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A Case Study on the Comparison of Fourth-Grade Students' Mathematics Achievement as Evidenced by the Measures of Academic Progress Assessment: Self-Contained vs. Departmentalized Settings

Adam David Dymond

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A Case Study on the Comparison of Fourth-Grade Students' Mathematics Achievement
as Evidenced by the Measures of Academic Progress Assessment: Self-Contained vs.
Departmentalized Settings

By
Adam D. Dymond

A Dissertation Submitted to the
Gardner-Webb University School of Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

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Approval Page

This dissertation was submitted by Adam D. Dymond under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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“Be courteous to all, but intimate with few, and let those few be well tried before you give them your confidence—true friendship is a plant of slow growth, and must undergo & withstand the shocks of adversity before it is entitled to the appellation.” – *George Washington, first president of the United States (1732-1799)*

Our first President probably did not have the dissertation in mind when making this assertion; however, I find it applicable to my doctoral journey. I will forever be indebted to the friends who have helped me along this expedition. Similar to Erik Weihenmayer’s trek up Everest, I too embarked upon a journey. Erik’s quest never would have ended in success without the aid of his guide and team. My team consisted of companions whose roles were integral in my success.

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Abstract

A Case Study on the Comparison of Fourth-Grade Students' Mathematics Achievement as Evidenced by the Measures of Academic Progress Assessment: Self-Contained vs. Departmentalized Settings. Dymond, Adam D., 2017: Dissertation, Gardner-Webb University

This dissertation was designed to examine whether fourth-grade students who received instruction in a self-contained setting were more likely to meet their target score on the Measures of Academic Progress (MAP) test than students who were taught in a departmentalized setting. Fourth-grade students in ALPHA School District took the MAP test in the fall and spring of the academic calendar year. Target scores were originated by the Northwest Evaluation Association (NWEA). These target scores showed the typical growth for a student in the particular grade level as calculated by national norms. The MAP test growth norms were very precise. Due to the enormous number of students involved in the norming study, NWEA staff was able to calculate the mean growth of similar groups of students from each grade level (2-10) who scored at each RIT level in the initial testing season. For this study, the researcher focused on students in the fourth grade.

Fourth-grade students from ALPHA School District were tested in the fall of 2015 and the spring of 2016. Scores of students taking both tests were obtained and categorized into two groups: self-contained and departmentalized. Once this process was completed, the researcher analyzed the target scores to determine whether or not there were significant differences in scores of self-contained and departmentalized classrooms. Teacher participants were asked to respond to a collection of survey questions to determine which factors were key contributors to students finding success in the math program in their classroom structure (self-contained, departmentalized). The researcher followed up by utilizing a group of volunteer interview participants to partake in a brief interview based on the findings to determine the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings.

An analysis of the data determined that all students grew equally well regardless of their target growth and classroom structure. Through a survey, it was determined that self-contained teachers place the highest importance on the factors of human relationships and individualized instruction, while departmentalized teachers place their importance in engaging lessons and content specialization. It was discovered that teachers are better when they teach toward their strengths; that math is most effectively taught in a structured environment where routines are evident; and the value in the importance of engaging students with relevant, creative instruction.

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Chapter 1: Introduction

The most important school-based factor contributing to increases in student achievement is teacher quality (Darling-Hammond, 1996). Teacher quality is defined as competent teachers being committed to their students and their students' learning, possessing deep subject matter knowledge, effectively managing and monitoring student learning, being reflective about their teaching, and being members of the broader school community (Mitchell, 2001). Teachers of quality should have, at a minimum, full certification in their main teaching field. Not only will good teachers help schools and districts meet rising expectations, but they will also help ensure that our students today will be prepared to be our leaders of tomorrow (Haycock, 1998).

The elementary classroom structure, with relevance to student achievement, is just as undetermined today as it was decades ago. Diverse structured arrangements are often deliberated and discussed. These discussions involve differing opinions from the individual school-level teachers, administrators, and parents to the district-wide and state-level curriculum personnel. Every stakeholder involved in these debates has a personal view regarding the best type of organization for instruction in core subject areas at the elementary level (Ackerlund, 1959; Canady & Rettig, 2008; Catledge-Howard, Dilworth, & Ward, 2003; Lamme, 1976; Livingston, 1961; McGrath & Rust, 2002).

The introduction of new legislation over the years has led to educational reform in the United States. President George W. Bush signed the No Child Left Behind Act (NCLB) with the ultimate goal of “steady academic gains until all students can read and do math at or above grade level, closing for good the nation’s achievement gap between disadvantaged and minority students and their peers” (United States Department of Education [USDOE], 2007, p. 1). The legislation reauthorized the Elementary and

Secondary Education Act (ESEA) of 1965 which provided funding for instructional technology, mathematics, and science instruction. NCLB expanded ESEA to hold states responsible for creating an accountability system to include annual assessments of students driven by measurable goals for the purpose of achieving adequate yearly progress (AYP; USDOE, 2004). NCLB also called for a highly qualified teacher to be placed in the core subjects in every classroom. In order to gain the title of highly qualified, a teacher must have a bachelor's degree and full state certification or licensure and prove he/she knows content for each teaching subject (USDOE, 2004, p. 2).

NCLB mandated highly qualified teacher status, but expecting elementary teachers to have the specialized knowledge to equip students in mathematics instruction as well as knowledge for every other subject they teach is unrealistic (Reys & Fennell, 2003). Consequently, some elementary schools choose another viable option where teachers can specialize in content areas and deliver quality instruction in fewer areas (Gerretson, Bosnick, & Schofield, 2008). When teachers become departmentalized and focus on their strengths, they have more time to refine lessons, construct learning opportunities, and collaborate with peers (Andrews, 2006; Becker, 1987; Chang, Muñoz, & Koshewa, 2008; Dropsey, 2004; Gerretson et al., 2008).

Statement of the Problem

Before making the decision to shift from a traditional style of instruction to a departmentalized style of instruction, school leaders should consider the organizational structure of the school and examine the research to ascertain whether or not instructional practice makes a difference in student achievement. Unfortunately, with gaps in the existing literature on the effectiveness of various organizational structures, many educators in pursuit of research-based evidence are oftentimes confronted with limited,

and even contradictory, research (Chang et al., 2008; Dropsey, 2004; Hampton, 2007; Hood, 2010; McGrath & Rust, 2002; Moore, 2008; Reys & Fennell, 2003; Yearwood, 2011). This poses a problem for school leaders who are considering a restructure. The purpose of this research study was to determine whether or not the instructional structure in which the students learn, either self-contained or departmentalized, had a significant influence on the academic scores of fourth graders in the area of math.

The Final Report of the National Mathematics Advisory Panel (2008) considered the importance of mathematics specialists at the elementary level. The authors could not find a difference in the mathematics achievement scores of students in the self-contained structure when compared to the departmentalized structure. One of the recommendations cited within the study was indirectly connected to the elementary schools' organizational structures within their math classrooms through the use of full-time elementary math teachers. This recommendation would initiate a move toward departmentalization rather than continuation of the self-contained, single-teacher structure. The recommendation stated,

The Panel recommends that research be conducted on the use of full-time mathematics teachers in elementary schools. These would be teachers with strong knowledge of mathematics who would teach mathematics full-time to several classrooms of students, rather than teaching many subjects to one class, as is typical in most elementary classrooms. This recommendation for research is based on the Panel's findings about the importance of teachers' mathematical knowledge. The use of teachers who have specialized schooling in elementary mathematics teaching could be a practical alternative to increasing all elementary teachers' content knowledge (a problem of huge scale) by focusing the need for

expertise on fewer teachers. (Final Report of the National Mathematics Advisory Panel, 2008, p. 44)

There is a problem in ALPHA County in upstate South Carolina. That problem, specifically, is that administrators in ALPHA County are annually faced with the task of determining the classroom structure to be used to deliver math instruction in fourth grade. Administrators simultaneously question a student's ability to learn in a self-contained classroom and a teacher's ability to grow relationships with students in a departmentalized classroom. In the variables of these considerations, a problem arises. Which structure is best for teaching fourth-grade mathematics in ALPHA County? In this study, research has been done in ALPHA School District's six elementary schools containing fourth grade to determine if the structural breakdown of the classroom into self-contained and departmentalized settings had a significant effect on 2015-2016 math achievement scores for fourth grade. The Measures of Academic Progress (MAP) achievement test was used to target student growth from fall to spring.

Research Questions

Moore (2008) wrote, "There is clearly a need for more empirical evidence for achievement outcomes related to organizational classroom structures, particularly the relationship between self-contained and departmentalized arrangement" (p. 48). The argument of the self-contained classroom versus the departmentalized classroom is not one that is easily depicted. Different school environments call for different forms of instruction. The comparison groups for the current study were comprised of students who received instruction in either a self-contained or a departmentalized setting in fourth grade. Fourth-grade students from classrooms from six elementary schools in upstate South Carolina served as the convenience sample for the study. Because the researcher

could not manipulate the independent variable in order to observe its effect on the dependent variable, a selection process was used to form groups. This process included surveying administrators to determine the type of organizational structure used in their schools. The researcher implemented a causal-comparative design in the current study to analyze target growth of 2015-2016 math MAP scores of fourth-grade students who were taught in classrooms where different organizational structures were implemented. Demographics of the schools were analyzed to determine discrepancies in sample characteristics. Similarities and differences between the comparison groups are reported in Chapter 4.

From these problem areas, the research questions guiding this study were

1. Are there significant differences in fourth-grade achievement scores (MAP) in math between students in self-contained and departmentalized classrooms?
2. What components of organizational structures do teachers relate as having an impact on the quality of the math program?
3. What are the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings?

Both individually and collectively, these research questions aim to help school leaders make a more informed decision when determining whether or not to utilize a departmentalized structure in the upper elementary school mathematical classroom.

Through a comparison of test scores between self-contained and departmentalized classrooms, the research study affords school leaders the advantage of additional research to help make a justifiable decision for the classroom structure for this region in South Carolina.

Significance of the Study

According to NCLB compliance requirements throughout the United States, schools must continuously seek ways to improve student achievement and obtain AYP for all children. In recent years, however, a number of attempts have been made to revolutionize the delivery of elementary education. For years, elementary schools have used limited organizational structures and operated with “instructional monotony” and “academic limitations” (Chan & Jarman, 2004, p. 70). The purpose of this study was to analyze archival test data from math scores of fourth-grade students attending six elementary schools in upstate South Carolina where the presence of two different classroom organizations were present to determine what effect existed between classroom organization and student achievement as measured by the MAP assessment. As the literature review presents in Chapter 2, there is a dearth of research to assist school leaders in making instructional decisions based upon the most viable use of self-contained and departmentalized classrooms as an educational structure for fourth graders. The results of this study will be used to aid school leaders in making decisions based upon the most viable use of self-contained and departmentalized classrooms as an educational structure for fourth-grade math students.

Limitations

Limitations in causal-comparative design include lack of randomization, manipulation, and control (Gay, Mills, & Airasian, 2009). Limitations of this study include the following.

1. The limitations of this study included the limited number of schools identified and teachers surveyed.
2. Obtaining equitable demographics was difficult from the given population of

schools.

3. A cluster sample of classes was selected; no generalizations should be made to other populations.
4. Individual socioeconomic status of students was federally protected, which limits sample choice based on school socioeconomic status similarities.
5. Data from only one grade level were analyzed; therefore, the results of this study may not be generalized to other grade levels.
6. Instructional strategies used by teachers were not considered by the study.
7. Teacher experience or effectiveness was not considered.
8. Specialized teacher training, degrees, or professional development in specific content areas was not considered.

Definition of Terms

The following terms are defined for the purposes of this study.

Departmentalized classroom. According to Parkay and Stanford (2007), in a departmentalized classroom, “students typically study four or five academic subjects taught by teachers who specialize in them. In this organizational arrangement, students move from classroom to classroom for their lessons” (p. 134).

MAP. The MAP test was developed by the Northwest Evaluation Association (NWEA). MAP is a test that many South Carolina school districts use to measure what students have learned in math, reading, writing, and science (Educational assessment that helps kids learn, n.d).

NCLB. Under President George W. Bush, NCLB was created to increase the federal government’s participation in the progress of educating students by using standardized testing to monitor and evaluate the accountabilities of school progress

towards making all students proficient in reading and mathematics by 2014 (Goldring & Berends, 2009).

Self-contained classroom. Parkay and Stanford (2007) defined the self-contained classroom as the most traditional and prevalent organizational structure in elementary schools. In this type of classroom, one teacher teaches all or nearly all subjects to a group of about 25 children with teacher and students remaining in the same classroom for the entire day. Students may go to other classes for related arts subjects. Students may also attend special classes for remedial or advanced instruction.

Teacher efficacy. Teacher efficacy is defined as a teacher's confidence in his/her ability to promote student learning (Hoy, 2000).

Chapter 2: Review of the Literature

According to Collins's (2001) discussion of the idea of the Hedgehog Concept, "Just because something is your core business- just because you've been doing it for years or perhaps even decades – does not necessarily mean you can be the best in the world at it" (Collins, 2001, p. 99). This idea can be applied to the subject at hand in that schools should not continue doing the same thing over and over again for the mere reason of consistency and comfort. Barker (1999) stated in that "A leader is someone you choose to follow to a place you wouldn't go by yourself" (p. 1). In looking at this quote, a change in school climate is definitely a place you would not go by yourself (Collins, 2001, p. 13).

The purpose of this study was to analyze archival test data from math scores of fourth-grade students where the presence of two different classroom organizations were present to determine what effect existed between classroom organization and student achievement as measured by the MAP assessment. This study will allow for school leaders to have a framework for conducting their own research in their school districts to determine an appropriate model of instruction for their classrooms.

