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Departmentalization in Intermediate Elementary Grade Levels and Student Performance in Mathematics

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DEPARTMENTALIZATION IN INTERMEDIATE ELEMENTARY GRADE LEVELS
AND STUDENT PERFORMANCE IN MATHEMATICS

By

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ABSTRACT

Departmentalization is a growing trend in elementary schools nationwide due to a focus on high stakes accountability testing. In a departmentalized school, teachers specialize in one to three subject areas and students benefit from the instruction of teachers with expert knowledge in their specific areas as opposed to the traditional, self-contained elementary school model where students receive instruction in multiple subjects from one teacher. This mixed methods study sought to investigate the process of departmentalizing fourth and fifth grade classrooms, and to examine the relationship between departmentalization and student achievement growth in St. Lucie Public Schools in Florida. The study found that elementary and K-8 schools with higher poverty populations, as well as schools with lower student enrollments, were the most likely to utilize departmentalization, especially a semi-departmentalized model in the fourth grade level. Students in departmentalized classrooms showed less growth over the course of the school year. The choice to departmentalize was largely teacher-directed and assignment of specific subjects to teachers was based on teachers’ perceived strength based on student achievement data, comfort levels, and personality for collaboration. These findings are discussed and recommendations for the district are offered in the final chapter.

Keywords: departmentalization, elementary mathematics, mathematics performance
CHAPTER 1
INTRODUCTION

Statement of the Problem of Practice

For the second time in a row, the mathematics achievement of American high school students has fallen on a major international benchmark, the 2015 Program for International Student Assessment (PISA), a test administered to 15-year old students worldwide. The United States ranks an unimpressive 38th out of 72 countries (OECD, 2016) in mathematics. Another international comparative study designed to measure trends in math achievement in fourth-grade students, the 2015 Trends in International Mathematics and Science Study (TIMMS), found similar results with fourth-graders scoring 11th best out of 45 international education systems (Provasnik et al., 2016). In the same study, over the past twenty years, fourth-grade students in the United States have shown overall improvement in the average scale scores, yet the cut score at the 25th percentile dipped in the most recent administration indicating that the lowest quartile of students is now performing even lower than the lowest quartile in previous years (Provasnik et al., 2016). Clearly, the United States does not lead the pack on a global stage as far as mathematics are concerned and, understandably, the mathematics performance of American students has been an area of concern for decades (Gerretson, Bosnick, & Schofield, 2008).

The importance of helping students achieve high levels of math performance extend beyond a globally competitive atmosphere. In a more local context, existing state policies regarding graduation and student progression requirements make it critical for students to successfully demonstrate their knowledge and be deemed “proficient” on high-stakes Florida Standards Assessments (FSA) each school year. In Florida high schools, a failed Algebra 1 End-of-Course FSA can prevent a student from graduating with a high school diploma. In third-
grade, students must score at least a Level 2 on the Grade 3 English Language Arts FSA or risk being retained in the third grade for an additional year. Students strive to succeed and pass each FSA so that, eventually, they will be able to graduate from high school as a young adult ready for college or a career. School grades are also influenced heavily by students’ successful passing of these tests and maintaining a passing score isn’t sufficient. Now, students must continually improve their scores each year for a school to receive or maintain a favorable school grade.

As a high school math teacher in St. Lucie Public Schools, I have observed the consequences of a lack of foundational mathematics knowledge in my own classroom. Students in the intermediate elementary grade levels do not always have the opportunity to learn from teachers with math proficiency as they do in secondary school, which could affect their later success in middle and high school math classes. When students do not receive the critical mathematical foundations in their elementary years, it becomes increasingly difficult for them to catch up and to succeed in advanced math coursework.

One way to combat this issue is by using a departmentalized instructional model at the intermediate elementary grade levels. In a departmentalized setting, students circulate to different teachers for specialized instruction in one to three subject areas (Chan & Jarman, 2004). Because departmentalization affords students the opportunity to receive instruction from a specialized mathematics teacher (Wu, 2009), this model could help lessen those deficits early on in a students’ mathematics education.

In St. Lucie Public Schools, of approximately 37,000 students, about half of them are enrolled in elementary schools with approximately 3,000 students at each grade level. According to state assessment data from the 2016 – 2017 school year, 56% of fourth-grade students and only 48% of fifth-grade students in St. Lucie Public Schools were able to
successfully demonstrate mathematical proficiency on their Florida Standards Assessment in mathematics (Florida Standards Assessment Results, 2017). That statistic should be alarming and deeply troubling, yet it is a reflection of a larger statewide problem (state proficiency averages were 64% and 57%, respectively) and nationwide. If mathematics achievement could be improved early in a child’s education, perhaps they could experience additional success later on at the middle and high school level as they continue to take Florida Standards Assessments, as well as the more challenging End-of-Course examinations in high school courses such as Algebra I.

When students arrive in middle school, they are introduced to a teacher who specializes in mathematics education. Certified subject-area specialists deliver content to students from grades 6-12. However, this is not the case in elementary schools. Instead, many teachers in a traditional, self-contained classroom setting are tasked with teaching all subjects to students - including math. Some teachers who may not like teaching or may not be well-versed in math are required to teach their students those critical skills that they will later need in their secondary math courses. Despite a lack of training in teaching math or a dislike for the subject, it is imperative that all teachers of the intermediate elementary grade levels teach the required standards to their intended depth and complexity. However, this task is not always accomplished and, in turn, many students face challenges as they advance through their secondary education and into college due to the lack of opportunities to be taught by teachers with a solid understanding of mathematics (National Research Council, 2001).

Previous studies on departmentalization’s effect on students’ math performance have been largely inconsistent and inconclusive (Taylor-Buckner, 2014). Some studies found that departmentalization was the preferred organizational structure for students’ mathematical
achievement (Andrews, 2006; Butzin, Carroll, & Lutz, 2006; DelViscio & Muffs, 2007; Moore, 2008; Ponder, 2008; Yearwood, 2011) while others found the self-contained model superior (Garner & Rust, 2002; Garrigan, 1992; McGrath & Rust, 2002). In St. Lucie Public Schools, two levels of departmentalization are used. In a completely departmentalized model, a single subject is assigned to each teacher. Alternatively, the much more common semi-departmentalized model assigns two or three subjects to each teacher. However, no studies to date have separated the varying levels of departmentalization (complete departmentalization or semi-departmentalization) within their analysis.

In addition, little is known about the possible impact of departmentalization where teachers teach mathematics in one classroom without a subject-specific certification in mathematics education. This is important because no subject-specific certifications exist for elementary school teachers in Florida. This means that students are taught mathematics in departmentalized or semi-departmentalized classrooms by teachers without mathematics-specific certification.

Despite the lack of empirical studies on the effect of different types of departmentalization and departmentalized classrooms taught by teachers without subject-specific certification, many elementary schools have departmentalized their instructional model (in St. Lucie Public Schools, most commonly at the fifth-grade level) by assigning teachers to teach one or more subject areas in multiple classrooms. Before departmentalization becomes more widespread across St. Lucie Public Schools, it is important to examine if departmentalization in mathematics instruction is associated with improved elementary math growth in St. Lucie Public Schools.
Research Questions and Conceptual Model

Departmentalization has emerged in an effort to not only increase elementary math performance, but to also meet increasing accountability demands placed upon schools and their students to perform better (Chan & Jarman, 2004). The purpose of this research is to examine the school background and process of departmentalization and the relationship between the degree of departmentalization and fourth-grade and fifth-grade students’ mathematical performance using principal interviews, survey data, and student mathematics achievement data on i-Ready’s fall, winter, and spring diagnostic assessments of about 5,000 fourth and fifth graders in all 26 elementary and K-8 schools in St. Lucie Public Schools during the 2017-2018 academic year. This mixed methods study using survey data from 26 principals and interview data from 9 principals along with student assessment data sought to answer the following questions:

1. What are the levels of departmentalization at the fourth and fifth grade levels, and what school background characteristics are associated with the degree of departmentalization?
2. How did principals decide to departmentalize fourth or fifth grade classrooms and how do they assign teachers to teach mathematics in departmentalized classrooms?
3. What is the relationship between the degree of departmentalization and fourth and fifth grade students’ mathematical performance growth, controlling for student background characteristics?

Mathematics instruction, whether it is in a self-contained classroom or in a departmentalized setting, is not the only factor affecting students’ mathematical achievement. As seen in Figure 1, students’ background characteristics such as gender, poverty level, and ethnicity also directly impact their math achievement growth. The type of mathematics
instruction received by student varies based on the degree and type of departmentalization (if any) used at each students’ school. Mathematics instruction is dependent on each schools’ background characteristics such as diversity, poverty level, and student enrollment. Additionally, the process in which the school departmentalized affects the exact type of departmentalization used at each grade level.

Together, a student’s background characteristics and the type of mathematics instruction they receive throughout the school year impact their overall math achievement growth. This model was used to determine the school background characteristics associated with varying levels of departmentalization, the process of assigning teachers specific subject(s) in a departmentalized setting, and the relationship between the degree of departmentalization and students’ mathematical achievement growth (controlling for students’ background characteristics).

Figure 1. Factors affecting students’ mathematical achievement growth
Significance of the Study

This study has important implication for district policy and practice on departmentalization. The success of St. Lucie Public Schools’ students affects not only students, but their teachers and administrators. Student achievement data is directly linked to both teacher and administrative evaluations so these stakeholders are certainly vested in their students’ success. If departmentalization is found to be associated with increased mathematics achievement growth, more schools may consider adopting the model.

Research question 1 seeks to understand the levels of departmentalization used across the fourth and fifth grade levels of St. Lucie Public Schools, as well as the school background characteristics associated with self-contained, semi-departmentalized, and completely departmentalized classrooms. This will determine whether particular school characteristics such as diversity level, poverty level, and student enrollment make a departmentalized model more likely to be used.

Research question 2 aims to understand how a departmentalized model came to be used at the fourth and/or fifth grade levels in a school, as well as the process for assignment of specific subject(s) to teachers. This will determine if the decision to departmentalize and the process of departmentalizing was principal-driven or more teacher-directed, and how the criteria for teacher assignment could influence the nature of mathematics instruction and students’ learning opportunities.

Definitions

The following terms are used throughout this dissertation, and their definitions are provided below:
**Departmentalization** – an instructional model in which teachers specialize in one to three subjects and instruct students in those subjects only

**Complete departmentalization** – a departmentalized model in which teachers become experts in a single subject and teach that subject exclusively

**Semi-departmentalization** – a departmentalized model in which teachers specialize in and teach two to three subjects

**Specialist** - a specific content-area (sometimes, more than one) expert teacher within a departmentalized school

**Generalist** – a teacher trained to instruct elementary students in all subject areas

**Self-contained classroom** – an instructional model in which a single teacher is responsible for the instruction of all subject areas

**Conclusion**

Despite inconsistent findings linking departmentalization to improved math performance, school districts across the country have altered the instructional organization of their elementary schools from a generalist setting to some degree of a departmentalized setting (Hood, 2009). Math performance is a known predictor of students’ future academic success, as well as an essential skill for the future workforce. While overall math performance has increased over the past twenty years, many students do not have access to the quality of mathematics instruction necessary to support them in achieving high levels of math performance (NAEP, 2011). As demonstrated by the results of several international comparative studies, the most recent math performance by students in the United States has not been up to par with other countries, with evidence of the lowest-level students in math now scoring even lower than before (Provasnik et al., 2016).
This mixed methods study using existing district data on student achievement, an original survey of school principals, and interviews with elementary and K-8 principals seeks to investigate not only the background and process of departmentalization at the fourth and fifth grade levels, but also if there is a statistically significant relationship between the degree of departmentalization and student achievement growth.
CHAPTER 2
LITERATURE REVIEW

Introduction

In a departmentalized instructional setting, students move to the classrooms of several teachers throughout each day. Depending on the degree to which an elementary school is departmentalized, this may mean that students see up to five different teachers daily (if each one specializes in a single content area) or they may rotate between a team of two or three teachers who each teach several subject areas. Departmentalization at the elementary level has increased in popularity in response to high accountability demands (Chan & Jarman, 2004), yet no clear relationship has been established between this instructional organization and improved student performance. In this chapter, I will first describe the history of departmentalization from its earliest forms in the beginning of the twentieth century to the varied levels it is seen as today. Then, I will discuss the studied advantages and disadvantages of using a departmentalized model, followed by an analysis of previous studies focused on departmentalization and student achievement.

