines which students are targeted. The "why" provides the rationale for the policy. The "how" comprises the recommended processes for achieving the goals. The following paragraphs provide research-based policy recommendations regarding student placement in mathematics courses, and will address the "what", "why", and "how" elements of policy.

What is the issue, and what are the district's expectations? The archival data in this case study publicized a variance in the percent of eighth grade students accessing the first-year algebra course in this region of California. The analysis revealed that the observed variance in placement was largely based on the school district in which the students happened to live. No evidence suggested that districts collaborated on placement practices, and middle school principals in several districts acted autonomously when placing students into mathematics courses. Regardless of the degree to which eighth grade students were placed in Algebra 1 in this region of California, whether high percentages or low percentages, many students failed to reach proficiency on the California Standards Test (CST) end-of course exam.

California's eighth grade algebra-for-all policy increased the percent of students completing Algebra 1 in eighth grade. Statewide cohort data show increases in eighth grade Algebra 1 from 26% in 2003-2006, to 51% in 2008-2011 (Liang & Heckman, 2013). However, the policy did not produce commensurate increases in the percentages 9th, 10th and 11th-grade students completing Geometry, Algebra II, and Pre-calculus mathematics courses (Liang & Heckman, 2013; Terry & Rosin, 2011). Only modest enrollment increases, between 2% and 6%, in these courses were realized. This contradicts the assertion of researchers that Algebra 1 in eighth grade promotes greater acquisition of higher mathematics in courses in high school (Adelman, 1999; Long et al., 2012; Riley, 1997). The data showed more students repeating the Algebra 1 course in high school than matriculated into higher levels of mathematics (Fong et al., 2014; Liang & Heckman, 2013). For some, this constituted a failed state policy, or at least a failure on achieving the academic gains the policy intended to produce (Domina et al., 2013; Loveless, 2008, 2009; Rosin, Barondess, & Leichty, 2009; Schmidt, 2012; Stein, Kaufman, Sherman, & Hillen, 2011), which the California State Board of Education reversed when it no longer punished middle schools for having students complete courses lower than Algebra 1 (State Board of Education, 2013). The policy of sanctions and punishments did not produce increases in higher course attainment (Laing et al., 2012; Laing & Heckman, 2013; Terry & Rosin, 2011). Administrators are well served to understand that a major outcome of mandating Algebra 1 in eighth grade, was repeating Algebra 1 in ninth grade (Domina et al., 2104; Terry & Rosin, 2009).

Articulating a district position on eighth grade mathematics placement assists administrators in developing rational processes for placing students (Cobb & Jackson, 2011; Waterman, 2010). A position on placement, other than a one-size-fits-all position, is endorsed by multiple researchers (Faulkner, Crossland, & Stiff, 2013; Loveless, 2008; Nomi, 2012; Waterman, 2010). A stated policy that promotes educational options, other than a single algebra course, and places students according to an analysis of their readiness for content, is preferable to a mandated algebra-for-all position (Loveless, 2009). Paradoxically, a policy at the local level that considers student readiness, and provides options for placement, conflicts with policy advisors who seek equity in opportunity (Mehan, 2015).

The equity issue is concerned that low-performing students may be overrepresented in ethnic and low socio-economic populations and thus are tracked into a mathematics' pathway that limits opportunity for higher-level courses (Loveless, 2011; Mehan, 2015). However, placing underprepared students into heterogeneous algebra courses has had the effect of increasing failure rates, and lowering the achievement of high performing students (Loveless, 2009; Nomi, 2012; Waterman, 2010). The greater the disparity in mathematical ability within a classroom, the greater the challenge becomes for teachers to meet the needs of all their students (Nomi, 2012). Evidence suggests that eighth grade students who are successful in Algebra 1 have greater success in college (Rosin et al., 2011). Yet, in California, college admission requirements for the state university systems identify Algebra 1 as the first course, of a three-course requirement that includes Geometry, and Algebra II, or their equivalents (University of California, 2015). Thus, delaying the algebra course to the ninth grade does not disqualify a student from achieving the admissions requirement. Moreover, the admissions requirement provides district decision makers flexibility in making eighth grade placement decisions, allowing for a course below first-year algebra, knowing that students can take the course in ninth grade.

Researchers suggest that in coherent systems of mathematics education, students are placed in appropriately rigorous courses according to their readiness, with intervention supports as needed for struggling students (Bitter & O'Day, 2010; Larson, 2011; Stein, Kaufman, Sherman, & Hillen, 2011). Measuring the success of this expectation occurs on two fronts:

- Measuring the adherence to processes for determining student readiness for a course (e.g. analyzing assessment data, analyzing student work, and reviewing grades in previous courses); and,
- Measuring student learning in the courses in which they are placed (e.g. analyzing assessment data associated with the course content, and analyzing student work) (Huang, Snipes & Finkelstein, 2014).

Establishing targets for the measurements provides the success criterion necessary to evaluate the policy's effectiveness (Hoy & Miskel, 2001). For instance, a process expectation for placement may establish a target for the percent of students matriculating into eighth grade being placed in mathematics classes according to a student-readiness matrix (i.e., at least 90 percent of incoming eighth grade students have been placed in mathematics courses according to the student-readiness matrix). The matrix includes readiness indicators established by the district (e.g., topic scores on the Grade 7 Mathematics Diagnostics Testing Program assessment of algebra readiness, cut scores on the state standardized tests, analysis of student work of essential sub-skills, a review of student grades in previous mathematics courses, as well as teacher recommendations).

Similarly, after students are placed, evaluating the appropriateness of the placement decision requires establishing success criteria on student achievement. These targets are locally established as well (e.g., scores on local content-aligned assessments, analysis of student work, and analysis of summative state tests). For instance, policymakers may establish a score of 70% or higher on a local assessment as evidence that a student is appropriately placed, and establish a target of having at least 80% of students appropriately placed to deem the policy successful.

Why is the issue important? The ramifications of middle-school student placement in mathematics classes are significant. Eighth grade students placed in algebra classes without appropriate considerations of readiness has led to failure and repeating courses in high school (Liang & Heckman, 2013). Students who repeat Algebra 1 in high school also tend to perform poorly (Fong et al., 2014). Research suggests that a sounder approach is to provide instruction to eighth grade students, which is appropriately rigorous and addresses deficits in essential algebraic concepts for the students that need it (Bitter & O’Day, 2010; Larson, 2011). Learning algebraic concepts is essential to accessing higher mathematics, but researchers disagree on whether the access is contingent upon, if the algebra is learned in eighth grade or in ninth grade (Finkelstein, Fong, Tiffany-Morales, Shields, & Huang, 2012; Fong et al., 2014; Loveless, 2009; Terry & Rosin, 2011). Establishing a local policy that puts to rest the algebra-in-eighth grade mandate, and considers the needs and readiness of the student, will guide a district in developing a coordinated and articulated pathway of mathematics courses – a pathway that allows for options other than Algebra 1 in eighth grade and still lead students to college admissibility (Bitter & O'Day, 2010; Clotfelter, et al., 2012; Finkelstein et al., 2012; Liang & Heckman, 2013).

This issue continues to take on political implications. In February 2015, California State Senator Mitchell, and Assembly Member Jones-Sawyers, introduced Senate Bill 359 (2015), the California Mathematics Placement Act of 2015. If enacted, the bill mandates placement policy for students leaving eighth grade and entering ninth. The legislators considered the high rate of students repeating eighth grade coursework in ninth grade as an unfair practice, which the bill describes as disadvantaging students in competing for college admission. The bill requires a transparent statewide placement policy, which mandates the use of multiple measures for the placement of students, including "diagnostic placement tests, statewide assessments, pupil grades, and pupil work" (p. 2). While this bill is intended to address ninth-grade placement, the ramifications on eighth grade decisions are apparent. The tendency to have students repeat in high school, what was taught in eighth grade, is now confronted with a proposed legislative remedy.

What is the recommended policy, and what are the recommendations on how to implement it? Goal 2 of this project study is to increase the understanding of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses. Decision-making is improved when a policy on the issue is developed and articulated (Hoy & Miskel, 2001). As presented earlier, organizational values, when clearly articulated, provide direction and undergird decisions made in a complex environment (Mueller, 2013). Cobb & Jackson (2012) noted that policies should have embedded in them suggestions for practice. Based on the above review and synthesis of the professional literature, the recommended policy statement below is provided, and (a) includes declarations of values and beliefs, (b) addresses placement decisions, and, (c) proposes commitments for attaining instructional program coherence in mathematics (Bitter & O'Day, 2010; Cobb & Jackson, 2011, 2012; Hoy & Miskel, 2001; Larson, 2011; Marzano & Waters, 2009; Mueller, 2013; Newmann et al., 2001).

Recommended Policy Statement with Associated Commitments to Actions

> The district leadership values mathematics education and understands the important role it plays in students' lives and in the nation's economic well-being.
>
> The district leadership believes that as a student's mathematics ability increases in early grades, the opportunity for the student to access higher levels of mathematics increases in upper grades.
>
> The district leadership believes all students can learn mathematics at high levels, if taught well, and provided instructional support.

The district leadership is committed to providing students appropriately rigorous mathematics education and places students, eighth grade or otherwise, into mathematics courses accordingly. The placement decision considers data from student diagnostic assessments and standards-based exams, and a review of student work. There are options for placement; this is not a one-size-fits-all-placement policy.

Adherence to the policy is not altered solely because of the potential impact of a state or federal accountability system. Rather, the policy is reviewed based on student needs, and in a cyclical fashion, changes are made based on the analysis of progress, or lack, toward district adopted learning goals, and mathematics course completion.

The district leadership understands that student readiness for grade-level mathematics content is contingent on the learning experiences in previous grades, and therefore pursues a coherent instructional program in mathematics.

The district leadership understands that a coherent instructional program in mathematics requires the following commitments:

Opportunity to learn (OTL). A commitment to providing the requisites for OTL in mathematics every day in all grades: Time, content, and quality instruction.

Time. A commitment to ensuring and protecting instructional time for mathematics education.

Content. A commitment to researching and obtaining curricular materials aligned according to a logical progression of increasingly complex mathematical content, which leads to acquisition of the California Standards for Mathematics.

Instruction. A commitment to a vision of high-quality instruction. The vision identifies explicit practices in instruction that lead students to the mathematics learning goals.

Assessments. A commitment to a coordinated assessment system that measures students' progress toward the learning goals, informs instruction by signaling student misunderstanding, and diagnoses student readiness for coursework. The assessments also identify students for course remediation, intervention, and acceleration.

Interventions. A commitment to providing supports for students struggling with content. The supports include interventions, such as, additional time in-class and before and after school to attend to observed in-class misunderstandings of mathematic content; a standalone course to remediate observed deficiencies in understanding; a support intervention course taken concurrently with the core grade-level course that addresses misconceptions, and front-loads, (i.e., previews) content the student will encounter in the core course.

Supportive working conditions and strong district and school instructional leadership: A commitment to developing a supportive work environment that couples accountability with professional learning opportunities; with routines of professional interactions that communicates expectations for ambitious instruction.

Professional development (PD). A commitment to PD for teachers and administrators organized around understanding critical math content, delivering specific effective pedagogy, implementing instructional materials, and analyzing assessment data to inform instruction.

Instructional coaching. A commitment to instructional coaching that provides: on-site modeling of instruction by those with instructional expertise; observation and feedback on instructional practice; and, facilitated reflective opportunities for teachers, to thoughtfully critique their own mathematics instruction.

