THE EFFECTS OF BILINGUAL EDUCATION ON READING TEST SCORES: CAN

DUAL-IMMERSION SUPPORT LITERACY FOR ALL STUDENTS?

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Dual-immersion is a bilingual education method offered that places English as a first language (EFL) and English language learner (ELL) students in the same classroom to learn two languages at the same time. This study examines whether second language acquisition through dual-immersion supports literacy for both ELL and EFLS children over time. Students' scores on standardized tests (ITBS, TAKS, Logramos, Stanford 9, and Aprenda) were studied to assess the impact, if any, of dual-immersion instruction vs. regular/bilingual education on reading development. Scores from 2000 through 2004 were gathered and analyzed for students enrolled in a dual-immersion class which started in kindergarten in 2000. These scores were compared to scores of students enrolled in regular and bilingual education classrooms for the same amount of time at the same school to examine whether there was an effect for students in the dual-immersion class. It was found that no significant difference existed between the groups. All groups were performing at a passing level on the standardized tests. The dual-immersion class was performing as well as the regular education class on standardized tests in both English and Spanish.

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INTRODUCTION

According to the 2000 Census data, 18.4% of households with children aged 5-17 in the United States and 32.4% of these households in Texas reported speaking a language other than English at home. That is, nearly one in three children in Texas lived in non-English speaking homes (United States Census Bureau, 2003). While some of these children come to school already fluent in English, as a group they present real challenges for educators and communities. It can be suggested that bilingualism and biliteracy are important for all students because knowing two languages is becoming essential in many communities, especially in Texas. Culturally diverse areas in states such as Texas, California and Arizona are highly populated with first generation Mexican-American families who still use Spanish as their primary language (Gilroy, 2001). This makes bilingual education especially important for the children of these families. Many of these Spanish-speaking children are placed in English language learner (ELL) classrooms that require them to learn English, thereby replacing their native language, and possibly diminishing their cultural background (Gilroy, 2001). In addition, it is important to recognize the opportunity for native English-speaking children to learn Spanish and help the community become better able to communicate without devaluing the native language and culture that is present for the Mexican-American population (Mitchell, Destino, Karam & Colon-Muniz, 1999).

Of course, not everyone agrees that bilingualism should be a goal for children in the United States. For example, in 1998, the citizens of the state of California passed Proposition 227, commonly referred to as "English for the Children," which required all public school instruction be conducted in English only. This and similar legislation across the country has been controversial, but it in part reflects a concern many people in the Unites States have that current

school programs do not sufficiently support English language proficiency for ELLs (English for the Children, 1997).

Unfortunately, "English only" legislation not only discourages ELLs' use of their native language in the school system, it also does not encourage opportunities for English as a first language speaker (EFLS) students to acquire a second language. It can be suggested that most Americans, if asked, would indicate that they would prefer to be bilingual themselves if the opportunity was offered at a time when they might acquire a second language fluently. Schools typically require a second language at the high school level in order to graduate. Most EFLSs do not see this high school requirement as making them a bilingual person. Dual-immersion is one model of second language instruction offered at the elementary level to help both ELL and EFLS students become bilingual.

Three goals for dual-immersion include "(1) bilingualism and biliteracy, (2) academic achievement through two languages, and (3) an appreciation of and ability to work with cultural diversity" (Freeman, 2000, p. 2). These goals identify the positive effects that dual-immersion may have on students in more than just one aspect of their lives. Both educators and researchers offer support for the idea that young children are capable of learning two languages simultaneously, and that doing so may benefit not only their cognitive development, but their cultural development as well (Hakuta, Bialystok, & Wiley, 2003; Jiminez, 1998). Biliteracy extends children's learning and offers more language experiences for young students to expand their cognitive abilities. Through allowing students to acquire a second language at a time when it may be optimal for the brain to acquire this type of information, it is suggested that the development of cognitive abilities may be enhanced (Hakuta et al., 2003; Kenner et al., 2002).