History of Departmentalization

One of the earliest mentions of departmentalization in the history of American schooling came in 1916 when Frank Forest Bunker published a bulletin detailing the formalization and organization of public education from the mid-1800s into the early twentieth century. Departmentalized schools first became popular, particularly in the Northeastern states closest to some of America’s oldest universities (Bunker, 1916). This change came about in an effort to ensure that specialist teachers were able to teach all of the content to grade levels, especially
after third grade when “teachers’ enthusiasm is keener because they are teaching subjects in which they have specialized” (Becker & Gleason, 1927).

From 1900 to 1930, the departmentalized instructional model gained prominence starting in New York City in 1900 (Otto & Sanders, 1964). Chicago Superintendent of school Edwin Cooley experimented with departmentalization as well, publishing several programs of organization with accompanying reports in 1905 (Pierce, 1935). Carl Rathmann, Assistant Superintendent of St. Louis Public Schools, noted that five elementary schools in his district had departmentalized their middle grades and that none of the principals of these five schools wished to discontinue the practice of departmentalization (Pierce, 1935).

In the 1940s, interest in departmentalization declined, yet many city schools maintained specialist teachers for non-academic subjects such as art, music, and physical education (Goodlad, 1966). In the 1950s, concerns over national security sparked an immense interest in more rigorous science and math instruction which, again, increased interest in departmentalization at the elementary level (Goodlad, 1966). After the implementation of the No Child Left Behind Act in 2001, departmentalization once again surged in popularity in response to the emphasis on standardized testing and new accountability measures put in place (Hood, 2009).

Though its popularity has wavered throughout the twentieth century and into the twenty-first century, previous empirical studies on departmentalization have not produced consistent findings regarding its effectiveness. Critics of the instructional organization have fervently opposed it for various reasons, yet its proponents have managed to bring it to relevancy again and again over the years. Though it is currently quite a popular instructional model, the
generalist organization has remained predominant in elementary schools throughout the country (Hood, 2009).

**Departmentalization and Tracking**

Grouping by ability, known as tracking, is used in some elementary schools as one method of instructional grouping. In a grade level grouped by ability, students are separated into different classes based on their prior achievement. In a departmentalized school which also utilizes tracking, students grouped into a higher level class may have the opportunity to participate in enrichment activities and deepen their content area knowledge beyond the regular scope of their grade level. Such advanced coursework and activities are not easily assigned or accomplished in a heterogeneously grouped class, but they may be more easily implemented when all students in the classroom are high-achieving in a particular subject area. Conversely, a group of low level students would be able to move through content at a slower pace than average, which may be to their benefit. However, opponents of tracking have claimed that it does not produce academic gains for gifted students and that it impedes the learning of on-level students (Oakes, 1987; Slavin, 1987). Oakes (1987) also noted the inequity of instructional quality for students grouped into the lower level classes, though it was attributed to an implementation issue rather than a grouping issue.

**Departmentalization in Secondary Education**

The organization of secondary school teachers into departments is virtually a universal concept across the United States. In Florida, this usually begins at the sixth grade level when students transition from elementary school to middle school. This change can also be seen in Florida’s available teaching certifications. Several subject-specific Middle Level Coverages are offered in English, General Science, Mathematics, and Social Science covering instruction in
Grades 5-9. An even more expansive subject-specific Secondary Level Coverage option is also available covering Grades 6-12 in Drama, English, Mathematics, and Social Science. However, elementary school teachers are only offered the non-subject-specific Elementary Level Coverages of Elementary Education (K-6), Prekindergarten/Elementary Education (age 3 through grade 3), and Preschool Education (birth through age 4). This shift from the “mothering plan” of a single teacher for all subjects in elementary school to secondary teachers organized by subject area has been common since the 1930s (Kilpatrick, 1905) and Florida teaching certifications still support that model, although departmentalization continues to spread across elementary schools (and extend to additional grade levels within already departmentalized schools) in the state.

**Departmentalization Abroad**

The United States of America is one of the few countries that subscribe to the belief that elementary teachers can teach all subject areas equally well. This explains why only a generalist Elementary K-6 certification exists for Florida’s elementary teachers. Most American preservice preparation and certification programs prepare teachers to teach all subject areas, unlike some educational systems around the world such as those in place in Sweden and South Korea. These two countries both allow for or require that elementary teachers specialize (Reys & Fennel, 2003).

**Sweden**

Sweden’s new teacher education model requires that all elementary and middle-grades teachers choose to specialize in one of three areas: mathematics and natural science, Swedish language and social science, or English and foreign language. To enter the mathematics and science specialization, a student must have graduated from a special high school program in
mathematics and natural science. This ensures that students enter the teacher program with a solid base of knowledge in their selected subject areas and that, upon graduation, every student in grades 1-7 will receive instruction from teachers who have expertise in their area of specialty (Reys & Fennel, 2003).

South Korea

In South Korea, teacher candidates enter a university and choose three out of twelve areas (moral education, Korean education, social studies, mathematics, science, physical education, music, fine arts, practical arts, elementary education, computer education, and English education) to specialize in. Based on the student’s grades on a national college entrance exam, their university assigns them one of their three selected areas for specialized study. Regardless of their assigned area, every elementary education student takes two mathematics and two mathematics education courses. Students assigned to study mathematics take an additional twenty credit hours in mathematics and mathematics education. Upon graduation, teachers participate in a teacher-hiring exam, receive an appointment to schools, and are assigned to a specific job regardless of their specialty area studied at the university level. Some elementary teachers are given the role of mathematics teacher-leaders and serve as demonstration teachers in their schools, create mathematics assessments for their grade level, and explore the mathematical content in-depth. However, mathematics teacher-leaders still teach all subjects to students in their class, but their responsibilities specific to mathematics instruction extend beyond their classroom (Reys & Fennel, 2003).
Debates on Departmentalization

Advantages of Departmentalization

Advantages for students. An obvious advantage for students has been argued based on the possibility that math performance could potentially improve under instruction from a content specialist. Hillson and Karlson’s 1965 work summarized this idea succinctly stating that the greater understanding a teacher has of a subject, the greater the possibility that students will receive high quality instruction. Professional educational groups have touted the use of departmentalization in elementary schools citing the many benefits to both students and teachers. In 2001, the Conference Board of Mathematics published a report recommending that math, specifically, be taught by departmentalized specialist teachers in the intermediate elementary grade levels. Finally, through departmentalization, students would spend less instructional time with a weak or inexperienced teacher in math (Hirsch, 1963) whose math anxiety could potentially affect their students in a generalist elementary school where the teacher spends an entire day with students every single day.

Advantages for teachers. Departmentalization seems to be viewed favorably by many teachers. Three studies conducted in Florida, Georgia, and Mississippi consistently reported that teachers preferred departmentalized than self-contained instructional model (Eddy & True, 1980; Gerretson, Bosnick, & Schofield, 2008; Watts, 2012). Studies conducted by Strohl, Schmertzing, and Schmertzing (2014) in Georgia and by Johnson (2013) in Tennessee further found that teachers in departmentalized classrooms exhibited higher morale and job satisfaction. Several studies examined the reasons for teacher preference and high morale and job satisfaction when their classrooms are departmentalized. Eddy and True (1980) found that departmentalization allowed teachers to work effectively as teams to organize their own form of
classroom organization, division of workload, procedures, and learning activities. Other reasons identified include more time to focus on fewer content areas (Gerretson et al., 2008) and lighter workload (Strohl et al., 2014).

**Disadvantages of Departmentalization**

**Disadvantages to students.** Opponents of departmentalization often claim that having multiple teachers makes it difficult to forge strong relationships with elementary students. Becker’s 1987 study found that self-contained elementary school settings were particularly advantageous to students from low social backgrounds and that being instructed by a limited number of teachers, unlike a departmentalized setting in which students may have three or more teachers, appeared to be a benefit in most subjects for most students. Thus, departmentalization may threaten the formation of high-quality relationships between students and their teacher (McPartland & Braddock, 1993).

Pianta and Stuhlman’s 2004 quantitative study demonstrated the important link between student-teacher relationships and student achievement. In this study, closeness between first grade students and their teachers was a significant predictor of teacher ratings of achievement. Silver, Measelle, Armstrong, and Essex (2005) further found that relationships with teachers provide children with the emotional support needed to successfully transition to school and that these same relationships appear to be formative for a child’s subsequent classroom behavior.

Based on the evaluation of eight Kentucky elementary schools departmentalized at the third, fourth, and fifth-grade levels, Chang, Muñoz, and Koshewa (2008) found that departmentalization may not be positive for young elementary students who may find it difficult to establish a caring and supportive relationship with their teachers if they see up to five teachers daily. They determined that self-contained, generalist classrooms more easily fostered a
nurturing, supportive climate. The importance of creating and fostering a safe, caring learning environment is supported by psychological theories of motivation (Schaps, 2003) and departmentalization makes this more challenging.

These findings are echoed in Liu’s 2011 qualitative study on preservice elementary teachers’ perceptions which found that student relationships were perceived to be threatened by a departmentalized model even though departmentalization alleviated elementary teachers’ anxiety over teaching math.

**Disadvantages to teachers.** Disadvantages to teachers were identified in previous studies based on the difficulty of transition from one subject to another. McGrath and Rust (2002) found that, based on a study of fifth and sixth grade students in one school district that departmentalized classes, students took significantly longer to transition from subject to subject, although there was no loss of instructional time. If a class is highly motivated or involved in a specific lesson, the teacher in the self-contained classroom may wish to continue that lesson. However, if that teacher’s allotted time with their class is up, departmentalization does not allow the flexibility that a generalist organization does (Walters, 1970).

Another disadvantage of departmentalization unique to Florida is that no subject-specific certifications exist for elementary school teachers. If there is no certification test to verify one’s claim, there is no way for a principal to know that they are, indeed, a specialist in a particular subject. Assigning teachers without math certification to teach math in multiple classrooms may not enhance students’ opportunity to learn nor improve teachers’ morale or job satisfaction. It is important to examine how the process of assigning teachers without a subject-specific certification to subject areas could influence the potential benefits of departmentalization. However, no previous studies examined such process and its implications.
Departmentalization and Student Achievement

Though departmentalization is becoming more widespread across the country, previous studies that analyzed the relationship between departmentalization and student achievement have produced mixed findings. Some studies reported statistically significant findings favoring departmentalization while others (often studying the same grade level and subjects) resulted in significant findings favoring a self-contained classroom. Other studies have found no statistical differences in the achievement of elementary students in departmentalized classrooms versus students in self-contained classrooms so there is little agreement over which instructional method is superior.

Table 1 lists all empirical studies that examined the relationship between departmentalization and mathematics achievement along with research design. The table categorized these studies into 3 groups based on the conclusion based on the finding: (1) studies that favor departmentalized model, (2) studies that favor self-contained model, and (3) studies that favor neither model due to no definitive conclusion. Although many of these studies included findings on multiple subject areas, I will report the findings on mathematics only because of the focus of the current study.