Professional learning communities (PLC). A commitment to have PLC at each school site. The PLC includes teachers, administrators and instructional coaches, and provides ongoing professional conversation regarding the status and implementation of the coherent instructional program of mathematics. In PLC teachers discuss, rehearse, and adjust instructional practices. In PLC teachers review materials, plan instruction, and seek solutions to problems associated with practice. In PLC administrators and instructional coaches participate as learners and to provide support.

Strong district and site instructional leadership: A commitment from the district to develop clear, shared goals for student learning, and, establishes explicit expectations for ambitious instruction. A commitment to equip site administrators with greater understanding of effective instructional practices in mathematics, and with processes for facilitating productive professional relationships leading to improved instruction. A commitment from site administrators to provide feedback on instruction that communicates district expectations and focuses on the PD teachers have received. It is the collective work of both teachers and principals to support the implementation of the instructional framework

Allocation of resources: A commitment to allocating district resources, money, staff, and time, to implement this policy.

Professional Literature Informing Goal 3

Measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solution.

The importance of having a criterion for a satisfactory solution. As presented in Section 1, and discussed in Section 2, Hoy & Miskel (2001) presented a general pattern for decision-making in education that supports the administration of complex tasks, they identified this process as an "action cycle" (p. 321),

- Recognize and define the problem or issue.
- Analyze the difficulties in the situation.
- **Establish criteria for a successful solution** (emphasis added).
- Develop a strategy for action.
- Initiate a plan for action.

- Evaluate the outcomes.

Though this pattern appears sequential, Hoy & Miskel, maintained that it is also cyclical. The findings of this case study revealed that the participants understood the issue, and the inherent difficulties, and they took action. However, the analysis revealed they did not follow a cyclical process of evaluating their outcomes in relation to a goal. The questionnaire, interview, and archival data exposed that students were placed into mathematics courses according to strategies that varied district to district. What was not evident was the development of criteria for determining whether the placement solutions were successful. Districts experiencing success in student achievement show evidence of stakeholder collaboration on explicit goals for instructional practice and student learning (Little, 2012; Marzano & Walters, 2009).

Determining what constitutes a satisfactory or acceptable solution, is a determination made by educational leaders who are tasked with dealing with complex issues (Lunenburg & Orenstein, 2004). Accordingly, decision makers analyze the issue and its difficulties, develop the success criteria, and then pursue a course of action. Alternative approaches are considered, (Lunenburg & Orenstein, 2004), and decision makers form judgements on which approach is most apt to produce the objectives – the success criteria (Hoy & Miskel, 2001; Lunenburg & Orenstein, 2004). The participants of this study described the issue as complex, with multiple factors constraining or influencing their professional thinking. The analysis of data revealed that the issue was not restricted to middle schools; rather, middle school educators were left to deal with their district’s lack of attention to coherence in its mathematics program in earlier grades.

Moving forward then, to address the eighth grade mathematics placement problem, the complexity of developing a coherent mathematics instructional framework districtwide must be a component of the solution (Cobb & Jackson, 2011). Hoy & Miskel (2001) suggested that decision makers consider the problem and the issues and develop success criterion. With that in mind, and fortified with the above review of professional literature on coherence, I offer in the position paper the following elements of a solution, each requiring criteria for success:

(A) Develop success criteria that measure the improvement of the Opportunity to Learn in all grades.

(1) Establishing and protecting instructional time dedicated to mathematics' instruction, and support interventions.

(2) Implementing curriculum aligned with researched-based learning progressions leading to deep understanding of algebraic concepts.

(3) Improving quality of instruction: implementing common effective instructional strategies school wide, according to grade level and content.

(4) Establish goals for implementation of strategies, including timelines and targets for how often the strategy is observed in practice.

(B) Develop success criteria that measure the implementation of course options and instructional support for students.

(1) Specifically in middle schools: Develop and implement courses that support appropriate placement options and instructional support for students.

(a) A grade-level course aligned with the content standards and learning progressions documents;

(b) An in-school intervention course for the struggling students, taken concurrently with the core course, which shores up essential skills, re-teaches content from the core course, and front-loads important skills necessary for future content in the core course; and

(c) A remedial or below-grade level, course for severely low-performing students focused on essential skills and concepts necessary for student access to algebra content.

(2) Develop additional instructional supports for addressing real-time misunderstanding of content, across all grade levels (i.e., whole class and targeted re-teaching, additional math instruction time before and after school, one-on-one tutoring).

(C) Develop success criteria that measure the implementation of a coordinated system of assessments.

(1) That gauge student progress towards mastery of the learning progressions, and,

(2) Inform instructional support and course placement decisions.

(D) Develop success criteria that measure the improvement of supportive working conditions.

(1) Providing professional development for teachers and administrators associated with content and instructional strategies, including job-embedded re-training as necessary.

(2) Implement structures for observations and feedback on implementation of instructional strategies, which involves peers in the observation and feedback processes.

(3) Institute collaborative PLCs for teachers to discuss mathematics instruction, review course content, and analyze student assessments and student work.

(4) Institute an on-site instructional coaching program, in which the coach

(a) Models instruction,

(b) Observes instructional practice and provides feedback to teachers,

(c) Implements cognitive coaching strategies to support teachers in becoming reflective practitioners

(d) Facilitates collaborative professional discussions on issues of practice.

(E) Develop success criteria that measure the improvement of the allocation of resources.

(1) Demonstrate that resources, including time, money and staff, are allocated to implement the coherent instructional program.

(2) Make accommodations in the master schedule, and in staffing, to support the course options and interventions.

(F) Establish success criteria that measure student achievement in mathematics.

(1) Identify targets for student achievement of the essential skills and concepts associated with algebra readiness.

(2) Specifically at the middle school level, establish targets for student achievement in the courses to which they are assigned.

(G) Establish success criteria that measures student access and completion of mathematics courses in high school.

(1) Identify targets for reducing the rates of ninth-grade students repeating eighth grade coursework.

(2) Identify targets for higher rates of high-school students accessing and successfully completing mathematics courses deemed admissible by the state university systems.

In behavioral decision-making in which administrators are attempting to satisfy as many of the organizational issues as they possibly can (Simon, 1947, 1993), and are addressing issues in a focused and incremental fashion (Lindblom, 1993), it is necessary they assume a cyclical stance (Hoy & Miskel, 2001). By first developing and understanding the goal, the satisfactory achievement objectives, they can then develop the action steps necessary to take their organization in a rational direction (Marzano & Waters, 2009). As the measurements are analyzed, the decision makers determine what adjustments or alternative actions are necessary to achieve objectives that have not been met. Later in this section an evaluation plan is offered that supports measuring these criteria for satisfactory solution.

This completes the review of the professional literature related to the project genre and the project goals, and the policy and practice recommendations.

Roles, Responsibilities, and Action Timelines

To achieve success, the commitments to actions noted in the policy statement requires concerted and sustained effort by school district governance teams, district and site level administrators, teachers, parents and students. This section assigns specific responsibilities to identified stakeholders, and provides a suggested timeline for implementation of the actions, and evaluation.

Roles and responsibilities. Reviewing the position paper is the responsibility of each member of the district leadership team. Implementing the recommendations of the position paper is the responsibility of various administrators, policy makers and educators in the school system. In order to implement the recommended actions, individuals are charged with various responsibilities. The following identifies the responsible actors and their deliverables:

Governing board. The Governing Board is responsible for reviewing its own policy language and revising it to accommodate the proposed guidelines for mathematics instruction. The local board receives training on the purpose and importance of program coherence. Board members participate in drafting the final guiding principles language, which includes value and belief statements that can serve to guide administrators in making decisions. The board ensures that financial resources necessary to implement the program are embedded in the district's adopted budget. The board receives periodic updates on the progress of the program and discusses rationale for revisions before approving changes. The governing board is responsible for adopting an explicit policy statement regarding mathematics instruction and the placement of students into mathematics courses.

District superintendent. The superintendent is responsible for commissioning, or facilitating, a strategic planning process that includes developing guiding principles for the district. These principles may be in the form of vison, mission and value statements. A concern for this project is a policy statement that directly clarifies the school district's commitment to mathematics education, and for placing students into mathematics courses. The superintendent is responsible for the casting the vision for a coherent instructional framework, and oversees the messaging effort in communicating the purpose and goals of coherence to the district and community wide. The superintendent coordinates the development of the program goals, (i.e., the criteria for success). These include goals for processes such as PD, assessments, instructional material adoption, instructional monitoring and feedback, and course options; and goals for student achievement such as, percent of students mastering grade-level standards, percent of students in remedial and intervention supports attaining mastery of essential algebra-readiness content. The superintendent oversees the evaluation process and reporting of progress to the governing board.

District level administrators. District level administrators responsible for curriculum adoption and instruction, have different titles depending on the district size and organizational structure. These include titles such as associate superintendent, assistant superintendent, and director of curriculum and instruction. These administrators are responsible for defining and communicating the attributes of a coherent instructional framework in mathematics. They coordinate the training for teachers and principals in effective instruction in mathematics that is researched-based practices according to grade-level content; coordinate the review and acquisition of instructional material aligned with the learning progressions; coordinate the training of teachers in the learning progressions; coordinate the district mathematics assessment regimen including assessments for student-readiness for algebra content; coordinate the analysis and reporting of assessment data; support site principals in developing PLC for mathematics instruction; support site principals in implementing on-site instructional coaching processes; and support site principals in developing effective practices for monitoring and feedback of instruction, including peer-to-peer observation and feedback. These individuals also collaborate with principals on the course options and placement decisions for students in accordance with the program goals and guiding principles. The district-level administrators develop processes for gathering information necessary for project evaluation, and assist in the project evaluation. The district-level administrators draft project evaluation reports.

Chief business official (CBO). The executive in charge of budget development and business operations ensures that protocols for purchasing instructional materials include evaluating the materials according to the learning progressions. Likewise, the CBO ensures that the funds committed to staffing and training are aligned with the program goals. The CBO collaborates with the district level and site-level administrators to determine how to optimize finite fiscal resources to fund the program. The CBO converses with the superintendent and governing board to determine funding priorities, and conveys suggestions for accommodating the program requirements.

Site administrators. Principals and vice principals are responsible for leading the reform efforts at the school site. They are responsible for collaborating with district-level administrators to coordinate on-site PD for (a) learning progressions, (b) the importance of coherent instructional programs, (c) effective instruction, (d) peer observation and feedback, and (e) PLC processes. The site administrators receive the same training as teachers, and become increasingly familiar with explicit instructional strategies. They participate in PLC meetings, and facilitate data discussions of student achievement in mathematics. They institute instructional coaching as a professional aspect of their schools. They establish instructional time in mathematics and guard it from interruption. Middle school principals are particularly responsible for placement decisions. They develop course options for middle school students which include opportunity for remediation and intervention. They evaluate the processes for placing students, and the progress on learning goals and communicate their findings to the district leadership. The site administrators assist district-level administrators in gathering information for project evaluation, and assist in the evaluation.

Teachers. The responsibilities of teachers are to gain understanding of the importance of a coherent instructional program and their role in implementing the instructional framework (i.e., honoring the dedicated time for math instruction, delivering content with curriculum and materials that are appropriately aligned with the learning progressions, and utilizing common research-based instructional strategies appropriate for the grade-level or course). Teachers participate in PD for learning progressions, content knowledge, instructional strategies, and PLC processes. The PLC processes include collaboration on lesson plans, analysis and discussion of student assessment data and student work, professional dialogue regarding the delivery of instruction, peer-observation-and-feedback of instructional practice, and involvement in the instructional coaching model. Teachers serve on curriculum review and selection teams (Law, 2011) and contribute to the evaluation of the program goals. Teachers assist in the gathering of data for project evaluation, and assist in the evaluation.