Theoretical/Conceptual Framework

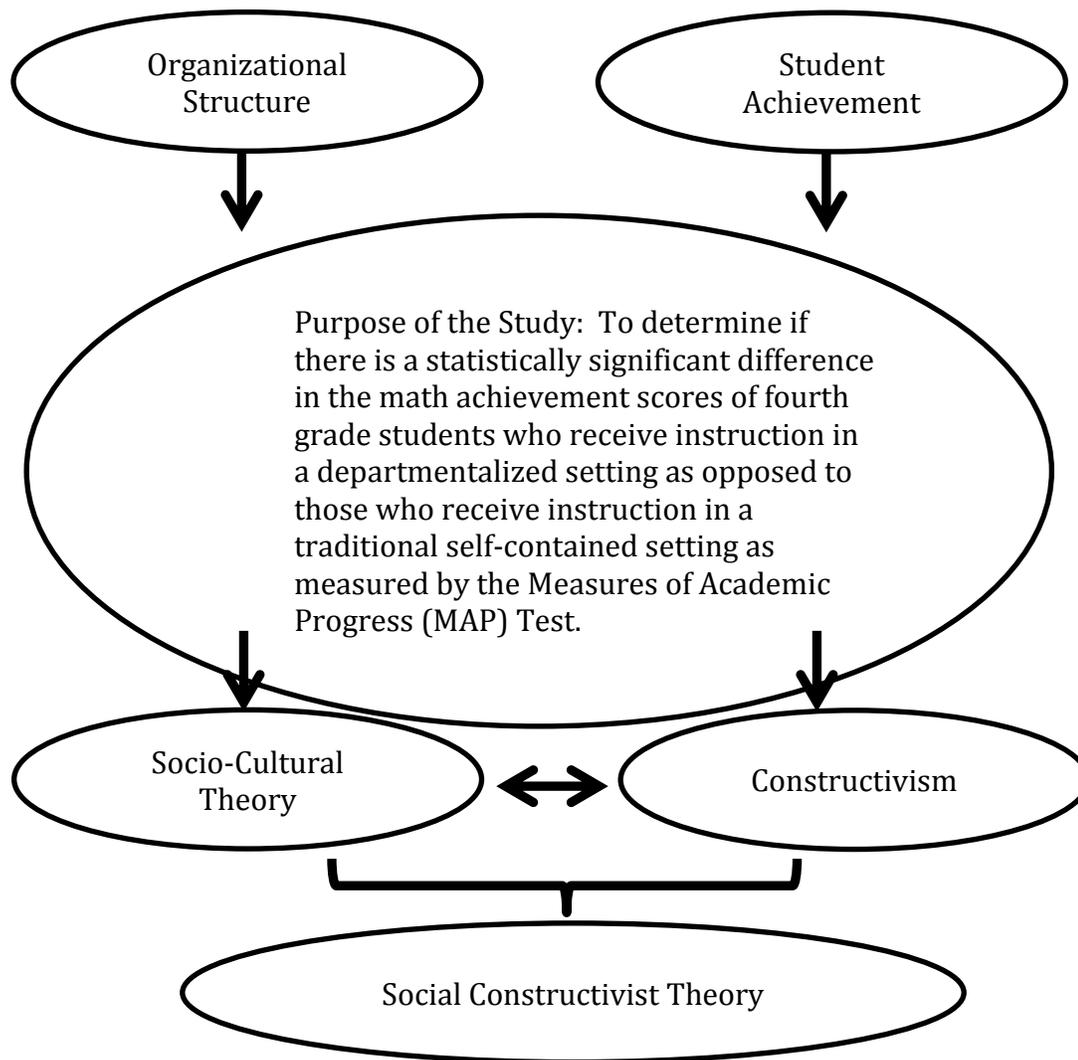


Figure. Theoretical/Conceptual Framework.

The conceptual framework for this study is built upon the educational theory of constructivism. The underpinnings for this research derive from Vygotsky's (1978) social constructivism and sociocultural theories and Piaget's (1952) constructivism theory. The framework establishes a basis for understanding the significance of structural environment in how a learner acquires and develops knowledge.

Constructivism, within the context of learning theory, involves an active learner who

constructs an academic knowledge base through the development of cognitive strategies and metacognition (Phye, 1997). Constructivism recognizes the social dimension of classroom learning and emphasizes the motivational elements of self-regulation and volition as essential learner characteristics (Phye, 1997).

Vygotsky (1978) introduced the “zone of proximal development,” which was based on problem solving and social skills; while Piaget (1952) focused more specifically on learning stages for acquisition of knowledge. Vygotsky strongly believed a child’s developmental progress was influenced through the outside environment where the learning took place (Ward, 2009). These theories illuminate how students construct knowledge and reference the conceptualization of the learning environment (Chang et al., 2008).

Vygotsky’s (1978) social constructivism and sociocultural theories and Piaget’s (1952) constructivism theory established a premise for recognizing and legitimizing the role that environment plays in knowledge acquisition and development. An important part of educational reform revolved around understanding how students learn and how instruction should be provided, not with the legislative outcomes of NCLB (Brooks & Brooks, 2001). While these theoretical frameworks historically introduce a relationship between the student’s ability to construct knowledge and the learning environment in which he/she best acquires new information, their premises are still evident within current organizational structures (Yearwood, 2011). Each student brings to the classroom a number of concepts and skills with which he or she gains information. These personal resources enable the student to solve problems posed within the learning environment (Demirci, 2009). The effect of an organizational structure on student achievement exists in numerous studies. For the purpose of this study, the researcher analyzed studies within

self-contained and departmentalized settings to determine specific gaps within the existing literature.

Andrews (2006) departmentalized the fifth grade at her school and conducted an action research study. In this study, she transitioned to a departmentalized social studies and math teacher. The results were generally inconclusive; however, there were some positive results. Fifteen percent less students fell into the bottom quartile on the national mathematics test once they became departmentalized. The school took ownership of the departmentalized classroom structure.

Moore (2008) conducted a study where he analyzed the standardized test scores of fourth- and fifth-grade students in six different school systems in Tennessee. He also attempted to determine the effect of teacher preference for a particular type of organizational structure – self-contained or departmentalized. His findings were that there was no significant difference in academic achievement based on classroom structure or teacher preference at the fourth-grade level. However, at the fifth-grade level, a significant difference was found in mathematics in favor of the departmentalized classroom structure (Moore, 2008).

Delviscio and Muffs (2007) reported that third-, fourth-, and fifth-grade students in a departmentalized classroom structure showed a definite increase in standardized test scores.

Kent (2010) compared the Kentucky Core Content Test scores of fourth- and fifth-grade students based on classroom structure (self-contained vs. departmentalized). She found that there was no significant difference on the academic performance in the subject areas of reading and mathematics (Kent, 2010).

Williams (2009) conducted a quantitative study to determine whether fifth-grade

students in departmentalized classroom structures achieved higher mean scale scores on the reading and mathematics sections of the Georgia Criterion Referenced Competency Test (CRCT) than students who were taught in a self-contained classroom structure. Using 2007 and 2008 CRCT data, she found that students who received instruction in a departmentalized classroom structure scored higher on the reading and mathematics portions of the 2007 CRCT (Williams, 2009).

Watts (2012) studied of the relationship between school organizational style and student outcomes. She found no significant difference between the self-contained and departmentalized instruction. She also found that there was no negative impact on student outcomes as a result of departmentalization. Also, teachers had a positive attitude toward departmentalization, indicating teachers found joy in that classroom structure (Watts, 2012).

Yearwood (2011) conducted a study using the Georgia CRCT fifth-grade scores as data. She controlled for previous achievement using ANCOVA, and the findings suggested that students who received instruction in a departmentalized classroom structure scored higher on the reading and mathematics portions of the 2010 CRCT (Yearwood, 2011).

Self-Contained Classroom Setting

The self-contained classroom is the most traditional and prevalent organizational structure in elementary schools. In this type of classroom, one teacher teaches all or nearly all subjects to a group of about 25 children, with the teacher and students remaining in the same classroom for the entire day. Students may go to other classes for related arts subjects. Students may also attend special classes for remedial or advanced instruction (Parkay & Stanford, 2007, pp. 133, 362).

In the past, the traditional, self-contained classroom structure has been considered the basic norm arrangement for many school systems (Canady & Rettig, 2008). Elementary teachers were responsible for teaching everything to the same collection of students for the entire school year (Heathers, 1960). One of the earliest plans to strengthen the traditional classroom was to provide specialist teachers to teach the physical education, art, and music classes (Heathers, 1960). The only absence of the primary teacher might have been for the specialty classes, lunch, recess, or particular classes for remediation and enrichment (also known as resource and gifted/talented; Heathers, 1960). The traditional, self-contained classrooms were organized in this way due to the idea of educating all aspects of the young child, often referenced as the “whole child” (Heathers, 1960). Whole Child education is the process of supporting the social and emotional needs of students (Garcia, 2007). By supporting the various nonacademic needs of students, the social distractions and disadvantages are reduced and the academic needs have a greater opportunity to flourish (Ackerlund, 1959; Anderson, 1962; Antonio, 2009; Bahner, 1965; Bezeau, 2007; Bowser, 1984; Canady & Rettig, 2008; Garcia, 2007; Heathers, 1960; Legters, McDill & McPartland, 1993; Lobdell & Van Ness, 1963; Naumann, 1977; Patton, 2003; Walters, 1970).

McGrath and Rust (2002) presented a study that investigated the relationship between elementary classroom organizational structures, particularly self-contained and departmentalized. It gave support for self-contained classrooms in the reduction of transition time in teaching subjects and increase in instruction time (McGrath & Rust, 2002, pp. 1-4). Alspaugh and Harting (1995) conducted a research study to outline the impact of transitional time for reading, mathematics, science, and social studies in achievement. The results of two schools in the study moving from self-contained to

departmentalized classrooms showed achievement losses in core subjects in the years of transition from self-contained to departmentalized classrooms. Alspaugh and Harting found that four of five groups of students who transitioned from a self-contained to a departmentalized structure saw a significant decline in their reading and math scores.

According to Piirto (2004), students who have been identified as gifted and are in self-contained settings score higher in this environment than when they are not. Both reported that it may be because students are able to be themselves without fear of the social implications associated with their giftedness.

The analysis from Catledge-Howard et al. (2003) also supported the self-contained classroom organization structure over a departmentalized organization. They concluded that student achievement was higher in language arts and science in self-contained environments and that schools should expect lower achievement scores during transitional years from fifth-grade self-contained classrooms to sixth-grade departmentalized classrooms (Catledge-Howard et al., 2003, pp. 1-5).

Rogers and Palardy (1987) conducted a survey of 125 elementary school principals in the southeastern section of the United States. The information gathered identified the grouping strategies and organizational structures being used from kindergarten through sixth grade. The findings indicated that “the majority of classrooms was self-contained with the percentage of such classes dropping at each successive level” (p. 113). Smaller schools had a higher percentage of classes using the traditional model over the nontraditional, departmentalized classroom model (Rogers & Palardy, 1987).

Flexibility is widely considered an advantage of the self-contained classroom structure (Culyer, 1984; Elkind, 1988). The daily schedule allows time to extend a specific subject area if necessary (Elkind, 1988). A departmentalized classroom lends

itself to wasted time due to students collecting materials to transition to another class for instruction by another teacher (Culyer, 1984; Elkind, 1988).

Students and teachers often develop a special connection with an individual teacher (Legters et al., 1993). Legters et al. (1993) stated that the teachers in the earlier grades “are likely to adopt a ‘student-orientation’ in which they take a broad view of the education of the ‘whole child’ and assume a personal responsibility for the success of each individual in their class” (p. 2). Bezeau (2007) stated that the personal relationship between the teacher and students in the self-contained, traditional class is a major strength over students and teachers who are in other types of classroom settings.

Canady and Rettig (2008) favored the traditional classroom over a departmentalized structure because “given ideal circumstances, that is, teachers who have a strong content knowledge and pedagogical skills in all subject areas, deep understanding of child development, a caring soul, and an abiding belief that all children can learn” (p. 127). They further preferred the traditional classroom to support a young child’s need for “the security and support of one competent, caring adult” (Canady & Rettig, 2008, p. 127).

McGrath and Rust’s (2002) study of fifth and sixth graders in departmentalized and self-contained classrooms found that students in self-contained classrooms made significant gains on the Tennessee Comprehensive Assessment Program (TCAP) in the total battery and language and science subtests; however, there were no significant differences in the math, reading, and social studies subtests (Catledge-Howard et al., 2003; McGrath & Rust, 2002). In addition, elementary teachers in self-contained settings had the advantage of knowing the strengths, weaknesses, and individual behaviors of each student and therefore can provide a better instructional experience by

accommodating for each of the individual learning styles and needs (Squires, Huitt, & Segars, 1983).

Harris (1996) stated that many of the previous studies that considered the effect of departmentalized classrooms on reading achievement were conducted prior to 1980, when most schools had implemented departmentalized classroom structures. Harris reiterated this statement and added that the data from this study “will sharpen one’s awareness of the effect of teacher-student relations on academic achievement” (p. 2).

Harris’s (1996) study highlighted several central issues that came to bear when school administration officials began investigating methods on how to organize classrooms within their schools. Also, it was felt that teachers within a departmentalized organization would be able to focus their skills in such a manner that would ultimately result in them having a depth of knowledge in their subject area that was not possible for teachers in self-contained classrooms. This knowledge would be passed on to students at a level that surpassed what teachers who serve as generalists could offer (Harris, 1996). Yet another issue relevant to this debate among several others was the concern over time-on-task. Many argue that self-contained organizational structure allows for more instructional time due to the lack of class transition (Harris, 1996).

Subjects selected for Harris’s (1996) study were from an urban school system in a northern state in the United States. Students were predominantly of Hispanic origin and located in an area of a low socioeconomic status. Two samples of students were selected for this research including 30 sixth-grade students in departmentalized classrooms and 30 sixth-grade students in self-contained classrooms. Academic achievement in this study was measured via student scores on the Iowa Tests of Basic Skills (ITBS), the standardized test used by the school system. A collection of *t* tests were used to

determine if there was a statistically significant difference in mean scores after the experimental group of students had been exposed to a departmentalized organizational structure for 1 year. Results of this analysis indicated that, at an ALPHA of .05, students in the Classroom Organizational Structures & Student Achievement for self-contained organizational structure scored statistically significantly higher than students in the departmentalized setting.

Departmentalized Classroom Setting

An alternative to the traditional, self-contained classroom structure is the departmentalized classroom structure. In this approach, the teachers teach specific content areas, and the students move from classroom to classroom during the day (Parkay & Stanford, 2007). Some advantages of departmentalization include specialization, instructional teams, teacher retention/transition to middle and high school, and flexibility. Specialization allows instructional time to be better utilized. Instructional teams can be formed to integrate subject content across the curriculum. Teachers are able to complete more in-depth lessons in a specific area, which may result in greater stability for them. Transition from elementary to middle school and middle to high school has been more easily achieved with departmentalization (Chan & Jarman, 2004). McPartland (1987) suggested that the intentions of departmentalization would allow teachers to become specialists in the subject matter they teach, and this would give them the knowledge required to design higher quality lessons. Others argued that if a teacher is highly proficient in math or writing, he/she will help others learn math or writing only if they can draw on their own knowledge to complete tasks (Hill, Rowan, & Ball, 2005).

Departmentalized classrooms allow teachers to maximize resources and preparation time (Flick & Lederman 2003). Teachers become more knowledgeable of

the subject matter they are expected to teach when departmentalization is implemented because they must have adequate understanding of the subject matter they are responsible for teaching (Flick & Lederman 2003).