As seen in Table 1, 6 out of 14 studies (approximately 43%) found a positive relationship between departmentalization and students’ mathematical achievement which led them to favoring a departmentalized model over the self-contained model. Only 2 out of 14 studies (approximately 14%) favored a self-contained model while another 6 out of 14 studies (approximately 43%) were inconclusive and favored neither model.
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<td>Improvement in the bottom quartile of standardized 5th grade scores in one semi-departmentalized classroom compared to previous year’s 5th grade.</td>
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<td></td>
<td>Butzin, Carroll, &amp; Lutz (2006)</td>
<td>Improvement in 3rd, 4th and 5th grade test scores in departmentalized classroom compared to those in self-contained classrooms in the same school.</td>
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<td>DelViscio &amp; Muffs (2007)</td>
<td>Improvement in 3rd, 4th, and 5th grade test scores in departmentalized classrooms compared to scores in years prior under a self-contained model.</td>
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<td>Moore (2008)</td>
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<td>Ponder (2008)</td>
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<td>Yearwood (2011)</td>
<td>5th grade students placed in departmentalized classes significantly outperformed 5th grade students in self-contained classes in the same district.</td>
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<td>2. Favoring self-contained model</td>
<td>Garner &amp; Rust (1992)</td>
<td>5th grade students in self-contained classrooms performed significantly higher than their counterparts in departmentalized classrooms in the same district.</td>
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<td>Garrigan (1992)</td>
<td>6th grade students in self-contained programs performed significantly higher than sixth grade students in departmentalized programs across the same state.</td>
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<td>Jack (2014)</td>
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<td></td>
<td>McGrath &amp; Rust (2002)</td>
<td>No difference in achievement gains was found between 5th and 6th grade students in a self-contained school versus their counterparts in a departmentalized school.</td>
</tr>
<tr>
<td></td>
<td>Page (2009)</td>
<td>No statistically significant correlation between student achievement and departmentalization in 6th grade students in the same state.</td>
</tr>
<tr>
<td></td>
<td>Taylor-Buckner (2014)</td>
<td>No significant differences between departmentalized and non-departmentalized students in mathematical proficiency nationally.</td>
</tr>
<tr>
<td></td>
<td>Watts (2012)</td>
<td>No significance in 4th student test scores between students in departmentalized classrooms and their counterparts in self-contained classrooms in the same district.</td>
</tr>
</tbody>
</table>
Findings Favoring Departmentalization

Approximately 43% of previous studies analyzed favored a departmentalized model over the self-contained model for students’ mathematical achievement. I will provide the detailed study findings from a few studies with the most rigorous methods here. Butzin, Carroll, and Lutz’s 2006 study introduced a departmentalization program to the third, fourth, and fifth grade students in the lowest-performing elementary school in a rural Kentucky county. One teacher focused on teaching reading, one teacher focused on teaching writing, and one teacher focused on teaching math, with all teachers teaching to third, fourth, and fifth grade students. Students in this program received science and social studies instruction from their home base teacher (one of the three specialized teachers). After a year using this program, it was found that students in the departmentalized third, fourth, and fifth grades were outperforming students placed in self-contained classrooms within the same school in reading, writing, and math. After an additional four years of the program, the once lowest-performing elementary school in the county had transformed into the fifth-highest performing school in the district. As a result of this, the departmentalized program was immediately implemented throughout the rest of the school.

A 2008 study of several schools across large, urban school district in Texas analyzed student performance on the Texas Assessment of Knowledge and Skills (TAKS) in third and fourth grade students across departmentalized and self-contained schools. Standardized test data from 4,103 third and fourth grade students from 24 elementary schools within the same district was used for analysis. Fourth grade students placed in departmentalized classrooms significantly outscored their peers in self-contained classrooms on the mathematics portion of TAKS (Ponder, 2008). Additionally, third grade bilingual students in departmentalized classes scored higher on
the TAKS mathematics assessment than third grade bilingual students in self-contained classrooms. This finding was replicated for fourth grade bilingual or ESL females.

Yearwood (2011) conducted a study of 2,152 fifth grade students attending 29 public schools in rural Georgia sought to determine whether fifth grade students in departmentalized classes attained higher mean scores on the Georgia Criterion Referenced Competency Test in reading or math compared to students in self-contained classes. In mathematics, students placed in departmentalized classes significantly outperformed students in self-contained classes (Yearwood, 2011).

These studies supported the benefit of departmentalization by showing statistically higher mathematical achievement of students in departmentalized classrooms than their counterparts in self-contained classrooms. This finding has led to a departmentalized setting being more often favored than the traditional self-contained model.

**Findings Favoring a Self-Contained Instructional Model**

As shown in Table 1, only 2 out of 14 previous studies analyzed (approximately 14%) favored a self-contained model over a departmentalized model for students’ mathematical achievement. Garner and Rust (1992) compared the reading, mathematics, science, and social studies achievement of fifth grade students in both departmentalized and self-contained classes in a rural Tennessee school district. Achievement was measured using the Stanford Achievement Test (SAT) with the end of the year fourth grade and end of the year fifth grade tests. After one year, no significant differences were found between students in departmentalized and self-contained classrooms. However, a year later, significant differences were found across all four academic areas with students in self-contained classrooms performing significantly higher than their counterparts in departmentalized classrooms (Garner & Rust, 1992).
A 1992 study of sixth-grade students’ achievement in reading, mathematics, science, and social studies was conducted to analyze achievement on the Missouri Mastery and Achievement Test (MMAT) across self-contained and departmentalized classrooms (Garrigan, 1992). It was found that these sixth grade students from across six different school districts in self-contained programs performed significantly higher than sixth grade students in departmentalized programs on the MMAT reading, mathematics, and science.

Though infrequent, these two studies showed students in a self-contained classrooms produced higher mathematical achievement than those in departmentalized classrooms.

**Mixed Findings**

As seen in Table 1, 6 out of 14 (approximately 43%) previous studies favored neither instructional model based on inconclusive and/or statistically insignificant findings. One study conducted by McGrath and Rust on fifth and sixth grade students in one rural Tennessee school district compared 197 students from two kindergarten-sixth elementary schools, one which was self-contained and one which was departmentalized. Students’ scale scores on the Tennessee Comprehensive Assessment Program (TCAP) Total Battery and subtests in Reading, Language, Mathematics, Science, and Social Studies were analyzed. No difference in achievement was found in students from the self-contained school versus students in the departmentalized school in Mathematics (McGrath & Rust, 2002).

A 2010 study of fourth and fifth grade students’ scores on the Kentucky Core Content Test found that there was no significant difference in academic achievement in mathematics (Kent, 2010). These 1,236 students’ scores, from eight different elementary schools in one urban Kentucky school district, were compared (approximately half of the students received instruction in a departmentalized format) and found to be similar in regard to mean score, number, and
standard deviation. No association was found between group (self-contained or departmentalized) and mathematics score.

A 2014 study on fifth-graders across 46 Georgia schools revealed no significance in student test scores between students in departmentalized classrooms and their counterparts in self-contained classrooms. This study measured student achievement using data from the Georgia Criterion Referenced Competency Test and concluded that mathematics achievement scores were not predicted by a school’s organizational structure (Jack, 2014). Despite the finding of no statistical difference between students from self-contained and departmentalized classrooms, students in the departmentalized classrooms, on average, scored slightly higher than students in self-contained classrooms (Jack, 2014).

In a 2014 study analyzing data from the U.S. Department of Education’s Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 data set (a large sample containing data from over 21,000 students), a significant difference was found in the mathematics proficiency of departmentalized and non-departmentalized students when teachers had below-average mathematics backgrounds (Taylor-Buckner, 2014). In this study, a teacher was classified as having a “below-average mathematics background” did not hold an undergraduate or graduate in degree in mathematics or mathematics education, had taken fewer than 2.6 college mathematics methods courses, and/or attended less than 9.6 hours of mathematics workshops in the past year. When exploring differences in mathematics proficiency among all students, there were no significant differences between departmentalized and non-departmentalized students. Surprisingly, students of the mathematically below-average departmentalized teachers displayed both the highest mathematics proficiency, as well as the biggest gains in mathematical proficiency.
Summary of Previous Findings

As seen in Table 1, based on the mixed findings of previous studies, there are inconsistent findings regarding the best instructional model for elementary mathematics. Six studies found the departmentalized model to be more effective in increasing student achievement, two studies found the self-contained model most effective, and six studies resulted in mixed findings. The majority of these studies used a single data point to compare mean scores on a standardized mathematics assessment. Outside of focusing on student achievement, few studies examined students’ growth in mathematics over time (likely due to the fact that a single test score was commonly used). This study overcomes this limitation by analyzing three scale scores obtained from each student’s September, January, and May diagnostic i-Ready assessments. This will allow for the analysis of means at three times during the school year, as well as the opportunity to calculate and examine students’ growth from the initial assessment in September to their final assessment in May. By using three scale scores as opposed to a single score for each student, this study will be able to track the differences in scores between students in self-contained classrooms versus students in semi-departmentalized classrooms versus students in completely departmentalized classrooms throughout the year and examine growth, an aspect not studied by many of the previous researchers of departmentalization.

Conclusion

Though departmentalization’s popularity has grown in response to increased accountability demands, previously conducted studies on departmentalization and student achievement have had mixed findings. There are certainly benefits and drawbacks to using a departmentalized model and the same could be argued for the self-contained model. Teachers in a departmentalized school may experience higher job satisfaction and certain student subgroups
could possibly benefit, but additional research is necessary to see if departmentalization is a viable solution to increasing intermediate-level elementary students’ mathematical performance.

The results of this study conducted on fourth and fifth grade students across St. Lucie Public Schools will inform district and school leaders about significant differences in instructional organizational models and students’ mathematical performance. Since departmentalization is currently being utilized to varying degrees across the district’s 26 elementary and combination K-8 schools, the results of this study could influence future instructional organization of fourth and/or fifth grade classrooms.
CHAPTER 3

METHODOLOGY

Introduction

A mixed methods research design was used to examine the background and process of departmentalization of fourth and fifth grade classrooms within St. Lucie Public Schools, as well as statistical relationships between departmentalization and math achievement growth.

This research combines principal survey data, principal interview data, and a secondary data analysis of district data on school background and student achievement from the i-Ready online instructional program. i-Ready is used in all tested grade levels (third, fourth, and fifth-grade) across all of St. Lucie Public Schools’ elementary schools to supplement teaching and to prepare students for their annual Florida Standards Assessments in the areas of reading and mathematics. Within i-Ready, students take three diagnostic assessments (aligned to the Florida Standards) to measure their proficiency and progress throughout the year. These tests are administered in September (Fall diagnostic), January (Winter diagnostic), and May (Spring diagnostic). Each completed diagnostic yields a scale score which was examined for proficiency, as well as learning gains throughout the year. Each student’s scale scores and learning gains were used to answer the overarching research questions:

1. What are the levels of departmentalization at the fourth and fifth grade levels, and what school background characteristics are associated with the degree of departmentalization?

2. How did principals decide to departmentalize fourth or fifth grade classrooms and how do they assign teachers to teach mathematics in departmentalized classrooms?
3. What is the relationship between the degree of departmentalization and fourth and fifth grade students’ mathematical performance growth, controlling for student background characteristics?

**Study Site and Participants**

St. Lucie Public Schools, a B-rated school district located on the Treasure Coast of Florida, enrolls over 37,000 students across its 53 schools. With a minority student population of approximately 67% and 74% of students receiving free or reduced-price lunch (FRL), St. Lucie Public Schools is quite diverse and analyzed data will encompass student populations from various ethnic backgrounds and socioeconomic levels (Facts At A Glance).

A pilot survey conducted with St. Lucie Public Schools’ elementary and K-8 principals in August 2017 showed that approximately 35% of this convenience sample of about 5,000 students received mathematics instruction from a teacher who teaches his or her class all subject areas in a traditional generalist elementary school. The remaining 65% receive mathematics instruction from a teacher assigned to teach mathematics in departmentalized elementary classrooms (complete departmentalization) or a teacher assigned to teach mathematics and another subject area in elementary classrooms (semi-departmentalization). The degree of departmentalization can differ from school to school so one school may have their fifth-grade organized in a team teaching format with two teams of teachers each teaching two or three subjects. Alternatively, a school could have one designated teacher who instructs all fourth and fifth-grade students in mathematics alone. Based on this pilot survey finding, the survey instrument and interview protocol were developed for the main data collection during the 2018-19.
Data Collection

This study used three types of data: (1) a survey of all 26 elementary or K-8 school principals who serve fourth and fifth grade students, (2) interviews of nine selected elementary or K-8 principals who serve fourth and fifth grade students whose schools use departmentalization or semi-departmentalization, and (3) district administrative data on school background characteristics and fourth and fifth grade student performance in mathematics and student background characteristics (race, gender, and free or reduced price lunch status) from the 2017-2018 school year.