This is not to suggest that adults cannot work hard and eventually become bilingual. However, waiting until adulthood may not have the same overall potential benefits.

It has been argued that the dual-immersion model may be particularly effective in facilitating biliteracy in young children (Christian, Howard & Loeb, 2000; Howard & Sugarman, 2001; Slavin & Cheung, 2003). While there are other models for encouraging biliteracy, which will be discussed below, an existing dual-immersion program was the focus of this study. Therefore, emphasis will be placed on what is known about this model in particular. Dual-immersion programs vary, but typically involve having students spend a portion of the day being taught in English and a portion of the day taught in a second language, most typically Spanish (at least in Texas). Core subject material (e.g., science, math, history, etc…) is taught throughout the day in the context of the language (English or Spanish) used at that particular time of the day (Howard & Sugarman, 2001). In this study, the dual-immersion class under examination was instructed in Spanish 90% of the day and in English 10% of the day in kindergarten and 1st grade, Spanish 80% and English 20% in the 2nd grade, and Spanish 50% and English 50% in the 3rd grade year.

This study was a longitudinal, quasi-experimental design. The purpose of the study was to compare reading scores (from a variety of standardized tests) of students in a dual-immersion classroom to scores of students from regular education and bilingual education classrooms. Most of the ELL and EFLS students in the dual-immersion classroom have been enrolled since kindergarten and have now completed the 3rd grade. These students' reading scores were compared to the scores of students from the same school who had been enrolled in regular and bilingual education for at least their 2nd and 3rd grade years. A review of the literature for reading development, second language acquisition and the potential link between the two is offered first.

As will be seen, most of the research to date has primarily focused on ELL students as they acquire English as a second language (L2). This study was intended to build on what is known about EFLS students as they acquire a second/foreign language, in this case Spanish. Foreign language acquisition for EFLS students may be just as important to educators as English language learning is for nonnative English speakers.

THEORY AND MODELS

This section combines information about language learning and its relation to age, general reading theory, the dual-immersion approach and different models of bilingual education.

Critical Period vs. Optimal Period

In U.S. high schools, a foreign language class is often required; however this requirement is not parallel with the research that states that the best time for children to acquire a second language is during the early childhood years (MacWhinney, 1998). Evidence shows that children learn second languages easier and faster when younger (MacWhinney, 1998). Research supports that young children acquire language easier than adolescents because of the nature and robustness of language learning as it appears to be a very resilient process at younger ages (Shonkoff & Phillips, 2001). As children grow older, the brain becomes less plastic and not as malleable to learn language, therefore suggesting that a second language could be learned more effectively at a younger age, meaning it may be optimal to learn it at this time, rather than critical (Bowman, Donovan & Burns, 2001; Hakuta et al., 2003; Shonkoff & Phillips, 2001). Plasticity refers to the brain's adaptability and ability to modify over time. As the brain develops, plasticity decreases and the brain is less adaptable to situations or change. From an educational standpoint, the public school system requiring a foreign language credit in high school is not consistent with the information provided that supports that foreign language should be taught at a younger age. Assuming that knowing a second language is a general goal for students because foreign language credit is required to graduate high school, the idea that it is not often offered in grades prior to high school is not consistent with the time frame that is optimal for students to acquire a second language.

The critical period hypothesis proposed by Penfield and Roberts in 1959, as cited in Hakuta et al. (2003), speculated that language proficiency is limited to the constraints of a certain time period for which individuals can become bilingual and/or biliterate. Although there does seem to be an age-related decline in learning a second language for individuals as they become older, the critical period theory is controversial because other variables become too difficult to separate (Hakuta et al., 2003). It has also been reported by Krashen (1988), that such a critical period would be fixated by age 5, which does not parallel with the research that suggests that a second language can be learned in the primary grades. For this reason, it may be better to think of the relation of age with second language learning as having an optimal period. This applies to the focus of this study because bilingual education in the primary grades tends to focus on English language learner (ELL) students and their progress with English. However, earlier grades can be considered a time to offer a "foreign" language to students who may be fully capable of acquiring a second language in order to communicate with diverse groups of people, and really have a chance to become bilingual. In this study, the school's goal was to introduce a second language at age 5 (in kindergarten), at a time when it may still be optimal for students to develop high levels of speaking, listening, reading and writing in two languages.