Alspaugh and Harting (1995) conducted a study to determine the impact of the transition period of self-contained classrooms to departmentalized classrooms on reading, mathematics, science, and social studies achievement in five equated groups of rural school districts. The variable used was the Missouri Mastery and Achievement Test (MMAT). The results of the study showed a decline in all of the subjects during the transitional year when students went from a self-contained classroom to a departmentalized setting. This study showed that declines should be expected when students are examined during this critical transition time (Alspaugh & Harting, 1995). Baptiste, Waxman, Waxman, and Anderson (1990) stated that cooperative learning at the elementary level has contributed to higher achievement when compared to whole-class instruction in heterogeneous classes (p. 166).

Lewitt (1997) argued that class size should be a major consideration in determining the organization of a classroom. Small class size is closely related to the self-contained classroom environment (Lewitt, 1997). Departmentalized classrooms are able to take on a greater number of students because of the physical time breakdown of the work load (Lewitt, 1997).

Hunter (1988) explained how the development of peer relations directly impacts success in the classroom. By the age of nine and 10, the dependence level upon a teacher starts to substantially decrease and peers begin to play a major role in the development of the child (Hunter, 1988). Departmentalized classrooms could be utilized to support this theory by giving students the opportunity of a wide variety of teaching styles and

personalities (Hunter, 1988).

Reed (2002) investigated the perceptions of fourth-grade students, parents, and teachers regarding a four-teacher instructional model of departmentalization at an elementary school. In a four-teacher instructional model, students receive instruction in the area of math, social studies, science, and ELA from four specialized teachers (Reed, 2002). Results indicated that students were positive about departmentalization and liked the opportunity to move from class to class. Parents increasingly felt more welcomed in the schools, and teachers believed that students felt that they had a sense of a common mission in addition to positive social and academic experiences (Reed, 2002). Successful elementary-level departmentalization experiences like these need to be expanded to include other elementary schools as they prepare students for the social and academic challenges that await them in middle school. After all, elementary students really need to be exposed to the opportunity to develop their survival skills as they transition from the egocentrism of childhood to a group-centered way of school life (Perlstein, 2003).

Chan and Jarman's (2004) study investigated student issues such as collaboration and emotional needs that are not met outside the self-contained classroom. A list of benefits for switching from the self-contained to a departmentalized setting for instruction has been defined.

Specialization. Students receive basic education from teachers specialized in particular disciplines. From the teachers' perspective, instructional time is better utilized by concentrating on fewer disciplines.

Instructional teams. Grade-level instructional teams can be formed to coordinate teaching efforts across each discipline. Students benefit because they are exposed to the instructional wisdom of more than one teacher.

Teacher retention. With a more focused workload, teachers are able to complete their teaching assignments with greater satisfaction. The result is greater stability and retention of highly qualified teachers.

Transition. Departmentalization in elementary schools aligns with middle schools organization, better preparing students for transition.

Flexibility. Departmentalization allows students to move between grade levels according to ability, and from ability group to ability group within grade levels.

(Chan & Jarman, 2004, p. 70)

Another name for departmentalized classrooms is team teaching, where a team of teachers work with a particular set of students (Kruse, 1997). Team teaching is known as a subgroup of departmentalized classrooms (Buckley, 2000). Buckley (2000) defined team teaching as “a pedagogical technique that shifts the role of instruction from the individual to a team – provides students with the opportunity to take a more active role in learning” (p. 2). Coffey (2009) described it as an

instructional strategy used across subject areas primarily in middle grades in a variety of methods. Teams are typically composed of between two and four teachers working collaboratively to plan thematic units and lesson plans in order to provide a more supportive environment for students. (para. 1)

Kruse (1997) and Spies (2001) examined the art of team teaching. Spies’s findings concluded that team teaching is beneficial because teams are able to share the same students, collaborate daily, own a portion of the school, group and regroup students for learning, and design relevant and meaningful curricular experiences when planning together. Rottier (1996) provided some advantageous advice for successful teams in middle school. He recognized that in order for team teaching to benefit both teaching and

learning, true teaming needs to begin with the school administrators. Principals “must sincerely believe teaming positively affects learning, and this belief must be supported by a genuine understanding of the nature of teaming. Unless principals understand their relationship to teaming, teams will not provide all benefits possible” (Rottier, 1996, p. 19). Bishop and Stevenson (2000) reported on the success of using a two or three person coworker team with the most vital attribute being the “relationship between teachers. Adult relationships carry over to students, reflecting values of good humor and respect for learning, work, and each other” (p. 15).

Williams (2009) focused on evaluating the effect of departmentalization on the 2007 and 2008 CRCT math scores of fifth-grade students from the same RESA district represented in the current study. Williams’s study was aligned similarly to that of Page (2009). Each study used *t* tests to compare student achievement data on standardized tests while seeking to determine whether schools that used departmentalized settings had a higher percentage of students meeting or exceeding state standards. Neither study used statistical analysis to control for previous achievement before the introduction of the independent variable; thus, findings were conflicting (Yearwood, 2011). Williams indicated there was no significant difference between the percentages of students passing state mandated standardized tests in 2008 based on the independent variable, organizational structure. Williams’s analysis of 2007 achievement data indicated a significant difference between the percentages of students passing at the “meets” and “exceeds” levels of proficiency. The departmentalized setting had a higher percentage of students passing at the “exceeds” level than the self-contained organizational structure. Conversely, results of the Page study indicated that schools without a departmentalized organizational structure had higher mean scores in the advanced or proficient range.

Moore (2008) conducted a study in Tennessee in six different school systems looking at fourth- and fifth-grade students. Moore also analyzed standardized test scores of comparison groups and sought to determine the impact of teacher preference for one form of organizational structure (self-contained or departmentalized). Findings indicated no significant difference in academic achievement based on organizational structure or teacher preference in all science, social studies, math, and English language arts for fourth grade. No significant difference was found in academic achievement of fifth graders with the exception of math. Conclusions of the study were that fifth graders who were taught math in departmentalized settings scored higher than fifth graders who were taught math in traditional settings. Moore's results of the study supported the findings of Gerretson et al. (2008) where a valid argument for utilizing content specialists at the elementary level was made.

Student Achievement

Student achievement is the measurement of whether students know and can apply the concepts they are taught (Yearwood, 2011). "The single most critical issue in education is student achievement" (Rood, 1988, p. 3). Student achievement has always been the ultimate objective of schools; but with more accountability tied to student achievement, the way students are assessed has become the focus (Goertz & Duffy, 2003). Rood (1988) stated that student achievement is defined as a dynamic process in which the student constructs meaning by using existing knowledge and experiences to interact with the task as perceived from the nature of the information provided and the instructional context. For this reason, teacher proficiency influences student achievement.

In a study by Garner and Rust (1992), the achievement in reading, mathematics,

science, and social studies of fifth-grade students in self-contained and departmentalized classrooms was compared. Student achievement was measured using the Stanford Achievement Test (SAT) with the end-of-the-year fourth-grade test and end-of-the-year fifth-grade test. Garner and Rust reported no significant differences at the outset of the study with the fourth-grade scores. “However, a year later significant differences were found in all four academic areas” (Garner & Rust, 1992, p. 34). Students in self-contained classrooms performed significantly higher in reading, mathematics, science, and social studies as compared with students in departmentalized classrooms (Garner & Rust, 1992, p. 35).

McPartland (1987) study of two organizational structures addressed a balance between high-quality subject matter instruction with positive teacher-student relations. The findings revealed advantages and disadvantages for each structure. “The study finds self-contained classroom instruction benefits student-teacher relations at a cost to high quality subject-matter instruction, while departmentalization improves the quality of instruction in specialized subject matter at a cost to student-teacher relations” (McPartland, 1987, p. 6).

The Iowa Tests of Basic Skills (ITBS) assessed a random sampling of fourth- and fifth-grade students in self-contained and departmentalized classrooms in the areas of science and social studies. Using a one-way multivariate analysis in science and social studies, over 600 students’ ITBS scores were analyzed. Social studies and science results revealed higher mean scores of both grades in the self-contained classrooms. When both subject measures were considered collectively, the results differed between the grade levels. The fourth-grade classes (self-contained and departmentalized) differed only in social studies with the traditional class being significantly higher. At the fifth-grade

level, there were no significant differences in either subject (Bowser, 1984).

Factors Impacting Success in Self-Contained Classrooms

The development of strong human relationships. The idea of teaching the whole child aligns closely with the learner-centered ideology in which the scope of instruction goes beyond academic curriculum and extends to address social and emotional needs of students (“Making a case,” 2011; Schiro, 2008). Advocates of this ideology propose the role of the instructor is to individualize instruction for students based on their “strengths, weaknesses, and personality traits” (Elkind, 1988, p. 13). Elkind (1988) stressed the importance of the student-teacher connection, especially for younger elementary students, by positing rotation (or departmentalizing) disrupts younger students’ learning and increases their stress levels and learning problems (p. 13). Culyer (1984) stressed the importance of the individualization of education based on the needs of each student, noting the importance of the self-contained classroom structure in facilitating such instruction. Chang et al.’s (2008) argument presented decades later was similar to that of Elkind’s. They supported the idea of solid student-teacher relationships by arguing that generalists, or self-contained teachers, teach their students across all areas, allowing them to know the students’ strengths and weaknesses across various settings to meet their needs. One study conducted by Pianta, Belsky, Vandergrift, Houts, and Morrison (2008) examined the amount of student-teacher interaction at the elementary level and supported Elkind’s and Chang et al.’s arguments. They examined the extent to which variation in the quality of emotional and instructional interactions predicted trajectories of achievement in reading and math from 54 months to fifth grade. The authors found positive correlations in both math and reading for quality of teaching and social/emotional interaction. This evidence may reveal a link between emotional

needs of children and academic achievement.

When elementary teachers departmentalize, they are responsible for more students than self-contained teachers. This distribution releases each teacher from complete accountability of any individual student, as they share this responsibility with students' other teachers. Another concern about departmentalization revealed in the literature is the potential for teachers to lose a sense of personal responsibility toward student success (Chang et al., 2008, p. 133). Teachers may lose a sense of ownership toward individual student success when they share teaching responsibility with other teachers for the same students (Chang et al., 2008).

Integration of subject matter areas. An advantage of the self-contained classroom is the ability to integrate subject matter into different subjects throughout the day. Self-contained classrooms allow the teacher to really get to know the students' strengths, weaknesses, and personalities; as they are with the group of students for the majority of the day, which may allow self-contained teachers to be better prepared to create instructional time for their students (Irmsher, 1996; McGrath & Rust, 2002). Departmentalizing makes it difficult for teachers to get to know students well, develop positive student-teacher relationships, create a caring and supportive environment, and make curriculum connections through integration (Bryk, Lee, & Smith, 1990; Legters et al., 1993).

Individualized instruction. In self-contained classrooms, each elementary teacher taught everything to the same group of students for an entire academic year. One of the earliest plans to strengthen the traditional (self-contained) classroom was to provide specialist teachers to teach the physical education, art, and music classes (Heathers, 1960). Walters (1970) strongly disagreed with the trend to modify the

traditional, self-contained classroom. He expressed his opposing views to the alternative departmentalized setting by basing his opinion on four educational concepts which strengthened the traditional classroom. The concepts included reinforcement of learning, individualization of instruction, development of self-direction, and psychological needs of the child.

A group of parents in 1989 looked at moving away from the elementary traditional classroom setting to the departmentalized setting and became concerned about the consequences of this shift. The Department of Elementary Education was called upon to investigate the issue after being called upon by the Board of Directors of the Des Moines Iowa Public Schools. In the report *Elementary School Organization: Self-Contained and Departmentalized Instruction* (1989), the traditional teacher was viewed as a generalist, rather than a specialist in the departmentalized classroom. The report findings further advocated for the self-contained classroom by indicating the elementary level should be “child-centered rather than subject-centered” (*Elementary School Organization: Self-Contained and Departmentalized Instruction*, 1989, p. 11). It was additionally reported the students within the traditional, self-contained classroom had “the security of working with one teacher all day” (*Elementary School Organization: Self-Contained and Departmentalized Instruction*, 1989, p. 11). Researchers agreed with this report to meet the needs of the whole child in one classroom setting. Bahner (1965) expressed, “The self-contained teacher presumably has a greater chance to establish an intimate rapport with the pupils—a rapport which positively influences the learning situation” (p. 337). Ediger (1994) recognized a teacher in a self-contained classroom had ample opportunities to be knowledgeable of the whole child, from the academic concerns to the emotional stability of familiarity.

Choices/flexibility in the use of time. Another advantage to remaining with the same academic teacher throughout the course of the day, as advocated by Culyer (1984), is flexibility with scheduling (McGrath & Rust, 2002). Teachers who maintain one group of students a day within the same room have the option to adjust their instructional schedule according to the needs of the students, whereas departmentalized schedules are more rigid because of the class rotation schedule. Elkind (1988) postulated that a significant amount of time was lost during students' class transition; however, McGrath and Rust (2002), who also opposed departmentalization, conducted a study that revealed no significant differences between the teaching models regarding actual instructional time.

Less transition. Gamoran (1986) found instructional time is related to increased student achievement, suggesting classroom configurations that maximize instructional time are more beneficial to students. Rice (2001) studied the impact of transition time on student achievement as measured by test scores in a longitudinal study on student performance in math and science. She found that when students changed classes in departmentalized settings, they lost time gathering materials, walking to a new location, and taking materials out again. Alternately, when students learned in self-contained settings, they conserved that time.

McGrath and Rust (2002) reported that transition time between subjects was significantly more efficient in self-contained classrooms and reported that the average transition time in self-contained classrooms was 3.27 minutes while the average transition time in departmentalized classrooms was 4.55 minutes. "Despite the longer transition time, the departmental teachers allotted a similar amount of instructional time in the five major subject areas compared to self-contained teachers" (McGrath & Rust, 2002, p. 42).

Culyer (1984) stressed that time is wasted at the end of one class as children prepare to leave and transition to the next class and stated, “Multiply transition time by the number of times it occurs per week (or year), and one quickly discovers how much potential instruction time is wasted” (p. 419).

Parent-teacher communication. An additional diffused responsibility related to the departmentalized structure is parental contact, as studied by Epstein and Dauber (1991). They found that teachers of self-contained classrooms had significantly higher parental involvement than departmentalized teachers. Self-contained teachers were more familiar with students as a result of more daily student-teacher interactions and were more likely to make contact with parents (Epstein & Dauber, 1991).

Teachers are charged with the responsibility of keeping accurate records of their students’ progress. In departmentalized classrooms, there are a greater number of students which would make communication with parents more difficult. Some schools have adopted well-organized programs with effective communication procedures which can be in the form of newsletters, web pages, and student planners. Consequently, students are given added responsibility to communicate with their parents using daily planners (Adams-Byers, Whitesell, & Moon, 2004).