Stakeholders: parents, students, community members. The success of the project involves the various stakeholders. Parents, community members, and students, join with the superintendent, teachers, administrators and staff to serve on the strategic planning team. This team collaborates on the development of the guiding principles and learning goals for the district and forwards the recommendations to the governing board. The stakeholder members are solicited from various populations including parent groups (i.e., Boosters clubs and Parent Teachers Association) and from advisory committees (i.e., School Site Councils, Superintendent Advisory Committee, English Learners Advisory Committee) and randomly at-large to ensure a diverse representation. Likewise, students are chosen from school clubs and leadership bodies, as well as at-large. For strategic planning purposes, students from grades six to 12 are recommended. Students have additional responsibility to engage with the instruction, give their best effort, and self-advocate by seeking assistance from teachers for misunderstanding of material.

Implementation and timelines. I have developed a project that proposes systemic reforms to address the issue of appropriate middle school mathematics placement and the decisions that face middle school and district level administrators. This project is multi-faceted, involving numerous participants, and requires a complex coordination of resources, planning and evaluation. Following the action-cycle decision-making (Hoy & Miskel, 2001), I advise in the position paper the following four-year implementation plan:

Year 1. "Recognize and define the problems or issues, analyze the difficulties in the existing situation, establish criteria for a satisfactory solution" and begin to "develop a strategy for action" (Hoy & Miskel, 2001, p. 319).

- Analyze student mathematics data, identify problem areas needing support.
- Evaluate opportunity to learn concerns (i.e., dedicated time for instruction, content, and quality of instruction).
    - Evaluate the use of time dedicated for mathematics instruction.
    - Evaluate current instructional materials according to their alignment with learning progressions.
    - Evaluate the observed instructional practices.
- Specifically for middle schools, document current course offerings in mathematics and processes for placing middle-school students.
- Evaluate current assessment regimen according to its alignment with the learning progressions, and its ability to measure student-readiness for algebra content.

- Investigate researched-based instructional strategies that support the learning of grade-level and course content standards.
- Assemble strategic planning team to review and recommend revisions to the current strategic plan, or draft a new plan. Develop guiding principles that inform district decisions. I have provided examples of guiding principle, and, value and belief statements.
- Develop a policy statement regarding the mathematics education program, and the importance of program coherence. I have provided a policy statement example.
- Establish criteria for satisfactory solutions for the implementation of a coherent instructional program, student achievement, and course completion. I have provided examples of criteria for satisfactory solution.
- Plan for professional development (PD) for the summertime and the following three-years to include
    - The importance of instructional program coherence,
    - The learning progressions that lead to algebraic understanding,
    - The analysis of student assessment data,
    - The use of curriculum and instructional materials, and
    - The processes associated with professional learning community.
- Plan revising assessment regimen to align with learning progressions, and provide data regarding student-readiness for algebra content.
- Plan revisions to dedicated time for mathematics in elementary grades to be instituted in Year 2.

- Begin planning the creation of course options, including in-school interventions and remediation to be instituted in Year 3.
- Deliver PD to administrators on the phases associated with the action-cycle of decision-making.
- Communicate the plans as they develop to teachers, administrators, governing board and strategic planning team.

I use the term “plan”, for preparing for PD, revising assessments, dedicating instructional time, and proposing new course options. In the action cycle, planning is advisable (Hoy & Miskel, 2001) as leaders must deliberate on the plans, consider alternatives, predict consequences, and make their selections on the course of actions which they believe best lead to the satisfactory criteria.

Year 2. In following the action cycle phases in Year 2, the phase of developing a strategy for action continues, and “initiating” certain actions begin.

- Deliver PD on the importance of program coherence.
- Deliver PD on the learning progressions.
- Pilot new instructional material aligned to the learning progressions in certain classrooms.
- Establish protected instructional time for mathematics in elementary grades.
- Deliver PD on effective instructional practices.
- Administer local assessments aligned to the learning progressions mid-year, and at the end of the year.

- Deliver PD on data analysis.
- Monitor implementation of instructional strategies.
- Deliver PD on PLC processes.
- Initiate PLC process on data review of local assessments.
- Provide PD to principals, on effective processes of monitoring instruction and providing feedback to teachers.
- Devise an instrument to document the use of explicit instructional strategies presented in PD sessions. Data collected with the instrument will inform the professional conversations regarding practice.
- Identify teachers to serve as instructional coaches.
- Specifically for middle-school, administer end-of-year algebra-readiness exams to sixth and seventh grade students.
- Specifically for middle-school, prepare a student placement matrix, identifying placement factors that inform the decision to place students into middle-school mathematics courses.
- Receive placement recommendations from sixth and seventh grade teachers for student placement in the following year.
- Acquire instructional materials for Year 3.
- Plan for Year three PD to include
- Training for instructional coaches,
- Ongoing training on instructional strategies,
- Training on use of new instructional materials, and

- Training on peer-to-peer observation and feedback
- Build syllabi for new course options.
- Communicate to teachers, administrators, governing board and strategic planning team the progress made toward program coherence.

Year 3. In this year of the implementation, actions are continuing and appraisals of the program according to the criteria for successful solutions are commencing.

- Provide continued PD for teachers and administrators on instructional strategies.
- Provide training for the instructional coaches.
- Provide continued PLC training to include peer-to-peer observation and feedback.
- Include teachers on learning walks, in which the observation instrument is used to collect data on the implementation of explicit instructional strategies learned in PD sessions.
- Specifically for middle schools, analyze student assessment data, and teacher recommendations, and other factors that are included on the student-placement matrix, and place seventh and eighth grade students into either a grade-level course, or a grade-level course and a concurrent intervention support course, or a remediation course to develop essential skills for algebra readiness. The administrators refer to the district guiding principles and policy statement regarding mathematics education to for further guidance regarding the placement decision.

- Improve the middle-school learning climate for identified students by instituting in-school intervention support course taken concurrently with core course. Support identified students deemed not ready for the core grade-level course by instituting an algebra-readiness course to shore up conceptual misunderstandings and prepare students for algebra content.
- Structure opportunities for grade-level PLC sessions to analyze student assessment data, collaborate on instruction, and discuss the successes and challenges of implementing instructional strategies.
- Institute instructional coaching, having coaches model strategies, and observe instruction and provide individual feedback and support.
- Administer local assessments aligned to the learning progressions mid-year, and at the end of the year. Administer end-of-year algebra readiness assessment to seventh and eighth grade students.
- Evaluate the processes associated with
- Administering assessments,
- Alignment of assessments with learning progressions,
- Providing PD,
- Monitoring and supporting the implementation of instruction strategies,
- The implementation of PLC processes
- The alignment of time, content and instruction with the requirements of the learning progressions, and,
- The appropriate placement of seventh and eighth grade students.

- Communicate findings to governing board, teachers, and strategic planning team.
- Plan for Year 4 PD, assessment processes, data reviews, and reporting.

Evaluations of program elements begin in Year 3. Much of the project demands the institution of processes. Criteria for satisfactory solutions exist for process as well as for student achievement. The local assessments are reviewed for their alignment to the learning progressions, and state exam data from Year 2 are also reviewed, to measure student progress toward the achievement goals. Comparisons of outcome data between local assessments and state assessments are additive, as local educators compare student results to determine reliability of local assessments; determining whether the local assessments reliably predict student outcomes on state assessments. Surveys of teacher and administrators provide information to guide the evaluation of, PD, monitoring of instruction, and the PLC processes.

Year 4. In this year full implementation occurs, and appraisals of effectiveness are conducted to inform future revisions of the project.

- Ongoing PD of the strategies rooted in the common instructional framework.
- Ongoing development and implementation of the instructional coaching model.
- Ongoing PD of effective PLC processes, including peer-observation-and -feedback.
- Continue administration of assessment regimen, including algebra-readiness.
- Continue gathering end-of-year teacher recommendations for placement of middle-school students in mathematics courses.

- Analysis of student outcome data, according to the criteria for satisfactory solution.
- Evaluate outcomes of middle-school student achievement in mathematics courses.
- Evaluate the placement of students in high school mathematics courses. Specifically, for ninth grade evaluate the rates of students repeating eighth grade coursework. Evaluate the rates that high-school students are accessing and successfully completing mathematics courses deemed admissible by the state university systems.
- Continue processes for monitoring implementation of the common instructional framework.
- Consider revising, upgrading and replacing instructional materials which are not deemed aligned with the instructional program and the learning progressions.
- Consider revising, upgrading and replacing assessments that are not aligned with the instructional program and the learning progressions.
- Consider revising processes for monitoring implementation of the common instructional framework.
- Consider revising common instructional framework to institute new researched-based best practices of instruction.
- Consider revising the student-placement matrix used to place students in middle-school mathematics courses.

This concludes the project 4-year action-cycle decision-making process. The actions in Year 4 promote sustainability of the project as action cycle decision-making is cyclical, and asks educational leaders to continually review the quality and effectiveness the educational program, with repeated regard for program coherence.

Evaluation Plan

Evaluation in action-cycle decision-making is not solely a summative endeavor, rather evaluation occurs in the early stages, and plays a role throughout the entire project (National Science Foundation, 2002). In this project the earliest stage of evaluation is used to define the problem in the local context. Educators in unified districts determine whether students are successfully completing grade-level courses in mathematics, and if the data prove problems of student mastery exist, particularly in the middle schools (as were shown in this case study), then this project suggests that educators probe for evidence of districtwide problems in instructional program coherence in mathematics. If problems exist in coherence of the mathematics education program, this project proposes developing criteria for satisfactory solutions to the problems, and, preparing and implementing actions to address the problems in order to move the district toward the satisfactory solutions. This project provides suggested actions to achieve the goals. The actions include implementing processes which advance instructional program coherence (Goal 1), implementing policy and practice intended to support administrators in making appropriate middle-school mathematics placement decisions (Goal 2), and, approaches to measure the effectiveness of the reforms in meeting the criteria for satisfactory solutions (Goal 3). The following represents plans for evaluating the project presented in the position paper.

Type of evaluation. An evaluation is defined by Trochim as the "systematic acquisition and assessment of information to provide useful feedback about some object" (Trochim, 2006, para 4), Trochim suggested that useful feedback provides audiences with important information to inform decisions. For this project, the audiences for the evaluation are the educators and stakeholders involved in the change effort to achieve program coherence, as well as, the appropriate placement of eighth grade students into mathematics courses. Evaluation ought to serve particular purposes (University of Texas, n.d.), in this project the purposes are to (a) gain insight into the issues of mathematics program coherence and student placement, (b) inform improvement to processes and practices that lead to coherence and appropriate placement, and (c) measure the effects of the reforms on meeting the criteria for satisfactory solution.

Two types of evaluations are involved in this project review, formative, and summative (National Science Foundation, 2002; The Pell Institute, 2015; University of Arizona, 2010). Formative evaluations occur during the implementation of the project and are useful in assessing the ongoing activities, providing timely information to improve the project. The National Science Foundation (NSF, 2002) advised that formative evaluation has two components, "implementation evaluation and progress evaluation" (p. 8). Implementation evaluation focuses on the fidelity of the implementation of actions as planned in the project (The Pell Institute, 2015), determining if the actions are occurring as described in the plan (NSF, 2002), and informs decisions on possible alternatives and revisions to the actions. Progress evaluation focuses on progress towards attaining the project's stated goals, providing information to determine if the project is proceeding as planned and the degree to which objectives are being met (NSF, 2002; The Pell Institute, 2015; Trochim, 2006b). Both aspects of formative evaluation are active in this project.