Models of Bilingual Education

Several models of bilingual education offer information about how children learn and what type of instruction best supports language learning. These models for second language learning include structured English immersion (sometimes called submersion), bilingual education, and dual-immersion. Structured English immersion utilizes the gradual phase-in of English instruction accordingly to ELLs' level of progress (Slavin & Cheung, 2003). An earlier model of structured English immersion is termed "submersion," in which English is included in

ELL instruction, but no provisions are made for ELL students (Slavin & Cheung, 2003).

Bilingual education is a model that differs from structured English immersion because it offers

significant amounts of instruction in other subjects such as science, math, and art, in the native

language of the ELLs. For example, the ELLs may be taught to read entirely in Spanish, and

then transitioned to English after mastery of their native language. These early models of second

language acquisition have led to the current model called dual-immersion. This approach is

explained in the following sub-section to offer information about dual-immersion and its impact

on ELLs, as well as EFLSs (English as a first language speakers), because it potentially offers

opportunities for both types of students to learn a second language while retaining the native

language.

<div align="center">The Dual-Immersion Model</div>

A bilingual education program called dual-immersion (sometimes referred to as two-way

immersion) may offer a more integrated approach to learning a second language than the

traditional bilingual education model (Christian, Howard & Loeb, 2000; Freeman, 2000). Most

traditional bilingual approaches include having one instruction period that focuses only on the

grammar and vocabulary of the second language. Dual-immersion on the other hand, offers

instruction in all subjects through two languages. For example, a dual-immersion classroom

would contain ELLs and EFLSs and might offer instruction throughout the day in both English

and Spanish to offer an opportunity for both groups of students to learn a second language while

retaining their native language. Dual-immersion programs have four central goals that are

common among all the models. These goals include: 1) a high level of proficiency is developed

in the student's native language; 2) a high level of proficiency is developed in a second language;

3) academic standards are the same as if the students were enrolled in regular education; and

4) positive cross-cultural attitudes are developed and maintained for all students (Howard, Sugarman & Christian, 2003).

There are two levels of language integration that are commonly used in the dual-immersion classroom. The first is the 50/50 model and the second is known as the 90/10 model (Howard, Sugarman & Christian, 2003). The 50/50, sometimes called the "balanced" model offers an equal 50% instruction in one language, and 50% instruction in the second language typically starting in kindergarten. The 90/10 model (the one used by the school in this study) is where most of the instruction (90%), is presented in the minority language (Spanish), and only 10% is offered in English in the early grades. With this level of integration an increasing amount of English is introduced at each higher grade level until the usage of the two languages is equal (like the 50/50 model), which usually occurs by the fourth grade.

One underlying principle related to dual-immersion is that the program needs to include both native English speakers and native speakers of the minority language (in this case Spanish) and that the two groups need to be somewhat balanced at each grade (Howard, Sugarman & Christian, 2003). It is also suggested that for the dual-immersion program to be most beneficial, the program continue for the full span of the primary grades (kindergarten - 5th grade), and the teacher and school demonstrate clear support for bilingualism. With this, it is important to note instructional strategies that promote the dual-immersion model. One such strategy is scaffolding.