Principal Survey

In November 2018, an email survey was sent out to principals of all 26 elementary and K-8 schools in St. Lucie Public Schools requesting information on the instructional model(s) used in grades four and five at each school in the 2016-17, 2017-2018, and 2018-19 school years as well as information on mathematics qualifications of their teachers. The survey instrument is included in Appendix B. The survey requested that principals classify the instructional model used in their fourth grade classrooms, as well as in their fifth grade classrooms. They were given three options to choose from for each grade level: no departmentalization, semi-departmentalization (teachers teach 2-3 subjects), and complete departmentalization (teachers specialize and teach a single subject). Then, if a semi-departmentalized option was chosen for either fourth or fifth grade, principals were asked to explain the details of their school’s semi-departmentalized model in narrative form.

Although the survey included questions to assess math teacher credentials, based on principal responses, no fourth or fifth grade math teachers in St. Lucie Public Schools were known to be mathematics majors, hold a secondary mathematics certification, or a National
Board certification in mathematics. All 26 elementary/K-8 principals participated in the email survey after multiple follow-ups through emails and phone calls by December 2018.

**Principal Interviews**

After the email survey was completed, a request to participate in an interview detailing the background and process of departmentalization at the fourth and fifth grade levels was emailed to 15 selected principals. These principals were selected based on the fact that their school assignment had not changed from the 2017-2018 school year to the 2018-2019 school year. Nine principals agreed to participate. These principals were asked to describe the qualifications of their departmentalized teachers, why departmentalization was used, and how departmentalized teaching assignments were decided at their respective school sites (see Appendix C for the interview protocol). These principal interviews were completed by the end of March 2019 and transcribed verbatim for analysis.

**District Administrative Data**

Three types of administrative data were gathered from St. Lucie Public Schools in August 2018 after obtaining the district approval for the research: (1) mathematics performance growth data of fourth and fifth graders in 26 elementary school during the 2017-18 academic year, (2) student background characteristics, and (3) school background characteristics. For the student mathematics performance data, i-Ready data for the fourth and fifth grade levels was obtained from the St. Lucie Public Schools district office. By using existing i-Ready data, students’ performance will not have been affected by the Hawthorne effect (the alteration of behavior by the subjects of a study due to their awareness of being observed) often noted in studies where participants are aware that they are being studied (French, 1953). Additionally, by using a mass data set that is available from the school district with identifying information removed, the
sample size will be much greater than it would have been if parental consent was required for experimentation. In addition, student background characteristics such as students’ gender, race, and socioeconomic status linked with the mathematics performance data and school background characteristics data were obtained from the St. Lucie Public Schools district office.

Data Analysis and Variables

RQ1: Level of Departmentalization and School Background Characteristics

Analysis. To address my first research question, *What are the levels of departmentalization at the fourth and fifth grade levels, and what school background characteristics are associated with the degree of departmentalization?*, I computed frequencies to obtain the percentage of schools that are completely departmentalized or semi-departmentalized separately for the fourth and fifth grade levels based on the principal survey data. This process was repeated to determine the extent of departmentalization within fourth and fifth grade classrooms of St. Lucie Public Schools during the 2016-2017 school year, 2017-2018 school year, and the upcoming 2018-2019 school year.

To examine the relationship between departmentalization and school background characteristics, t-test was used at the school level (one variable at a time) for the mean percentage difference between no departmentalization and semi-departmentalization for the fourth grade (there was no complete departmentalization) and between semi-departmentalization and complete departmentalization for the fifth grade (only one school used self-contained instructional model).

Variables.

*Departmentalization.* In the email survey to all 26 elementary and K-8 principals, for each school year in question, principals were asked, “Please select which of the followings
applies to the departmentalization of your fourth and fifth grade classrooms during the 2016-17/2017-18/2018-19 academic years by entering a X mark for each grade level” with a table listing three choices: (1) No departmentalization, (2) semi-departmentalization (teachers teach 2-3 subjects), and (3) complete departmentalization (teachers specialize and teach a single subject). They were asked to choose one option for fourth and fifth grade separately.

Fourth and fifth grade classrooms can be either completely departmentalized, semi-departmentalized, or not departmentalized at all and the responses were coded “0” for no departmentalization, “1” for semi-departmentalization, or “2” for complete departmentalization.

**School Background Characteristics.** The Florida Department of Education publishes data regarding the diversity level, poverty level, and enrollment of public schools in the state of Florida, including the 26 schools used in this study. Diversity was measured by the percentage of students classified as an ethnic minority. Poverty was measured by the percentage of students receiving free or reduced-price lunch. Enrollment measured by the number of students enrolled in the 2017-2018 school year. As shown in Table 2, during the 2017-2018 school year, a mean of 68.7% of students in the 26 elementary and K-8 schools within St. Lucie Public Schools were classified as ethnic minority students while a mean 82.9% of students received a free or reduced-price lunch. Of the 26 elementary and K-8 schools, enrollment ranged from 454 students up to 1,453 students, with a mean enrollment of 835.9 students.

Table 2: Descriptive Statistics of School Background Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity (% of Ethnic Minority Students)</td>
<td>26</td>
<td>68.7</td>
<td>13.0</td>
<td>50.4 – 96.1</td>
</tr>
<tr>
<td>Poverty (% Free or Reduced-Price Lunch)</td>
<td>26</td>
<td>82.9</td>
<td>15.9</td>
<td>57.3 – 100</td>
</tr>
<tr>
<td>Enrollment (N of students)</td>
<td>26</td>
<td>835.9</td>
<td>338.1</td>
<td>454 - 1453</td>
</tr>
</tbody>
</table>
RQ2: Background and Process of Departmentalization

Analysis. To address the second research question, *How did principals decide to departmentalize fourth or fifth grade classrooms and how do they assign teachers to teach mathematics in departmentalized classrooms?*, interview data from the 9 participating elementary/K-8 principals was coded and analyzed for similarities and differences. Prior to coding, I listened to the audio recordings of each interview to capture nuances that may not be apparent in the transcripts. I used a categorizing strategy to analyze similarities and differences before sorting them into specific categories. Prior codes were used to identify major themes regarding the length of time departmentalization had been utilized in each school, the motivation behind using a departmentalized model, and how teachers were assigned specific subjects to teach within a departmentalized model. After the initial coding, each code was reviewed thoroughly to categorize them further. Using this strategy, several more themes emerged and were confirmed after listening to each audio recording an additional time.

RQ3: Departmentalization and Mathematics Performance Growth

Analysis. To answer the last research questions, *What is the relationship between the degree of departmentalization and fourth and fifth grade students’ mathematical performance growth, controlling for student background characteristics?*, I used the following equation for multiple regression analysis.

\[ Y \text{ (Spring score)} = a + b_1 \text{ (fall score)} + b_2 \text{ (departmentalization)} + b_3 \text{ (female)} + b_4 \text{ (FRL)} + b_5 \text{ (Black)} + b_6 \text{ (Hispanic)} + b_7 \text{ (Multiracial)} + e. \]

In the fourth grade level, a statistical difference in students’ mathematics achievement scores in May between self-contained and semi-departmentalized classrooms was examined using multiple regression analysis, controlling for students’ September scores and background
characteristics. In the fifth grade level, statistical differences in students’ mathematics achievement scores in May among self-contained classrooms, semi-departmentalized classrooms and completely departmentalized classrooms was examined using multiple regression analysis, controlling for students’ September scores and background characteristics. Additionally, t-tests and ANOVA were performed comparing scale scores on the September, January, and May assessments to analyze differences in proficiency between students in self-contained classrooms, semi-departmentalized classrooms, and completely departmentalized classrooms. Statistical significance was be determined based on an alpha of \( \leq .05 \).

**Variables.**

**Student Background Characteristics.** St. Lucie Public Schools provided data on students’ gender, race, and socioeconomic status along with their scale scores on each of i-Ready’s three diagnostic assessments. Student gender was coded as 1 = female and 0 = male, student race was coded as 1 = Black, Hispanic, American Indian/Alaska Native, or Mixed Race and 0 = White or Asian, and student’s free or reduced price lunch were coded as 1 = receiving free or reduced price lunch, 0 = otherwise.

**Student Achievement.** i-Ready, billed as a “K-12 Adaptive Diagnostic” tool by creators Curriculum Associates, is popular in schools because of its ability to pinpoint weaknesses in students’ knowledge and to continuously monitor students’ progress throughout a school year. It provides personalized instruction and practice to students while also providing teachers with valuable feedback on their students’ knowledge and performance making differentiated instruction much easier. i-Ready’s diagnostic assessments are aligned to the Florida Standards in which the students will be tested. Each diagnostic (all of which are adaptive in nature) will present students with anywhere from 54-72 test items. i-Ready’s tests have been shown to have
strong correlations with other Common Core-based summative assessments ranging from .77-.85 across grade levels and subjects making it a valid instrument for measuring students’ mathematical achievement. Each diagnostic test is administered on a computer at school and students are given an unlimited amount of time to complete it. According to i-Ready, most students finish within 30-60 minutes. These tests are administered in September (Fall diagnostic), January (Winter diagnostic), and May (Spring diagnostic). Each completed diagnostic yields a scale score which will be examined for proficiency, as well as learning gains throughout the year. Scale scores are calculated instantly and are available to teachers for immediate analysis. Each student’s learning gain in math were computed by the difference between the scale scores in September and May. The scale scores were standardized across three diagnostic assessments in order to measure the achievement growth.

**Descriptive Statistics.** Table 3 and 4 present the descriptive statistics and frequencies of the fourth and fifth graders’ math scores and background characteristics respectively. At the fourth grade level, i-Ready classifies student diagnostic scale scores of 465-526 as being on grade level. A score between 465-481 classifies students as “Early Grade 4”, a score between 482-516 classifies students as “Mid Grade 4”, and a score between 517-526 classifies students as “Late Grade 4”. According to i-Ready, students in Grade 4 are expected to gain 22-31 points from their Fall diagnostic scale score to their Spring diagnostic scale score over the course of the school year, regardless of their initial score.

Though the mean Fall, Winter, and Spring diagnostic scale scores were all below what i-Ready considers on level for the fourth grade, the mean scale score did increase with each administration, as expected over the course of the school year. The mean Fall scale score of 426.09 is equivalent to a second grade placement in math, the mean Winter scale score of 443.25
is equivalent to a third grade placement in math, and the mean Spring scale score of 457.52 is equivalent to a third grade placement in math (only 7.48 points beneath a fourth grade placement). Despite the below grade level mean scale scores, the mean growth from the Fall scale score to the Spring scale score was 31.43 points, slightly higher than the range of expected gains for a fourth grade student over a single school year. Gender and ethnicity were close to being evenly balanced (with the exception of the “Multiple Race and Others” group which only represented 4.6% of students) among fourth grade students while a majority of students (63.6%) received free or reduced-price lunch.

Table 3: Descriptive Statistics of Student Variables at Fourth Grade Level

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean/%</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Scale Score</td>
<td>2358</td>
<td>426.09</td>
<td>25.46</td>
<td>298 – 502</td>
</tr>
<tr>
<td>Winter Scale Score</td>
<td>2358</td>
<td>443.25</td>
<td>25.06</td>
<td>296 – 517</td>
</tr>
<tr>
<td>Spring Scale Score</td>
<td>2358</td>
<td>457.52</td>
<td>27.38</td>
<td>307 – 527</td>
</tr>
<tr>
<td>Growth (Fall – Spring)</td>
<td>2358</td>
<td>31.43</td>
<td>13.28</td>
<td>-76 – 141</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1209</td>
<td>51.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1149</td>
<td>48.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White and Asian</td>
<td>774</td>
<td>32.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>745</td>
<td>31.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>731</td>
<td>31.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Race and Others</td>
<td>108</td>
<td>4.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRL</td>
<td>2358</td>
<td>63.6%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At the fifth grade level, as shown in Table 4, i-Ready classifies student diagnostic scale scores of 480-540 as being on grade level. A score between 480-497 classifies students as “Early Grade 5”, a score between 498-526 classifies students as “Mid Grade 5”, and a score between 527-540 classifies students as “Late Grade 5”. According to i-Ready, students in Grade 5 are expected to gain 20-29 points from their Fall diagnostic scale score to their Spring diagnostic scale score over the course of the school year, regardless of their initial score.