Factors Impacting Success in Departmentalized Classrooms

Content specialization. Lowery (2002) found specialized instruction built teacher confidence and competence. Teaching fewer subjects improved subject-area attitudes by allowing teachers to focus on standards and teach strategies in depth rather than spreading their time and talents over a wide range of subject areas. Wilkins (2008) found that teachers with more positive attitudes toward specific subject areas used more effective instruction methods in those areas. While Lowery’s study showed an

improvement in attitudes and teaching abilities through specialized instruction, Wilkins showed teachers used more effective teaching methods in subject areas toward which they had more positive attitudes. Reys and Fennell (2003) suggested that it is “unrealistic” to expect elementary teachers to have specialized, expert knowledge in many subjects (p. 277). Ma (1999) said that what teachers in the United States are expected to accomplish with limited time is “impossible” (p. 127).

Self-efficacy is another component affected by decreasing workload and increasing focus in subject areas. Self-efficacy can be fostered through a departmentalized format as teachers become more proficient in their content knowledge through focused professional development. Self-efficacy of departmentalized teachers is also fostered as their skills become more refined through the concentration of fewer subjects than self-contained teachers (Bailey, 2010; Podhajski, Mather, Nathan, & Sammons, 2009). Self-efficacy was shown to have a positive impact on teacher job performance in multiple studies. A study conducted on the relationship between various factors of teaching and teacher job satisfaction revealed student achievement, self-efficacy, and job satisfaction were reciprocal in nature (Caprara, Barbaranelli, Steca, & Malone, 2006). Brown (2012) compiled an extensive review of studies conducted on the relationship between self-efficacy and burnout and found that all the studies reviewed revealed a negative relationship between teacher self-efficacy and burnout. Research reviewed by Muijs and Reynolds (2002) suggested that students who have teachers with high efficacy attain better scores on achievement tests than students who are taught by teachers with low efficacy. Muijs and Reynolds also suggested that low teacher efficacy has been linked to low expectations of student achievement.

Instructional teacher teams. Team teaching capitalizes on the idea of

collaboration because it allows teachers to “share responsibility, have autonomy over their classes, and [be] better able to solve any problems which arise” (Abdallah, 2009, p. 1). Collaboration between teaming teachers decreases the amount of individual planning time for which each teacher is responsible. Teachers reflect on lessons, students, and other aspects of teaching and learning in a way only collaboration between teammates can offer (Abdallah, 2009; Stewart & Perry, 2005).

Patterson, Syverud, and Seabrooks-Blackmore (2008) found collaboration to be highly important for professional networking for positive impact on learning opportunities for children. Feedback from students included comments about enjoying the different perspectives collaboration brought, benefiting from different teaching styles through collaborating teachers, being exposed to a variety of different viewpoints, and how it benefited their own learning (Patterson et al., 2008). In Dugan and Letterman’s (2008) study, findings also suggested that students preferred team-taught courses involving truly collaborative teaching methods.

Collaboration between teachers has proved critical to making this model work in terms of improving student achievement. Rea and Connell (2005) emphasized that “collaborative teaching structures that are well-planned, skillfully implemented, and meticulously evaluated hold the potential for addressing the demands for greater accountability for improving student outcomes” (p. 35).

Transition to a middle school type classroom. According to Weldy (1991), middle school teachers reported an expanded list of specific challenges that students face in making the transition from elementary to middle school. The study described reduced parent involvement, more teachers, no recess, no free time, new grading standards and procedures, more long-range assignments, more peer pressures (e.g., cliques, dealing with

older students and students from other schools), accepting more responsibility for their own actions, unrealistic parental expectations, lack of experience in dealing with extracurricular activities, coping with adolescent physical development, social immaturity, and lack of basic skills as challenges that were reported by teachers in the study.

Students who move into middle-level schools from elementary grades that rotate students between classes at least part of the day reported feeling better prepared to enter a middle-level school. Waggoner (1994) investigated transition concerns and the self-esteem of 171 sixth graders. Students from teamed settings in elementary schools demonstrated a stronger affiliation in school activities and fewer concerns about the transition to junior high school than students in self-contained sixth-grade classrooms. Teachers in teamed settings felt their students exhibited fewer indicators of stress related to progressing to junior high school than teachers of students in self-contained sixth-grade classrooms. Sixty-six percent of all students surveyed believed they would be better prepared for seventh grade if they had more than one sixth-grade teacher (Waggoner, 1994).

Eccles and Midgley (1991) explained that school administrators and organizers prefer the departmentalized over the self-contained model of instruction because it allows students to be familiar with the secondary educational system ultimately becoming better adjusted with the system. Because the students were previously exposed to departmentalization during the later parts of their elementary education, they will not be spending their time acclimating to the high school organization.

In-depth learning. The use of instructional time is another residual effect of the implementation of content specialists through a departmentalized structure. Eidielis and

Jewkes (2011) examined the impact of teacher preparedness in a particular topic on the instructional time allotted for that topic. They discovered the less prepared teachers reported they were to teach a topic, the less time they spent on teaching it. Eidielis and Jewkes used statistics to analyze teachers who taught subjects in which they were most knowledgeable and prepared. Departmentalized teachers experience repetition with fewer subject areas than self-contained teachers, potentially giving them more practice and opportunities for reflection through repeated lessons. Wilkins (2010) also conducted a study that revealed a relationship between teacher attitudes toward specific subject areas and the time they spent teaching each area. She noted that teachers were more likely to spend the most time teaching the subjects they favored and also introduced literature regarding instructional quality for teachers' more favored subjects. Wilkins's (2010) study can be used to show how teachers vary in levels of favoritism of subjects they teach, which further adds to the value of departmentalization when teachers are assigned their preferred subjects.

Equal time given to each subject area. In a study of block scheduling, Mattox, Hancock, and Queen (2005) discovered significant gains in student achievement when block schedules were implemented. The study noted that classes were longer and thereby provided teachers with the time needed to do more active learning with students. The block schedules also allowed for more limited number of classes per teacher, so teachers had sufficient time to plan and develop more detailed, effective lessons. Hill et al. (2005) found there to be a significant relationship between the mathematical knowledge held by teachers and the achievement of their students. They also indicated that additional time was an effective predictor of increased student achievement.

Engaging lessons. Hill et al. (2005) noted that the intention of

departmentalization allows teachers to become specialists in the subject matter they teach, and this gives them the knowledge required to design higher quality lessons (p. 377). Students in departmentalized classes can become eager learners who benefit from being exposed to active, engaging lessons; different teaching personalities; and various teaching styles; while their teachers benefit from having increased opportunities for collaboration (Hood, 2010; McPartland, 1987; McPartland, Coldiron, & Braddock, 1987). Their literature highlights the specific benefits of choosing departmentalized instruction, particularly at the upper elementary level, including having enthusiastic subject matter experts in the classroom along with more lesson planning time, resulting in in-depth, engaging lesson preparation (Hood, 2010; McPartland, 1987; McPartland et al., 1987).

Summary

This chapter included a comprehensive review of literature and research related to self-contained and departmentalized organizational structures. In an effort to situate the research study in the context of student achievement and teacher perception, the researcher juxtaposed advantages and disadvantages of both organizational structures against both historical and contemporary backdrops. Factors impacting success in departmentalized classrooms included content specialization, instructional teacher teams, teacher retention, transition to a middle school type classroom, flexibility, in-depth learning, equal time to subject area, and engaging lessons. Factors impacting success in self-contained classrooms included student/teacher relationships, choices/flexibility in the use of time, less transition/more on-task time, integration of subject matter, and “child-centered” instruction.

Overall, the literature presents opposing viewpoints and conflicting data. These

inconsistencies confirm the significance of this research study and present a need for both qualitative and quantitative data to examine the effects of classroom organizational structures within the fourth-grade math classroom. The research design and methodology are discussed at length in Chapter 3.

Chapter 3: Methodology

There is a problem in determining the appropriate structural model (self-contained, departmentalized) for fourth-grade math students. In addition to research on student achievement, some research credits a self-contained structure for stronger student/teacher relationships and on-task time, while other research supports a departmentalized structure as the best option for teacher content efficacy. These inconsistencies and gaps in research reveal a need for further research, especially a mixed-methods study utilizing both quantitative and qualitative data. This research study simultaneously explores the complexities of student achievement and teacher perception.

The purpose of this chapter is to explain the methods used to complete the quantitative research study. As previously mentioned, this study examined which organizational structure, self-contained (one teacher for all academic subjects) or departmentalized (math taught by a different teacher), had the greatest effect on general fourth-grade students' math achievement as measured by the MAP test developed by NWEA. A secondary purpose addressed the consideration of teacher perceptions on teaching in a self-contained classroom versus a departmentalized classroom.

From the above problem statement, the following research questions were developed and addressed.

1. Are there significant differences in fourth-grade achievement scores (MAP) in math between students in self-contained and departmentalized classrooms?
2. What components of organizational structures do teachers relate as having an impact on the quality of the math program?
3. What are the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings?

Research Design

According to Creswell, Fetters, and Ivankova (2004), a mixed-methods approach involves pulling together quantitative and qualitative data collection and analysis in a single research study. A casual-comparative research design was used to test the null hypotheses in this ex-post facto research study. Quantitative methods involve the process of collecting, analyzing, interpreting, and writing the results of a study (Creswell, 2003). Because the participants were predetermined by the participating schools, students could not be randomly assigned by the researcher. The researcher examined the archival data of two different classroom organizational instruction techniques—self-contained (one teacher) and departmentalized structures (math taught by a different teacher). This procedure was accomplished by analyzing the 2015 and 2016 math MAP test data of the fourth-grade students to investigate the cause-and-effect relationships of the two different types of instructional techniques (independent variables) as measured by the MAP test (dependent variable). According to Ary, Jacobs, Razavieh, and Sorensen (2006), this design will look “at the consequences of differences on an independent variable” (p. 360).

Other areas of concern about the classroom organization included irrelevant variables involving teacher perceptions, opinions, and experience. These variables were addressed using a teacher data collection and survey instrument to be discussed later in this chapter.

Population and Sample

The primary participants for the research study were general fourth-grade students from ALPHA School District. The sample size consisted of six schools totaling 696 general education students in all. Students identified as having special needs, such as a

learning disability that caused them to be pulled completely out of the general education classroom, were excluded from this study. This exclusion was necessary because every student with disabilities had an individualized educational plan with specific modifications and accommodations. These modifications and accommodations may have interfered with the test data since resources and support were often available to the students beyond the general classroom setting. Secondary participants were the 32 general education, fourth-grade teachers employed by the six elementary schools.

The variable used was 2015-2016 math fourth-grade MAP scores. Information was gathered from the release of MAP data from the ALPHA School District office officials with the correlation of teacher classroom structures by way of an email survey. The information was then categorized by school, teacher, and students in the fall and again in the spring to analyze student growth versus classroom structure.

In addition to the student test analysis, teacher participants were asked to complete a six-question survey dedicated to their structure of teaching, self-contained or departmentalized, that focused on understanding how specific factors contribute to students finding success in the math program. Lastly, the researcher asked for volunteers to act as interview participants to take part in a brief interview consisting of five questions to gather deeper information centered around the results of the teacher survey.

Setting

The setting of this research study was a school district in ALPHA County that consisted of six public school systems in upstate South Carolina. Prekindergarten through fifth grades was the dominant grouping of the schools. The remainder of the schools used variations of grade-level groupings. The school with the largest student population had 902 students in the spring of 2016, while the school with the smallest

student population had 303 students in the spring of 2016. The mean student population of the schools was 533 students.

Based on state-adopted standards, math curriculum taught across the setting was the same. Common Core State Standards provided a consistent, clear understanding of what students were expected to learn, so teachers and parents knew what they needed to do to facilitate student learning. The standards were designed to be robust and relevant to the real world, reflecting the knowledge and skills that young people need for success in college and careers (Implementing the common core state standards, 2013). Standards were grouped by strands in content areas (Implementing the common core state standards, 2013).

In Grade 4, instructional time focused on three critical areas: (1) developing understanding and fluency with multi-digit multiplication and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and (3) understanding that geometric figures can be analyzed and classified based on their properties such as having parallel sides, perpendicular sides, particular angle measures, and symmetry (Implementing the common core state standards, 2013).

Students generalized their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They applied their understanding of models for multiplication (equal-sized groups, arrays, area models); place value; and properties of operations, in particular the distributive property, as they develop; discuss; and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they

selected and accurately applied appropriate methods to estimate or mentally calculate products. They developed fluency with efficient procedures for multiplying whole numbers and understood and explained why the procedures work based on place value and properties of operations and used them to solve problems. Students applied their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they developed; discussed; and used efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They selected and accurately applied appropriate methods to estimate and mentally calculate quotients and interpret remainders based upon the context (Implementing the common core state standards, 2013).

Students developed understanding of fraction equivalence and operations with fractions. They recognized that two different fractions can be equal (e.g., $15/9=5/3$), and they developed methods for generating and recognizing equivalent fractions. Students extended previous understanding about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number (Implementing the common core state standards, 2013).

Students described, analyzed, compared, and classified two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepened their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry (Implementing the common core state standards, 2013).

Instrument

The instrument used to measure the student growth was the MAP test. Developed by NWEA, MAP is a test many South Carolina school districts use to measure what

students have learned in math, reading, and writing. Some districts administer MAP twice per year, in the fall and the spring, while other districts may issue it three or four times in a school year. Many of the school-wide or grade-wide tests given to students are “traditional standardized” tests. This means that every student is tested with the exact same questions and their results are compared to other students their age. MAP is different from those kinds of tests because not all students see the same questions.

The MAP test is a type of “computerized adaptive test.” This means that the test systematically adjusts the difficulty of the questions to meet the level of the student. The test, which has no time limit, begins with a question that matches the student’s grade level. If the student answers the question wrong, the computer will offer an easier question next. The rest of the questions are determined according to the student’s performance on previous questions.

The MAP assessment is different from state standardized tests because it adapts to the level of the test taker. Consequently, it can assess the instructional level of a student and identify concepts that the student might be ready to learn so parents and teachers are more informed and better equipped to meet the specific needs of the learner. When the student takes the test again later in the school year, the results will measure the student’s progress and identify new concepts needing attention. This is important because it illuminates areas of strengths and weaknesses in the student’s knowledge compared to other students across the nation.

Since MAP is administered on a computer, the score of the test can be given as soon as the student completes the test. The score will be called a Rasch Unit (RIT), which is a special type of number scale that measures student achievement. A RIT score will vary from grade level to grade level as a student grows. These scores can be used to

compare the student's performance to that of a "typical" student his or her age. Using scores this way helps identify students who need remediation or extra support. Parents who are interested in how their child's score compares to a "typical" student his/her age can discuss the results with their child's teacher. Scores can also be used to gauge a student's expected progress/growth within a given school year.

