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Bilingual Education in Florida: Effect of Bilingual Education in Florida

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BILINGUAL EDUCATION IN FLORIDA: EFFECT OF BILINGUAL EDUCATION ON ACADEMIC PERFORMANCE

By

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Abstract

The purpose of this thesis is to determine the impact of bilingual education in the state of Florida on students' academic performance. In order to procure an unbiased assessment of the effects of bilingual education, the reading and mathematics FCAT 2.0 scores for the years 2011 to 2014 in two bilingual, two partially bilingual, and two monolingual K-8 schools will be examined. The goal is to determine if program type has an effect on passing rates. For the purpose of this thesis it was expected that bilingual education does not negatively affect the performance of students in FCAT 2.0 reading and mathematics. The results show that two-way immersion program has a positive impact on academic performance in the reading portion of standardized assessments. The type of program does not appear to have an effect on students' performance in the mathematics assessment.

Keywords: Bilingual education, standardized test, FCAT

BILINGUAL EDUCATION IN FLORIDA: EFFECT ON ACADEMIC PERFORMANCE

Bilingual education has always been a topic of great controversy in the United States. The evolution of bilingual education in the Unites States is closely tied to its political and historical context (Nieto, 2009). There are those who claim that bilingual education hinders students' academic performance such as organizations like ProEnglish, which claim that "After 30 years of the bilingual experiment and billions of dollars spent, reliable research shows that these programs fail to teach students the English language and literacy they need for school success" (Bilingual Education, n.d.). There are also those who see bilingual programs as a threat to the 'American way of life', unity of the nation, and dominance of the English language (Martinez, 2007). The English-only movement began around 1986 when organizations started forming due to fear of English becoming an endangered language. Recent English-only legislative efforts call for the removal of bilingual education by "eliminating costly and ineffective multilingual policies" (Pimentel, 2001). Such is the case with policies like Proposition 227 which virtually ended bilingual education in the state of California and marked the first time that citizens voted on a specific instructive strategy for educating children (Gandara et al., 2000). Preposition 227 declared that, "All children in California public schools shall be taught English by being taught in English" (California Education Code, Chapter 3, Article 1.Section 305). However, these political efforts do not seem to take into consideration the nature and quality of bilingual programs. They are based on assumptions that teaching children in their native language, when this one is a minority language, negatively impacts their acquisition of English. As a result, there is a very limited number of bilingual programs in the United States, and those that do exist do not have the prestige needed to change this negative view on bilingual education. In fact, schools that do offer some kind of bilingual education have a shortage of

bilingual teachers (O'Connor, 2015). Advocates of bilingual education claim that students in bilingual programs perform at the same academic level if not better in the long run than those in monolingual programs (Cummins, 1989). For instance, studies performed in other countries like Spain indicate that bilingual education yields higher test scores when implemented correctly (Hermida, 2015).

Thus, the purpose of this thesis is to move beyond the sound bites and politics of bilingual education and to examine the results of standardized tests of students enrolled in targeted bilingual schools in Florida and compare them with those of students in monolingual schools.

This thesis is organized as follows. First, there is a background information section which includes key definitions about bilingualism, a discussion of what other studies have found about bilingual education, and an explanation of the importance of conducting this study in Florida. Then there is the methods section which includes an overview of bilingual programs in Florida, information about the targeted schools, and data selection and analyses. And finally the thesis will be concluded with the results, discussion, and limitations.

Background

Additive and Subtractive Bilingualism. Professor James Cummins (1994), from the University of Toronto, defines additive bilingualism as one in which the native language of students continues to be developed. It is a bilingualism in which the native culture is valued while the second language is added. For example, when an English-native speaker is put in a German and English bilingual program. He or she learns the second language without losing his first. In contrast, he defines subtractive bilingualism as one in which the second language is added at the expense of

the first language and culture. He also states that as a result of this kind of bilingualism the first language diminishes. An example of subtractive bilingualism would be a program in which the student's native language is a minority language like the Mayan language Mam in Guatemala and he or she goes to school. The education the students receives is in Spanish and in order for the student to succeed he or she end up losing their first language. This often happens in the United States as a result of English as a Second Language (ESL) programs that are taught in English. Professor Cummins' (1994) research suggests that students who learn a second language in an additive bilingual environment succeed at a much greater extent than those in a subtractive bilingual environment (Cummings, 1994). In the United States, Spanish and other immigrant languages are basically suppressed and eliminated at the elementary school level (Montrul, 2012, p.300). As Montrul (2012) points out, many Spanish-speaking children in the United States experience a shift in language competency and balance in which the first language becomes the secondary language and the second language becomes the primary language (p. 233). For example, a child whose first and primary language is Spanish might experience a shift to English once he or she starts school. Often their second and secondary language, English, becomes their primary language. This can then lead to the weakening of the child's first language and or incomplete acquisition of the same. In many cases, this can start at home. Many immigrant parents perceive their native language as an obstacle in their children's path to success in this country (Montrul, 2012, p. 208). This causes them to expose their children to English-only education. When this happens and students are placed in a monolingual program they start to lose their ability to speak and understand their native language. This is especially true for younger children and those who never learned to write or read their first language. This can have a negative impact in the children's academic performance. In one of Thomas and Collier's

(2002) studies, English language learners immersed in monolingual education because their parents refused bilingual education showed decreases in reading and math achievement by fifth grade.

In order to understand bilingual education one needs to understand the difference between a foreign language program and a bilingual program. A foreign language program is one where the foreign language is treated as another subject, taught a couple of hours a week. Students are taught about the foreign language but not necessarily taught in that language. This means that the instructor does not necessarily teach the class in the target language, even though this practice has become uncommon in recent years (Montrul, 2012, p. 251). Students in this kind of program take a foreign language like Spanish or French as one of their subjects. On the other hand, the target language in bilingual education is not only another subject, it is also the medium of instruction of other subjects. Students are taught subjects like mathematics and science in the target language. The materials used to teach the subjects are in the target language and the instructor uses the target language to communicate with students (Montrul, 2012, p. 251). The differences between bilingual education and foreign language programs can be seen in more detail in Table 1.

One-way and Two-way Immersion. There are several types of bilingual education. One-way immersion is sometimes referred to as partial immersion. In this type of program students are majority language speakers, in the United States this is English speakers, with limited to no proficiency in the minority or immersion language. Two-way immersion is also called Dual Language, bilingual immersion, two-way bilingual, and developmental education (term used by the United States Department of Education) (Frequently Asked Questions, n.d.). In this kind of program, the students who participate are majority language speakers as well as minority

language speakers. The ideal ratio of majority language speakers to minority language speakers is one to one, but a minimum of a two to one is essential ("Frequently Asked Questions, n.d.). Both of the fully bilingual schools chosen for this study follow this format. In Ada Merrit K-8 Center students receive English instruction during sixty percent of the time and forty percent in a second language, Spanish or Portuguese ("Ada Merritt", n.d.). As for Coral Way K-8, students receive English instruction during sixty percent of the time and forty percent in Spanish. Both, Ada Merrit K-8 and Coral Way K-8, are part of the Elementary Bilingual School Organization (BISO) program, that seeks to achieve "bilingual and biliterate proficiency in a school setting where two culture groups study one another's native language and cultural background, and demonstrate mutual respect for one another's heritage" ("Dadeschools", n.d.). Thus, the main focus of study for this thesis is additive two-way immersion.

Table 1.

Differences between bilingual education and foreign language programs (Garcia 2009, p. 17).