The term scaffolding, as used by Vygotsky, describes the interaction between any more skilled person with a less skilled person (Cumming-Potvin, Renshaw, & van Kraayenoord, 2003). Through peer interaction, scaffolding offers help for students learning to read and learning a second language while progress is monitored and the degree of assistance is adjusted for them to work at their maximum potential as they offer support for one another. One

important aspect of dual-immersion classrooms is that the atmosphere includes a balance of students from the English and non-English backgrounds who participate in instructional activities together (Center for Applied Linguistics, 2003).

Scaffolding may be important during reading development and second language learning because peer help between native speakers and non-native speakers can benefit each other as they acquire the second language in which their partner has a greater understanding. Assuming a native speaker of each of the dual languages is participating in a dual-immersion program, the experience should offer many such scaffolding opportunities among students (Freeman, 2000). For example, in one study observing interactional modification for comprehensible input between native speakers and nonnative speakers, Long (1985) noted that native speakers adjusted their level of language to aid comprehension for beginning-level learners acquiring a second language offering help through scaffolding (as quoted in Cumming-Potvin, Renshaw & van Kraayenoord, 2003). There has been a well-established interest in peer support as a teaching strategy because the analysis of buddy reading in dual-immersion programs has proved beneficial to both participants (Cline, 2003). Scaffolding is thought to help learning in general, but also offers extra support in dual-immersion classrooms as students are acquiring a second language and learning to read at the same time with the help of one another, and the aid of the teacher.

This study is expected to provide information on whether participation in a dual-immersion classroom had an impact on reading development in comparison to regular education and its relationship to reading development. Prior research findings concerning dual-immersion and reading development will be discussed below. It is anticipated that dual-immersion may be more effective than English only in supporting reading development for both ELLs and EFLSs

(Barratt-Pugh & Rohl, 2001). This is because the more the native and foreign languages are used, the more likely the children will retain information about both languages which is thought to support reading development and language acquisition in general (Moll, Saez & Dworin, 2001). Next, language acquisition will be discussed with an explanation of the monitor model that theorizes how children generally acquire typical language development.

Thinking about Language: Krashen

Krashen (1987, 1988) is a leading researcher/theoretician on second language acquisition. He has proposed five hypotheses related to second language acquisition, based to some extent on first language acquisition. These hypotheses include: the natural order hypothesis, the affective filter hypothesis, the monitor model hypothesis, comprehensive-input hypothesis, and the acquisition-learning hypothesis. Of these, primary emphasis here is on the natural order hypothesis, although other relevant aspects raised by some of the other hypotheses are also discussed.

Krashen (1987), suggests that acquisition of grammatical structures follows a predictable, 'natural order' independent of the learners' age, and that this occurs for second language development very much the same as first language development. The natural order hypothesis encompasses the theory that children pass through 4 stages of language acquisition. These stages include: 1) the pre-production stage, 2) the early production stage, 3) the speech emergence stage, and 4) the intermediate fluency stage (Krashen, 1987). At stage 1, it is thought that if comprehensible input (exposure to language that students understand) is offered to a student, the child will be able to build meaning even with little understanding of the language. This stage also offers an opportunity for students to modify their speech and build vocabulary through real life situations. In this stage, concrete ideas are offered through language instruction (as opposed to

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abstract concepts) as the student is trying to acquire the basics of the second language orally. In stage 2, words and short phrases emerge. Instructor feedback is important for the student as it allows for opportunities to use the second language, which in turn offers more comprehensible input for the student to build meaning upon. In the third stage, the student's ability to use longer phrases and even sentences is expanded. The final stage, stage 4, is where the student is able to use complex sentence structures and has a greater comprehension of the language. The student will continue to progress until she has full proficiency in the second language. When considering initial language development for children in their first language, these stages match typical development for children, thus the natural order hypothesis.