Though the mean Fall, Winter, and Spring diagnostic scale scores were all below what i-Ready considers on level for the fifth grade, the mean scale score did increase with each administration, as expected over the course of the school year. The mean Fall scale score of 449.80 is equivalent to a third grade placement in math, the mean Winter scale score of 464.06 is equivalent to a fourth grade placement in math, and the mean Spring scale score of 473.84 is equivalent to a fourth grade placement in math (only 6.16 points beneath a fifth grade placement). Despite the below grade level mean scale scores, the mean growth from the Fall scale score to the Spring scale score was 24.04 points, which falls within the range of expected gains for a fifth grade student over a single school year. Gender and ethnicity were close to being evenly balanced (with the exception of the “Multiple Race and Others” group which only represented 4.6% of students) among fifth grade students while a majority of students (60.5%) received free or reduced-price lunch.

St. Lucie Public Schools provided data on students’ background characteristics such as gender, ethnicity, and free/reduced-price lunch status. They also provided the accompanying Fall, Winter, and Spring diagnostic scale scores for all fourth and fifth grade students in the 2017-2018 school year.
Table 4: Descriptive Statistics of Student Variables at Fifth Grade Level

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean/</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Scale Score</td>
<td>2565</td>
<td>449.80</td>
<td>26.12</td>
<td>305 – 524</td>
</tr>
<tr>
<td>Winter Scale Score</td>
<td>2565</td>
<td>464.06</td>
<td>27.40</td>
<td>298 – 537</td>
</tr>
<tr>
<td>Spring Scale Score</td>
<td>2565</td>
<td>473.84</td>
<td>30.77</td>
<td>300 – 538</td>
</tr>
<tr>
<td>Growth (Fall – Spring)</td>
<td>2565</td>
<td>24.04</td>
<td>18.85</td>
<td>-124 – 140</td>
</tr>
<tr>
<td>Gender</td>
<td>2565</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1328</td>
<td>51.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1237</td>
<td>48.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>2565</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White and Asian</td>
<td>889</td>
<td>34.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>753</td>
<td>29.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>804</td>
<td>31.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Race and Others</td>
<td>119</td>
<td>4.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRL</td>
<td>2565</td>
<td>60.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Protection of Human Subjects**

Because this research was a non-experimental secondary data analysis, expedited IRB approval was sought out. Prior to receiving data, St. Lucie Public Schools removed identifying information except for a student’s gender, race, socioeconomic status, and the school background data. Principals’ survey and interview responses were obtained on a voluntary basis and their identities, as well as their schools’ identities were kept confidential. Pseudonyms are used for the interview quotes and survey data are reported without identifiable information about the schools.
Positionality Statement

As a secondary math teacher and an aspiring administrator, student success is one of my top priorities. In a world of education dominated by high-stakes assessment, educational leaders are constantly searching for newer, better ways to instruct students and, hopefully, lead them to increased success. My own desire to seek out the best instructional organizations for student success led me to study departmentalization. As a math teacher holding a professional teaching certificate in Mathematics 6-12, I presumed that elementary school teachers who specialized in teaching mathematics (as we do in secondary school) would yield increased student success in mathematics. However, I underestimated the power and value of strong, positive student-teacher relationships in elementary school-aged children. Over the past seven years, I have taught middle school and high school students and, though my experiences have been diverse and highly valuable, they cannot be compared to the experiences of teaching elementary school students.
CHAPTER 4

RESULTS

Introduction

This chapter provides the results of the analyses of principal surveys, principal interviews, and data analysis of fourth and fifth grade student i-Ready data for addressing three research questions. Principal survey data was compiled and analyzed to determine the frequency and levels at which elementary and K-8 schools within St. Lucie Public Schools utilized a departmentalized. Interviews with nine selected principals took place to determine the background of departmentalization in each principal’s school, as well as the teacher assignment process. A quantitative analysis was done on i-Ready data from approximately 5,000 fourth and fifth grade students who took the Fall, Winter, and Spring i-Ready diagnostic assessments in the 26 elementary/K-8 schools of St. Lucie Public Schools.

Level of Departmentalization and School Background Characteristics

This section reports the findings for the first research question, *What are the levels of departmentalization at fourth and fifth grade level, and what school background characteristics are associated with the degree of departmentalization?*

Level of Departmentalization

Based on principal email survey responses, the frequency and levels at which the 26 elementary/K-8 schools within St. Lucie Public Schools utilized departmentalization during the 2017-18 year was determined. At the fourth grade level, 65.4% of schools did not departmentalize at all while 34.6% of schools utilized a semi-departmentalized model in which teachers taught two or three subject areas. At the fifth grade level, a single school (3.8%) did not
departmentalize, while 80.8% of fifth grades were semi-departmentalized, and 15.4% of fifth grade classrooms were completely departmentalized with a single subject taught by each teacher. This shows that the departmentalization is more common at the fifth grade level than fourth grade level. In addition, no fourth grade classrooms used complete departmentalization.

Table 5: Degree of Departmentalization in 26 Schools during the 2017-18 Academic Year

<table>
<thead>
<tr>
<th></th>
<th>4th Grade</th>
<th>5th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>17</td>
<td>65.4%</td>
</tr>
<tr>
<td>Semi-Departmentalization</td>
<td>9</td>
<td>34.6%</td>
</tr>
<tr>
<td>Complete Departmentalization</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>26</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The survey also asked the degree of departmentalization in the 2016-17 and 2018-19 academic year and Table 6 presents the results. These data allowed me to examine the stability of departmentalization over 3 years by examining before and after the 2017-18 academic year which was the focus of the current study. As shown in Table 6, there was no change in instructional model used from the 2016-2017 school year to the 2017-2018 school year. However, from the 2017-2018 school year to the 2018-2019 school year, two schools changed their semi-departmentalized fifth grade classes to self-contained classes.
Table 6: Degree of Departmentalization in 26 Schools during the 2016-17 and 2018-19 Academic Years

<table>
<thead>
<tr>
<th></th>
<th>2016-17</th>
<th></th>
<th>2018-19</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4th Grade</td>
<td>5th Grade</td>
<td>4th Grade</td>
<td>5th Grade</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>17</td>
<td>65.4%</td>
<td>1</td>
<td>3.8%</td>
</tr>
<tr>
<td>Semi-Departmentalization</td>
<td>9</td>
<td>34.6%</td>
<td>21</td>
<td>80.8%</td>
</tr>
<tr>
<td>Complete</td>
<td>NA</td>
<td>NA</td>
<td>4</td>
<td>15.4%</td>
</tr>
<tr>
<td>Sum</td>
<td>26</td>
<td>100%</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

School Characteristics Associated with Departmentalization

The characteristics of diversity, poverty, and student enrollment were analyzed to determine any existing relationship between departmentalization and school background. T-tests were performed for the school variables and at each grade level. As seen in Table 7 below, the only statistically significant findings were that both high-poverty schools and schools with lower student enrollment numbers were more likely to utilize a semi-departmentalized model at the fourth grade level. There was no statistically significant differences in the school background characteristics between the semi-departmentalized and departmentalized fifth grade classrooms.
Table 7: Relationships between Departmentalization and School Background Characteristics (t-tests)

<table>
<thead>
<tr>
<th>Background</th>
<th>Grade</th>
<th>Departmentalization</th>
<th>N</th>
<th>Mean</th>
<th>T-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversity</td>
<td>4th</td>
<td>None</td>
<td>17</td>
<td>66.85</td>
<td>-.97</td>
</tr>
<tr>
<td></td>
<td>4th</td>
<td>Semi-Departmentalization</td>
<td>9</td>
<td>72.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Semi-Departmentalization</td>
<td>21</td>
<td>69.71</td>
<td>1.66</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Complete Departmentalization</td>
<td>4</td>
<td>63.90</td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>4th</td>
<td>None</td>
<td>17</td>
<td>78.42</td>
<td>-2.13*</td>
</tr>
<tr>
<td></td>
<td>4th</td>
<td>Semi-Departmentalization</td>
<td>9</td>
<td>91.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Semi-Departmentalization</td>
<td>21</td>
<td>81.95</td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Complete Departmentalization</td>
<td>4</td>
<td>83.83</td>
<td></td>
</tr>
<tr>
<td>Enrollment</td>
<td>4th</td>
<td>None</td>
<td>17</td>
<td>919.29</td>
<td>2.42*</td>
</tr>
<tr>
<td></td>
<td>4th</td>
<td>Semi-Departmentalization</td>
<td>9</td>
<td>678.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Semi-Departmentalization</td>
<td>21</td>
<td>822.62</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>Complete Departmentalization</td>
<td>4</td>
<td>814.25</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01

Background and Process of Departmentalization

This section addressed the second research question, *How did the principals decide to departmentalize 4th or 5th grade classrooms and how do they assign teachers to teach mathematics in departmentalized classrooms?*
Interviews were conducted with nine elementary/K-8 principals to further understand how departmentalization worked at each school site. Based on responses to the initial email survey, interview requests were emailed (see Appendix C) and interviews were arranged with nine principals who agreed to participate. These nine principals were selected because their school assignment had not changed from the 2017-2018 school year to the 2018-2019 school year. A semi-structured interview was conducted with each principal (see Appendix D) and interviews were recorded and transcribed for data analysis. Brief descriptions of each school’s instructional organization as explained by their principals are provided first, followed by the findings regarding the decision to departmentalize, process of teacher assignment to departmentalized classrooms, and teacher attitudes toward departmentalization reported by principals.

**Interview Participants**

Table 8 presents the degree of departmentalization at fourth and fifth grade levels along with the school background characteristics of each principal. Five principals used semi-departmentalization at the fifth grade level, but no departmentalization at the fourth grade level. Three principals used semi-departmentalization at fourth grade level and semi-departmentalization or complete departmentalization at the fifth grade level. One principal used no departmentalization at the fourth or fifth grade level.

Mrs. Angela Payne, principal of School 1, oversaw a semi-departmentalized fifth grade. At School 1, there were five fifth grade teachers divided into two teams. One team consisted of three teachers while the other was a two-person team. On the team of three, one person taught math and writing, one taught language arts, and one taught science and social studies. On the two-person team, one teacher taught math and social studies and their partner taught language
arts and science. School 1 is an elementary school with lower than average diversity and poverty.

Table 8: List of Interviewees

<table>
<thead>
<tr>
<th>School</th>
<th>Principal</th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
<th>Diversity</th>
<th>Poverty</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Angela Payne</td>
<td>None</td>
<td>Semi-dept.</td>
<td>50% - 60%</td>
<td>60% - 70%</td>
<td>500 – 750</td>
</tr>
<tr>
<td>2</td>
<td>Kathleen Kenny</td>
<td>None</td>
<td>Semi-dept.</td>
<td>80% - 90%</td>
<td>70% - 80%</td>
<td>500 - 750</td>
</tr>
<tr>
<td>3</td>
<td>Elena Fisher</td>
<td>None</td>
<td>Semi-dept.</td>
<td>60% - 70%</td>
<td>70% - 80%</td>
<td>750 – 1000</td>
</tr>
<tr>
<td>4</td>
<td>Rachel Garcia</td>
<td>None</td>
<td>Semi-dept.</td>
<td>80% - 90%</td>
<td>90% - 100%</td>
<td>250 - 500</td>
</tr>
<tr>
<td>5</td>
<td>Maria Wyatt</td>
<td>None</td>
<td>Semi-dept.</td>
<td>60% - 70%</td>
<td>60% - 70%</td>
<td>1250 - 1500</td>
</tr>
<tr>
<td>6</td>
<td>Olivia Barnes</td>
<td>Semi-dept.</td>
<td>Complete Dept.</td>
<td>60% - 70%</td>
<td>90% - 100%</td>
<td>500 – 750</td>
</tr>
<tr>
<td>7</td>
<td>Eve Barbour</td>
<td>Semi-dept.</td>
<td>Semi-dept.</td>
<td>50% - 60%</td>
<td>70% - 80%</td>
<td>500 – 750</td>
</tr>
<tr>
<td>8</td>
<td>Laura Kent</td>
<td>Semi-dept.</td>
<td>Semi-dept.</td>
<td>80% - 90%</td>
<td>90% - 100%</td>
<td>500 – 750</td>
</tr>
<tr>
<td>9</td>
<td>David Reid</td>
<td>None</td>
<td>None</td>
<td>60% - 80%</td>
<td>90% - 100%</td>
<td>1000 - 1250</td>
</tr>
</tbody>
</table>

Notes:  
1 The principal names are pseudonyms.  
2 Ranges are used to anonymize schools.