Furthermore, the RIT scores can be used with a curriculum tool to help determine specific skills the student might be ready to develop or extend. For example, a score from 191-200 on the reading portion of the MAP test would suggest that a student might be ready to develop the following skills: making inferences about the emotions of characters in the text, drawing conclusions based on information from informational texts, and making inferences to identify settings in literary passages.

According to NWEA, the extensive item bank of questions used on the NWEA MAP tests have been developed over a substantial period of time. This has given staff, charged with statistical analysis, abundant opportunities to establish the reliability of the tests. The result has been the collection of a significant amount of reliability evidence over time. Test and retest studies have consistently yielded statistically valid correlations between multiple test events for the same student. Such studies rely on the methodology of having students retest within several days. NWEA test and retest studies have typically looked at scores from the same students after a lapse of several months. Despite this methodology (which would have the expected result of lowering the correlation figures), the reliability indices have consistently been above what is considered statistically significant. Internal reliability (reliability between test items) has also been impressive. This is all the more remarkable in view of the volume and breadth of the item bank and the fact that MAP is an adaptive test. MAP users can be confident of the

reliability of their tests. The rigor that has been applied to the reliability studies has left no doubt that the MAP assessment system has been constructed, and continues to be maintained, in a manner that assures more than adequate reliability.

Fourth-grade students in ALPHA School District take the MAP test in the fall and spring of the academic calendar year. According to NWEA, NWEA originates target scores. These target scores show the typical growth for a student in the particular grade level as calculated by national norms. The MAP test growth norms are very precise. Due to the enormous number of students involved in the norming study, NWEA staff has been able to calculate the mean growth of similar groups of students from each grade level (2-10) who scored at each RIT level in the initial testing season. For this study, the researcher focused on students in fourth grade (Educational assessment that helps kids learn, 2015).

Data Collection

Upon receiving approval from the Institutional Review Board, the researcher contacted the director of assessment and accountability from the school district involved in the study to ensure the value of the research study to the district. Additionally, the researcher verified that the study would respect the privacy and due process rights of students and employees and would not interfere with the educational programs of the district. The researcher agreed to provide the district with a copy of the completed research. The researcher then surveyed the elementary school administrators from the six schools to determine (1) the number of fourth-grade homerooms, (2) how many of the homerooms were self-contained, and (3) how many of the homerooms were departmentalized. At this time, the researcher was given last names for the fourth-grade homeroom teachers and permitted to ask the homeroom teachers specific survey

questions. The researcher contacted building-level principals prior to dispatching the survey to potential homeroom teacher participants. An online Google form was used to virtually collect the data from the survey questions. By using a Google form, the researcher was able to create a survey, embed it into an email, and send it to the group of homeroom teachers. A Google form is a convenient, self-serve survey platform on which users can, by themselves, create, deploy, and analyze surveys through an online interface. This method upheld the integrity of the research process while also respecting the busy schedules of the teachers. Each homeroom teacher was also given a hard copy of the survey instrument as an alternative to the online survey.

1. In a self-contained classroom setting (math taught using the traditional method where one teacher is responsible for teaching all content), how do the following factors contribute to students finding success in the math program?

Factors impacting Success in Self-Contained Classrooms	No Importance	Little Importance	Neutral	Important	High Importance
The development of strong human relationships					
Integration of subject matter areas					
Individualized instruction					
Choices/Flexibility in the use of time					
Less Transition					
Parent-Teacher communication					

2. In a departmentalized classroom setting math taught by a different teacher or

specialist), how do the following factors contribute to students finding success in the math program?

Factors impacting Success in Departmentalized Classrooms	No Importance	Little Importance	Neutral	Important	High Importance
Content Specialization					
Instructional teacher teams					
Transition to a Middle School type classroom					
In depth learning					
Equal time given to each subject area					
Engaging Lessons					

After teacher participants completed the online survey, they were asked to voluntarily participate in a follow-up interview. Data collected through post-interviews revealed perceptions and experiences of self-contained and departmentalized classroom teachers. Seidman (2006) discussed how interviewing, at its core, is “understanding the lived experience of other people and meaning they make of that experience” (p. 9). These interviews provided insight into experiences of teachers who taught in self-contained and departmentalized settings as well as their perceptions related to those experiences. The purpose of the interviews was to narrow the scope of the data gathered from the survey questions to understand concepts on an individual scale. As Seidman discussed, understanding the individual experiences allowed for comparison between perceptions of the same experience. The interview questions were open-ended; and to

eliminate influence on responses, the use of biased or leading language was intentionally avoided. Analyses of interviews were coded for themes and patterns; they were also compared and contrasted against the other interviews (Saldaña, 2009).

The interview participants from the group of homeroom teachers who chose to participate in a post-interview were asked a series of questions in order to establish identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings. Interview participants were offered a different set of questions based on their classroom structure (self-contained/departmentalized).

Post-interview questions for self-contained teachers.

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays a significant role in their ability to gain knowledge in mathematics?
3. Can you talk a little bit more about the importance of human relationships on fourth-grade students' success in a math program?
4. How does the concept of individualized instruction increase in a self-contained classroom?
5. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

Post-interview questions for departmentalized teachers.

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays a significant role in their ability to gain knowledge in mathematics?
3. In today's classroom, why do you think content specialization plays such an important role in student success?

4. A lot of teachers responded that engaging lessons are key towards student success. How does teaching in a departmentalized setting allow for lessons to be more engaging?
5. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

The researcher then contacted the Coordinator of Test Administration from ALPHA School District and requested the fall and spring MAP scores for every student in fourth grade according to school and homeroom teacher. Data were sent to the researcher in an excel spreadsheet listing all scale scores from the math 2015-2016 fall and spring portion of the MAP assessment from students who had attended the six schools located in the upstate of South Carolina. In order to safeguard the rights and anonymity of the students, all students were de-identified prior to placement on the spreadsheet. The homeroom teachers' names were kept on the spreadsheets in order to help classify which students were from self-contained classrooms and which students were from departmentalized classrooms.

Data from the MAP assessment Excel spreadsheets for the six elementary schools were sorted according to self-contained and departmentalized instructional models and assembled into two individual spreadsheets. Each of the spreadsheets contained the fall 2015 and spring 2016 RIT scores for the students along with the number of growth points that were accrued. The 2015-2016 math MAP scores were then analyzed to answer the primary research question guiding the study: Are there significant differences in fourth-grade achievement scores (MAP) in math between students in self-contained and departmentalized classrooms?

A quantitative analysis yields itself to statistical procedures. The researcher chose

to use a t test to analyze the student achievement data. A t test looks at the t statistic, t distribution and degrees of freedom to determine a p value (probability) that can be used to determine whether the population means differ (Trochim, 2006). The analyses covered data acquired from the test. The test consisted of fall (pre) and spring (post). The aims of the analyses were to determine whether the students would have a significant change in their achievement scores dependent upon the classroom structure in which they spent the year (self-contained or departmentalized). This study used method of quantitative analysis to process the data. To know the significant difference, the data were analyzed by using the formulation of t test (Trochim, 2006).

A statistical process was used to address the research questions and hypotheses and deliver evidence such as comparison of groups of individuals as they relate to specific scores (Creswell, 2008). In this study, the dependent variable was math achievement for individual students which was measured by the scores achieved from the math portion of the MAP assessment. The independent variable was the type of classroom organizational structure that was employed: self-contained or departmentalized classroom structures.

Data Analysis

The purpose of this study was to analyze archival test data from math scores of fourth-grade students attending six elementary schools in upstate South Carolina where the presence of two different classroom organizations were present to determine what effect existed between classroom organization and student achievement as measured by the MAP assessment. The results of this study will be used to aid schools in making decisions based upon the most viable use of self-contained and departmentalized classrooms as an educational structure for fourth graders. Currently, each of the

elementary schools utilizes the organizational structure chosen by the individual school leadership team. Within each school, teachers maintain independent perceptions and opinions as to whether self-contained (math taught using the traditional method where one teacher is responsible for teaching all content) or departmentalization (math taught by a different teacher or specialist) provides a better learning environment and produces better student performance on the MAP assessment (Williams, 2009).

In quantitative research, an instrument is utilized to accurately gauge the variables in the study (Creswell, 2008). For the purposes of this research study, data consisted of individual test scores from fourth-grade students' math portion of the 2015-2016 MAP assessment from six elementary schools in upstate South Carolina. The scores were collected and organized on spreadsheets for analyzing and comparing scores of fourth-grade students in self-contained and departmentalized classroom structures from the 2015-2016 school year. Creswell (2008) asserted that the larger the number of participants in a study, the more formidable the case is for applying the outcome to a large number of people. This research study included approximately 696 students from six elementary schools either enrolled in a self-contained or departmentalized classroom structure. Using the data resources provided by the school district, the researcher categorized the de-identified student scores according to two separate classroom organizations titled "Self-Contained Classroom Organization" and "Departmentalized Classroom Organization." Data from the 14 self-contained homerooms were copied and pasted onto the new spreadsheet listing the de-identified scores of the 297 students. This process was repeated for the 399 de-identified scores from the 18 departmentalized classrooms. The researcher replicated this process for the spring data and then comprehensively analyzed the data to determine the amount of growth the students

experienced from fall 2015 to spring 2016 in both the self-contained and departmentalized classrooms.

The second part of the research study involved open coding to analyze and organize the data from the teacher surveys. As previously mentioned, teacher participants received different questions based on their classroom organizational structure.

Post-interview question for self-contained teachers: In a self-contained classroom setting (math taught using the traditional method where one teacher is responsible for teaching all content), how do the following factors contribute to students finding success in the math program?

Teacher participants were then asked to rate six areas with a rating of no importance, little importance, neutral, important, or high importance. The areas of inquiry were

1. The development of strong human relationships
2. Integration of subject matter areas
3. Individualized instruction
4. Choices/flexibility in the use of time
5. Less transition
6. Parent-teacher communication

Question for departmentalized teachers: In a departmentalized classroom setting (math taught by a different teacher or specialist), how do the following factors contribute to students finding success in the math program?

Teacher participants were then asked to rate six areas with a rating of no importance, little importance, neutral, important, or high importance. The areas of

inquiry were

1. Content specialization
2. Instructional teacher teams
3. Transition to a middle school type classroom
4. In-depth learning
5. Equal time given to each subject area
6. Engaging lessons

These questions allowed the researcher to identify which components of organizational structures teachers value as having the most impact on the quality of their math program. The responses from these questions were analyzed and then compared to the growth in student achievement as assessed by the MAP assessment.

After the results of the surveys were tallied, the researcher asked for volunteer teachers to interview, asking them the following questions in order to identify the cultural classroom differences in environments when comparing self-contained and departmentalized settings.

Self-contained teachers.

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays a significant role in their ability to gain knowledge in mathematics?
3. Can you talk a little bit more about the importance of human relationships on fourth-grade student success in a math program?
4. How does the concept of individualized instruction increase in a self-contained classroom?
5. Is there anything else you think the audience would like to know about

classroom structures and their impact on student learning?

Departmentalized teachers.

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays a significant role in their ability to gain knowledge in mathematics?
3. In today's classroom, why do you think content specialization plays such an important role in student success?
4. A lot of teachers responded that engaging lessons are key towards student success. How does teaching in a departmentalized setting allow for lessons to be more engaging?
5. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

Data were collected to investigate the trends found in the identifiable cultural classroom differences in environments. The transcribed interviews were subjected to a content analysis. Content analysis is a technique that allows the researcher to utilize data to cross-validate findings obtained by different techniques (Krippendorff, 1980). An application of content analysis is the development of themes. Identifying themes in identifiable cultural classrooms facilitates assertions analysis in providing a frequency in which topics are characterized (Krippendorff, 1980). The data collected were divided into three frequency distribution tables, one for common questions and two to account for the unique self-contained and departmentalized teacher questions. According to Krippendorff (1980), "the frequency with a symbol, idea, or subject matter occurs in a stream of messages tends to be interpreted as a measure of importance, attention, or emphasis" (p. 41). Response frequencies were tallied in each of these thematic areas.

Responses gathered in interviews received one of four strength codes: no response, weak response, moderate response, or strong response as it related to the themes. Strength codes provide qualifications toward subject matter to be used as a measure of intensity or strength of a belief, conviction, or motivation (Krippendorff, 1980). The following codes were used in the analysis of the interviews: No response was given if the theme was not addressed; weak response was given if the theme was addressed with a short answer such as a simple yes or no; moderate response was given if the theme was addressed with a specific example of the theme; and a strong response was given if the theme was addressed elaborately with actual examples of processes that pertained to the theme.

Reliability was protected by following standard procedures in data collection. No variability occurred in the implementation of instruments or interview procedures at each of the designated study sites. The field tests and evaluation assisted in determining that the study can be replicated in other situations.

Summary

Chapter 3 presented the research design, population and sample, instrumentation, and procedures that were used for data collection and analysis. This study used quantitative procedures to analyze organizational classroom structures as associated with student achievement scores. It also used qualitative procedures to analyze teacher perceptions toward components of organizational structures that teachers relate as having an impact on the quality of the math program and identifiable cultural classroom differences in environments in self-contained and departmentalized settings. This study used a sample of fourth-grade classrooms from a school district in the upstate of South Carolina. Chapter 4 provides an analysis of data.

Chapter 4: Results

The elementary classroom structure, with relevance to student achievement, is just as undetermined today as it was decades ago. Diverse structured arrangements such as self-contained and departmentalized classrooms are often deliberated and discussed. The educational theory of constructivism theory establishes a basis for understanding the significance of structural environment in how a learner acquires and develops knowledge (Piaget, 1952; Vygotsky, 1978). These discussions involve differing opinions from the individual school-level teachers, administrators, and parents to the district-wide and state-level curriculum personnel. Every stakeholder involved in these debates has a personal view regarding the best type of organization for instruction in core subject areas at the elementary level (Ackerlund, 1959; Canady & Rettig, 2008; Catledge-Howard et al., 2003; Lamme, 1976; Livingston, 1961; McGrath & Rust, 2002). Research has indicated there are gaps in the existing literature on the effectiveness of various organizational structures; many educators in pursuit of research-based evidence are oftentimes confronted with limited and even contradictory research (Chang et al., 2008; Dropsey, 2004; Hampton, 2007; Hood, 2010; McGrath & Rust, 2002; Moore, 2008; Reys & Fennell, 2003; Yearwood, 2011). This poses a problem for school leaders who are considering a restructure as it relates to students progressing in their learning as it pertains to classroom structure.