With first language development, oral language comes before reading and writing. The natural order approach suggests that second language acquisition, is similar to first language development in this way. The main goal of the natural order approach is to develop basic communicative skills as the instructor corrects errors made by the student through modeling. No matter what age a person is when they start working on gaining the second language, this hypothesis suggest that it will take an extensive period of time, much like it takes a baby a long time to begin to speak and then become an effective communicator. Speech production generally comes slowly and should not be forced. This hypothesis emphasizes that the teacher role in helping to acquire second language is to modify instruction to meet the needs of individual students, and even allow for a silent period for students as they learn. The idea is that in this way, anxiety is decreased for students, which is thought to promote second language acquisition. In dual-immersion, children are immersed in oral language opportunities in both languages starting in kindergarten (at least in this study). This environment may be particularly effective because the child's first language is supported (keeping anxiety low), while exposure to oral experiences

in the second language is extensive as well. In addition, dual-immersion classrooms are "natural" in how they expose children to the second language, not just orally, but through the reading of books, and writing that children are exposed to in the classroom (in both languages).

Another hypothesis suggested by Krashen (1987) that is relevant to dual-immersion is the affective filter hypothesis. This hypothesis states that a number of affective variables play a role in language acquisition, which include motivation, self-confidence, and anxiety. Krashen (1987) claims that second language learners with high motivation, self-confidence, a positive self-image, and with a low level of anxiety are better equipped for success in language acquisition. Students with low motivation, low self-esteem, and debilitating anxiety have a raised affective filter that may form a mental block that prevents comprehensible input from being used for acquisition. In other words, when the filter is up it impedes language acquisition. According to this hypothesis, positive affect along with supportive instruction is necessary for acquisition to take place (Krashen, 1987). The idea of high motivation, self-confidence, positive self-image, and low levels of anxiety supports the dual-immersion model and its goals.

Reading Theory

This study explores the potential relationship between learning to read and second language acquisition. This is important because if students were to become bilingual but to begin scoring poorly on tests of reading, most schools would not be willing to support bilingual programs. Both theory and research suggests that such negative academic outcomes should not be expected.

One theory that relates to reading development and second language acquisition is the shared reading context, which approaches literacy through meaning-centered activities and discussion that is customized around students' needs (Cumming-Potvin, Renshaw & van

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Kraayenoord, 2003). It is thought that shared reading, along with second language acquisition, will enhance native reading development and benefit acquisition of the native language (Cumming-Potvin, Renshaw & van Kraayenoord, 2003). The term shared-reading is employed to describe the interaction between students and teachers as well as the social events surrounding the story as the literature emerges (Cumming-Potvin, Renshaw & van Kraayenoord, 2003). Shared-reading includes physical action during reading that involves finger-point reading and picture explanation. This involves the student in reading through action thus terming shared reading, as opposed to being read to by another. Stories, rhymes, pictures, and pretend reading, also support shared reading as they aid reading development in children by involving them with reading through physical action. Ideally, this theory relates to the dual-immersion program because if children can read together to create these interactions and experiences, which is a goal of dual-immersion, the theory states that their learning of a second language will benefit development of the native language as well.

The Program at Research Elementary

Research Elementary is a pseudonym for the actual name of the school and district whose data will be analyzed for this research. The program at Research Elementary School presents a unique opportunity for understanding a dual-immersion classroom over time. In 2000-2001, Research Elementary created a single, dual-immersion kindergarten classroom whose students were taught 90% the day in Spanish and 10% of the day in English utilizing both languages while learning a variety of subjects (Research Elementary dual-immersion teacher, personal communication, September 24, 2004). The students were selected for the dual-immersion class based on pre-kindergarten enrollment at the school. All of the students in the one pre-kindergarten class offered at Research Elementary were placed in the dual-immersion class.

These children continued in this unique classroom receiving the same 90/10 in 1st grade, however in the 2nd grade, they were taught 80% of the work in Spanish and 20% in English. In the 3rd grade, the students were taught with an equal 50/50 amount of instruction of the day in Spanish and in English (Research Elementary dual-immersion teacher, personal communication, September 24, 2004). The dual-immersion class had the same teacher in kindergarten, and 1st grade, then had a different teacher in 2nd and 3rd grade. These teachers loop every two years; therefore, the students have the same instructor for two years before having a different teacher. The rest of the children in this study are considered to be in regular or bilingual education classrooms, which may or may not have a looping teacher. This allows for a longitudinal study based on data that has already been collected from students beginning in kindergarten (2000-2001) through 3rd grade (2003-2004), examining reading development over time.