Summative evaluation is concerned with the overall effect of the project, assessing the degree to which the project achieved its goals. Summative evaluation serves to inform the stakeholders as to which goals of the project were achieved and not achieved (The Pell Institute, 2015). The Pell Institute (2015) identified types of summative evaluations: goal-based, targeted outcomes, impact on the larger community, and cost-benefit. Summative evaluations for this project includes goal-based evaluation to determine if Goal 1 (i.e., increase the understanding and implementation of instructional program coherence in mathematics), and Goal 2 (i.e., increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses), were advanced. Moreover, the evaluation associated with Goal 3 (i.e., measure the effects of implementing the policy and practice recommendations in meeting established criteria for satisfactory solution) is not only concerned with the satisfactory implementation of the systemic reforms outlined in this project, but also with the measureable effects on improving student readiness for middle-school mathematics, appropriately placing middle-school students into mathematics courses, and the degree to which students are accessing higher-levels of mathematics in high school.

The summative evaluation includes targeted outcomes evaluation, assessing whether the project had demonstrable effects. The evaluation determines the effectiveness of specific district and school processes intended to promote coherence in the mathematics instructional program. The summative evaluation also reviews the revised processes for mathematics placement in the middle school. Ultimately, the summative evaluation measures student acquisition of the learning goals, accessing and successfully completing grade-level courses, and continuing to higher levels of mathematics in high school. This measurement in turn informs the overall effectiveness of the project. Summative evaluations regarding the impact on the larger educational community are not an aspect of the project's evaluation plan, however, advancing program coherence in mathematics, may serve to influence the instructional programs of other disciplines. Cost-benefit evaluation is not an aspect of this project, though project costs may influence project sustainability and revisions.

Evaluating the project implementation and progress. In this position paper, I have presented a project that relies heavily on implementing process-oriented actions. The actions are intended to revise, or develop, research-based processes promoting instructional program coherence, and processes intended to inform the decisions middle-school administrators make in placing students in mathematics courses. I have suggested utilizing the *implementation evaluation* aspect of formative evaluation to assess and monitor the project delivery and utilizing *progress evaluation* aspect of formative evaluation to monitor the degree to which the actions are achieving the desired outcomes (NSF, 2002).

Implementation evaluation. Formulating questions, to assess the project's implementation, is an aspect of implementation evaluation (NSF, 2002; The Pell Institute, 2015). In the position paper, I suggested the following examples of questions to guide the implementation evaluation process; these questions are pertinent each year of the implementation:

- Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? Are district leaders attending to the policy guidance?
- Are the processes to promote instructional program coherence initiated? Which processes are moving forward? Which processes are lagging?
- Are the processes to determine student readiness for middle-school mathematics content initiated? Which processes are moving forward? Which processes are lagging?

Progress evaluation. The project includes outcomes for the processes themselves, and outcomes for student learning leading to algebra readiness. The formative evaluation aspect for assessing progress towards these outcomes is called "progress evaluation" (NSF, 2002, p. 9). In the position paper, I suggested the following questions to guide the progress evaluation; these questions are pertinent each year of the implementation:

- Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? How are district leaders attending to the policy guidelines?
- How are the attributes of Opportunity to Learn (OTL) functioning? How is time allotted for mathematics instructions? How are the learning progressions guiding

the selection of instructional material? How are instructional strategies presented in professional development (PD) sessions being effectively delivered in classrooms?

- What instructional strategies are included in the common instructional framework? How do they support the learning progressions? How do they differ at grade-levels? How are they implemented and monitored in the classroom? What are teachers experiencing?
- How are the processes for monitoring mathematics instruction and providing feedback being implemented? Are teachers experiencing greater or lesser success with implementing the common instructional framework? Are there data showing increases in student learning in mathematics that are linked to the instructional changes?
- Are local assessments aligned with the learning progressions? How are the data from the assessment analyzed? How are teachers involved in the analysis of student assessment data?
- Are support interventions in place for struggling students? What is the scope of the interventions? How are students accessing the support?
- Which aspects of professional learning community (PLC) are functioning? How are teachers and administrators interacting around problems of practice? Are peer-observations-and-feedback processes producing changes in instructional practice?

- Which aspects of instructional coaching are functioning? How are teachers and instructional coaches interacting to improve the delivery of instruction and promote reflective practice? Are teachers and coaches reporting changes to practice as a result of coaching?
- What have been the PD activities for teachers and administrators related to the goals of the project? How has PD influenced the professional practice and professional culture of the school? How are teachers trained regarding the learning progressions and in using the adopted content?
- What are the changes to the course offerings at the middle school? How have they been implemented? Does evidence show students are mastering the course content?
- How is the process for placing middle-school students into mathematics classes changing?
- What changes are occurring in ninth-grade mathematics placement? Are fewer students repeating eighth grade coursework?
- What is occurring beyond ninth grade? Are more students accessing and successfully completing higher-level mathematics courses?

Analysis of the responses to both the implementation evaluation, and progress evaluation, questions inform the ongoing assessment of the project's effects. Without instituting these two aspects of formative assessment, the project implementers are unable to judge in a timely fashion the fidelity of implementation to the project design; neither are the implementers in a position to judge the system changes (i.e., new or revised processes), or the ongoing effects on student-learning outcomes. On the other hand, having the ability to make judgements allows for implementers to revise pieces of the plan to improve progress towards the project goals. For this reason, in the position paper, I included recommendations to conduct formative evaluations of project implementation, and, progress evaluation towards project goals.

Overall evaluation goals. The overall goal of evaluation is to determine the ability of the project to do what was intended (Trochim, 2006b). For this project, it is determining whether the recommendations presented in the position paper, and applied by implementers, achieved the stated goals of the project. Making this overall determination is a function of summative evaluation (The Pell Institute, 2015; Trochim, 2006b). In the position paper, I suggested two types of summative evaluation goal-based evaluation and target-outcomes based evaluation. I suggested both evaluations to determine whether the overall goals of the project are achieved, or, certain outcomes only. If all the intended outcomes are achieved then both overarching goals of the project are satisfied.

Project implementers are pursuing multiple facets of systems' reform intended to achieve instructional program coherence (Goal 1), which requires coordinating time, content and instruction, aligning assessments, improving professional practice, and achieving greater levels of student learning. Understanding which, if any, of these outcomes were achieved, aids the implementers in making determinations on which aspects to strengthen or revise, and what alternatives they may want to pursue. Project implementers are also pursuing assistance in making decisions when it comes time to place middle-school students into mathematics courses (Goal 2). When students enter eighth grade ready for grade-level content, the placement decision is trouble-free, and the readiness suggests that students are benefitting from the mathematics education program. However, when students are not ready, having developed choices other than the one-size-fits-all options, equips administrators to place students appropriately, while the district improvement efforts are underway.

Ultimately, having data that show the degree to which the reform efforts are realized according to the criteria for satisfactory solutions, and the degree to which students are demonstrating satisfactory success in mathematics courses in middle school and beyond provides clear summative evidence of the effectiveness of the project (Goal 3). Accordingly, in the positon paper, I suggested the following questions to guide the goal-based and target-outcomes based summative evaluations:

- How are the organizational values, and beliefs, and the mathematics education policy statement guiding mathematics instruction districtwide?
- Which characteristics of a coherent instructional program are operating? How well are they operating? Which aspects are not operating well?
- Which aspects of professional practice are operating well, i.e., PLC, instructional coaching, peer observation and feedback, and analysis of student outcome data to inform practice? Do teachers and administrators have a greater appreciation of the importance instructional program coherence?
- Which PD activities resulted in changes to professional practice?

- What opportunities exist for student support in addressing deficits in understanding grade-level content in mathematics?
- Have assessments been developed and administered which are aligned to the learning progressions, and assess student readiness for algebra content? Are the results of the assessments routinely analyzed by district level administration and in PLC, and is the analysis used to inform instruction?
- Do options exist for student placement in middle-school mathematics courses?
- Does assessment data indicate the higher percentages of students are demonstrating higher levels of mastery in grade-level standards districtwide, as compared to the beginning of the project?
- Are higher percentages of students successfully completing grade-level coursework in the middle school?
- Are lower percentages of ninth-grade students repeating eighth grade coursework?
- Are higher percentages of high school students accessing and completing mathematics courses deemed admissible by the state university systems?

The summative evaluation guides implementers in making decisions regarding the future direction of the project (The Pell Institute, 2015). Reporting the summative evaluation to the stakeholders, governing board, administrators, and teachers adds a layer of accountability to the project, and provides opportunity to communicating revisions.

Sample Student Placement Matrix

The California Mathematics Placement Act of 2015, introduced by State Senator Mitchell, and co-authored by Assembly Member Jones-Sawyer, seeks to add language to the California education code addressing student placement in mathematics courses. The current language of the proposed legislation specifically requires:

> Each *governing board of a* local educational agency, as defined, serving pupils in grade 8 or 9, or both, to ~~develop~~ *develop, adopt in a regularly scheduled public meeting,* and implement, a fair, objective, and transparent ~~statewide~~ mathematics placement policy with specified elements. The bill would further require each local educational agency to ensure that its mathematics placement policy is available to each pupil and his or her parent or legal guardian and is posted prominently on its Internet Web site. (California Mathematics Placement Act of 2015, p. 1 italics and strikethrough in original).

When initially proposed, the senator sought to institute a transparent *statewide* mathematics placement policy. The current language (above) removes the statewide expectation for placement, but requires the local governance team to adopt a policy with specified elements. The propose legislation identifies the specified elements for placement thusly, “Systematically takes current academic objective measures into consideration, such as statewide assessments, pupil grades, and diagnostic placement tests” (California Mathematics Placement Act of 2015, p. 2).

The proposed legislation further requires ongoing assessment and reporting to the governing board of students’ progress in their mathematics courses to evaluate the appropriateness of their placement. The legislation requires an assessment in the first three months of the academic year for the purpose of reevaluating individual student progress and to determine the appropriateness of the placement. Further, the proposed legislation

> Requires examination of pupil placement data, at least annually, to ensure that there is no disproportionate impact in the course placement of pupils by race, *gender*, ethnicity, or socioeconomic background. The local educational agency shall report the aggregate results of this examination to the governing board of the local educational agency and prominently post the examination results on its Internet Web site. This report may be included as part of the local educational agency's accountability report of its local control and accountability plan (California Mathematics Placement Act of 2015, p. 2, italics in original).

The proposed legislation implies a degree of dissatisfaction this senator and coauthor have with placement practices in California. While initially desiring to address the dissatisfaction via a statewide mandated placement policy, the legislators have amended the proposal allowing local governing boards to develop policy. This project offers policy and practice recommendations specifically related to this issue. One of the practice recommendations is to develop a student-placement matrix to inform eighth grade placement decisions. The sample matrix I have provided includes the specified elements identified in the proposed legislation.

The proposed legislative language specifies statewide assessments and diagnostic placement tests be considered in placement decisions. Huang et al. (2014) asserted that the results on the Grade 7 Mathematics Diagnostics Testing Project (MDTP) assessment are useful in identifying eighth grade students for Algebra 1. They showed that students who mastered 5 of 7 topics on the assessment had a 75% chance of scoring proficient or higher on the eighth grade Algebra 1 test. The MDTP test measures student understanding of (1) decimals and percent, (2) exponents, square roots, and scientific notation, (3) fractions and their applications, (4) integers, (5) literals and equations, (6) data analysis, probability, and statistics, and (7) geometric measurement and coordinate geometry.