The purpose of this study was to address teacher perceptions, experiences, and opinions concerning the classroom organizational structure at the fourth-grade level. A secondary purpose of the mixed-methods study was to determine if there was a statistically significant difference in the math achievement scores of fourth-grade students who received instruction in a self-contained setting as opposed to those who received

instruction in a departmentalized setting as measured by archival data from the 2015-2016 math scores on the MAP assessment. The results of the 2015-2016 MAP of fourth-grade students in the area of math and the compilation of findings of the teacher surveys are reported.

This chapter is organized in four sections. The first section presents the descriptive statistics of the students, schools, and teachers. The second section details the student achievement results of the fourth-grade students' MAP mathematics scores by the self-contained (one teacher for all academic subjects) instruction and the departmentalized (math taught by a different teacher) instruction, which addresses Research Question 1. The third section reports teacher responses to the electronic survey, which addresses Research Question 2. The fourth section reports the findings from the volunteer teachers who participated in the interview portion of the data collection, which addresses Research Question 3.

Descriptive Statistics

Students from six elementary schools in the ALPHA School District were the specific focus of the study, and they served as the convenience sample. Students were approximately between the ages of 9 and 11 years old. Students were sorted into two groups: (a) students who received instruction in a self-contained setting and (b) students who received instruction in a departmentalized setting. There were a total of 696 students in the sample. Table 1 shows the sample size for setting (classroom structure) and subject area (math). To increase validity of the study, the students who did not participate in both administrations of the 2015 fall MAP assessment and 2016 spring MAP assessment were excluded from the study.

Table 1

Frequency Table of Setting by Subject and Sample Size

Setting	Subject	n
Self-Contained	Math	297
Departmentalized	Math	399

Group demographics were analyzed to determine discrepancy in sample characteristics. Similarities and differences between the groups are reported in Tables 2 and 3.

Table 2

Frequency Table of Setting by Gender

School	Setting	n	Female	n%	Male	n%
1	2	80	37	46%	43	54%
2	1	41	23	56%	18	44%
3	1	45	19	42%	26	58%
4	1	119	62	52%	57	48%
5	1	43	20	47%	23	53%
	2	276	131	47%	145	53%
6	1	49	22	45%	27	55%
	2	43	24	56%	19	44%

Note: 1=Self-Contained, 2=Departmentalized.

Each group was ethnically diverse, but the majority of the participants were Caucasian. The ethnic breakdown of the participants was 1.6% Asian, 11.2% Black, 0.9% Hispanic, 85.4% Caucasian, 0.8% Multi-racial, and 0.1% American Indian. Table 3

shows the ethnic breakdown of the sample.

Table 3

Frequency Table of Setting by Ethnicity

Ethnicity	n	n%	Self-Contained Group	Group %	Departmentalized Group	Group %
Asian	11	1%	4	1.3%	7	1.8%
Black	78	11%	36	12.1%	42	10.5%
Hispanic	7	1%	3	1.0%	4	1.0%
Caucasian	594	85%	252	84.9%	342	85.7%
Multi-racial	5	>1%	1	<0.1%	4	1.0%
American Indian	1	>1%	1	<0.1%	0	0%
Total	696	100%	297	100%	399	100%

MAP scores are represented in RIT scores, thus providing for uniform interpretation of performance and allowing comparisons to be made from year to year with the same test. The primary purpose of the MAP assessment is to provide a valid measure of the quality of educational services provided yielding national norms; therefore, the covariate (fall 2015, spring 2016 math MAP assessment) is reliable and does not violate the reliability assumption.

Utilizing a large sample size helped ensure scores were normally distributed.

Table 4 shows mean scores for the schools' fall 2015 and spring 2016 math MAP assessments.

Table 4

Schools' Mean RIT Scores for Fall 2015 and Spring 2016 Math MAP Assessment

School	Setting	Mean Fall 2015 Math RIT Score	Mean Spring 2016 Math RIT Score
1	2	202.3	209.9
2	1	202.2	214.1
3	1	200.8	210.6
4	1	203.1	214.5
5	1	198.4	209.5
	2	201.5	210.6
6	1	203.9	211.6
	2	204	211.5

Note: 1=Self-Contained, 2=Departmentalized; mean scores rounded to the nearest tenth (0.1).

As shown in Table 5, during 2015-2016, 154 (51.9%) fourth-grade students served in the self-contained setting met their target growth score on the MAP in the area of math. Of the 399 fourth-grade departmentalized students, 168 (42.1%) served in the departmentalized setting met their target growth score on the MAP in the area of math.

Table 5

2015-2016 Fourth Grade Students Meeting Their MAP Target Score

Setting	Subject	n	n met Target Score	% met Target Score
Self-Contained	Math	297	154	51.9%
Departmentalized	Math	399	168	42.1%

Note: Percentages rounded to the nearest tenth (0.1).

Participating Teachers

The school district utilized in this study was located in the outskirts of Spartanburg, South Carolina. The sampling for the study consisted of the six elementary schools that contained fourth grade. In all, there were 32 classrooms broken down into 14 self-contained and 18 departmentalized classroom settings. The teachers involved in the study were asked to participate in an electronic survey which addressed Research Question 2, “What components of organizational structures do teachers relate as having an impact on the quality of the math program?” Teachers were asked to share how various factors contributed to students finding success in the math program in their structure (self-contained, departmentalized). Each teacher had the opportunity to respond to the survey with factors directly related to their classroom structure. The following are the results of the survey.

Summary of the self-contained survey: In a self-contained classroom setting (math taught using the traditional method where one teacher is responsible for teaching all content), how do the following factors contribute to students finding success in the math program?

Table 6

Contributing Factors to the Self-Contained Classroom

Factors	High Importance	Important	Neutral	Little Importance	No Importance
1. The development of strong human relationships	11	3	0	0	0
2. Integration of subject matter areas	8	4	1	1	0
3. Individualized instruction	9	5	0	0	0
4. Choices/flexibility in the use of time	7	5	1	1	0
5. Less transition	5	5	3	1	0
6. Parent-teacher communication	10	3	1	0	0

Summary of the departmentalized survey: In a departmentalized classroom setting (math taught by a different teacher or specialist), how do the following factors contribute to students finding success in the math program?

Table 7

Contributing Factors to the Departmentalized Classroom

Factors	High Importance	Important	Neutral	Little Importance	No Importance
1. Content specialization	8	10	0	0	0
2. Instructional teacher teams	8	8	2	0	0
3. Transition to a middle school type classroom	5	6	4	2	1
4. In-depth learning	10	7	1	0	0
5. Equal time given to each subject area	9	7	2	0	0
6. Engaging lessons	13	5	0	0	0

Based on the results of the survey, the researcher asked for volunteers from the teacher sample to participate in a brief interview answering a selection set of questions. Four of the self-contained teachers and three of the departmentalized teachers participated in the study. Research Question 3 asked, “What are the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings?”

The self-contained teachers were asked,

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student’s classroom structure plays a significant role in their ability to gain knowledge in mathematics?

3. Can you talk a little bit more about the importance of human relationships on fourth-grade students?
4. How does the concept of individualized instruction increase in a self-contained classroom?
5. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

The departmentalized teachers were asked,

1. How do you think teacher's strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays significant role in their ability to gain knowledge in mathematics?
3. In today's classroom, why do you think content specialization plays such an important role?
4. A lot of teachers responded that engaging lessons are key towards student success. How does teaching in a departmentalized setting allow for lessons to be more engaging?
5. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

Analysis for Research Question 1

Research Question 1: Are there significant differences in fourth-grade achievement scores (MAP) in math between students in self-contained and departmentalized classrooms?

There was a significant time by target interaction, $t(1387)=3.167, p=.002$. In order to understand the interaction, simple slopes were calculated for the relationship between time of the year and assessment scores at three target values (low, average, and

high). Low target values were determined to be 210-218. At low target values (34%), test scores significantly increased 8.1 units from fall to spring, $t=13.20$, $p<.01$. Average target values were determined to be 202-211.5. At average target values (50%), test scores significantly increased 9.47 units from fall to spring, $t=21.73$, $p<.01$. High target values were determined to be 193-204. At high target values (66%), test scores significantly increased 10.84 units from fall to spring, $t=17.67$, $p<.01$.

A type of classroom environment by testing time of the year interaction revealed $t(1386)=-2.136$, $p=.033$). In order to understand how classroom structures were related to test scores from fall to spring, a simple slope analysis was performed. Results revealed self-contained classrooms significantly improved test scores from 202.14 to 212.52, $t=17.05$, $p<.01$. Likewise, students in the departmentalized setting significantly increased test scores from 201.85 to 210.40, $t=14.15$, $p<.01$.

A test was performed to determine if students with different target values grew differently in different classroom structures. No significant interaction was found, $t(1384)=.359$, $p=.719$. This indicates all students grew equally well regardless of their target and classroom structure.

A test was performed to determine if students with different target values grew differently in different teachers' classrooms. No significant interaction was found, $F(25, 1288)=.237$, $p=1.0$. This indicates that all students grew equally well regardless of their target and classroom teacher. When comparing all 32 classrooms, the teacher's impact on student test scores over time accounted for 4%.

Regardless of the setting, the instruction was equitable across all subgroups. Direction for further research could include independent variables such as the time of the day students are tested, teachers tied to specific classroom performance over an extended

period of time, student gender, teacher gender, or other demographics.

Analysis for Research Question 2

Research Question 2: What components of organizational structures do teachers relate as having an impact on the quality of the math program?

The study conducted gave fourth-grade teachers from 32 classrooms the opportunity to share their thoughts on factors that they felt contributed to the success of the fourth-grade student when it came to them finding success in a math program. The teachers responded to a survey based on research that highlighted the common factors that previous researchers earmarked as having the greatest impact on classroom structure.

The self-contained teachers were asked the following question: In a self-contained classroom setting (math taught using the traditional method where one teacher is responsible for teaching all content), how do the following factors contribute to students finding success in the math program?

The teachers were then presented with the following factors.

1. The development of strong human relationships
2. Integration of subject matter areas
3. Individualized instruction
4. Choices/flexibility in the use of time
5. Less transition
6. Parent-teacher communication

Teacher participants were asked to rate each factor with an evaluation of high importance, important, neutral, little importance, or no importance. The survey responses were valuable in better understanding teacher perspectives as they related to specified factors contributing to student success in the math classroom. One hundred percent of

the participating teachers thought the development of strong human relationships was either of high importance (78.6%) or important (21.4%) when it came to students finding success in a math program. Research shows that trust relationships involve risk, reliability, vulnerability, and expectation (Hoy & Tschannen-Moran, 2003; Young, 1998). Bryk and Schneider (2003) explained that each party in a relationship maintains an understanding of his or her role's obligations and holds some expectations about the obligations of the other parties. For a school community to work well, it must achieve agreement in each role relationship in terms of the understandings held about these personal obligations and expectations of others (Bryk & Schneider, 2003, p. 41).

Teachers from the survey differed slightly when it came to integration of the subject matter. While 85.7% of the teachers involved in the study saw the integration of subject matter as being of either a high importance (57.1%) or important (28.6%), 14.2% of participating teachers either perceived this factor as having little importance (7.1%) or remained neutral (7.1%). Jensen (1996) suggested, "The brain learns best in real-life, immersion-style multi-path learning . . . fragmented, piecemeal presenting can forever kill the joy and love of learning" (p. 213). The more connections made by the brain, the greater the opportunity for making high-level inferences (Jensen, 1996).

Self-contained teachers in the study group attributed individualized instruction as a primary factor in the success of math students. The survey resulted in 64.3% of teachers finding high importance and the remaining 35.7% finding important. The unity in these teacher ratings supports Bloom's (1976) educational theories regarding individualized instruction. Bloom considered the attainment of the learning goal to be more important than the comparison of student progress. Bloom also purported it as irrational to believe that all students needed the same amount of time to learn a new skill

or concept.

According to the survey results, teachers valued the importance of having teaching flexibility within their classrooms. The factor of choices/flexibility earned a rating of high importance from 50% of teachers, while 35.7% of teachers saw it as important. Outliers included 7.1% of teachers reporting choices/flexibility in the use of time as being neutral and another 7.1% regarding this factor as having little importance. McGrath and Rust (2002) found that teachers who maintain one group of students a day within the same room have the option to adjust their instructional schedule according to the needs of the students, whereas departmentalized schedules are more rigid because of the class rotation schedule.

On the factor of less transition time, 28.5% of teachers indicated that less transitions were of little importance (7.1%) or were neutral (21.4%); 71.4% of the teachers reported that having less transitions in the school day were either important (35.7%) or of high importance (35.7%). The schools from the participating teachers are very rigid when it comes to scheduling instructional time in order to limit transition time. Structure was very evident in the math programs. These practices are in line with McGrath and Rust (2002), who found that “despite the longer transition time, the departmental teachers allotted a similar amount of instructional time in the five major subject areas compared to self-contained teachers” (p. 42). In conclusion, the results from this teacher survey revealed that while saving transition time in a self-contained class was important to classroom teachers, other factors were of greater significance.

According to the American Federation of Teachers (2007), substantial evidence exists showing that parent involvement benefits students, including raising their academic achievement. There are other advantages for children when parents become involved,

namely increased motivation for learning, improved behavior, more regular attendance, and a more positive attitude about homework and school in general. Teachers involved in the study were equally concerned with the factor of parent-teacher communication having an impact in student success in the math program: 92.8% of the teachers indicated that parent-teacher communication was of high importance (71.4%) or important (21.4%); 7.1% remained neutral; while none chose little importance or no importance.

The departmentalized teachers were also asked to respond to a survey. Unlike the self-contained teacher survey, this particular survey highlighted influential factors for student impact within a departmentalized classroom structure. The teachers of departmentalized classrooms were asked to respond to the following question: In a departmentalized classroom setting (math taught by a different teacher or specialist), how do the following factors contribute to students finding success in the math program?

The teachers were then presented with the following factors.

1. Content specialization
2. Instructional teacher teams
3. Transition to a middle school type classroom
4. In-depth learning
5. Equal time given to each subject area
6. Engaging lessons

Teachers were asked to give each factor a rating of high importance, important, neutral, little importance, or no importance. Within each of the factors, discoveries were made that showed importance to the understanding mindset of the participating teachers.

When the researcher surveyed the teachers, the results gave insight into understanding what role the specified factors had in contributing success in math students

who resided in a departmentalized classroom; 100% of the participating teachers thought the content specialization was either of high importance (44.4%) or important (55.6%) when it came to students finding success in a math program. Chan and Jarman (2004) declared that teachers in self-contained classrooms are forced to teach subjects they do not enjoy or feel comfortable teaching. “Teachers need not be Jacks of all trades but can be masters of their fields” (Chan & Jarman, 2004, p. 70). Reys and Fennell (2003) posited that teachers with particular knowledge and expertise in mathematics (mathematics specialists) created the best learning environment for students.