	Bilingual Education	Foreign Language Program
general objective	To promote some kind of bilingualism	To gain competency in a foreign language
academic objective	to teach on a bilingual model so that the student can function between the two cultures	To learn another language and familiarize oneself with another culture
use of target language	The target language is the medium of instruction	The target language is the subject of instruction
use of language for instruction	Use of two or more languages	Use of the target language only
teaching focus	Integration of language and content	Explicit instruction of the target language as sole objective

Research on immersion type programs has been conducted in many languages all over the world (Bingham, 2002). Perhaps the country with the most influential results is Canada. Substantial and meticulous research on Early French immersion (EFI) has been conducted in Canada since the first program started in 1965 (Bingham, 2002). EFI has proved to be so successful that it went from twenty something children in the first program to over 325,000 in 2000 (Canadian Parents for French 2000, p.53). Early French immersion programs result in students achieving at a high level of second language development, as well as a mastery of the school subjects equivalent to that of students studying through their first language, English (Bingham, 2002). The EFI students have only shown a temporary lag in English language arts, which disappears after three years, usually by second grade (Bingham, 2002).

In the United States, immersion programs started as early as the 1960s in California and Florida (Bingham, 2002). There are currently about 242 immersion programs in the United States (Bingham, 2002). The two-way immersion program was first introduced in the United States in 1963, when Coral Way was opened (Bingham, 2002). Since then, the program has expanded to around 248 programs in 23 states, in areas where two significant language groups are present (Bingham, 2002). In Coral Way's case the two groups are English speakers and Spanish speakers. According to Christian (1994), these programs have been highly successful in developing bilingual skills not only in minority language children, but also majority language children. Dr. Lindholm-Leary's research also suggests that in comparison to students in English-only programs, middle and high school students in a dual language program score at a comparable or higher level in reading and mathematics standardize tests, are less likely to drop out of school, and are equally or more likely to enroll in higher level mathematics courses than those students in monolingual programs (Lindholm-Leary & Adelson-Rodriguez, 2015). Thomas

and Collier (2002) concluded the same after reporting that in a study performed at a two-way program in Oregon, a larger percentage of Spanish-speaking children exceeded state standards in comparison to other students, district and state wide. As for native-English students in two-way bilingual immersion programs, they performed at the same or higher level than students in monolingual programs. They also maintained their English, added a second language to their knowledge base, and achieved well above the 50th percentile in all subject areas on state standardized tests (Thomas & Collier, 2002). Students in bilingual programs outperform comparable students in monolingual programs in academic achievement in all subjects, after four to seven years of dual language education (Thomas &Collier, 2002). Another important indicator of the success of dual immersion bilingual programs is that students in bilingual programs sustain the gains they have made throughout middle and high school, even when the bilingual program ends in fifth grade (Thomas & Collier, 1997).

In order for a bilingual program to be successful there are certain criteria that need to be met. Research on effective schools has shown that successful outcomes result from a curriculum that is not associated with a remedial instructional model but with an enriched one (Darling-Hammond, 2000). Programs with a remedial approach have led to high failure rates among English language learners (Garcia & Gopal, 2003). In order for a bilingual program to be successful it must include a curriculum that not only reflects, but also values students' cultures (Montecel & Cortez, 2002). Thomas and Collier (2002) suggest that schools create a natural learning environment with challenging themes that attract students' attention and use their bilingual and bicultural skills to attain new knowledge. Positive interaction between students and teachers should also be a priority since the use of positive social and instructional interactions yield better academic results in both English language learners and native English speakers

(Howard, Sugarman, Christian, Lindholm-Leary, & Rogers, 2007). Lindholm-Leary (2001) also points out that, in an ideal language curriculum, input is adjusted to the comprehension level of the learner, is interesting and challenging, and there is enough quantity.

Florida has the third highest Hispanic population in the United States, accounting for 19.1% of the total Hispanic population (Brown & Lopez, 2013). Florida experienced an increase in the Hispanic population, rising from 22.5% in 2010 to 24.1% in 2014 ("Population Estimates", 2015). The Miami-Hialeah area has the seventh largest Hispanic metropolitan population in the country (Brown & Lopez, 2013). Miami is one of the only two cities in the United States where Hispanics are a majority of the population, making up 65% of the population (Brown & Lopez, 2013). Two-thirds of the Hispanic population in Miami is foreign-born, making it the highest in the United States (Passel, D'Vera, & Lopez, 2011). Despite all of this, there has not been any research on bilingual education in Florida. The official language of Florida is English and the legislature has the power to enforce it in official matters by appropriate legislation (Constitution of the State of Florida, Article II, Section 9, 1988). This could potentially result in the elimination and or reduction of bilingual programs in Florida. Unless research is done to prove the effectiveness of Bilingual education in Florida, there is a threat of legislations like Proposition 227 in California.

The question to be discussed is: Does program type affect students passing rate on standardized assessments of English reading and mathematics?

Methods

Bilingual Programs in Florida

For this thesis, a complete list of all schools offering some type of bilingual program in Florida was compiled (See Appendix A). The list includes type of program, grade levels in which the program is offered, year the program started, and the way teaching time is divided between English and Spanish. The Florida Department of Education does not have a single database with all the bilingual programs in the state. In order to complete the spreadsheet with all the bilingual programs in Florida, we visited each county's website. In the websites we found the names of all the schools in the county and proceeded to determine which schools had a bilingual program by visiting each schools' website. To be able to determine what type of bilingual program the schools had, we called the Language Supervisor of each county and in some cases individual schools. The end result was a list of 164 schools. This means that of the 3,629 public schools in Florida, 164 offer some kind of bilingual program. Of these, 78.66% are located in South Florida. The majority of schools with bilingual programs are located in Miami-Dade County, which has 82 schools with some kind of bilingual program. However, out of the eighty two schools that offer a bilingual program in Miami-Dade County only two are fully bilingual. All the other schools limit their bilingual programs to one or two classes per grade level. North of Orlando, only two schools have a bilingual program. The distribution of schools with bilingual programs can be observed in the map shown in Figure 1.