Mrs. Kathleen Kenny, principal of School 2, oversaw a semi-departmentalized fifth grade consisting of four teachers divided into two teams. Each team had one teacher who specialized in math and science while their partner taught language arts and social studies. School 2 is an elementary school with higher than average diversity and below average poverty.

Mrs. Elena Fisher, principal of School 3, oversaw a semi-departmentalized fifth grade consisting of four teachers paired as teams of two. One teacher taught math and science while their partner taught language arts and social studies. School 3 is a K-8 with average diversity and below average poverty.

Dr. Rachel Garcia, principal of School 4, oversaw a semi-departmentalized fifth grade made up of two teachers. One teacher taught math and science while the other taught language arts and social studies. School 4 is a small K-8 with above average diversity and poverty.
Mrs. Maria Wyatt, principal of School 5, oversaw a semi-departmentalized fifth grade made up of three teams of two teachers. Within each team, one teacher taught language arts and social studies while their partner taught math and science. School 5 is a large K-8 with average diversity and below average poverty.

Mrs. Olivia Barnes, principal of School 6, oversaw a semi-departmentalized fourth grade and a completely departmentalized fifth grade. In fourth grade, there was a team of three teachers and a team of two teachers. Within the triad, one person taught language arts and social studies, one person taught math exclusively, and one person taught science with writing. On the two person team, one person taught language arts and social studies while the other taught math and science. In fifth grade, there was a similar splitting up of five sections into a triad team and a pair, except each team had one teacher who exclusively taught math. School 6 is an elementary school with average diversity and above average poverty.

Mrs. Eve Barbour, principal of School 7, oversees a semi-departmentalized fourth and fifth grade. In both the fourth and fifth grades, there were two teams of two teachers. On each team, one person taught math and science while their partner taught language arts and social studies. School 7 is an elementary school with below average diversity and poverty.

Mrs. Laura Kent, principal of School 8, oversaw semi-departmentalized classrooms in both the fourth and fifth grade levels. In fourth grade, there were two teams of two teachers. Within each team, one teacher taught math and science while their partner taught language arts and social studies. Fifth grade has two pairs of two teachers who followed the same splitting of subject areas. School 8 is an elementary school with above average diversity and poverty.

Mr. David Reid, principal of School 9, chose not to departmentalize any grade levels at his school. He cited the importance of establishing and maintaining positive student-teacher
relationships at the elementary level, something that was especially important to him in his past experience as an elementary teacher. He emphasized that those relationships are even more critical in high poverty schools like his own which led him to oversee the only self-contained fifth grade across St. Lucie Public Schools.

The principals’ descriptions show that the departmentalized models utilized across St. Lucie Public Schools varied greatly based on number of teachers on a team and number of sections of students per grade level. However, the most common configuration for a departmentalized fourth or fifth grade math teacher was the assignment of teaching both math and science to a single grade level.

Decision to Departmentalize

The interviews revealed that the decision for schools and individual grade levels was largely made based on request from teachers, not based on the district encouragement or principals’ own initiative. Also, most principals (7 out of 8) found that some grade levels were already departmentalized upon their initial assignment to the school. When additional teams of teachers approached their principal with the idea of departmentalization, administrators were receptive to the idea and, after a review of student achievement data, permitted teachers to implement their requested departmentalized model.

Mrs. Kenny, principal of School 2, was approached by two fourth grade teachers who wanted to create two two-person departmentalized teams and requested her assistance in hiring teachers with specific strengths to complete each team.

They were the ones who approached me about it and said “Hey, we want to take a look at departmentalization. This is what our data is showing. What we would need to complete
the package would be a person strong in math and science on one team and ELA on the other team.”

Mrs. Payne, principal of School 1, mentioned changes for the upcoming school year and expanding the semi-departmentalized model down to two members of her school’s fourth grade. Fourth grade is not departmentalized at all, but there is talk for it being done this coming year. We’ll start with a two-man team because they’re really gung ho about it and the other three will stay by themselves. One wants to focus on the ELA and reading and the other will definitely do math and science.

There quotes support the common pattern among the principals that teacher preference is an important criterion for whether, how, and to what degree the classrooms are departmentalized. Mrs. Barnes, principal of School 6, was the sole exception to this pattern. In her first year as principal of School 6, she had the idea to try departmentalization as a solution to the difficulties of collaborative planning with eight teachers in a single grade level.

With forty-five minutes a week to plan reading, forty-five minutes to plan math, and that many people at a table trying to come up with a lesson plan that works with everyone’s years of experience, their personalities, their beliefs about reading and math, it all comes out. At the end of forth-five minutes, we really were not accomplishing what we needed to do so halfway through that year, we kind of played around a little bit with third grade, who was willing to divide. They had eight sections so they were willing to divide half and half, and they liked it because, then, when we came to the table to plan, you’re talking about four teachers and a coach versus eight teachers trying to come up with a lesson plan.
Mrs. Barnes’ decision to departmentalize was not directly driven by improving student achievement, but by manageability of collaborative planning with a smaller number of teachers. Even in this case, teachers’ input seems to have been important for her.

Mr. Reid, principal of School 9, was the sole principal to not use any degree of departmentalization at the fourth or fifth grade level. He emphasized the importance of the close student-teacher relationship at those grade levels (especially in a high poverty school such as his own) and he expressed his belief that departmentalization could threaten those relationships. Thus, he has been opposed to using any degree of departmentalization at any elementary grade level throughout his tenure as school principal.

In summary, the decision to utilize a departmentalized model was largely teacher-driven, not directed by the principal or the district’s encouragement. With teachers eager to try a new model and student achievement data to support their requests, principals were happy to accommodate their teachers’ requests and hopeful to see continued success from their students.

**Process of Teacher Assignment to Departmentalized Classrooms**

Since departmentalized teams were largely teacher-directed, teachers also had a major part in the assignment of specific subject areas to individual teachers. Assignment was made based on teachers’ perceived strengths and comfort levels, not necessarily credentials. No principals interviewed were aware of any departmentalized teachers of math holding National Board certifications or Mathematics 5-9/Mathematics 6-12 certifications. Teachers’ personalities for collaboration also played an important role in determining which groupings of teachers would be most effective for collaboration and, ultimately, student achievement.

Mrs. Payne, principal of School 1, noted the importance of student data (in the form of district unit assessments, as well as Florida Standards Assessments) confirming their strength in
teaching that subject as well as the importance of teachers’ comfort levels with their assigned subject.

It’s really about strengths, what they’re comfortable with, and really about their background. Even though they are certified in elementary, it’s what they felt more of a fit in and based on their scores. Data had a lot to do with it.

Dr. Garcia, principal of School 4, echoed the importance of teacher strengths, in addition to teachers’ personalities for collaboration in making a departmentalized model work.

When looking for strengths in teachers… you really are looking for someone you know that will work together as a team. You look for people that will work well together because you have varying personalities. Some people work well with certain personalities. Some people work well with other personalities so that’s something that I always taken into consideration.”

Mrs. Barnes, principal of School 6, also noted the importance of matching both teacher strengths and personalities to departmentalized team members.

I had a fifth grade teacher who was a really great math teacher, but he just said what he thought. On my fourth grade team, it wouldn’t have worked because those ladies are kind of sensitive, but there were younger and a little more blunt kind of people on the fifth grade team and I thought “I think he’s going to do better with them because he’ll say this and if they don’t like it, they’ll just tell him.” and it worked out really, really well.

Overall, teacher assignment to specific subject areas was based on a combination of perceived strength based on student achievement data, teachers’ comfort level, and teacher personalities for collaboration. Since no teacher held specialized mathematics credentials, assignment of mathematics was given to teachers who felt comfortable teaching it and who had
student achievement data to support their strength in the assigned subject areas. Schools with larger enrollments and multiple sections per grade level carefully organized teachers into teams based on their personalities for collaboration.

**Teacher Attitudes Toward Departmentalization Reported by Principals**

According to the principals, teachers had largely positive attitudes regarding the departmentalized model mainly due to the ability to focus on a single subject or a fewer number of subjects than a generalist self-contained teacher of the same grade level. Also, teaching fewer subjects yielded more time to plan for the assigned subject(s) and additional time to understand their content standards.

Mrs. Wyatt, principal of School 5, explained some of the major advantages her departmentalized teachers have touted of the departmentalized model.

Most of the teachers like it because they feel like they can get really a stronger understanding of those standards and it allows them to almost expand on instructional practice of how to teach it rather than having to worry about teaching six things, they’re focused on getting stronger in their assigned areas.

Mrs. Barnes, principal of School 6, noted that a departmentalized model can be especially helpful to newer teachers.

Because of the fact that the teachers don’t have years and years of experience, I think it helps them to be able to focus on fewer subject areas to teach and begin to own the standards and know what the standards are really looking for.

Principals reported largely positive feedback from teachers on using a departmentalized model. Additional time to plan, as well as increased time to focus on the standards of fewer subject areas (as opposed to all subject areas) were often brought up as major advantages for
departmentalized teachers. This teacher buy-in was a major reason for many principals to continue to support departmentalization. Contrary to the assumption underlying departmentalization identified in previous literature (Delviscio & Muffs, 2007; Ponder, 2008; Yearwood, 2011), few principals noted the benefit of departmentalization for improving the quality of instruction and student achievement as a reason for continuing departmentalization at their schools.

**Relationship Between Departmentalization and Student Math Performance**

This section reports the finding that address the last research question, *What is the relationship between the degree of departmentalization and fourth and fifth grade students’ mathematical performance, controlling for student background characteristics?*

Before conducting multiple regressions, a t-test, an ANOVA, and a post-hoc analysis were conducted to examine the differences in the mathematics scores in fall, winter, and spring as well as the growth rate (spring scores – fall scores) based on the degree of departmentalization at fourth and fifth grade levels. Table 9 presents the findings.

At the fourth grade level, differences in scale scores (fall, winter, and spring) between students in self-contained classrooms versus students in semi-departmentalized classrooms were all statistically significant, yet growth between the two groups was not. Students who are in classrooms with no departmentalization scored significantly higher than the students in semi-departmentalized classrooms in all mathematics scores in fall, winter, and spring assessment. However, there was no statistically significant difference in the growth rate.
Table 9: Differences in the Mathematics Scores by Degree of Departmentalization

<table>
<thead>
<tr>
<th>Grade Departmentalization</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Growth (Spring-Fall)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>t/F-value</td>
<td>Mean</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; No Departmentalization</td>
<td>1588</td>
<td>428.43</td>
<td>6.46**</td>
<td>445.70</td>
</tr>
<tr>
<td>Semi-Departmentalization</td>
<td>770</td>
<td>421.27</td>
<td></td>
<td>438.21</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; No Departmentalization</td>
<td>95</td>
<td>443.17</td>
<td>7.28**</td>
<td>461.83</td>
</tr>
<tr>
<td>Semi-Departmentalization</td>
<td>2062</td>
<td>450.72</td>
<td></td>
<td>465.18</td>
</tr>
<tr>
<td>Complete Departmentalization</td>
<td>408</td>
<td>446.69</td>
<td></td>
<td>458.90</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01

At the fifth grade level, statistically significant differences existed between students in self-contained classrooms, students in semi-departmentalized classrooms, and students in completely departmentalized classrooms on the fall, winter, and spring assessments, as well as in growth. Students in semi-departmentalized classrooms had the highest mean scores on the fall, winter, and spring assessments. On the fall assessment, students in self-contained classrooms had the lowest mean scores. However, students in completely departmentalized classrooms had the lowest mean scores on both the winter and spring assessments. Students in self-contained classrooms demonstrated larger growth than students in semi-departmentalized classrooms (3.8 more), as well as completely departmentalized classrooms (9.89 more).