The factor of instructional teacher teams was recognized by 88.8% of teachers as a factor with high importance (44.4%) or important (44.4%); 11.1% remained neutral on the topic of instructional teacher teams contributing to students finding success in the math program. Anderson (1967) suggested that due to the variety of techniques and environments offered by departmentalization, students benefit from exposure to multiple instructors throughout the day. The ability to collaborate regularly, to share a teaching philosophy, to create a consistent environment for students between two classrooms, and to have regular and ongoing communication were all key pieces suggested by the research for creating a successful teaching team (Abdallah, 2009; Dugan & Letterman, 2008; Gerretson et al., 2008; Kloo & Zigmond, 2008; Licitra, 2009; Stewart & Perry, 2005). Furthermore, teachers were able to collaborate for the success of all students by putting their thoughts together while planning (Reed, 2002). Researchers reported that this type of collaborative planning and united effort contributed to strong learning communities among teachers (Chang et al., 2008).

According to Delviscio and Muffs (2007), departmentalization of upper elementary grades in the era of high-stakes testing reduced “transition shock” among

sixth graders when they moved from traditional settings to a fully departmentalized middle school. The current study revealed the most widespread of the survey results was the factor of transition to a middle school type classroom; 61.1% of participating teachers responded that preparing students for a middle school type classroom was either of high importance (27.8%) or important (33.3%). The 61.1% was the smallest percentage of high importance/important for any of the factors that impact student learning in departmentalized classrooms, which shows the irrelevance of this particular factor to the teacher participants; 16.7% of teachers considered this factor as either of little importance (11.1%) or of no importance (5.6%), while 22.2% remained neutral on the factor.

Survey feedback from teacher participants revealed that in-depth learning yielded a response rate of 94.5% high important (55.6%)/ important (38.9%) and 5.6% reported a neutral response (22.2%); 94.5% valued in-depth learning as a factor for impacting the success of students in a math program. This was one of three factors whose percentages of high importance/important responses by departmentalized teachers were in the 90% or higher, thus contributing to the educational impact of this factor. Within the departmentalized classroom, teachers are able to focus their efforts on a specific area in the curriculum. Teachers can concentrate on learning subject and pedagogical content as well as instructional strategies at a deeper level (Gerretson et al., 2008).

Departmentalized teachers responded to the factor on equal time given to each subject area with high results: 50% high importance, 38.9% important, 11.1% neutral. George and Alexander (1993) stated, “few schools can overcome the barriers of ineffective schedules or restrictive environments” (p. 365). Creation of an effective schedule is needed for any well-functioning school program.

Departmentalized teachers in the study found that the highest factor impacting

student success in the math program was the ability to teach engaging lessons; 100% of teachers in the study responded to the ability to teach engaging lessons as either being of high importance (72.2%) or important (27.8%). Anderson (1967) rallied for teacher specialization and contended that teachers who are experts in their field will be better able to understand and meet the needs of the learners. Building upon Anderson's thoughts, Chan and Jarman (2004) suggested that students become the beneficiaries of a wealth of knowledge that could not be matched in a self-contained classroom.

In conclusion, teachers of self-contained classrooms who participated in the study placed the highest importance on the development of strong human relationships (78.6%) and parent-teacher communication (71.4%). Departmentalized teachers in the study placed the highest importance on engaging lessons (72.2%) and in-depth learning (55.6%). According to this study, these were the greatest factors that made an impact on students finding success in their respective math programs.

Analysis for Research Question 3

Research Question 3: What are the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings?

The study conducted gave fourth-grade teachers from 32 classrooms the opportunity to share their thoughts regarding identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings. Based upon the teacher surveys, the researcher interviewed teachers from both the self-contained and departmentalized classroom structures in hopes of digging deeper into the results of the survey. Seven of the 32 teachers (four self-contained, three departmentalized) took part in the voluntary interview. All teacher interview participants were asked the following three questions.

1. How do you think teacher strengths and knowledge affect student outcomes?
2. Do you think a student's classroom structure plays a significant role in their ability to gain knowledge in mathematics?
3. Is there anything else you think the audience would like to know about classroom structures and their impact on student learning?

In addition to these primary questions, teacher interview participants were asked two secondary questions in response to the results from their classroom structure's survey.

Self-contained.

1. Can you talk a little bit more about the importance of human relationships on fourth-grade students' success in a math program?
2. How does the concept of individualized instruction increase in a self-contained classroom?

Departmentalized.

1. In today's classroom, why do you think content specialization plays such an important role on student success?
2. A lot of teachers responded that engaging lessons are key towards student success. How does teaching in a departmentalized setting allow for lessons to be more engaging?

Table 8 displays the frequencies of themes recorded in interviews with teacher interview participants from three questions that were common to both the self-contained and departmentalized teachers. Table 9 provides the overall strength codes as determined by the researcher.

Table 8

Frequencies of Themes Common to Self-Contained and Departmentalized Teachers by Number

	Themes	Teacher Interview Participants	
		Self-Contained Teachers	Departmentalized Teachers
Question 1	Teacher strength	8	6
	Teacher knowledge	6	9
Question 2	Structure is significant	11	7
	Structure is insignificant	1	0
Question 3	Structure's impact on student excitement	2	2
	Structure's impact on student motivation	5	4

Table 9

Frequencies of Themes Common to Self-Contained and Departmentalized Teachers by Strength Code

Themes	Teacher Interview Participants						
	Self-Contained Teachers #1-4				Departmentalized Teachers #1-3		
	#1	#2	#3	#4	#1	#2	#3
Teacher strength	strong	moderate	weak	moderate	moderate	no response	moderate
Teacher knowledge	strong	no response	strong	weak	moderate	strong	weak
Structure is significant	strong	strong	strong	strong	strong	weak	strong
Structure is insignificant	no response	no response	no response	weak	no response	no response	no response
Structure's impact on student excitement	no response	strong	weak	no response	moderate	weak	no response
Structure's impact on student motivation	strong	moderate	moderate	moderate	moderate	moderate	no response

Question 1 described in Tables 8 and 9 explored the teacher perception and understanding of how a teacher's individual strengths and knowledge affect student

outcomes. Teacher interview participants indicated a value in teaching toward their strengths and area of knowledge. The idea of being effective in the subjects they taught showed value to the teachers. Another theme that emerged within the interview data was the students' ability to grow based on the confidence of the teachers' ability to help them. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 10

Teacher Interview Participants' Validating Support to Common Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	Since I am so passionate about these math and science, I really put my heart and soul into teaching these subjects to my class. I always try to take professional development classes to improve myself in reading and writing.
Response #2	In my grade level, teachers that are better at math are able to comprehend the processes and explain those steps better to students.
Response #3	A teacher's strength and knowledge can make a difficult task/skill easy for a student to learn and gain confidence.
Response #4	The more you practice something, the better you will be at it. I am much more effective now than I was several years ago. The more effective I am, the more students will learn.
Response #5	Students can see how important the subject matter is when teachers have a combination of subject knowledge and a strong desire to help students learn. Students can see how important the subject matter is and develop a desire to learn about it and become just as excited as the teacher. When they (students) have desire and encouragement, they perform better.
Response #6	Understanding student gaps and why they are missing concepts and why they struggle with weakness is what takes teaching to the next level. Teacher's knowledge directly influences student outcome.
Response #7	I have a good grasp of the 4th grade math content and I am also aware of the common mistakes that students make. Teachers that don't feel strong in a certain area will put up a mental wall and will not be able to do well in those areas.

Question 2 explained in Tables 8 and 9 focused on whether or not teachers believe that classroom structure plays a significant role in a student's ability to gain knowledge in

mathematics. Interview responses centered on the teacher's ability to utilize time management both inside the classroom (while teaching) and outside (when planning). Teacher interview participants shared a common desire to be effective in student outcomes. All of the teacher interview participants spoke about the importance of timing in their classrooms and having math fit into a block, whether it was in the self-contained or the departmentalized classroom. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 11

Teacher Interview Participants' Validating Support to Common Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	My math lesson is divided into three parts, whole group instruction, small group instruction, and guided math stations. I am able to meet the needs of all of my students so that they can gain the knowledge they need to be successful in math through small groups.
Response #2	Students compute and solve problems at different rates, and it is important for a teacher to provide common quiet time for all students to think through and solve problems before discussion.
Response #3	Regardless of structure, math is most effectively taught in a structured environment, where routines are evident.
Response #4	Even as a first year teacher, I would get better at teaching the lessons for my second class (in a departmentalized structure).
Response #5	Teaching in a departmentalized structure allowed me to focus all of my planning efforts on only two subjects. I was able to come up with great lessons that were very effective and hands on.
Response #6	I think that it is important to have structure in the schedule because then students know what to expect.

Question 3 described in Tables 8 and 9 afforded teacher interview participants the opportunity to speak candidly about anything else they thought the audience would want

to know about classroom structures and their impact on student learning. The teacher interview participants continued to be passionate about creating a classroom environment that was structured and welcoming, while simultaneously shaping a space where students felt safe. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 12

Teacher Interview Participants' Validating Support to Common Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	When classrooms are structured around teachers that are knowledgeable and lessons that motivate and engage, students become excited about learning, which results in maximum student potential being reached.
Response #2	Students need structure to help them be successful in school, regardless of self-contained or departmentalized.
Response #3	Students need to feel welcome in their classroom. They need to know it is a safe place, nurturing, fun, and loving.
Response #4	It is okay to make mistakes and take risks without being ridiculed because learning from our mistakes is part of learning and succeeding.
Response #5	This year I have worked with teachers who have had experience, but are so focused on the perfect lesson rather than seeing the whole picture in student learning (where does this student need to go this year? and what is their designed learning path for them individually?). All components in your classroom should be geared to the students' learning path.

The self-contained teacher interview participants were asked specifically about the importance of human relationships and individualized instruction on fourth-grade students' success in the math program. Tables 13 and 14 further investigate the previous findings.

Table 13

Frequencies of Themes Common to Self-Contained Teachers by Number

	Themes	Self-Contained Teachers
Question 4	Human relationships impacting the student	7
	Human relationships impacting the teacher	8
Question 5	Individualizing instruction based on student strength	3
	Individualizing instruction based on student weakness	5

Table 14

Frequencies of Themes Common to Self-Contained Teachers by Strength Code

Themes	Self-Contained Teachers #1-4			
	#1	#2	#3	#4
Human relationships impacting the student	moderate	strong	Strong	moderate
Human relationships impacting the teacher	moderate	weak	moderate	moderate
Individualizing instruction based on student strength	no response	weak	moderate	no response
Individualizing instruction based on student weakness	moderate	strong	moderate	no response

The initial teacher survey noted that 100% of the participating teachers thought the development of strong human relationships was either of high importance (78.6%) or

important (21.4%) when it came to students finding success in a math program. Upon a closer examination of the importance of human relationships, it was evident that teachers held student performance in high regard when they knew their students both individually and academically. Human relationships had as large effect on the teacher as it did the student. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 15

Teacher Interview Participants' Validating Support to Self-Contained Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	Since I have my students for all subjects, I am able to see their strengths and weaknesses. I may have a student who is very smart in math but cannot complete word problems successfully due to a reading difficulty.
Response #2	I feel like I can see students overall by teaching them all subjects and relate to their needs and interests easier than a teacher who only teaches students 1 or 2 subjects.
Response #3	It is important for students to have positive relationships centered around math because students easily develop an attitude of "I'm just not a math person."
Response #4	Relationships are very important to any age student. When students don't feel valued, they won't do their best.

Self-contained teacher interview participants were also asked how the concept of individualized instruction increased in a self-contained classroom. The initial teacher survey resulted in 64.3% of teachers finding high importance and the remaining 35.7% noting important when it came to individualized instruction being a factor that contributes to students finding success in the math program. Upon further research, it was found in

the study that the participating teachers spoke with more of an emphasis on a higher importance for individualized instruction for weaker students. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 16

Teacher Interview Participants' Validating Support to Self-Contained Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	Having taught both in a self-contained structure and in a departmentalized structure, I was able to become very good at pinpointing math issues with students because I had so much practice doing that. Individualized instruction is important in both structures.
Response #2	I am able to differentiate on an individual basis because of my knowledge of my students' strengths and weaknesses. Often times, my students' weaknesses carry over from subject to subject. Having knowledge of this helps me as their teacher to better individualize their instruction.
Response #3	Having my students all day gives me a better understanding of how to group my students for individual success. With the amount of students in my class, pulling students in one-on-one situations is difficult, so grouping in areas of strength/weakness bands becomes easier because I feel like I know them better as learners because of having them all day.
Response #4	I feel like I am better able to individualize education to students in my classroom because I have knowledge of their learning habits in other subject areas.

The departmentalized teacher interview participants had the opportunity to specifically address factors that directly impacted the quality of the math program. They were asked about why they considered content specialization and engaging lessons being important factors in students finding success in the math program. Tables 17 and 18

further investigate the previous findings.

Table 17

Frequencies of Themes Common to Departmentalized Teachers by Number

	Themes	Departmentalized Teachers
Question 4	Content specialization impacting the teacher teaching the student	6
	Content specialization impacting the student learning from the teacher	5
Question 5	Engaging lessons help influence student participation/growth	4
	Engaging lessons motivate teacher creativity	7

Table 18

Frequencies of Themes Common to Departmentalized Teachers by Strength Code

Themes	Departmentalized Teachers #1-3		
	#1	#2	#3
Content specialization impacting the teacher teaching the student	Moderate	strong	moderate
Content specialization impacting the student learning from the teacher	Moderate	moderate	moderate
Engaging lessons help influence student participation/growth	Weak	weak	moderate
Engaging lessons motivate teacher creativity	Moderate	strong	strong

One hundred percent of the participating teachers in the survey thought that

content specialization was either of high importance (44.4%) or important (55.6%) when it came to students finding success in a math program. The researcher asked the teacher interview participants to reflect upon why they thought classroom teachers felt content specialization impacted student success. They were even when it came to content specialization impacting the teacher teaching the student versus the student learning from the teacher. The teacher interview participants centralized their speculations around the idea that teachers have the opportunity to become experts in their field when they only have to teach one or two subjects. Being departmentalized allows teachers to participate in learning and professional development with focused instructional opportunities in their subject areas. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 19

Teacher Interview Participants' Validating Support to Departmentalized Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	<p>I feel content specialization allows teachers to become experts and allows them to take that knowledge to get to know that student academically in that subject.</p> <p>When you have time to specialize in a specific area you can become an expert that will therefore spill over into the students success.</p>
Response #2	<p>Content specialization is important for student success because it allows for more in-depth learning.</p>
Response #3	<p>I learned a lot of content over the years through reading books, going to professional development, and working closely with my subject coaches. It is important to be able to pass that knowledge on to students so they have a better understanding of the material and retain in to apply to future learning. I know that other teachers might not have had all the experience and do not have the content specialization to pass on to their students.</p>

The teacher interview participants also spoke to the question in the interview directly related to departmentalized teachers' position that engaging lessons are essential for student success. In the survey, departmentalized teachers in the study found that the highest factor impacting student success in the math program was a teacher's ability to teach engaging lessons. The researcher sought to have teacher interview participants elaborate upon this factor by inquiring as to how the departmentalized setting allowed teachers to create more engaging lessons. While teachers responded saying that engaging lessons impacted student participation/growth, more so they spoke to engaging lessons spurring teachers' ability to be creative. Teacher responses illuminated a shared belief that the opportunity to have fewer subjects to prepare for allowed teachers more time to hone in on one or two subject areas. Supporting the findings, teacher interview participant responses are recorded for further validation in the following table.