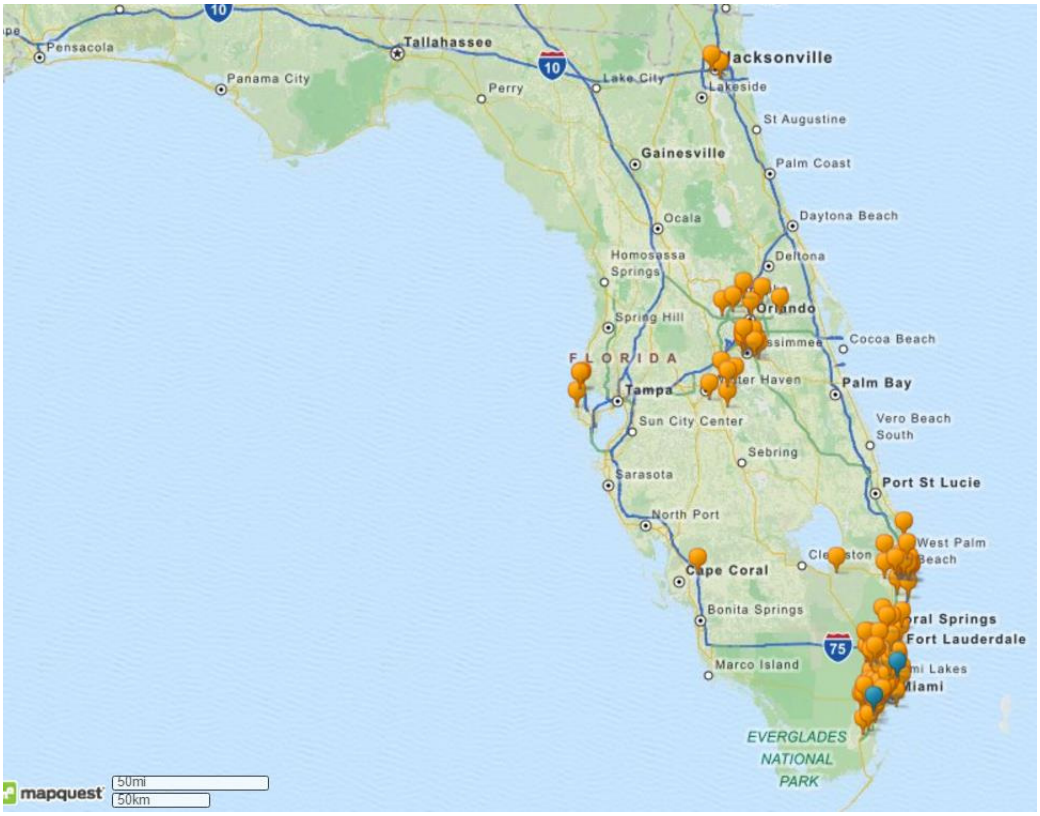

Figure 1. Map of Schools with Bilingual Programs in Florida

Targeted Schools

For the purpose of this thesis, we chose two fully bilingual schools, Ada Merritt K-8 Center and Coral Way K-8 Center, as the test subjects. We also selected two non-bilingual schools, Leewood K-8 Center and David Lawrence K-8 Center, and two schools that are partially bilingual, Jane S Roberts K-8 and Marcus A. Milam K-8. These specific monolingual and partially bilingual schools were chosen because they have comparable demographics and percentage of students considered to be socioeconomically disadvantaged to that of the bilingual schools (See Table 2). The ethnic and racial background of the students in each school can be observed in Figures 3-8. All six schools selected are located in different parts of Miami Dade County so Hispanics are the majority in all six schools (See Figure 2).

Also, we made sure the schools chosen had comparable school grades, which means that schools from each program type have the same grade, which range from "A" to "F". The school grades are determined by student performance in standardized tests, student learning gains, and participation and performance on end-of-course assessments ("School Grades", 2015). One last factor taken into consideration was whether or not schools were Title I schools. This goes hand in hand with the percentage of students that are classified as economically disadvantaged. Title I is a federal program that falls under No Child Left Behind and provides funding to schools with high numbers of children from low-income families. This is meant to ensure that all children meet state academic standards, in Florida's case this is measured by the FCAT 2.0 ("Title I", 2015). Three out of the six schools selected are Title I schools. We made sure to select one Title I school for each of the three type programs.

Table 2.

Schools' information

School	Minority %	Economically Disadvantaged %	School Grade 2015	Title I (Yes/No)	Charter School (Yes/No)
Ada Merritt K-8	76	31	A	N	N
Leewood K-8	78	27	A	N	N
Jane S. Roberts K-8	80	40	A	N	N
Coral Way K-8	93	70	B	Y	N
David Lawrence K-8	87	76	B	Y	N
Marcus A. Milam K-8	99	89	B	Y	N

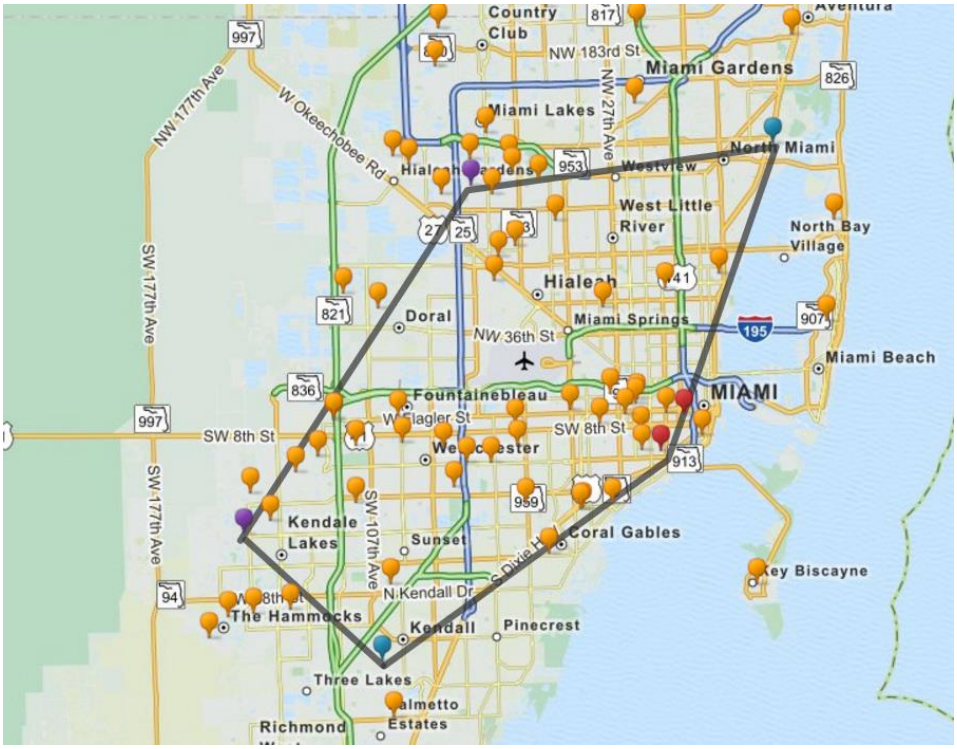

Figure 2. Map of Miami-Dade County showing schools with bilingual programs. Targeted schools shown in purple, red, and blue

Ada Merritt K-8 Center. Ada Merritt is the state's first tri-county "commuter" school, open to students from Miami-Dade, Broward, and Monroe Counties. It does not have traditional attendance boundaries and admission is determined by a lottery system and a language proficiency exam. It currently employs 47 teachers and has an enrollment of 700 students. Twenty six have advanced studies and six are National Board Certified Teachers. The school is currently ranked as an "A" school, a grade it has maintained since 2004 ("Executive Summary, 2015).

The school is the only one in the state that has a dual-language international education program that combines International Baccalaureate (IB) and International Studies (IS) programs. Students who attend this school can choose between Spanish and Portuguese as their second language. In 2012, Ada Merritt K-8 Center received the Rio Branco Award presented by the Brazilian government for excellence in Portuguese language instruction. The school plans to increase learning gains by providing before and after school tutoring sessions for the bottom quartile students ("Executive Summary, 2015).

Ada Merritt K-8 Centers' demographic composition is as follows: 71% of the students are of Hispanic origin, 3% are of Black, non-Hispanic origin, 24% are of White, non-Hispanic origin, 1% of Asian origin, 0.09% of Asian/Pacific Islander origin, and 0.04% of Multiracial origin (See Figure 3).

Coral Way K-8 Center. Coral Way K-8 Center became the first bilingual school in the United States in 1963 when it was opened through the "Spanish for Spanish" program. It originally offered the dual immersion program for students K to 5. In 2004, the school expanded their program to include middle school. The school employs a total of 99 full-time staff members and 60 part-time staff members. Thirteen of the teachers are National Board Certified Teachers. It is

currently ranked an "A" school, score that has maintained for the past 16 years. ("Executive Summary, 2015).

All students, regardless of their origin, participate in the dual language program. Sixty percent of the day is taught in English, while forty percent is taught in Spanish. Students receive language arts, science, and social studies in both languages. Mathematics is taught bilingually. The school started offering the International Studies Program (IS) in 1983. Through this program, students receive five extra hours of Spanish language and culture a week. Coral Way K-8 Center has the only dual language full-time Gifted Program in the State ("Executive Summary, 2015).

Coral Way K-8 Centers' demographic composition is as follows: 91% of the students are of Hispanic origin, 7% are of Black, non-Hispanic origin, 1% are of White, non-Hispanic origin, 0.8% of Asian origin, 0.8% of Asian/Pacific Islander origin, and 0.01% of Multiracial origin (See Figure 4).