A post-hoc analysis at the fifth grade level revealed statistically significant differences between self-contained and semi-departmentalized students’ scores, as well as semi-departmentalized and completely departmentalized students’ scores on the fall assessment. On the winter and spring assessments, statistically significant differences were only present between
semi-departmentalized and completely departmentalized students’ scores. Finally, when comparing growth from the fall to spring assessments, statistically significant differences were present between self-contained and completely departmentalized students’ scores, as well as semi-departmentalized and completely departmentalized students’ scores.

These findings indicate that there are other factors that may explain the achievement growth other than the departmentalization. For this reason, student background characteristics were controlled in the multiple regression analysis below to further examine the relationship between departmentalization and math achievement growth. The results are presented separately for fourth and fifth grade levels in Tables 10 and 11.

At the fourth grade level, multiple regression was performed to determine relationships between students’ mathematical performance and semi-departmentalization using their spring diagnostic scale scores as the dependent variable and controlling for fall scale scores and student background characteristics. There was a statistically significant relationship between students’ fall and spring scores as expected. The students in a semi-departmentalized fourth grade classroom improved their mathematics scores significantly less than the students in a self-contained classroom. The coefficient of -1.971 represents that achievement growth of students in semi-departmentalized classrooms are 2 points less than that of students in non-departmentalized classrooms on average. Black students’ achievement growth was also significantly less than that of White and Asian students. Students’ gender and free-reduced lunch status, and being Hispanic and multiracial students were not significantly associated with the achievement growth.
At the fifth grade level, multiple regression was performed to determine relationships between students’ mathematical performance and the degree of departmentalization (semi-departmentalization and complete departmentalization) using their spring diagnostic scale scores as the dependent variable and controlling for fall scores and student background characteristics. Because there was no one school that did not use departmentalization, in this analysis, the difference in student achievement growth was tested between semi-departmentalization and complete departmentalization. Again, there was a statistically significant relationship between students’ fall and spring scores as expected. Students in a completely departmentalized fifth grade classroom improved their mathematics scores significantly less than the students in a semi-departmentalized classroom. The coefficient of -6.662 represents that, on average, the achievement growth of students in completely departmentalized classrooms is 6.662 points less
than that of students in semi-departmentalized classrooms. Black students’ achievement growth was also significantly less than that of White and Asian students. Students who receive free or reduced-price lunch were less likely than the other students to improve achievement from fall to spring. Students’ gender and being Hispanic and multiracial students were not significantly associated with the achievement growth.

Based on the findings of this mixed method study, at the fourth grade level, only one third of all of the schools (34.6%) used semi-departmentalization and no school used complete departmentalization. At the fifth grade level, a majority (80%) used semi-departmentalization, a small number of schools (15%) used semi-departmentalization, and only one school did not use any departmentalization. Departmentalization is a common practice at the fifth grade level, but not at the fourth grade level in St. Lucie Public Schools.

Table 11: Relationship between Achievement Growth and Departmentalization at Fifth Grade Level (N=2,469)

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>64.823</td>
<td>6.820</td>
<td></td>
</tr>
<tr>
<td>Fall scale scores</td>
<td>0.917**</td>
<td>0.015</td>
<td>0.776</td>
</tr>
<tr>
<td>Complete Departmentalization</td>
<td>-6.662**</td>
<td>1.014</td>
<td>-0.080</td>
</tr>
<tr>
<td>Gender</td>
<td>0.231</td>
<td>0.752</td>
<td>0.004</td>
</tr>
<tr>
<td>Free-Reduced Lunch</td>
<td>-1.911*</td>
<td>0.782</td>
<td>-0.03</td>
</tr>
<tr>
<td>Black</td>
<td>-3.032**</td>
<td>0.974</td>
<td>-0.045</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-1.228</td>
<td>0.936</td>
<td>-0.019</td>
</tr>
<tr>
<td>Multiracial</td>
<td>-0.387</td>
<td>1.867</td>
<td>-0.003</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.635 \]

Dependent variable: Spring scale score
* p < 0.05, ** p < 0.01
High-poverty schools and smaller schools were more likely than low-poverty and larger schools to departmentalize at the fourth grade level (semi-departmentalization). However, there was no statistically significant relationship between school background characteristics and departmentalization at the fifth grade level.

The decision to departmentalize is largely teacher-directed and assignment of subject-area(s) is based on teacher strength based on supporting student data, comfort levels, and personality of collaboration, rather than improved instruction and student learning opportunities.

According to the principals, departmentalized teachers tend to enjoy teaching fewer subjects because it allows them more time to plan for and focus on the teaching of their assigned subject(s). Most importantly, multiple regression analyses showed a statistically significant negative relationship between departmentalization and student math achievement growth from fall to spring. This means that the students who are in self-contained classrooms improved their math scores significantly more than the students who are in departmentalized classrooms at fourth grade level. At the fifth-grade level, the students who are semi-departmentalized classrooms improved their math scores significantly more than the students who are in completely departmentalized classrooms.
CHAPTER 5

DISCUSSION

Introduction

This research utilized a mixed methods design to answer the following questions:

1. What are the levels of departmentalization at the fourth and fifth grade level, and what school background characteristics are associated with the degree of departmentalization?

2. How did principals decide to departmentalize fourth or fifth grade classrooms and how do they assign teachers to teach mathematics in departmentalized classrooms?

3. What is the relationship between the degree of departmentalization and fourth and fifth grade students’ mathematical performance growth, controlling for student background characteristics?

Interpretation of the Findings

Level of Departmentalization

In St. Lucie Public Schools, departmentalization is used at two levels, a semi-departmentalized model in which teachers teach two or three subjects and a completely departmentalized model in which teachers are assigned a single subject to teach. At the fourth grade level, only semi-departmentalized models were used in addition to the traditional self-contained model in which teachers teach all subject areas. Only 9 out of the 26 elementary and K-8 schools (34.6%) used the semi-departmentalized model during the 2017-2018 school year. At the fifth grade level, departmentalization was much more widely used. Both semi-departmentalized and completely departmentalized models were used at 25 out of the 26 elementary and K-8 schools during the 2017-2018 school year. Of the 25 schools utilizing some
form of departmentalization, only 4 used the completely departmentalized model. This may be due to various challenges such as a discrepancy in the number of teachers per grade level and the number of sections of students which would make it difficult to assign one teacher per subject.

Departmentalization could be more popular at the fifth grade level than fourth grade because fifth graders in Florida are tested in science for the first time in their academic careers and a greater emphasis is placed on science instruction in fifth grade. In addition, teachers and schools may be more conscious about preparing fifth graders for completely departmentalized classes in middle schools. As shown in Table 6, two schools changed their fifth grade classes from semi-departmentalized to self-contained in the 2018-2019 school year. This could be due to changes in teaching staff, differing numbers of sections of students in the grade level, or even in response to an observed drop in achievement on the Florida Standards Assessment. Future studies could examine trends like this toward or, in the case of St. Lucie Public Schools’ fifth grade classrooms, away from departmentalized models, as well as the reasons behind the changes in instructional model.

In St. Lucie Public Schools, tracking is not used at any of the elementary and K-8 schools, regardless of the use of departmentalization. Used in conjunction with tracking, departmentalization could yield different results. However, St. Lucie Public Schools, as a whole, chooses to focus on bringing students into proficiency rather than moving the highest achieving students even higher. In the 2017-2018 school year, only 53% of tested students in St. Lucie Public Schools were proficient in mathematics so the focus on increasing proficiency is logical.

**School Characteristics Associated with Departmentalization**

The only statistically significant findings regarding school background characteristics and the degree of departmentalization were that higher poverty schools and schools with a lower
enrollment schools were more likely to utilize a semi-departmentalized model at the fourth grade level. Higher poverty schools tend to have a higher rate of teacher turnover and some of the highest percentages of new teachers in St. Lucie Public Schools. These schools are located throughout the county and, though they are considered high poverty, these schools receive some of the largest Title I funding per student to provide students with supplementary materials for instruction, as well as afterschool tutoring programs. As mentioned by the principal of School 6, departmentalization could be easier for newer teachers who may be overwhelmed by having to learn and teach the many standards across all subject areas within a grade level. By assigning teachers fewer subject areas to instruct students in, they may have more time to focus on their assigned area(s) and be able to delve deeper into the associated standards. This supports earlier findings that linked departmentalization to more time for teachers to focus on fewer content areas (Gerretson et al., 2008), as well as a lighter workload (Strohl et al., 2014). Additionally, since teacher turnover tends to be a problem in high poverty schools, using a departmentalized model may make it easier for principals to find substitute teachers (short-term or long-term) to fill a teaching vacancy in one or two subjects versus a substitute well-versed in all subject areas for an elementary grade level. The prevalence of the semi-departmentalized model at the fourth grade level in both high-poverty schools and small schools may be because teachers at these schools view semi-departmentalization as a method for having fewer subject areas to plan for and focus on, allowing them increased time to deliver good quality instruction to meet the diverse needs of their students.

**Decision and Process of Departmentalization**

In seven out of the eight principal interviews, principals said that the idea to departmentalize was brought to them by individual groups of teachers who wished to try it or,
alternatively, a departmentalized model was already in use when the principal was assigned to their school site. Only one school moved from a traditional self-contained model to a departmentalized model at the principal’s request. The fact that teachers approached their administration indicates their willingness and initial buy-in of a departmentalized model. Teachers’ willingness to departmentalize aligns with previous studies which found that departmentalized teachers exhibited higher morale and job satisfaction (Johnson, 2013; Strohl, Schmertzing, & Schmertzing, 2014).

Though teachers’ willingness to departmentalize could be associated with positive aspects for teachers, principals must carefully consider their process for departmentalizing each grade level. Though teachers may approach their principal with their own ideas for splitting up the subjects amongst their team members, ultimately, principals make the final decision on which teacher is assigned to teach a specific subject area. In all eight principal interviews, assignment of teachers to a certain subject area was based on teachers’ perceived strength, comfort level, and characteristics for collaboration. These subjective criteria may not be the most effective way of deciding who should teach which subject. The use of subjective criteria alone could explain the observed negative relationship between achievement growth and departmentalization. Instead, principals could consider the use of subjective data in addition to more objective criteria such as their own teacher observations, district unit assessment data, and student achievement data to help make the best assignment decisions for their students’ success. A drawback to this principal-directed decision-making would be potentially undesirable subject area assignments for teachers which could lessen their buy-in to participating in a departmentalized model.
Relationship Between Departmentalization and Student Math Performance Growth

Multiple regressions were performed to control for student background characteristics and, overall, it was determined that both fourth and fifth grade students in departmentalized settings demonstrated less growth from their Fall diagnostic assessment to their Spring diagnostic assessment than their peers in non-departmentalized classrooms. In fact, fifth-grade students in completely departmentalized mathematics classrooms had the smallest achievement growth. Despite the positive perceptions both teachers and principals had regarding departmentalization, these statistically significant findings indicating the negative relationships between departmentalization and students’ growth were surprising.

A possible explanation for this finding could be the potentially negative impact departmentalization has on student-teacher relationships (Chang, Muñoz, and Koshewa, 2008). Students who feel closer to their teachers (as those in self-contained classrooms who spend the entirety of each school day with their teacher likely do) show higher gains in academic skills (Pianta & Stuhlman, 2004; Silver, Measelle, Armstrong, & Essex, 2005). Creating a caring, supportive classroom environment is undoubtedly easier for teachers to do when they spend the entire day with the same group of students. This comfortable and safe learning environment is also linked to student motivation (Schaps, 2003). This type of close learning environment, as well as higher student levels of motivation, may not be so easily achieved if teachers are spending as little as an hour each day with multiple groups of students as completely departmentalized teachers would.