The researchers found that topics 1 through 5 were significant predictors of success in eighth grade Algebra 1, and suggested administrators consider these outcomes when placing students in eighth grade mathematics courses. Additionally, coupling the MDTP results with student results on the Grade 6 California Standards Test (CST) increased the probability of identifying students ready for eighth grade Algebra 1. Specifically, students whose scale score on the Grade 6 CST was 17 points higher than the state’s proficiency cut score of 350, had a 75% chance of achieving proficiency in eighth grade Algebra 1. Students that attained 367 or higher on the Grade 6 CST, and demonstrated mastery of topics 1 through 5 on the grade 7 MDTP had an 80 percent probability of achieving proficiency in Algebra 1. Students who scored at the proficient level on the Grade 7 CST showed a 78% chance of attaining proficiency. However, as the researchers noted, Grade 7 CST scores are often not available when placement decisions for the following year are made. The researchers encouraged using MDTP outcomes as they are more readily available, and combining Grade 6 CST with Grade 7

MDTP, had superior predictive qualities than the Grade 7 CST score alone. The researchers noted that as Grade 7 CST score become available in the summer, they can be used to refine placement decisions.

The placement question revolves around whether to assign eighth grade students to the core grade-level course or to a course that is slower. Using assessment data is considered additive in the placement process (Huang et al., 2014). The matrix below is an example of combining assessment data with other key factors when considering placing eighth grade students into their mathematics courses. The proposed legislation specifically identifies student grades as an element for consideration when placing students: Grades are included in the matrix. Furthermore, the matrix includes teacher recommendation as an element, as the study's participants indicated teacher input as additive in making the placement decision. Finally, the matrix allows local educators to include elements such as local benchmark assessments, and analysis of student work to the matrix.

Sample student placement matrix.

Specified elements to consider when placing eighth grade students into mathematics courses	Suggested scores and percent correct for placement in the grade-level course	Suggested scores and percent correct for placement in the grade-level course with concurrent support intervention course	Suggested scores and percent correct for placement in the readiness course
Grade 6 CST Scale Score	367 or higher	350 – 366	<350
Grade 7 MDTP algebra readiness test: Predictive topics (1) decimals and percent (2) exponents and square roots; scientific notation (3) fractions and their applications (4) integers (5) literals and equations Additional topics (6) data analysis, probability, and statistics, (7) geometric measurement and coordinate geometry	Percent correct Predictive topics (1) 75% (2) 75% (3) 75% (4) 66% (5) 70% Additional topics (6) 66% (7) 66%	Percent correct Predictive topics (1) 50% - 74% (2) 50% - 74% (3) 50% - 74% (4) 50% - 65% (5) 50% - 70% Additional topics (6) 50% - 65% (7) 43% - 69%	Percent correct Predictive topics (1) < 50% (2) < 50% (3) < 50% (4) < 50% (5) < 50% Additional topics (6) < 50% (7) < 43%
Grade 7 CST Scale Score	350 or higher	325-349	<325
Math grade earned in Grade 7	B or Higher	C, D	F
Grade 7 teacher recommendation	Teacher recommends student for core class without reservations	Recommendation includes identified topics for remediation	Teacher recommends students for the readiness course
Local elements to consider when placing eighth grade students into mathematics courses: Local Grade 7 assessments (i.e., benchmarks) Analysis of student work (i.e., performance tasks, projects, etc.).	Locally developed	Locally developed	Locally developed

MDTP is Mathematics Diagnostics Testing Project.

Percent correct of MDTP topics for predicted success in Algebra 1 suggested from Huang et al. (2014).

As California transitions from the California Standards Test to another testing model, a similar matrix should be developed that considers outcomes on the new state assessment.

Sample Evaluation Matrix

The actions presented in the position paper are developed to support stakeholders in the participating districts desiring to implement the project and achieve the goals. Project implementers in districts not associated with this case study are advised to determine the degree to which the problem of placement exists in their systems and implement the policy and practice recommendations accordingly. The evaluation matrix below offers a concise overview of the evaluation strategy, with suggested responsibilities, and guiding questions.

Sample evaluation matrix.

Action	Goals	Evaluation Type	When	Responsible Persons	Guiding Questions
Strategic Planning	1, 2, 3	Formative: Implementation Summative	Year 1	All Stakeholder groups	Has the strategic planning process produced guiding principle statements? Has a policy statement regarding mathematics education been developed? How are district leaders attending to the policy guidance?
Evaluate attributes of Instructional Program Coherence	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches	How are the processes to promote instructional program coherence initiated? Which processes are moving forward? Which processes are lagging?
Evaluate status of Opportunity to Learn (instructional time, content alignment, instructional practice)	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Teachers	How are the attributes of Opportunity to Learn (OTL) functioning? How is time allotted for mathematics instructions? How are the learning progressions guiding the selection of instructional material? How are instructional strategies presented in professional development (PD) sessions being effectively delivered in classrooms?
Content adoption aligned with learning progressions	1, 3	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Teachers	How has the learning progressions influenced the acquisition of curriculum and instructional materials? What challenges in implementations are teachers describing? Has grade-level standards-aligned material leading to algebra readiness been adopted and routinely implemented throughout the K–8 mathematics education program?
Evaluating status of assessment regimen	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration	Are local assessments aligned with the learning progressions? How are the data from the assessment analyzed? How are teachers involved in the analysis of student

					assessment data?
Common instructional framework	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches Teachers	What instructional strategies are included in the common instructional framework? How do they support the learning progressions? How do they differ at grade-levels? How are they implemented and monitored in the classroom? What are teachers experiencing?
Professional development	1	Formative: Implementation & Progress	Year 1-4	District Administration Site Administration Instructional Coaches Teachers	What have been the PD activities for teachers and administrators related to the goals of the project? Has PD addressed the following program elements? • Instructional program coherence • Learning progressions leading to algebra readiness • Analysis of student outcome data • Use of curriculum and instructional materials • Processes associated with PLC How has PD influenced the professional practice and professional culture of the school? How are teachers trained regarding the learning progressions and in using the adopted content? How have principals been trained on effective processes of monitoring instruction and providing feedback to teachers?
Instructional coaching model; reflective practice	1, 3	Formative: Implementation & Progress Summative	Year 2-4	District Administration Site Administration Instructional Coaches Teachers	Which aspects of instructional coaching are functioning? How have instructional coaches been trained? How are teachers and instructional coaches interacting to improve the delivery of instruction and promote reflective practice? How are teachers and coaches reporting changes to practice as a result of coaching? Has instructional coaching and reflective practice become a routine aspect of the instructional program?
Professional learning communities (PLC)	1, 3	Formative: Implementation & Progress Summative	Year 2-4	District Administration Site Administration Instructional Coaches Teachers	Which aspects of professional learning community (PLC) are functioning? How are teachers and administrators interacting around problems of practice? Are peer-observations-and-feedback processes producing changes in instructional practice? Have PLC processes become a routine aspect of the professional culture?
Middle school student placement; course options	1, 3	Formative: Implementation & Progress Summative	Year 1-4	District Administration Site Administration Teachers	What information is included on the student placement matrix? Is the placement practice aligned with the district policy? How is the process for placing middle-school students into mathematics classes changing? What are the changes to the course offerings at the middle school? How have they been implemented? How are students assigned to courses? Have new course syllabi, curriculum, and instruction been developed? Are the new courses

					established as regular components of the mathematics education program?
Learning climate: Appropriate course options, and support interventions	1, 3	Formative: Implementation & Progress Summative	Year 1-4	District Administration Site Administration Teachers	Are support interventions in place for struggling students? What is the scope of the interventions? How are students accessing the support?
Identification of criteria for satisfactory solution	2	Formative: Implementation & Progress	Year 1-3	Superintendent District Administration Site Administration Teachers	Have criteria for satisfactory solutions been developed for the following project elements? • Implementing OTL • Implementing common instructional framework • Identifying and implementing content aligned with the learning progressions leading to algebra readiness. • Implementing in-school instructional supports • Implementing course options • Implementing coordinated system of assessments • Improving supportive working conditions including PD, and effective monitoring and feedback of instruction • Instituting PLC processes and Instructional coaching • Allocation of resources to implement the coherent instructional program including master schedule, staffing, new course offerings and support interventions • Targets for student achievement in grade-level and readiness courses? • Targets for course repeaters in ninth grade • Targets for students completing higher-level mathematics courses in high school.
Middle-school student achievement	3	Formative: Progress	Year 3,4	District Administration Site	To what degree are students mastering the learning progressions associated with their course assignment? Does evidence show

		Summative		Administration Teachers Students	students are mastering the course content? What are the rates of attaining proficiency in the assigned courses? Do the data indicate a trend?
Ninth-grade student placement; achievement	3	Formative: Progress Summative	Year 3,4	District Administration Site Administration Teachers Students	What changes are occurring in ninth-grade mathematics placement? Are fewer students repeating eighth grade coursework?
High-school student access and successful completion of higher-level mathematics courses	3	Formative: Progress Summative	Year 3,4	District Administration Site Administration Teachers Students	What is occurring beyond ninth grade? Are more students accessing and successfully completing higher-level mathematics courses? Do the data indicate a trend?

Summary and Conclusion

This position paper provides an overview of the case study that showed issues associated with placing the middle-school students in mathematics courses. The complexity of the problems were due in part to the condition of the mathematics education programs in the participating districts; and due in part to the decision-making processes of district and site level administrators in participating districts that lacked aspects of an action cycle, specifically, criterion for satisfactory solutions, and evaluation of actions and outcomes. The case study findings suggested that students entered middle-school ill-equipped for the rigor of grade-level content, and some administrators considered factors other than student aptitude when placing eighth grade students into mathematics courses.

In this position paper, a review of professional literature is provided to build a case for the suggested remedies for solving the problems reported in the key findings of the case study. The remedies are presented as two overarching goals:

- Increase the understanding and implementation of instructional program coherence in mathematics.

- Increase the understanding and implementation of effective decision-making processes, which lead to appropriate placement of eighth grade students into mathematics courses.

Specific policy and practice recommendations to achieve the goals are provided, as are detailed roles and responsibilities. Suggested timelines for actions, and a plan for evaluation are intended to support project implementers in their efforts.

Conclusion. The problems associated with student placement in middle-school mathematics courses do not originate in middle school. The mathematics education students experience in the primary and intermediate grades has enormous consequence on students' ability to access middle-school content. Furthermore, the degree to which students demonstrate they have internalized algebraic concepts as they matriculated through the grade levels, will influence middle-school administrators' decisions to place students into middle-school mathematics courses. The recommendations in this position paper support policymakers, district and site administrators, and other stakeholders, into developing a coherent instructional program in mathematics. The recommendations deliver a more focused systems approach on the issue, and offers researched-based suggestions to guide implementers committed to improving the mathematics program for all students, including those in the critical middle-school years.

References

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns and bachelor's degree attainment.* Washington, DC: U.S. Department of Education.

Archbold, D. (2010). "Breaking the mold" in the dissertation: Implementing a problem-based, decision-oriented thesis project. *The Journal of Continuing Higher Education*, *58*(2), 99-107.

Archbold, D. (2008). Research versus problem solving for the education leadership doctoral thesis: Implications for form and function. *Educational Administration Quarterly*, *44*(5), 704-739.