Jane S. Roberts K-8 Center. Jane S. Roberts K-8 Center was built in 1989 as an elementary school. In 2011 it expanded to include middle school. Seven percent of the teachers are National Board Certified Teachers. In 2013, the school opened the Biomedical Program for grade level 6 to 8. The program consists of Biomedical Science classes and Research classes. The school's bilingual program started in 1993 and the school currently offers one bilingual class per grade level. Jane S. Roberts is currently ranked an "A" school ("Executive Summary, 2015).

Jane S. Roberts K-8 Centers' demographic composition is as follows: 92% of the students are of Hispanic origin, 6% are of Black, non-Hispanic origin, 2% are of White, non-Hispanic origin, 1% of Asian origin, 0.5% of Asian/Pacific Islander origin, and 0.5% of Multiracial origin (See Figure 5).

Marcus A. Milam K-8 Center. Marcus A. Milam K-8 Center was built in 1961 to serve as an elementary school. It expanded to serve as a middle school in 1998. The bilingual program started in 1993 and the school currently offers two bilingual classes per grade level. The school is currently ranked a "B" school, and it has maintained a score of "A" or "B" since it went from a "D" to an "A" in 2001 ("Executive Summary, 2015).

Marcus A. Milam K-8 Centers' demographic composition is as follows: 97% of the students are of Hispanic origin, 1% are of Black, non-Hispanic origin, 0.9% are of White, non-Hispanic origin, 0.5% of Asian origin, and 0.4% of Asian/Pacific Islander origin (See Figure 6).

Leewood K-8 Center. Leewood K-8 Center was established in 1971 as an elementary school. It expanded to include middles school in 2008. The teaching staff at Leewood K-8 consists of 53 full-time teachers. The school is currently ranked as an "A" school, score that it has maintained for the past 16 years. Twenty six percent of the students participates in the Gifted Program. In 2012, the school received one of five Samsung for Tomorrow grants in the amount of $110,000, which the school has used to incorporate technology into the curriculum ("Executive Summary, 2015).

Leewood K-8 Centers' demographic composition is as follows: 66% of the students are of Hispanic origin, 3% are of Black, non-Hispanic origin, 22% are of White, non-Hispanic origin, 10% of Asian origin, 1% of Asian/Pacific Islander origin, and 0.07% of Multiracial origin (See Figure 7).

David Lawrence K-8 Center. David Lawrence K-8 Center opened in 2006, becoming the first school built in North Miami in 50 years. The teaching staff consists of 103 fulltime teachers. Out of which four are National Board Certified Teachers. The school is currently ranked as a "B" school, score which it has maintained since it dropped from an "A" to a "B" in 2013. In 2011, the

school opened the S.T.E.M program. It offers rigorous secondary curriculum implementation in Biology and Physical Science ("Executive Summary, 2015).

David Lawrence K-8 Centers' demographic composition is as follows: 50% of the students are of Hispanic origin, 35% are of Black, non-Hispanic origin, 13% are of White, non-Hispanic origin, 1% of Asian origin, 1% of Asian/Pacific Islander origin, and 0.7% of Multiracial origin (See Figure 8).