Table 20

Teacher Interview Participants' Validating Support to Departmentalized Themes

Teacher Response	Teacher Interview Participants' Responses
Response #1	When the teacher is allowed to focus on a specific content area, they can dig deeper and provide more meaningful activities. They are also more aware of their student's needs and how to address them so the lessons are more meaningful and engaging.
Response #2	I think a teacher utilizes all of their resources and media to help engage learning in a departmentalized classroom. Lessons are able to be rigorous and make room for student growth.
Response #3	Being departmentalized allows lessons to be more engaging because it allows me to prepare better lessons because I can spend more time researching better ideas for lessons, creating or gathering the necessary materials, and being able to keep those for future use. Then I can build on to those ideas to improve them or expand them to incorporate additional activities. Lessons are also more engaging because I have more time to create lessons that are applicable to students' lives and are real world related.

Summary

In conclusion, there are identifiable cultural classroom differences in self-contained and departmentalized organizational settings. Even so, voices from both classroom structures concur that teachers are better when they teach toward their strengths and that math is most effectively taught in a structured environment where routines are evident. Teacher interview participants also agreed on the importance of engaging students with relevant, creative instruction. Differences were noted in teacher perceptions of classroom organizational structures. Self-contained teacher interview participants felt their classroom structure granted better opportunities for building human relationships and creating individualized instruction, while departmentalized teacher interview participants credited their classroom structure for engaging lessons through content specialization.

Chapter 5: Summary, Conclusions, and Recommendations

The purpose of the mixed method case study was to examine whether a statistically significant difference in 2015-2016 MAP math academic growth existed among fourth-grade students who received instruction in a self-contained setting as opposed to fourth-grade students who were taught math in a departmentalized setting. Second, the purpose of the research was to discover what components of organizational structures teachers revere as having an impact on the quality of the math program. Last, the research aimed to discover the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings. For the purpose of this study, a self-contained classroom setting is one where a single teacher is responsible for all core content areas for a particular group of students for the entire school year. A departmentalized setting is one where teachers teach in their area of specialization and students move from one classroom to another for instruction. In this setting, students have multiple teachers for core subjects, and each teacher is responsible for a specific subject or group of subjects.

Discussion of the Results

The following section consists of a more detailed discussion of data collection and analysis. Each section is organized by the research questions, the findings discovered by the data, how the hypotheses or null hypotheses were or were not accepted, and any additional data that came about from the research questions.

Research Question 1: Are there significant differences in fourth-grade achievement scores (MAP) in math between students in self-contained and departmentalized classrooms? Students in the study were administered the MAP assessment in the fall of 2015. Based on their scores, they were assigned a target growth

score for the spring assessment. Students ranged in scores from 166-243. Because of the range of entry-level scores, the Achievement Status and Growth Calculator assigned the students a growth score that ranged from 9-11 points. Students from the study were again assessed in the spring of 2016 to determine if they had met their target growth score after spending the school year in the allotted classroom setting.

The results were calculated, and 51.9% of students participating in the self-contained classroom structure either met or exceeded their target growth score while only 42.1% of the students in the departmentalized classroom structure were able to meet their target growth score. It was evident from the results of the number of students who met their target growth score that the students in the self-contained classroom structure clearly outperformed their counterparts by 9.8%. The only variable present that was analyzed was that of classroom structure. There are several student-related factors that could have had implications such as student attendance, teacher attendance, classroom interruptions, and instructional time allocations. Specific factors identified by teachers that played a role in the results of the study are analyzed in Research Questions 2 and 3 below.

While this study assessed the percentage of students who were able to meet or exceed their target growth score, the researcher was also able to compare the overall mean score for the fall and spring assessment. The mean score for the self-contained classroom in the fall assessment was 202.1 and grew to 212.6, which is a growth of 10.5 points or 5.19 %. In the departmentalized classroom structure, the mean score was 201.9 in the fall and grew to 210.6 in the spring, showing a growth of 8.7 points or 4.30%. This evidence shows the average growth of the students in the self-contained setting outperformed that of the departmentalized setting by 1.8 average growth points.

Research Question 2: What components of organizational structures do

teachers relate as having an impact on the quality of the math program? There are components of organizational structures that teachers relate as having an impact on the quality of the math program. Teachers of self-contained classrooms who participated in the study placed the highest importance on the development of strong human relationships (78.6%) and parent-teacher communication (71.4%).

Research supports strong human relationships being an important factor for student success. Sebring and Bryk (2000) stated that in schools that are improving and where trust and cooperative adult efforts are strong, students report that they feel safe, sense that teachers care about them, and experience greater academic challenge. According to Bryk and Schneider (2003), the more interaction the parties have over time, however, the more their willingness to trust one another is based on the other party's actions and their perceptions of one another's intentions, competence, and integrity (pp. 41-42). Bryk and Schneider's (2002) work indicated that while trust alone does not guarantee success, schools with little or no trust have almost no chance of improving. Tschannen-Moran and Hoy (1998) discussed human relationships' importance in education by presenting a comprehensive review of the literature on the definition of trust. They found five key components commonly used to measure trustworthiness which included benevolence, reliability, competence, honesty, and openness.

Research supports the study's findings of parent-teacher communication having an impact on student success. Schussler (2003) stated cultivating the teacher-parent relationship is also considered vital to the development of schools as learning communities. According to the American Federation of Teachers (2007), parent involvement benefits students raising their academic achievement. When parents are involved, students have increased motivation for learning, improved behavior, more

regular attendance, and a more positive attitude about homework and school in general (American Federation of Teachers, 2007). Research of the American Federation of Teachers also showed that parental involvement can free teachers to focus more on the task of teaching children. By having more contact with parents, teachers learn more about student needs and home environments, which is the information they can apply toward better meeting those specific needs (American Federation of Teachers, 2007).

Departmentalized teachers in the study placed the highest importance on engaging lessons (72.2%) and in-depth learning (55.6%). According to this study, these were the greatest factors that made an impact on students finding success in the math program.

Research supports the study's findings of engaging lessons as having a high impact on student instruction. Hill et al. (2005) discussed how departmentalization of subjects allows teachers to become specialists in the subject matter they teach, and this gives them the knowledge required to design higher quality lessons (p. 377). Other notable research concluded that students in departmentalized classes can become eager learners who benefit from being exposed to active, engaging lessons; different teaching personalities; and various teaching styles, while their teachers benefit from having increased opportunities for collaboration (Hood, 2010; McPartland, 1987; McPartland et al., 1987). Their literature on departmentalized classrooms focused on having an enthusiastic subject matter, experts in the classroom, and more lesson planning time resulting in in-depth, engaging lesson preparation (Hood, 2010; McPartland, 1987; McPartland et al., 1987).

Research supports the current study's results of in-depth learning having an impact on the quality of the math program. Wilkins's (2010) study revealed a relationship between teacher attitudes toward specific subject areas and the time they

spent teaching each area. Wilkins noted that teachers were more likely to spend the most time teaching the subjects they favored and also introduced literature regarding instructional quality for teachers' more favored subjects.

Teachers benefit from teaching as content specialists. By narrowing the scope of teachers' instruction, their attitudes toward subject areas taught improved as their self-efficacy and quality of instructional methods increased (Brashears, 2006; Schwartz & Gess-Newsome, 2008). Research also notes that students in multiple studies received higher quality instruction through more focused teaching and performed better on achievement tests than students who received instruction in all subject areas from one teacher (Bailey, Shaw, & Hollifield, 2006; Brashers, 2006; Schwartz & Gess-Newsome, 2008).

Research Question 3: What are the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings? There are identifiable cultural classroom differences in self-contained and departmentalized organizational settings. Even so, voices from both classroom structures concur that teachers are better when they teach toward their strengths and that math is most effectively taught in a structured environment where routines are evident. Teacher interview participants also agreed on the importance of engaging students with relevant, creative instruction. Sternberg and O'Hara (2000) found that when students were taught in a way that incorporated analytical thinking; creative thinking (creating, imagining, and inventing); and practical thinking (applying, implementing, and putting into practice), students achieved at higher levels than when taught using conventional instructional methods.

Differences were noted in teacher perceptions of classroom organizational

structures. Self-contained teacher interview participants felt their classroom structure granted better opportunities for building human relationships and creating individualized instruction, while departmentalized teacher interview participants credited their classroom structure for engaging lessons through content specialization.

Research supports both of these findings. Self-contained teachers find refuge in McPartland's (1987) research that found teacher-student relationships were strong indicators of student success. In addition, research also notes that classroom culture reflects the teacher's preparation prior to entering the classroom, his/her orchestration of the learning activity, and the students' understanding of the procedures and routines that facilitate purposeful learning. Classroom culture, however, also emanates from the personal relationship of the teacher with his/her students and the relationships among the students themselves. Relationships affect how and what students learn (Elias et al., 1997).

Departmentalized teachers are supported by research stating schools using teachers as content specialists in departmentalized settings reported that teachers had more time to plan effective instruction and to focus their professional development efforts on improving delivery of the material (Andrews, 2006; Becker, 1987; Gerretson et al., 2008; Page, 2009).

Conclusion

This casual-comparative design study aimed to analyze target growth of fourth-grade students who were taught in classrooms with different organizational structures (self-contained and departmentalized) and determine if there were significant differences in achievement scores in math. The research indicated that all students grew equally well regardless of their target growth and classroom structure. While there appears to be a

difference in students meeting their target growth, self-contained outperforming departmentalized, it was not noteworthy enough to be identified significant. Future research could analyze the growth between the two structures over a longitudinal time to determine if the difference was sustained, thus causing school leaders to consider the need to shift to self-contained classrooms. The research also aspired to determine what components of organizational structures teachers relate as having an impact on the quality of the math program. Through a survey, it was determined that self-contained teachers place the highest importance on the factors of human relationships and individualized instruction, while departmentalized teachers place their importance on engaging lessons and content specialization. Last, the research desired to determine the identifiable cultural classroom differences in environments in comparing self-contained and departmentalized settings. The research indicated that teachers are better when they teach toward their strengths; that math is most effectively taught in a structured environment where routines are evident; and the value in the importance of engaging students with relevant, creative instruction. One can expect that creative classrooms outperform noncreative classrooms. Research shows that highly creative individuals display exploratory behavior when encountering novelty; are optimistic, tolerant of uncertainty; pursue their goals with intensity; display responsibility; are directed to their goals; are able to utilize resources; are self-accepting and congruent; and they display empathy, tolerance, and integrated consciousness (Chavez-Eakle, Lara, & Cruz, 2006).

While there were identified differences between the two structures, the examination of the structures created areas of consideration worthy of future inquiry.

In relation to Morgan's (2006) metaphors, the idea of staying in either a self-contained or departmentalized classroom most closely relates to Morgan's chapter on

psychic prisons. Morgan went on to state that teachers are trapped by their own thoughts, ideas, and beliefs or by the unconscious mind when it comes to thinking about switching their teaching style. This research will be used as a pathway to break teachers free from their psychic prisons as they relate to classroom structure through the interpretation of this study.

Recommendations for Research

In the current study, 51.9% of students participating in the self-contained classroom structure either met or exceeded their target growth score, while only 42.1% of the students in the departmentalized classroom structure were able to meet their target growth score. NWEA calculates the spring target scores based on the individual student's overall achieved RIT (Rausch Unit) score in the fall. The current study analyzed the performance of students from self-contained and departmentalized classroom structures in meeting their target growth score on the overall achieved RIT score. NWEA breaks down the achieved RIT score for math into four goal performance areas: Algebraic Thinking & Operations, Number Sense & Operations, Measurement & Data Analysis, and Geometry. Future research would include analyzing the students from each structure in their performance in each of the goal performance areas. Future research would discover if there is a significant relationship between classroom structure and an individual's ability to grow in the goal performance areas.

Based on the survey that teachers were given, 28.5% of participating teachers responded that less transitions in self-contained classrooms was a factor of little importance (7.1%) or remained neutral (21.4%) on the question. Further research would include a more specific focus on the breakdown of the self-contained classroom in these schools to see how transitions are being used within the classrooms as compared to those

in the departmentalized classrooms.

The survey revealed an outlier when it came to departmentalized teacher responses in consideration of transition to a middle school type classroom as a factor to contributing to students finding success in the math program: 22.2% of participating teachers remained neutral to this factor, while 16.7% responded saying it was of either little (11.1) or no importance (5.6%). The research showed that transition to a middle school type classroom was one of the most common reasons for schools to choose a departmentalized setting for their classroom structure. Further research would include investigation of middle school type classrooms with specific inquiry into the similarities between middle schools and their feeder elementary schools as depicted by students and teachers.

Surveys were offered to teachers of self-contained and departmentalized classrooms in fourth grade. Further research would include researching and surveying students and parents to see their perceptions on the topic.

Interviews were conducted based on a volunteer basis. Further research would be to include a larger sample of teachers to participate, possibly using an incentive. Further research could also include perceptions from school leaders in the area.

Concluding Remarks

Choosing a classroom structure for schools should be a decision that is researched, analyzed, and part of an ongoing discussion for school leaders. When looking at classroom structures as they relate to student success in math, there are many avenues to analyze the practices we put into place. The researcher chose academic achievement in a fourth grade upstate community in South Carolina, a sample of components teachers see as impactful, and a fragment of cultural classroom differences in

environments. The results indicated greater success for students in a self-contained setting. Teachers of both structures saw success through strong human relationships (self-contained), parent-teacher communication (self-contained), engaging lessons (departmentalized), and in-depth learning (departmentalized). Teachers agreed on the importance of engaging their students with relevant, creative instruction. This study can be replicated to fit other communities, and additional studies conducted may determine other factors influencing student achievement.

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