Ball, D. L., Sleep, L., Boerst, T. A., & Bass, H. (2009). Combining the development of practice and the practice of development in teacher education. *Elementary School Journal*, *109*(5), 458-474.

Barnard, C. (1938). *The functions of the executive.* Harvard University Press. Cambridge, MA.

Bellei, C. (2009). Does lengthening the school day increase students' academic achievement? Results from a natural experiment in Chile. *Economics of Education Review*, *28*(5), 629-640.

Berends, M., Goldring, E., Stein, M., & Cravens, X. (2010). Instructional conditions in charter schools and students' mathematics achievement gains. *American Journal of Education*, *116*(3), 303-335.

Bitter, C., & O'Day, J. (2010). Raising expectations for mathematics instruction in California: Algebra and beyond. Policy and practice brief. *California Collaborative on District Reform*. Retrieved from http://cacollaborative.org/sites/default/files/CA_Collaborative_8th_Grade_Algebra.pdf

Blanton, M. (2008). *Algebra in elementary classrooms: Transforming thinking, transforming practice.* Portsmith, NH: Heinemann.

Blanton, M., Stephens, A., Knuth, E., Gardiner, A. M., Isler, I., & Kim, J. S. (2015). The development of children's algebraic thinking: The impact of a comprehensive early algebra intervention in third grade. *Journal for Research in Mathematics Education*, *46*(1), 39-87.

Bloom, B. S. (1974). Time and learning. *American Psychologist*, *29*(9), 682-688.

Borg, W. (1980). Time and school learning. In Denham, C., & Lieberman, A. (Eds.). *Time to learn*. US Dept. of Education, National Institute of Education, Program on Teaching and Learning. Retrieved from http://files.eric.ed.gov/fulltext/ED192454.pdf

California Department of Education. (2014b). *2014–15 California assessment of student performance and progress (CAASPP)*. Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/ta/tg/ai/documents/caasppchart14.pdf

California Department of Education. (2013). *Mathematics framework chapters.* Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp

California Department of Education (2013). *2013 STAR test results*. Retrieved from http://star.cde.ca.gov/star2013/SearchPanel.aspx?ps=true&lstTestYear=2013&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education. (2012). *Overview of California's 2011-12 accountability reporting system*. Retrieved from http://www.cde.ca.gov/ta/ac/ay/documents/overview12.pdf

California Department of Education (2012). *2012 STAR test results*. Retrieved from http://star.cde.ca.gov/star2012/SearchPanel.aspx?ps=true&lstTestYear=2012&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education. (2011a). *2010-11 academic performance index reports: Information guide.* Retrieved from http://www.cde.ca.gov/ta/ac/ap/documents/infoguide11.pdf#search=api%20academic%20performance%20index&view=FitH&pagemode=none

California Department of Education (2011b). *2011 STAR test results*. Retrieved from http://star.cde.ca.gov/star2011/ViewReport.aspx?ps=true&lstTestYear=2011&lstTestType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education (2010a). *2010 STAR test results*. Retrieved from http://star.cde.ca.gov/star2010/SearchPanel.asp?ps=true&lstTestYear=2010&lstT

estType=C&lstCounty=50&lstDistrict=&lstSchool=&lstGroup=1&lstSubGroup=1

California Department of Education (2010b). *California common core state standards: Mathematics*. Sacramento, CA: Author. Retrieved from http://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf

California Department of Education. (1997). *Mathematics content standards for California public schools: Kindergarten through grade twelve.* Sacramento, CA: CDE Press. Retrieved from http://www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf

Carpenter, T., Levi, L., Berman, P. & Pligge, M. (2005). Developing algebraic reasoning in the elementary school. In T. Romberg, T., Carpenter, & F. Dermock (Eds.), *Understanding mathematics and science matters,* 81 – 98. Mahwah, NJ: Lawrence Erlbaum Associates.

Carroll, J. (1963). A model of school learning. *The Teachers College Record*, *64*(8), 723-723.

Centre for European Policy Studies (n.d.). *A guide to writing a CPES policy brief*. Retrieved from http://www.ceps.eu/system/files/article/2010/12/Guide%20to%20writing%20CEPS%20Policy%20Brief.pdf

Childress, S., Elmore, R., Grossman, A., & Johnson, S. M. (2007). *Managing school districts for high performance: Cases in public education leadership*. Cambridge, MA: Harvard Education Press.

Cobb, P., & Jackson, K. (2012). Analyzing educational policies: A learning design perspective. *Journal of the Learning Sciences*, *21*(4), 487-521. doi:10.1080/10508406.2011.630849.

Cobb, P. & Jackson, K. (2011). Towards an empirically grounded theory of action for improving the quality of mathematics teaching at scale. *Mathematics Teacher Education and Development*, *13*(1), 6 – 33.

Coburn, C., & Stein, M. (2006). Communities of practice theory and the role of teacher professional community in policy implementation. In Honig, M. (Ed.) *New directions in education policy implementation: Confronting complexity*, 25-46. Albany, NY: State University of New York Press.

Coggshall, J. G., Rasmussen, C., Colton, A., Milton, J., & Jacques, C. (2012). Generating teaching effectiveness: The role of job-embedded professional learning in teacher evaluation. Research & policy brief. *National Comprehensive Center for Teacher Quality*. Retrieved from http://files.eric.ed.gov/fulltext/ED532776.pdf

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2012). *The aftermath of accelerating algebra: Evidence from a district policy initiative*. Working Paper 69. National Center for Analysis of Longitudinal Data in Education Research. Washington DC: American Institute for Research. Retrieved from http://files.eric.ed.gov/fulltext/ED529166.pdf

Common Core State Standards Initiative. (2015). *Standards in you state*. Retrieved from http://www.corestandards.org/standards-in-your-state/

Common Core Standards Writing Team. (2013). *Progressions for the Common Core State Standards in Mathematics (draft). Front matter, preface, introduction. Grade 8, High School, Functions*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.

Confrey, J. (2011). *What now? Priorities in implementing the Common Core State Standards for mathematics*. Paper presented at the Friday Institute for Educational Innovation.

Corey, D. L., Phelps, G., Ball, D. L., Demonte, J., & Harrison, D. (2012). Explaining variation in instructional time an application of quantile regression. *Educational Evaluation and Policy Analysis*, *34*(2), 146-163. Retrieved from http://epa.sagepub.com.ezp.waldenulibrary.org/content/34/2/146.full.pdf+html

Darling-Hammond, L., Newton, S. P., & Wei, R. C. (2013). Developing and assessing beginning teacher effectiveness: The potential of performance assessments. *Educational Assessment, Evaluation and Accountability, 25*(3), 179-204.

Daro, P., Mosher, F., & Corcoran, T. (2011). *Learning trajectories in mathematics: A foundation for standards, curriculum, assessment, and instruction*. Philadelphia, PA: Consortium for Policy Research in Education. Retrieved from http://files.eric.ed.gov/fulltext/ED519792.pdf

Desimone, L., & Long, D. A. (2010). Teacher effects and the achievement gap: Do teacher and teaching quality influence the achievement gap between Black and

White and high-and low-SES students in the early grades. *Teachers College Record*, *112*(12), 3024-3073.

Domina, T., McEachin, A., Penner, A., & Penner, E. (2014). Aiming high and falling short California's eighth grade algebra-for-all effort. *Educational Evaluation and Policy Analysis*. doi:10.3102/0162373714543685

Domina, T., Penner, A. M., Penner, E. K., & Conley, A. (2013). Algebra for all: California's 8th grade algebra initiative as constrained curricula. *Education*, (*94)*9. 824-6374.

DuFour, R., DuFour, R., Eaker, R., & Many, T. (2006). *Learning by doing: A handbook for professional learning communities at work*. Bloomington, IN: Solution Tree.

Durwood, C., Krone, E., & Mazzeo, C. (2010). *Are two algebra classes better than one? The effects of double-dose instruction in Chicago*. Chicago: Consortium on Chicago School Research.

Earl, L. (2007). Assessment as learning. In W. Hawley, & D. Rollie (Eds.), *The keys to effective schools: Educational reform as continuous improvement.* (85-98). Thousand Oaks, CA: Corwin Press.

Elliott, S. (2014). Measuring opportunity to learn and achievement growth: Key research issues with implications for the effective education of all students. *Remedial and Special Education*, 0741932514551282.

Elmore, R. F. (2000). *Building a new structure for school leadership*. Washington, DC: Albert Shanker Institute.

Fair Mathematics and Placement Act of 2015, California Senate Bill 359. (2015).

Faulkner, V. N., Crossland, C. L., & Stiff, L. V. (2013). Predicting eighth grade algebra placement for students with individualized education programs. *Exceptional Children*, *79*(3), 329-345.

Finkelstein, N., Fong, A., Tiffany-Morales, J., Shields, P., & Huang, M. (2012). *College bound in middle school and high school? How math course sequences matter*. Sacramento, CA: The Center for the Future of Teaching and Learning at WestEd.

Fitzpatrick, M., Grissmer, D., & Hastedt, S. (2011). What a difference a day makes: Estimating daily learning gains during kindergarten and first grade using a natural experiment. *Economics of Education Review*. *30*(2), 269-279.

Fong, A., Jaquet, K. & Finkelstein, N. (2014). *Who repeats algebra 1, and how does initial performance relate to improvement when the course is repeated?* (REL 2015-059). Washington, DC: U.S. Department of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED548534.pdf

Foster, J., & Wiser, M. (2012). The potential of learning progression research to inform the design of state science standards. In A.C. Alonzo & A.W. Gotwals (Eds), *Learning progressions in science: Current challenges and future directions* (pp. 3-12). Rotterdam, The Netherlands: Sense Publishers.

Frederick, W., & Walberg, F. (1980). Learning as a function of time. *Journal of Educational Research*, *73*(4), 183-204.

Frick, W. C. (2011). Practicing a professional ethic: Leading for students' best interests. *American Journal of Education, 117*(4), 527-562.

Fullan, M. (2003). *Core principles as a means of deepening large scale reform*. A paper prepared Paper prepared for the Department for Education and Skills, Britain. Retrieved from http://www.michaelfullan.ca/media/13396057550.pdf

Garrison, L. F., & Holifield, M. (2005). Are charter schools effective? *Planning and Changing*, *36*(1), 90-103.

Grissom, J. A., Loeb, S., & Master, B. (2013). Effective instructional time use for school leaders: Longitudinal evidence from observations of principals. *Educational Researcher*, 0013189X13510020.

Hallinger, P. (2010). Developing instructional leadership. In *Developing successful leadership* (pp. 61-76). The Netherlands: Springer.

Hallinger, P., & Murphy, J. (1985). Assessing the instructional management behavior of principals. *The Elementary School Journal*, 217-247.

Hill, H. C., & Grossman, P. (2013). Learning from teacher observations: Challenges and opportunities posed by new teacher evaluation systems. *Harvard Educational Review*, *83*(2), 371-384.

Hoff, N., Olsen, A. & Peterson, R. (2015). Dropout screening & early warning. University of Nebraska-Lincoln. Retrieved from http://k12engagement.unl.edu/Dropout%20Screening%20%26%20Early%20Warning%203-27-15.pdf

Hord, S. & Sommers, W. (2008). *Leading professional learning communities*. Thousand Oaks, CA: Corwin Press.

Hoy, W. & Miskel, C. (2001). *Educational administration: Theory, research, and practice.* (6th ed.) New York, NY: McGraw Hill.

Huang, C., Snipes, J., & Finkelstein, N. (2014). *Using assessment data to guide math course placement of California middle school students*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. Retrieved from http://ies.ed.gov/ncee/edlabs.