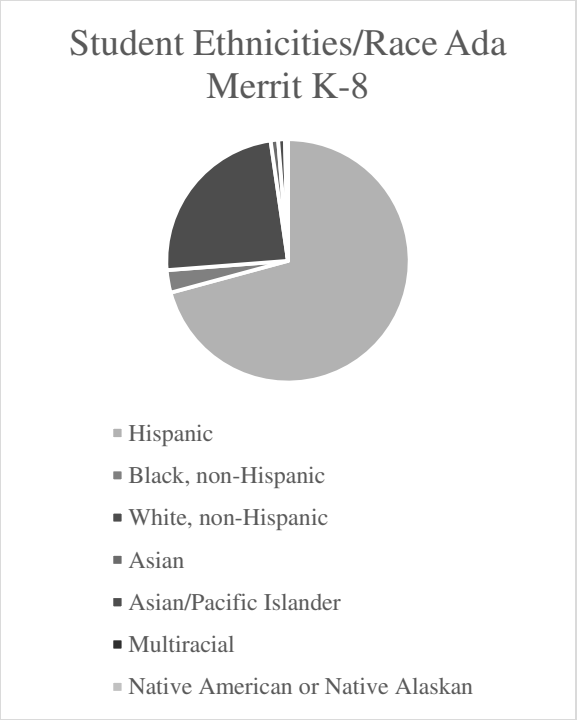

Figure 3. *Ada Merritt's Race/Ethnicity*

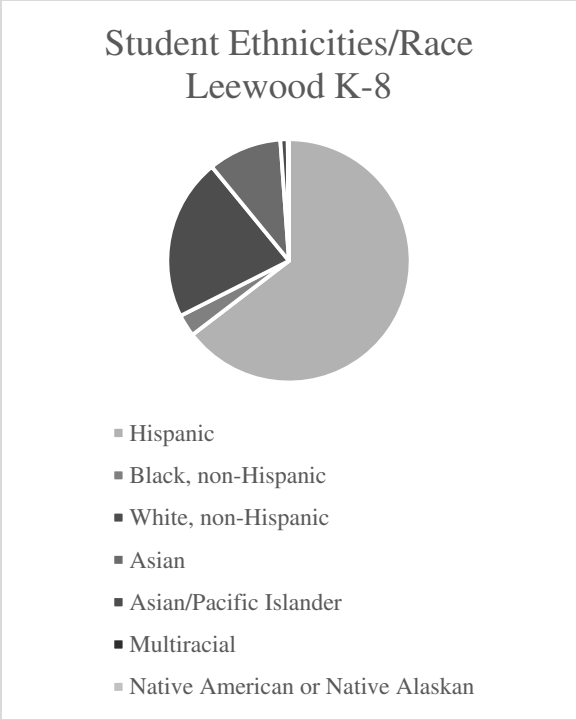

Figure 4. Leewood's Race/EthnicityJA

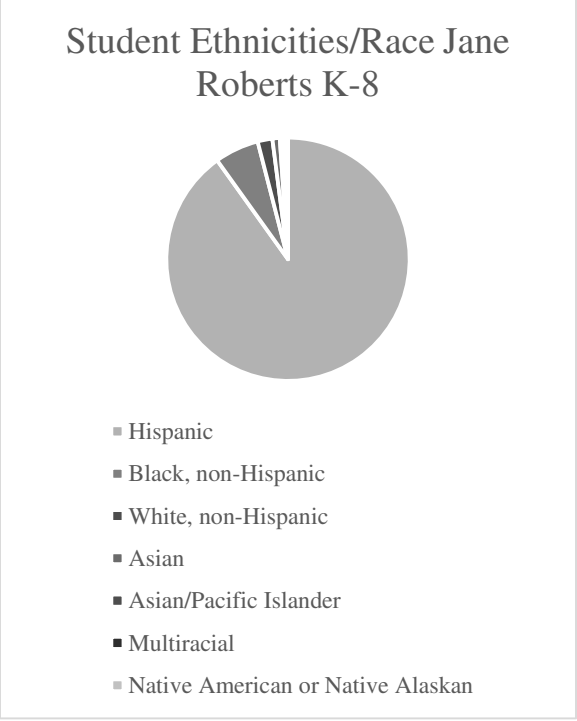

Figure 5. Jane Robert's Race/Ethnicity

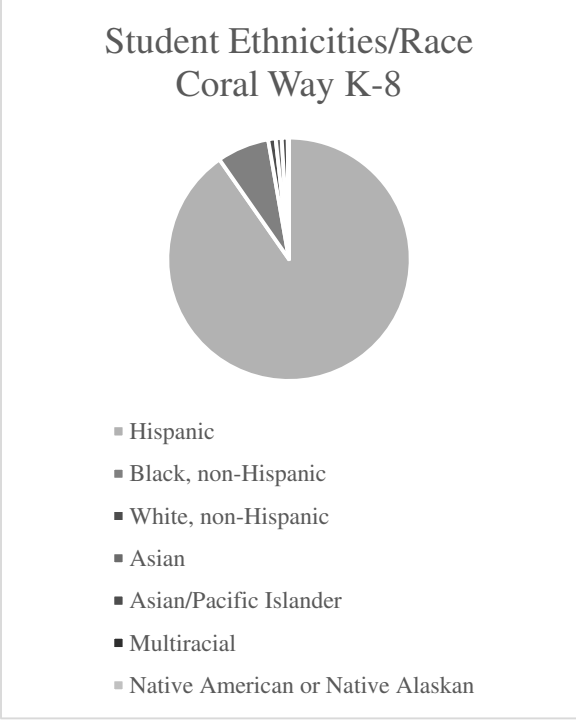

Figure 6. Coral Way's Race/Ethnicity

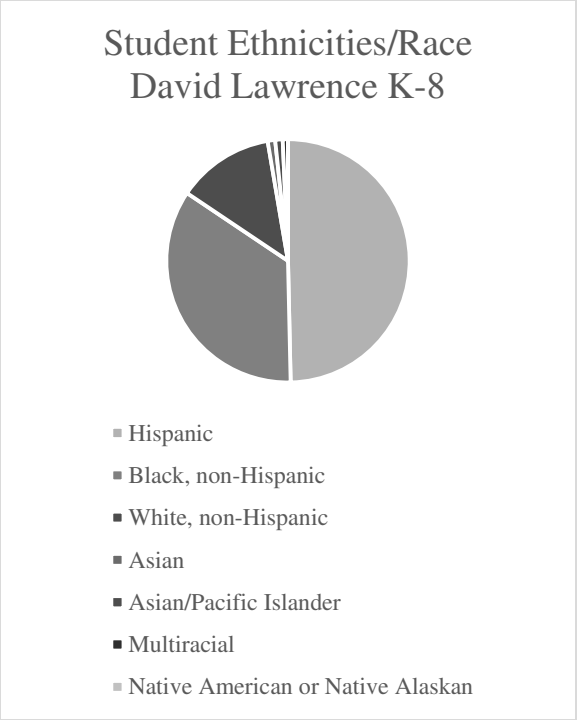

Figure 7. David Lawrence's Race/Ethnicity

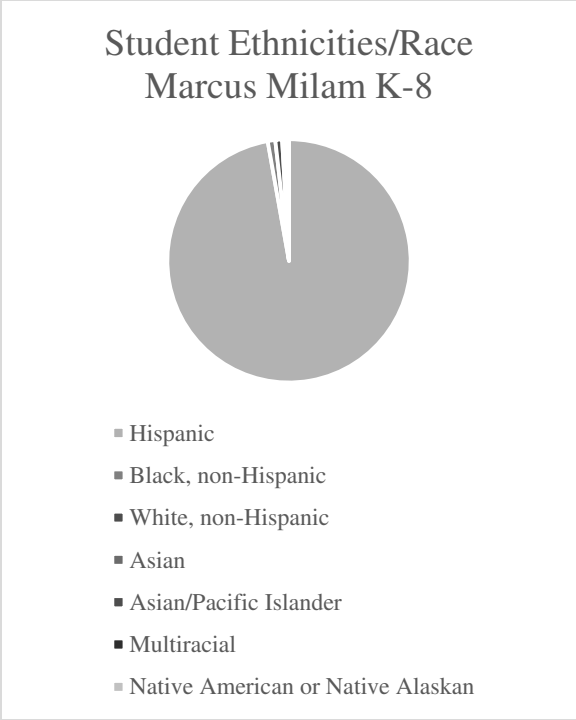

Figure 8. Marcus Milam's Race/Ethnicity

Data Selection and Analyses

Data Selection

A total of 164 public schools in Florida offer some kind of bilingual program. Most of them are part of the Choice Program, in which participation is voluntary and in most cases admission is determined by a lottery system ("Magnet Schools", nd.). The schools selected for this thesis offer a two-way model of bilingual education. The performance measures used to compare the type of programs were the passing rates for the reading and mathematics FCAT 2.0 from 2011 to 2014. The passing rates were obtained through the annual reports of the Florida Department of Education. The FCAT 2.0 is a standardized assessment that measures student achievements of the Next Generation Science Standards (NGSS), which sets the content standards of what students are expected to know and be able to do ("Next Generation", n.d.). The FCAT 2.0 measures students' performance in reading, mathematics, science, and writing. Most students, including English language learner (ELL) and exceptional student education (ESE) students, take the FCAT 2.0 assessment. The rationale for including these students in these tests is to hold them to the same high standards as their peers and to ensure that their needs are not overlooked (Coltrane, 2002). FCAT 2.0 Reading scores range from 140 to 302. The scores are then assigned to Achievement Levels that range from 1 to 5, with 1 being the lowest and 5 being the highest. To be considered on grade level, students must achieve a Level 3 or higher ("Understanding FCAT 2.0 Reports, 2013).

Data Analyses

For each FCAT 2.0 test, the mean passing rates (i.e., the average passing rate from 2011-2014) for each school by grade level were submitted to a 4 × 6 analyses of variance (ANOVA)

with repeated measures. The between-subjects factor was Program Type (monolingual, partially bilingual, completely bilingual, state average), and the within-subjects variable was Grade Level (3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{th}, 8^{th}). If there are differences among the different types of school programs, a main effect for Program Type would be expected. In addition, if there are differences among programs at certain grade levels, a significant interaction between Program Type and Grade Level would be expected.

Results

Table 3 displays the means and standard deviations for each school by grade (3^{rd} grade through 8^{th} grade) on the FCAT Reading Test. And Figure 9 shows the mean scores by Program Type. A 4×6 ANOVA revealed a main effect for Program Type, $F(3, 24) = 3.30$, $p = .038$. There was no effect for Grade and no interaction between Grade and Program Type ($Fs < 1.5$, $ps > .20$). For the effect of Program Type, pairwise comparisons revealed the following differences: A greater percentage of students from the completely bilingual schools passed the reading test than students from the partially bilingual Schools ($p = .014$). In addition, the completely bilingual schools was the only program type for which the passing rate was significantly higher than the state average ($p = .016$).

Table 3.

Mean Passing Rate by Grade (2011-2104) on FCAT Reading

		Grade					
School	Program	3rd	4th	5th	6th	7th	8th
Ada Merritt	Complete Bilingual	90.75	87.75	86.00	89.75	94.24	88.00
		(5.56)	(6.65)	(2.16)	(2.87)	(2.36)	(5.48)
Leewood	No Immersion	84.25	81.25	74.00	77.50	87.50	74.50
		(6.34)	(3.30)	(14.12)	(12.87)	(3.51)	(12.87)
Coral-Way	Complete Bilingual	61.00	61.75	66.25	69.50	63.00	69.00
		(5.23)	(8.26)	(8.96)	(11.70)	(7.07)	(8.04)
David Lawrence	No Immersion	63.00	61.50	67.00	61.25	53.50	45.75
		(14.02)	(4.12)	(3.16)	(9.67)	(8.74)	(9.11)
Jane Roberts	Partial Bilingual	68.25	70.00	72.75	73.50	87.50	74.50
		(6.85)	(10.30)	(14.45)	(10.63)	(3.51)	(12.87)
Marcus Milam	Partial Bilingual	46.75	49.50	49.50	50.50	57.50	46.50
		(12.12)	(10.47)	(8.81)	(4.51)	(6.56)	(11.33)
State Average		56.75	60.50	60.00	58.50	57.50	55.25
for Florida		(0.50)	(1.29)	(1.41)	(1.29)	(0.58)	(1.71)