All students can benefit from a strong positive relationship with their teachers, especially those coming from a lower socioeconomic background (McPartland & Braddock, 1993) and those students who may not have many positive relationships with adults at home (Becker,
1987). If those students are transitioning throughout the day to multiple teachers, they may not be able to forge as strong of a relationship as they would if they stayed with the same generalist teacher all day. Forming close bonds and positive relationships with adults at school is critical to students from disadvantaged backgrounds since these relationships are often associated with the students’ own achievement motivation (Becker, 1987). Since departmentalization was more common in higher poverty schools, this explanation makes sense.

**Study Limitations and Future Research**

Unlike previous studies, this mixed-methods study examined students’ mathematical achievement over the course of an entire school year and differentiated between levels of departmentalization. In addition, this study examined the case of departmentalization of mathematics classrooms when no teacher have mathematics credential as measured by math major, math education major or National Board certification in mathematics. This was important because Florida Department of Education does not offer subject-specific elementary level certifications. Despite these strengths, it is important to point out several limitations and future research agenda.

First, to fully examine the process of teacher assignment to specific subject areas for instruction, teachers could have been interviewed. Since most decisions regarding the departmentalization process was teacher-driven, teacher feedback would be valuable to understand why they chose a particular subject or how their team decided to divide the workload. Principal interviews revealed that the assignment of subject areas was teacher-driven, but learning the decision process used by the teachers who did it could have shed more light on the challenges in splitting up subjects amongst teachers.
Second, departmentalized classrooms can look quite different and quality of instruction was not measured or observed in this study. Teachers could have been observed and evaluated for effective pedagogical techniques to see if departmentalized teachers across the district, or even within the same school, were providing the same quality level of mathematics instruction to their students. Differing levels of quality mathematics instruction could directly impact student performance, regardless of whether a departmentalized model was being utilized or not. This is especially important because the assumption of departmentalization that it offers a higher quality instruction that leads to improved student learning compared to self-contained classrooms.

Finally, this study examined the correlation between the different levels of departmentalization and students’ mathematical achievement, but correlational data does not imply a causal relationship. Though there were some statistically significant results, it is impossible to say whether the departmentalized being utilized is the reason for those differences. Schools that struggle with improving student achievement may tend to use departmentalization as a solution whereas successful schools with a history of higher student achievement may not be so inclined to implement a departmentalized model if their self-contained model is producing satisfactory student results. It is important to identify possible factors that may explain the negative relationship between departmentalization and achievement growth.

Future research could be conducted at a larger scale beyond a single school district such as St. Lucie Public Schools. An even larger sample size from districts with different student background characteristics could certainly produce different results, such as a study utilizing data from students statewide. St. Lucie Public Schools is a medium-sized district with high levels of poverty and diversity meaning results from this study cannot be generalized to the entire state of Florida. Had this study been performed in a district with different levels of student enrollment,
poverty, and/or diversity, the findings could have also been very different. For instance, if this study were replicated in a small school district with low levels of poverty and diversity, a different association between the degree of departmentalization and achievement growth may have resulted.

**Recommendations**

On a school level, departmentalization should be used with caution. Despite mixed findings on departmentalization and student achievement in the literature, this study showed statistically significant negative relationship between departmentalization and students’ mathematical performance growth. Before deciding to continue to use departmentalization, it is important for district and school administrators to examine if the instructional quality of departmentalized classrooms are better than that of self-contained classrooms. It is also important to pay attention to the nature of teacher-student relationship in examining the instructional quality as previous studies have found that departmentalization could potential affect such relationship.

**Conclusion**

Overall, this study analyzed the background and process of departmentalization at the fourth and fifth grade levels, as well as the relationship between departmentalization and students’ mathematical performance growth over the course of a school year (unlike previous studies which examined single data points from different school years). Surprisingly, results showed departmentalization had a statistically significant negative relationship with students’ growth over the school year. Despite this, it is commonly used throughout St. Lucie Public Schools, most often at the fifth-grade level. Also, departmentalization is more common at higher poverty schools and schools with lower student enrollments at fourth grade level. The choice to
departmentalize was largely teacher-directed and assignment of subjects was based on teachers’ strength based on school data, comfort levels, and personalities for collaboration.

Departmentalization should be discussed carefully prior to implementation. Even though preferred by many teachers, it is important for district and school administrators to examine the instructional quality and student-teacher relationship in departmentalized classrooms before deciding whether or not to continue to use departmentalization.
APPENDIX A

IRB APPROVAL LETTER

Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673  FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 10/01/2012
To: Paige McMahon
Address: 2006 E Dr. M.L.K.
Dept: EDUCATIONAL LEADERSHIP
From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Departmentalization in Intermediate Elementary Grade Levels and Student Performance in Mathematics

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Exempt per 45 CFR § 46.101(b)(1) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 08/30/2012 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to assure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Motoko Akiba <makiba@fse.edu>, Advisor

HSC No. 2012.25485
APPENDIX B

ELEMENTARY/K-8 PRINCIPALS EMAIL SURVEY

Good evening _(insert principal’s name)_,

I am a high school math teacher at Lincoln Park Academy, as well as a doctoral candidate in Florida State University’s Educational Leadership and Policy program. Last August, I conducted a pilot survey to help me understand the extent of departmentalization of fourth and fifth grade classrooms within St. Lucie Public Schools. Now, I am beginning my dissertation research which will study the relationship between departmentalization and elementary students’ mathematics performance. The information provided in this survey will be kept confidential to the extent allowed by law and all schools will be randomly assigned a code to maintain confidentiality. This information will be used to understand the nature of departmentalization in the intermediate elementary grade levels within St. Lucie Public Schools. Your participation is greatly appreciated.

_Developmentalization Survey_

1. Please select which of the following applied to the departmentalization of your fourth grade and fifth grade classrooms during the previous 2016-2017 school year by entering an “X” mark for each grade level. If you were assigned to another school site during the 2016-2017 school year, please select “unknown”.

<table>
<thead>
<tr>
<th></th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>No departmentalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-departmentalization (teachers taught 2-3 subjects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete departmentalization (teachers taught a single subject)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Please select which of the following applied to the departmentalization of your fourth grade and fifth grade classrooms during the 2017-2018 school year by entering an “X” mark for each grade level.

<table>
<thead>
<tr>
<th></th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>No departmentalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-departmentalization (teachers taught 2-3 subjects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete departmentalization (teachers taught a single subject)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. If you selected “Semi-departmentalization” in either the fourth or fifth grade level, please describe the arrangement of mathematics teaching at 4th and 5th grade levels.
Example: At the fourth grade level, 2 teachers taught math in all 6 classrooms (3 classrooms each). At the fifth grade level, one teacher taught math in all 5 classrooms.

4. Please select which of the following will apply to the departmentalization of your fourth grade and fifth grade classrooms during the upcoming 2018-2019 school year by entering an “X” mark for each grade level.

<table>
<thead>
<tr>
<th></th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>No departmentalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-departmentalization (teachers taught 2-3 subjects)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete departmentalization (teachers taught a single subject)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. If any of your fourth or fifth grade classrooms were departmentalized or semi-departmentalized during the 2017-2018 school year, please fill out the following table by indicating the number of teachers with various mathematics qualifications.

<table>
<thead>
<tr>
<th></th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Teachers who Teach Mathematics in Departmentalized or Semi-Departmentalized Classrooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Teachers with Mathematics or Mathematics Education Major in Undergraduate or Graduate Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Teachers with Middle Grade Mathematics 5-9 Certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Teachers with 6-12 Mathematics Certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Teachers with National Board Certification in Mathematics (any levels)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For questions related to the interview purpose and procedure, please contact me through email. Alternatively, you may contact my advisor, Dr. Motoko Akiba, at makiba@fsu.edu. For questions related to the rights of research participants, please contact Florida State University’s Human Subjects Office at (850) 644-7900. The project ID is 2018.23822.

Thank you very much for your participation in my research!

Paige McMahon
Doctoral Candidate
Dept. of Educational Leadership & Policy Studies
Florida State University
Good evening __(insert principal’s name)__:

I am writing to invite you to participate in an interview on departmentalization in fourth and fifth grade classrooms. The purpose of this interview is to better understand the characteristics of departmentalized schools during the 2017-2018 school year for my dissertation research. The interview will take about 25 to 30 minutes and your responses will be kept confidential to the extent allowed by law. Both your identity and your school name will never be disclosed. During the interview, I will ask you about the following information: 1) Departmentalized teaching assignments 2) History of departmentalization within your school 3) Educational background of departmentalized teachers 4) Hiring practices for filling departmentalized positions 5) Departmentalization and student achievement. A list of specific questions will be emailed to you prior to the interview.

Your participation in this interview is voluntary. Your responses will be kept strictly confidential. If you decide to participate in this interview, you will receive a report summarizing the findings on departmentalization in elementary schools across St. Lucie Public Schools (without school names).

For questions related to the interview purpose and procedure, please contact me through email. Alternatively, you may contact my advisor, Dr. Motoko Akiba, at makiba@fsu.edu. For questions related to the rights of research participants, please contact Florida State University’s Human Subjects Office at (850) 644-7900. The project ID is 2018.23822.

If you are willing to participate in this interview, please let me know the date and time that are convenient for you. I will either visit your school or we will talk over the phone.

Thank you for your consideration and I look forward to hearing from you.

Sincerely,

Paige McMahon
Doctoral Candidate
Dept. of Educational Leadership & Policy Studies
Florida State University
APPENDIX D

PRINCIPAL INTERVIEW PROTOCOL

Opening Statement: Thank you for agreeing to participate in my research on departmentalization in elementary schools. Today I will be asking you several questions to help me better understand how departmentalization worked during the 2017-2018 school year in the fourth and fifth grade levels at your school. Your responses will be kept confidential to the extent allowed by law. Both your identity and your school name will never be disclosed. Let’s get started…

Interview Questions:

- During the 2017-2018 school year, I understand from the survey that 4th/5th grade classrooms in this school were departmentalized/semi-departmentalized. How did your school decide which teacher(s) would teach specific subjects in your departmentalized setting?

- I understand from the survey that the last year was your first year to implement departmentalization/semi-departmentalization. What made your school implement departmentalization/semi-departmentalization in this past year for the first time?

OR

- I understand from the survey that your school also used departmentalization/semi-departmentalization during the 2016-17 academic year. Do you know when your school first implemented departmentalization/semi-departmentalization? How was the decision made to departmentalize or semi-departmentalize your 4th/5th grade classrooms in the first place?

- [Ask if the information was not provided in the survey] What is the educational background of your departmentalized fourth and fifth grade math teachers?
  - How many teachers are teaching mathematics at 4th/5th grade level?
  - How many of them had a major in mathematics or mathematics education in their undergraduate or graduate degree?
  - How many of them hold a math-specific certification on their Florida teaching certificate?
  - How many of them hold either National Board certification in math?

- How does the departmentalized model influence your teacher hiring practices?

- How do you think teachers like departmentalization compared to the more traditional self-contained model?

- How do you think departmentalization impacts student achievement?
I understand from the survey that you are/are not planning to continue to departmentalize/semi-departmentalize 4th/5th grade classrooms in the coming year. Could you tell me why you decided to continue/discontinue to departmentalize/semi-departmentalize these classrooms?

Closing Statement: That concludes my questions for you. Thank you again for your participation. I truly appreciate your responses as they will serve as a valuable component of my research on departmentalization.
REFERENCES


BIOGRAPHICAL SKETCH

Dr. Paige E. McMahon was born and raised on the Treasure Coast of Florida. She is a proud product of St. Lucie Public Schools graduating from Lincoln Park Academy with her International Baccalaureate Diploma in 2008. Paige earned her Bachelor of Science degree in Psychology and International Affairs from Florida State University in 2012. Upon her graduation from college, Paige returned to her alma mater, Lincoln Park Academy, to begin her teaching career. Paige has taught both middle and high school mathematics since 2012. In 2015, she earned a Master of Education in Educational Leadership from Florida Atlantic University. In 2016, she entered the Educational Leadership and Policy doctoral program at Florida State University where she has also earned a graduate certificate in Program Evaluation.