Kanold, T. D., Briars, D., & Fennell, F. (2011). *What principals need to know about teaching and learning mathematics*. Bloomington, IN: Solution Tree Press.

Kaput, J. (1999). Teaching and learning a new algebra. In E. Fennema, & T. Romberg (Eds.), *Mathematical classrooms that promote understanding*, (pp. 133-155). Mahwah, NJ: Lawrence Erlbaum Associates.

Katterfield, K. (2013). Setting instructional expectations: Patterns of principal leadership in middle school mathematics. *Leadership and Policy in Schools*, *12*(4), 337-373. doi:10.1080/157000763.2013.792935

Knight, J. (2009). Instructional coaching. In J. Knight (Ed.), *Coaching approaches and perspectives* (p. 29-55). Thousand Oaks, CA: Corwin Press.

Knight, J. (2007). *Instructional Coaching: A partnership approach to improving instruction.* Thousand Oaks, CA: Corwin Press.

Kobrin, J., Larson, S., Cromwell, A., & Garza, P. (2014). Establishing parameters for consideration of common core mathematics learning progressions. *Annual* *meeting of the American educational research association Philadelphia, Pennsylvani*a.

Konrad, M., Helf, S., & Joseph, L. M. (2011). Evidence-based instruction is not enough: Strategies for increasing instructional efficiency. *Intervention in School and Clinic*, *47*(2), 67-74. doi:10.1177/1053451211414192.

Kurleander, M., Reardon, S., & Jackson, J. (2008). Middle school predictors of high school achievement in three California school districts. *Santa Barbara, CA: California dropout research project,* University of California, Santa Barbara.

Kurz, A. (2011). Access to what should be taught and will be tested: Students' opportunity to learn the intended curriculum. In S. N. Elliott, R. J. Kettler, P. A. Beddow, & A. Kurz (Eds.), *Handbook of accessible achievement tests for all students: Bridging the gaps between research, practice, and policy* (pp. 99–129). New York, NY: Springer.

Larson, M. (2011). *Administrator's guide: Interpreting the common core state standards to improve mathematics education.* Reston, VA: The National Council of Teachers of Mathematics, Inc.

Lavy, V. (2010). *Do differences in school's instruction time explain international achievement gaps in math, science, and reading?: Evidence from developed and developing countries*. National Bureau of Economic Research.

Law, E. (2011). Exploring the role of leadership in facilitating teacher learning in Hong Kong. *School Leadership & Management: Formerly School Organization, 31*(4), 393-410. doi:10.1080/13632434.2011.606268

Leithwood, K., Anderson, S. E., Mascall, B., & Strauss, T. (2010). School leaders' influences on student learning: The four paths. In T. Bush, L. Bell, & D. Middlewood (Eds.), *The Principles of educational leadership and management*, (pp.13-30). Thousand Oaks, CA: SAGE.

Levpuscek, M. P., & Zupancic, M. (2009). Math achievement in early adolescence: The role of parental involvement, teachers' behavior, and students' motivational beliefs about math. *Journal of Early Adolescence, 29*(4), 541-570. doi:10.1177/0272431608324189

Liang, J.H. & Heckman, P.E. (2013). An examination of algebra for all through historical context and statewide assessment data. *Journal of Transformative Leadership and Policy Studies, 3*(1), 3-20.

Liang, J. H., Heckman, P. E., & Abedi, J. (2012). What do the California Standards Test results reveal about the movement toward eighth grade algebra for all? *Educational Evaluation and Policy Analysis, 34*(3), 328-343. doi:10.3102/0162373712443307

Lincoln, Y. & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Lindblom, C. (1993). *The science of muddling through*. New York, NY: Irvington.

Little, J. W. (2012). Professional community and professional development in the learning-centered school. In M. Kooy, & K. Van Veen (Eds.), *Teacher learning that matters: International perspectives*, (pp. 22-43). New York, NY: Routledge.

Little, J. W. (2007). Professional communication and collaboration. In W. Hawley, & D. Rollie (Eds.), *The keys to effective schools: Educational reform as continuous improvement.* (51-66). Thousand Oaks, CA: Corwin Press.

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal*, *49*(2), 285-322. doi:10.3102/0002831211431952

Loveless, T. (2011). *The tracking wars: State reform meets school policy*. Washington, DC: Brookings Institution Press.

Loveless, T. (2009). Tracking and detracking: High achievers in Massachusetts middle schools. *Thomas B. Fordham Institute*. Retrieved from http://files.eric.ed.gov/fulltext/ED507543.pdf

Loveless, T. (2008). The misplaced math student: Lost in eighth grade algebra. *Special Release: The 2008 Brown Center on American Education.* Retrieved from: http://www.brookings.edu/~/media/Files/rc/reports/2008/0922_education_loveless/0922_education_loveless.pdf

Lunenburg, F. & Ornstein, A. (2004). *Educational administration: Concepts and practices.* (4th ed.) Belmont, CA: Wadsworth / Thompson Learning.

Marcotte, D. E., & Hansen, B. (2010). Time for school. *Education Next*, *10*(1), 53-59.

Marrongelle, K., Sztajn, P., & Smith, M. (2013). Scaling up professional development in an era of common state standards. *Journal of Teacher Education*, *64*(3), 202-211. doi:10.1177/0022487112473838

Marzano, R. (2003). *What works in schools: Translating research into action.* Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. (2000). *A new era of school reform: Going where the research leads us*. Aurora, CO: Mid-Continent Research for Education and Learning.

Marzano, R., & Waters, T. (2009). *District leadership that works: Striking the right balance.* Bloomington, IN: Solution Tree Press.

Mathematics Diagnostic Testing Project (2012). *MDTP test levels.* California State University/University of California. Retrieved from http://mdtp.ucsd.edu/Tests.shtml

Mehan, H. (2015). Detracking: A promising strategy to increase social mobility for underserved youth. In *Opening the doors to opportunity for all: Setting a research agenda for the future*, (pp. 75-82). Washington DC: American Institute for Research.

Morgatto, S. (2008). Should all students be required to take algebra? Are any two snowflakes alike? *Clearing House*, *81*(5), 215-218.

Mueller, R. (2013). A general model of organizational values in educational administration. *Educational Management Administration & Leadership, 42*(5). 640 – 656. doi:10.1177/174143213510504

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: Authors.

National Research Council. (2010). *Preparing teachers: Building evidence for sound policy.* Committee on the Study of Teacher Preparation Programs in the United

States, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

National Research Council. (2001). Knowing what students know: The science and design of educational assessment. In J. Pelligrino, N, Chudowsky, and R, Glaser (Eds.) *Committee on the foundations of assessment. Board on testing and assessment, center for education. Division of behavioral and social sciences and education.* Washington, DC: National Academy Press.

National Science Foundation. (2002). *Evaluation and types of evaluation.* Arlington, VA: Author Retrieved from http://www.nsf.gov/pubs/2002/nsf02057/nsf02057_2.pdf

Newmann, F. M., Smith, B., Allensworth, E., & Bryk, A. S. (2001). Instructional program coherence: What it is and why it should guide school improvement policy. *Educational Evaluation and Policy Analysis*, *23*(4), 297-321.

Nomi, T. (2012). The unintended consequences of an algebra-for-all policy on high-skill students effects on instructional organization and students' academic outcomes. *Educational Evaluation and Policy Analysis*, *34*(4), 489-505. doi:10.3102/0162373712453869

Polly, D., Wang, C., McGee, J., Lambert, R. G., Martin, C. S., & Pugalee, D. (2014). Examining the influence of a curriculum-based elementary mathematics professional development program. *Journal of Research in Childhood Education*, *28*(3), 327-343. doi:10.1080/02568543.2014.913276

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher, 31*(7), 3.

Price, H. E. (2012). Principal–teacher interactions: How affective relationships shape principal and teacher attitudes. *Educational Administration Quarterly*, *48*(1), 39-85. doi:10.1177/0013161X11417126

Riley, R. W. (1997). *Mathematics equals opportunity.* District of Columbia, U.S.: Federal Department of Education. ERIC Document Reproduction Service No. ED 415119

Robinson, V. M. (2007). *School leadership and student outcomes: Identifying what works and why*. (Vol. 41). Winmalee, Victoria, Australia: Australian Council for Educational Leaders.

Rosin, M., Barondess, H. & Leichty, J. (2009). *Algebra policy in California: Great expectations and serious challenges*. Mountain View, CA: EdSource. Retrieved from http://edsource.org/wp-content/publications/pub_algebra_final.pdf

Sacramento County Office of Education. (2010). *Analysis of California standards to common core standards.* Retrieved from http://www.scoe.net/castandards/multimedia/k-12_math_crosswalks.pdf

Schmidt, W. (2012). At the precipice: The story of mathematics education in the United States. *Peabody Journal of Education*, *87*(1), 133-156. doi:10.1080/0161956X.2012.642280.

Schmidt, W., Houang R. & Cogan, R. (2002, Summer). A coherent curriculum: the case of mathematics. *American Educator*, 1–18.

Sergiovanni, T. (2007). *Rethinking leadership* (2nd edition). Thousand Oaks, CA: Corwin Press.

Silicon Valley Mathematics Initiative. (2013). *Pearson Gates curriculum maps*. Morgan Hill, CA: Author. Retrieved from http://www.svmimac.org/home.html

Simon, H. (1947). *Administrative behavior.* New York, NY: Macmillan.

Simon, H. (1993). Decision-making: Rational, nonrational, and irrational. *Educational Administration Quarterly*. *29(3)*, 392-411.

Slavin, R. E., Lake, C., & Groff, C. (2009). Effective programs in middle and high school mathematics: A best-evidence synthesis. *Review of Educational Research, 79*(2), 839-911. doi:10.3102/0034654308330968

Smith, B. (2000). Quantity matters: Annual instructional time in an urban school system. *Educational Administration Quarterly*, *36*(5), 652-682.

State Board of Education. (2013). *SBE meeting for March 2013*. Sacramento, CA: California Department of Education. Retrieved from http://www.cde.ca.gov/be/ag/ag/yr13/agenda201303.asp

Stein, M. K., Kaufman, J. H., Sherman, M., & Hillen, A. F. (2011). Algebra a challenge at the crossroads of policy and practice. *Review of Educational Research*, *81*(4), 453-492.

Terry, L., & Rosin, M. (2011). *California's math pipeline: Many routes through and around college-prep courses*. Mountain View, CA: EdSource. Retrieved from http://edsource.org/wp-content/publications/pub11-seventhGRadeMathBrief3Update.pdf

The Pell Institute. (2015). Evaluation approaches and types. *Evaluation toolkit*. Washington, DC: Author. Retrieved from http://toolkit.pellinstitute.org/evaluation-101/evaluation-approaches-types/

Trochim, W. (2006). Introduction to evaluation. *Research methods and knowledge base.* Web Center for Social Research Methods. Retrieved from http://www.socialresearchmethods.net/kb/intreval.php

University of Arizona. (2010). Types of evaluation. *Program planning and evaluation*. Retrieved from https://extention.arizona/evaluation/content/types-evaluation

University of California. (2015). *A – g guide*. Retrieved from http://www.ucop.edu/agguide/a-g-requirements/c-mathematics/index.html

University of Texas. (n.d.). *Evaluate programs: Program evaluation process*. Retrieved from https://www.utexas.edu/academic/ctl/assessment/iar/programs/plan/why-process.php

Vannest, K. J., & Parker, R. I. (2010). Measuring time: The stability of special education teacher time use. *Journal of Special Education, 44*(2), 94-106.