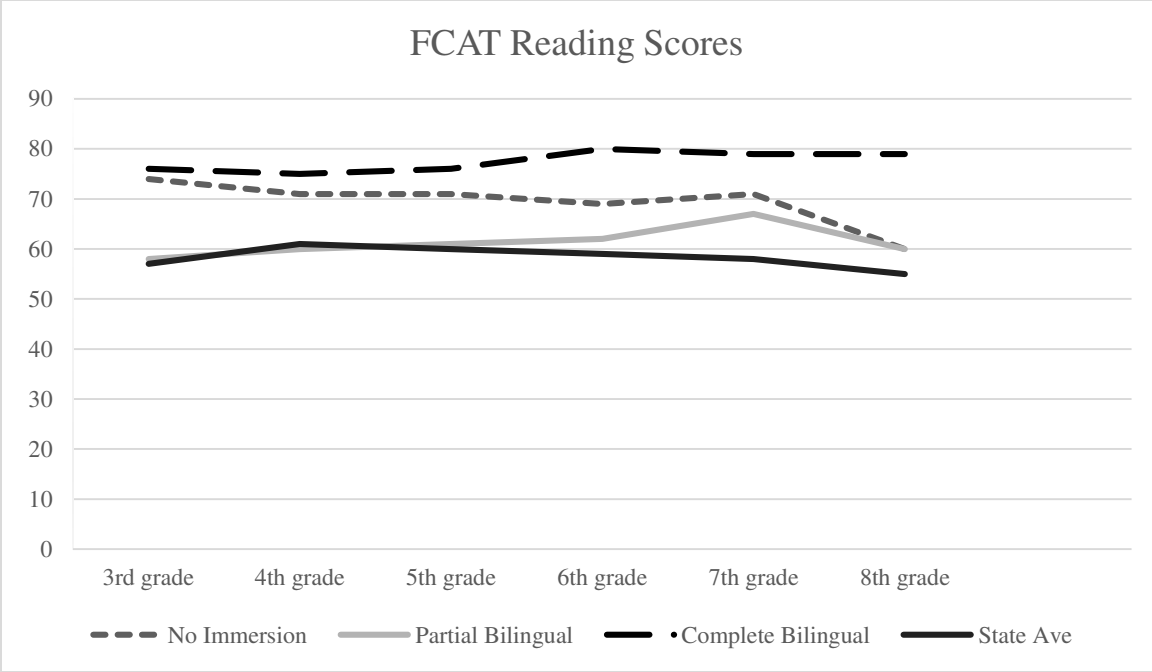

Figure 9. FCAT Reading Scores by Program Type

Table 4 displays the descriptive statistics means for each school by grade on the FCAT Math Test, and Figure 10 shows the mean test scores by program type. A 4 × 6 ANOVA revealed a main effect for Grade, $F(5, 120) = 8.14$, $p < .001$. There was no effect for Program Type and no interaction between Grade and Program Type (Fs < 2.0, ps > .10). For the effect of Grade, pairwise comparisons revealed that a greater percentage of students from 3rd and 4th grade passed the math test than students from 5th through 8th grade (ps < .05).

Table 4.

Mean Passing Rate by Grade (2011-2104) on FCAT Math

		Grade					
School	Program	3rd	4th	5th	6th	7th	8th
Ada Merritt	Complete	96	86.00	88.00	85.00	90.00	77.00
	Bilingual	(3.50)	(10.05)	(4.69)	(1.83)	(4.36)	(19.97)
Leewood	No Immersion	91.00	83.00	74.00	74.00	78.00	70.00
		(5.06)	(4.20)	(2.83)	(6.95)	(8.73)	(20.87)
Coral-Way	Complete	62.00	64.00	54.00	56.00	61.00	53.00
	Bilingual	(9.18)	(9.49)	(2.94)	(7.27)	(4.36)	(12.49)
David Lawrence	No Immersion	64.00	64.00	57.00	54.00	51.00	48.00
		(18.96)	(16.38)	(5.98)	(4.43)	(7.85)	(15.78)
Jane Roberts	Partial Bilingual	77.00	81.00	73.00	69.00	74.00	77.00
		(4.50)	(5.83)	(5.45)	(6.95)	(6.81)	(11.09)
Marcus Milam	Partial Bilingual	73.00	85.00	72.00	64.00	59.00	57.00
		(6.06)	(9.04)	(7.30)	(9.76)	(11.12)	(21.65)
State Average for		58.00	61.00	56.00	53.00	56.00	53.00
Florida		(1.00)	(2.08)	(0.82)	(0.50)	(0.50)	(4.65)

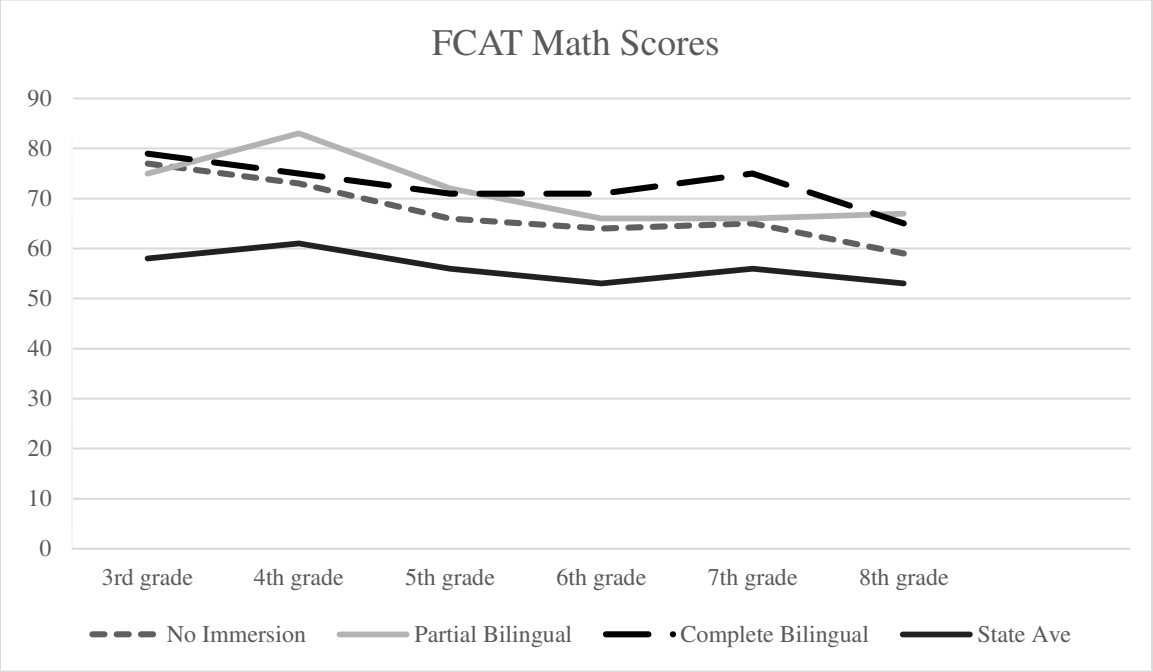

Figure 9. FCAT Mathematics Scores by Program Type

To summarize the findings, the percentage of students in complete bilingual programs who passed the Reading FCAT 2.0 in 2011 to 2014 was higher than those of students in partial bilingual or no immersion programs. However, this was not the case for the Mathematics FCAT 2.0. Program type does not appear to influence students' performance in math assessments.