Vaughn, S., Wanzek, J., Murray, C. S., & Roberts, G. (2012). Intensive interventions for students struggling in reading and mathematics. A practice guide. *Center on Instruction*.

Waterman, S. (2010). *Pathways report: Dead ends and wrong turns on the path through algebra.* Palo Alto, CA: Noyce Foundation.

Watkins, S., & McCaw, D. (2007). The tipping point: Knowledge failure at the vision, mission, and core values level. In L. Lemasters, & P. Papa (Eds.), *At the tipping* *point: Navigating the course for the preparation. The 2007 Yearbook of the National Council of Professors of educational administration.* Lancaster, PA: Proactive Publications. Retrieved from http://files.eric.ed.gov/fulltext/ED523723.pdf#page=449

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad*. Dallas, TX: National Staff Development Council.

Welner, K. (2009). Non-evidence about tracking: Critiquing the new report from the Fordham Institute. *The Teachers College Record*.

Werblow, J., Urick, A., & Duesbery, L. (2013). On the wrong track: How tracking is associated with dropping out of high school. *Equity & Excellence in Education*, *46*(2), 270-284. doi:10.1080/10665684.2013.779168

Williams, T, Haertel E., Kirst M.W., Rosen, M. & Perry M. (2011). *Preparation, placement, proficiency: Improving middle grades math proficiency. Policy and practice brief.* Mountain View, CA: EdSource.

Willis, J., Inman, D., & Valenti, R. (Eds.). (2010). *Completing a professional practice dissertation: A guide for doctoral students and faculty*. IAP.

Yin, R. (2009). *Case study research.* Thousand Oaks, CA: Sage Publications, Inc.

Appendix B: Questionnaire

Data Collection Instrument

Thank you for agreeing to participate in this case study as a portion of the research requirement of Walden University for the doctoral degree. The purpose of this case study is to explain the decision-making processes of administrators in local unified school districts related to the decision of placing eighth grade students into math courses in 2010 – 11, 2011 – 12, and 2012 – 13. As was detailed in the *Informed Consent* permission document, you are not compelled to complete this questionnaire and your responses to the prompts and questions will remain confidential and available for your review. Answer the questions for which you feel you have experience.

Name: ___________________________

For which District did you work in 2010 – 11, 2011 – 12, and 2012 – 13?

What was your position?

1. Describe your involvement and experience in placing eighth grade students into math courses in 2010 – 11, 2011 – 12, and 2012 – 13?

2. Describe any school or district policies, formal or informal, that influenced the placement of eighth grade students into math courses in 2010 – 11, 2011 – 12, and 2012 – 13.

3. Describe any factors, or constraints, that influenced your decision to place students into eighth grade math courses in 2010 – 11, 2011 – 12, and 2012 – 13.

4. Describe your understanding of how eighth grade math placement in 2010 – 11, 2011 – 12, and 2012 – 13 may have affected the California Academic Performance Index (API) for your district's middle schools, or your school if you were a site administrator. (This prompt is not interested in the actual student outcomes; rather, what was your understanding of how the student placement may affect the eventual API.)

5. Describe what effect, if any, California's school accountability system had on your decision to place students in eighth grade math courses in 2010 – 11, 2011 – 12, and 2012 – 13?

6. How do you describe your students' overall performance on the eighth grade CST in mathematics during these years, whether it was the General Math or the end-of-course Algebra 1 exam?

7. Has, or did, your process for placing students into eighth grade math courses changed since placing students in 2010 – 11, 2011 – 12, and 2012 – 13? If so, why did the process changed? And, how did the process changed?

8. What other information, or support, if any, would help you in making the decision to place eighth grade students into math courses?

9. Describe any formal or informal training you've received in administrative "decision-making"?

10. Are there any other comments that you would like to make regarding the placement of eighth grade students into mathematics courses?

Appendix C: Semi-Structured Interview Questions

Interview

Statement to Participants (read aloud by researcher): Thank you for agreeing to participate in this case study. You are not compelled to complete this interview, and may withdraw at anytime. Your responses to the prompts and questions will remain confidential and available for your review.

Audio-taping will assist me with the data analysis potion of the research. The audio-tape will be used for analysis purposes only and the responses will remain confidential and available for your review. Do I have your permission to audio-tape?

Structured portion (same for all participants).

Interviewer: “What is your name?”

“For which District did you work in 2010 – 11, 2011 – 12, and 2012 – 13?”

“What was your position in 2010 – 11, 2011 – 12, and 2012 – 13?”

Interviewer: “I brought your completed questionnaire with me for you to refer to as we proceed with the interview.”

1. “According to the completed questionnaire you had experience with the placement of eighth grade students into math classes in 2010 – 11, 2011 – 12, and 2012 – 13. Other than what’s on the questionnaire, are there any additional aspects of the decision-making experience, to place students into certain math courses that you could share?

Unstructured (potential probing questions that may differ from one participant to another)

1. “You mentioned certain factors that you considered when making the placement decision, how were these factors developed?”
2. “Were there aspects of the experience that challenged you as a professional? How so?
3. “You mentioned equity, how did this influence your process?
4. “You mentioned aptitude…
5. “You mentioned test scores…
6. “You mentioned etc….
7. “As you’ve had opportunity to reflect on your students’ results on the eighth grade state mathematics exams, please describe your opinion of their performance.”
8. “Since, 2010 – 11, you said ‘things have changed’, how have they changed?”
9. Other follow up questions that help participants explain or describe their experiences relative to the central phenomenon.

Final question of all participants

1. “As you consider the future of eighth grade mathematics in your school or district, what do you believe should be included in a common practice or policy for eighth grade mathematics placement?”

Appendix D: Request to Conduct Research and Recruit Voluntary Participants

Request to conduct research and recruit potential voluntary participants in doctoral dissertation research

[Date]

[Superintendent Name]
District Superintendent
[School District]
[Street Address]
[City, State, Zip]

RE: Request to conduct research and recruit potential voluntary participants in doctoral dissertation research.

Dear [Superintendent],

In accordance with your district's Board Policy regarding research (BP 6162.8) the associated Administrative Regulation (AR 6162.8) and following the Walden University Institutional Review Board (IRB) protocols, I am presenting the following information to you, with the desire that you will review the information and provide written permission to seek voluntary participants in Turlock Unified School District:

Name of researcher and academic credentials: Don Davis, Walden University Candidate for Doctor of Education: Administrative Leadership for Teaching and Learning. Dissertation Title: **Placing Students in eighth Grade Mathematics: A Case Study of the Decision-Making Process**.

Purpose and scope of the project: The research investigates the administrative decision-making relative to the placement of eighth students into mathematics courses.

Method of study or investigation to be used: This is a qualitative study, seeking to elicit the experience of administrators connected with the decisions that resulted in placing eighth grade students into mathematics courses. Potential participants include: Superintendent, district level administrators, middle school or junior high school administrators. Voluntary participants will be sought using available on-line information, if contact information is not readily available on line, then the researcher may contact the Human Resources department for district email addresses of potential voluntary participants.

Extent of participation expected of students and staff: NO STUDENTS will be recruited or used in this study. Administrators who volunteer to participate, will provide informed consent, complete a semi-structured questionnaire with open ended questions (approximate time to complete 15 – 20 minutes), and may participate in a follow-up phone or face-to-face interview (approximately 15 – 30 minutes). Participation is voluntary, the information and the data provided will remain confidential.

Use to which project results will be put: The results will be used to advance the understanding of administrative decision-making which is a foundational aspect of Administrative Theory in Education (Griffith, 1959).

Benefits to the schools in the district: The findings may serve to inform effective decision-making in the future.

No school names or names of participants shall be used in the findings.

If you, or your designee, agree to provide permission for the recruitment of potential candidates, please transfer the adjoining letter of cooperation to your district's letterhead.

Sincerely,

Don Davis

Appendix E: Proposed Letter from Community Research Partner

Community Research Partner Name
Contact Information
Date

Dear Don Davis,

Based on my review of your research proposal, I give permission for you to conduct the study entitled **Placing Students in eighth Grade Mathematics: A Case Study of the Decision-Making Process** within the [Name of School District]. As part of this study, I authorize you to:

- seek voluntary participation of [School District] administrators, and their informed consent to participate,
- to provide a semi-structured questionnaire to participants with open ended questions,
- conduct a follow up semi-structured interview with participants to clarify and probe responses provided on the questionnaire, and
- allow participants to review the study's findings if they desire.

Individuals' participation will be voluntary and at their own discretion, and may be withdrawn by the participant at any time.

I understand that our organization's responsibilities include:

- Providing the district email contact of potential candidates when not publically available on line.
- Allow participants time to complete research questionnaire.
- Allow participants time to be interviewed in their offices, on their campuses, or on a district provided telephone.

We reserve the right to withdraw from the study at any time if our circumstances change.
I confirm that I am authorized to approve research in this setting.
I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the researcher without permission from the Walden University IRB.

Sincerely,

Authorization Official
Contact Information

Appendix F: Informed Consent Notification

Appendix E

Informed Consent

To: [Name of participant]

From: Don Davis

Date: [Date]

Re: Research study for doctorate

Study Purpose and Invitation

You are being invited to participate in a research study that has the approval of the University of Walden's Institutional Review Board and the [fill-in district name]. The purpose of this study is to learn about your experience with the placement of eighth grade students into math classes in 2010-11 and after. This study is being conducted by doctoral candidate Don Davis, and is sponsored by doctoral chair Dr. Maryann Leonard.

Inclusion

- Your inclusion as a potential participant is due to your knowledge of or experience with the phenomenon of placing students in eighth grade mathematics courses over the past few years.

Disclosure of Risk

- The professional risks for an unintended disclosure of confidential information are minimal and include:
    - **Data collection reveals participant disagreement with leadership decisions.**
- The risks of psychological stress greater than one would experience in everyday life are minimal and include:

- **Some participants may have felt conflicted about their decision-making relative to this phenomenon.**

Participation and Compensation

- If you agree to participate, you will participate by completing a questionnaire and having a follow up interview. Each should take 15 minutes, but no more than 30 minutes to complete. You may decline to answer any question and you may choose to opt out at any time with no professional or personal penalty.
- Your participation in the research study is voluntary and there is no compensation for participating.

Confidentiality

- Your participation and answers to the questions will be held in confidence.

Benefits

- There are no direct benefits to you personally for participating: however, the knowledge gained may help understand the administrative decision-making process, and support administrators in the future with placing students in eighth grade math courses.

Consent and Refusal

- You may refuse to participate without being subject to any penalty or losing any benefits to which you are otherwise entitled.

- You may ask clarifying questions about the study and about being a participant before giving consent (direct questions to Don Davis at 209.756.0089 or via email donald.davis@waldenu.edu)
- To protect your privacy, no consent signature is requested. Instead, your consent by return e-mail with the words **"I Consent"** will indicate your consent if you choose to participate.
- You may print or save a copy of the consent form.

Participant Rights

- A participant may withdraw from the study at any time without professional or personal penalty.
- If you have any questions about your rights as a research subject, you can contact the Walden University's Research Participant Advocate at 800-925-3368, extension 3121210. The committee has reviewed this study.

I thank you for considering becoming a voluntary participant. Again, if you have questions about the study feel free to contact me. If you make the determination to participate, please email the words "I consent" to me at donald.davis@waldenu.edu. Feel free to print or save this consent form for your records.

Regards,

Don Davis
Doctoral Candidate