Discussion

This thesis set out to determine the impact of bilingual education on standardized test scores. It was found that complete bilingual education has a positive impact on reading test scores. Furthermore, type of program was not found to have any impact on math test scores. This corresponds to the result obtained by Thomas and Collier (1997) when they tested the performance of two-way bilingual immersion students who met or exceeded Oregon state standards in English reading by the end of 3rd and 5th grades. This is related to the bilingual advantage. Bilingual students have a cognitive advantage when it comes to learning. For instance, bilingual children have a greater ability to control attention, inhibit distraction, monitor sets of stimuli, expand working memory, and shift between tasks (Bialystok, 2011). Research with adults has revealed similar results, showing that bilinguals have faster reaction time and are less disrupted than monolinguals when they are presented with competing but irrelevant feature of stimulus (Costa, Hernández, & Sebastián-Gallés, 2008). It can be said that using two languages somehow disciplines bilinguals to have a better controlled-attention or "central executive" than monolinguals by helping them pay attention directly to relevant information under pressure of interference (Bialystok & Majumder, 1998). Furthermore, bilingual students' controlled-attention has been found to have a positive impact on working memory capacity and recognition. A study found that compared to monolinguals, bilingual students are better at directing their attention to task-relevant information and maintain their attention despite adverse interference (Yang, H., Yang, S., Ceci, & Wang, 2005). Bilingual students have also been found to have greater phonological awareness. Rubin and Turner (1989) compared the phonological awareness of English speakers to those in French immersion programs. The students in the French immersion program performed better than their monolingual counterpart despite the fact

that they were minimally bilingual. Yet another advantage of bilingualism is the protection it offers against cognitive decline. In 2007, a study found that bilingualism offers a four-year delay of symptoms of dementia (Bialystok, Craik, & Freedman, 2007).

The findings suggest that more than the program type, the most impactful factor is the quality of education. A high quality and enriching curriculum is essential for the success of dual language programs. As Garcia and Gopal (2003) have pointed out, remedial programs have led to high failure rates on high school exit exams. It is necessary to transition from a focus on remediation to a forward-looking practice that emphasizes the provision of quality programs (Slavin, 2013).

Limitations

The main limitation for this thesis was sample size. The study was limited to two completely bilingual schools, the only ones in Florida. Another limitation was access to information. The Florida Department of Education does not keep record of all the bilingual programs in the state. In fact it does not even provide guidelines for their curriculum or set up. This is left up to the county, which means that to obtain information about the programs each individual county or even school needs to be contacted. The counties do not seem to keep organized records of the programs and the information they have is often outdated. Additionally, it was not possible to separate the scores of the students in bilingual programs from those in monolingual ones. Such information is only accessible by applying to do research in each county, for which obtaining permission often takes up to a year. Another limitation for this study is that we could not track specific students' progress throughout the years since we did not have access to individual scores. More in-depth research about the impact of bilingual education could be

done by applying for research in each county and obtaining access to individual scores. Something else that could be studied is the quality of bilingual programs. In this thesis, we tested the impact that bilingual education has on students' performance in the FCAT 2.0. However, it would be useful to also analyze the schools' curriculums to determine what kind of program works best. This study was limited to program type but as the results indicate the lower socioeconomic schools tend to have lower scores. Future research can isolate socioeconomic background more as a variable to investigate the success of this kind of programs in different socioeconomic backgrounds. Hopefully this study will stimulate further discussion and promote dual immersion keeping in mind that quality is what determines the success of students.

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Appendix A

List of all 164 schools with bilingual programs in Florida

SCHOOL	COUNTY	PROGRAM	START YEAR	GRADES	%TIME IN SPANISH	%TIME IN ENGLISH
Gove Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
North Grade Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
Hagen Road Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
Freedom Shores Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
South Grade Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
C.O. Taylor/Kirkland	Palm Beach	Dual Language	2013	K t 5	50	50
New Horizons Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
Plumosa Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
Greenacres Elementary	Palm Beach	Dual Language	2013	K t 3	50	50
Berkshire Elementray	Palm Beach	Dual Language	2013	K t 5	50	50
Forest Hill Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
Melaleuca Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
Jupiter Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
Highland Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
Cholee Lake Elementary	Palm Beach	Dual Language(Choice Program)	2013	K t 5	50	50
Liberty Park	Palm Beach	Dual Language	2013	K t 5	50	50

Hope-Centennial Elementary	Palm Beach	Dual Language	2013	K t 5	50	50
Conniston Middle	Palm Beach	Dual Language(Choice Program)	2013	6 t 8	50	50
Lake Worth Middle	Palm Beach	Dual Language	2013	6 t 8	50	50
Okeeheelee Middle	Palm Beach	Dual Language(Choice Program)	2013	6 t 8	50	50
Palm Springs	Palm Beach	Dual Language	2013	6 t 8	50	50
John I. Leonard High	Palm Beach	Dual Language(Choice Program)		9 t 12	50	50
Pleasant Hill Elementary	Osceola	Dual Language	2015	K t 2	40	60
East Lake Elementary	Osceola	Dual Language	2015	K t 2	40	60
Lakeview Elementary	Osceola	Dual Language	2015	K t 2	40	60
Cypress Elementary	Osceola	Dual Language	2015	K t 2	40	60
Partin Settlement Elementary	Osceola	Dual Language	2015	K t 2	40	60
Boggy Creek Elementary	Osceola	Dual Language	2015	K t 2	40	60
Florida Ridge Elementary	Osceola	Dual Language	2015	K t 2	40	60
Central Avenue Elementary	Osceola	Dual Language	2015	K t 2	40	60
Celebration	Osceola	Dual Language	2015	K t 8	40	60
Kissimmee Elementary	Osceola	Dual Language Academy	2015	K t 2	40	60
Ventura Elementary	Osceola	Dual Language Academy	2015	K t 2	40	60
Thacker Avenue Elementary School for International Studies	Osceola	Dual Language	2015	K t 2	40	60
Westside K-8 School	Osceola	Dual Language	2015	K t 2	40	60
Neptune Middle School	Osceola	One- Way	2015	6 t 8		
Ada Merritt K-8	Miami-Dade	BISO(Two-way)		PreK t 3	40	60
Coral Way K-8	Miami-Dade	BISO(Two-way)	1963 /2004	K t 8	40	60
Marjory Stoneman Douglas Elementary	Miami-Dade	BISO(Two-way)	2004	K t 3	40	60

Emerson Elementary	Miami-Dade	BISO(Two-way)		K t 1	40	60
Dr. Carlos F. Finlay Elementary	Miami-Dade	BISO(Two-way)		K t 1	40	60
Southside Elementary	Miami-Dade	BISO(Two-way)		K t 3	40	60
Springview Elementary	Miami-Dade	BISO(Two-way)		K t 1	40	60
Auburndale Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Bent Tree Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Biscayne Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Bright, J.H. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Calusa Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Campbell Drive Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	2004	K t (exp)	40	60
Caribbean Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Carver, G. W. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Citrus Grove Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Coral Park Elementary	Miami-Dade	Extended Foreign	1993	K t 3	40	60

		Language(Two-Way)				
Coral Terrace Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 1	40	60
DuPuis, J. G. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	1 t 5	40	60
Emerson Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Fairchild, David Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Fairlawn Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Graham, Ernest Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 6	40	60
Gulfstream Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Emerson Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Hialeah Gardens Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Hurston, Zora Neal Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Kensington Park Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60

Kinloch Park Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Matthews, Wesley Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Miami Lakes Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	Exte nded Day	40	60
Morningside Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 4	40	60
North Beach Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
North Hialeah Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
North Twin Lakes Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Ojus Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Palm Lakes Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Palm Springs Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Palm Springs North Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 4	40	60
Pepper, Claude Elementary	Miami-Dade	Extended Foreign	1993	K t 5	40	60

		Language(Two-Way)				
Porter, Dr. Gilbert L. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	2004	K t (exp)	40	60
Riverside Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Royal Palm Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Shenandoah Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Sheppard, Ben Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Smith, John Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 4	40	60
Skyway Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	1 t 2	40	60
Sunset Park Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Sylvania Heights Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Thomas, Eugenia B. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 3	40	60
Twin Lakes Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	1 t 5	40	60

Whispering Pines Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 2	40	60
Wyche, Charles D. Elementary	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 5	40	60
Everglades K-8 Center	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 4	40	60
Key Biscayne K8	Miami-Dade	Extended Foreign Language(Two-Way)	2004	K t (exp)	40	60
Milam, M.A. K-8 Center	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 8	40	60
Roberts, Jane S. K8	Miami-Dade	Extended Foreign Language(Two-Way)	1993	K t 8	40	60
Bell, Paul W. Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Chiles, Lawton Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 7	40	60
Citrus Grove Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Dario, Ruben Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Filer, Henry Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Glades Middle	Miami-Dade	Extended Foreign	1993	6 t 7	40	60

		Language(Two-Way)				
Hammocks Middle	Miami-Dade	Extended Foreign Language(Two-Way)	2004	6 t 8	40	60
Miami Lakes Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	7 t 8	40	60
Palm Springs Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Shenandoah Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
West Miami Middle	Miami-Dade	Extended Foreign Language(Two-Way)	1993	6 t 8	40	60
Braddock, G. Holms High	Miami-Dade	Extended Foreign Language(Two-Way)	1993	9 t 12	40	60
Miami High	Miami-Dade	Extended Foreign Language(Two-Way)	1993	9 t 12	40	60
Air Base Elementary	Miami-Dade	International Studies	2007			
Coconut Grove Elementary	Miami-Dade	International Studies	2004	K t 1 (exp)		
Coral Way Elementary	Miami-Dade	International Studies	2006			
Lorah Park Elementary	Miami-Dade	International Studies	2004	PreK t 1		
Martin, F. C. Elementary	Miami-Dade	International Studies	2006	PreK t 5		
Merritt, Ada Elementary	Miami-Dade	International Studies	2007			
Morningside Elementary	Miami-Dade	International Studies				
North Dade Center for Modern Languages	Miami-Dade	International Studies				

Sunset Elementary	Miami-Dade	International Studies				
Carver, G. W. Elementary	Miami-Dade	International Studies				
North Dade Middle	Miami-Dade	International Studies				
Coral Reef High	Miami-Dade	International Studies				
Hillcrest Elementary	Orange	Dual Language		K t 5	50	50
Tildenville Elementary	Orange	Dual Language		K t (exp)	50	50
Hunter's Creek Elementary	Orange	Dual Language		K t (exp)	50	50
Union Park Elementary	Orange	Dual Language		K t (exp)	50	50
Garrison Jones Elementary	Pinellas	Dual Language		K t 5	50	50
Dunedin ELementary	Pinellas	Dual Language		1 t 3	50	50
Ridgecrest Elementary	Pinellas	Dual Language		1 t 5	50	50
Highpoint Elementary	Pinellas	Dual Language	ende d		50	50
Eagle Point Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Broadview Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Chapel Trail Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Cypress Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Indian Trace Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Manatee Bay Elementary	Broward	Dual Language Extended		K t (exp)	50	50
Boulevard Heights Elementary	Broward	Dual Language		K t (exp)	30	70
Country Isles Elementary	Broward	Dual Language		K t (exp)	30	70
Eagle Ridge Elementary	Broward	Dual Language		K t (exp)	30	70
Gator Run Elementary	Broward	Dual Language		K t (exp)	30	70
Oakland Park Elementary	Broward	Dual Language		K t (exp)	30	70

Everglades Elementary	Broward	Dual Language		K t (exp)	30	70
Pompano Elementary	Broward	Dual Language		K t (exp)	30	70
Tedder	Broward	Dual Language		K t (exp)	30	70
Watkins	Broward	Dual Language		K t (exp)	30	70
Westchester	Broward	Dual Language		K t (exp)	30	70
Bethune Elementary	Broward	Dual Language		K t (exp)	30	70
Hallandale Elementary	Broward	Dual Language		K t (exp)	30	70
Lakeside Elementary	Broward	Dual Language		K t (exp)	30	70
Margate Elementary	Broward	Dual Language		K t (exp)	30	70
Meadowbrook Elementary	Broward	Dual Language		K t (exp)	30	70
Ramblewood Elementary	Broward	Dual Language		K t (exp)	30	70
Sawgrass Elementary	Broward	Dual Language		K t (exp)	30	70
Silver Lakes Elementary	Broward	Dual Language		K t (exp)	30	70
Silver Palms Elementary	Broward	Dual Language		K t (exp)	30	70
San Jose Elementary	Duval	Dual Language	2007	K t 5	50	50
Beauclerc Elementary	Duval	Dual Language	2007	K t 5	50	50
Alfred duPont Middle	Duval	Dual Language	2013	6 t 8	50	50
West Riverside Elementary	Duval	Dual Language	2013	K t 2 (exp)	50	50
Tice Elementary	Lee	Dual Language	2012	PreK t 1	50	50
Alta Vista Elementary	Polk	Dual Language	2006	K t 1 (exp)	50	50
Eastside Elementary	Polk	Dual Language	2006	K t 1 (exp)	50	50
Lake Marion Creek School	Polk	Dual Language	2006	K t 1 (exp)	50	50
Sandhill Elementary	Polk	Dual Language	2006	K t 1 (exp)	50	50
Wahneta Elementary	Polk	Dual Language	2006	K t 1 (exp)	50	50
Spring Lake Elementary	Seminole	Dual Language		K t 5	40	60

Red Bug Elementary	Seminole	Dual Language	K t 5	40	60
Forest City Elementary	Seminole	Dual Language	K t 5	40	60

Appendix B

Passing rates for Reading FCAT 2.0

		School					
Year	Grade	Ada Merritt	Leewood	Coral-Way	David Lawrence	Jane Roberts	Marcus A. Milam
2011	3	87	92	68	69	72	63
	4	89	85	72	65	85	60
	5	84	87	74	71	86	57
	6	92	89	74	69	85	57
	7	96	91	72	63	80	61
	8	81	77	59	48	68	46
2012	3	89	77	57	52	62	47
	4	86	81	60	65	68	56
	5	85	72	59	64	84	57
	6	86	76	60	51	79	47
	7	94	90	64	56	77	49
		87	76	63	45	70	62
2013	3	88	86	57	51	63	34
	4	80	77	52	59	62	37
	5	89	55	74	68	64	44
	6	89	60	84	55	69	48
	7	91	84	61	53	76	56
	8	90	88	72	56	75	43
2014	3	99	82	62	80	76	43
	4	96	82	63	57	65	45
	5	86	82	58	65	57	40
	6	92	85	60	70	61	50
	7	96	85	55	42	72	64
	8	94	57	62	34	80	35

Appendix C

Passing Rates for Mathematics FCAT 2.0

		School					
Year	Grade	Ada Merritt	Leewood	Coral-Way	David Lawrence	Marcus Milam	Jane Roberts
2011	3	97	97	75	92	82	83
	4	96	85	78	86	95	89
	5	94	76	54	79	68	76
	6	86	77	49	60	63	77
	7	95	84	59	51	67	79
	8	94	91	70	64	80	84
2012	3	92	85	54	59	71	73
	4	83	78	60	50	88	75
	5	86	76	58	56	76	72
	6	83	68	51	50	51	70
	7	85	78	64	61	51	71
	8	90	83	52	58	63	85
2013	3	94	92	60	51	70	77
	4	73	80	61	66	74	80
	5	89	74	51	41	64	65
	6	87	68	63	52	68	62
	7	86	66	55	49	47	79
	8	74	47	50	34	56	77
2014	3	100	89	58	54	69	74
	4	91	87	57	53	81	80
	5	83	70	53	52	80	77
	6	84	82	62	52	74	65
	7	92	85	64	42	69	65
	8	50	57	40	34	28	61