Because of limited research specifically focused on dual-immersion programs, this paper first reviews the literature on general reading development to explain how children's literacy emerges for typically developing students through regular education, and how this may be supported by dual-immersion. Next, a literature review over dual-immersion and language development offers information about the dual-immersion program itself, and how language development may be supported through this approach, and what this program may offer to educational institutions for young children. Finally, dual-immersion and reading development together are explored as past literature about both subjects is offered to support the purpose of this particular study.

LITERATURE REVIEW

This section first reviews the literature concerning reading development and bilingualism, language/reading development as it relates to dual-immersion, and long- vs. short-term impacts of dual-immersion.

Language Acquisition

One concern about children learning two languages simultaneously has come from the idea that doing so may confuse the student and/or delay reading development as compared to students acquiring only a single native language. However, current research suggests that such delays are not typical.

In several studies by Lea Lee (2004) and Buckwalter and Yi-Hsuan (2002), testing indicates that English language learner (ELL) and English as a first language speaker (EFLS) students who understand the orthographic (spelling) features in their native language perform better in reading text in the second language. This indicates that correct spelling acquisition in the native language offers experience for reading in the second language, and actually aids second as well as native language learning. Language acquisition offered in the form of dual-immersion may be important for reading development because as at-risk children are identified, they can be placed in a program that may reduce the risk of falling behind in reading, either in the native language or in the second language, which for ELL students, is the primary language within most school systems in Texas.

Reading Development and Bilingualism

The universality of the phonology-reading connection will be addressed by reviewing studies that address this issue in English monolingual children, as well as children whose first language (L1) is not English. Phonological awareness, in relation to early literacy development,

is predictive of reading acquisition (Muter & Diethelm, 2001). This phonology-reading connection is important because it can be extended to English and nonnative English speakers to examine early literacy development. Rubin and Turner (1989) studied phonological awareness in native English speaking students who were educated in 1st grade in French and found that learning to read in French supported better phonological awareness skills than monolingual English-speaking students being educated in their native language. Another study by Bruck and Genessee (1995) looked at the components of phonological awareness and their relationship to bilingualism. They found that the kindergarten bilingual students who were EFLSs showed higher awareness of onset-rhyme distinction than their monolingual English-only peers. They also found that the bilingual children (EFLSs) were superior to their monolingual English-only counterparts in syllable awareness (Bruck & Genessee, 1995).

Two instructional methods commonly used to educate students in reading development are deductive, involving inferences from general principles, and inductive, proceeding from particular facts to a general conclusion. One study examined deductive and inductive instructional methods for L2 learners in comprehension and production of target structure in the second language (Erlam, 2003). Three classes of fourth form (6th grade) students were examined and measured on a baseline test of scholastic abilities. The EFLS students' level of English was sufficient as they were nearing the end of their second year of foreign language instruction in French. For this study, each class met 5 days a week for three 45-minute lessons in French in which the instruction was arbitrarily assigned to deductive instruction, inductive instruction, or the control group, which received typical French instruction that consisted of both inductive and deductive methods (Erlam, 2003). All groups received an equal amount of instruction in French. For the deductive group, the model of teaching involved form-focused activities that allowed

students time to think and apply rules that followed explicit instruction. The inductive group had little explicit knowledge, and received much less feedback than the deductive group receiving explicit information. The control group was unaware that they were receiving instructional treatment at all. A reading comprehension test was given which consisted of a short, written text in French. The students were to answer 10 multiple-choice questions about the text. Reading comprehension results revealed greater gains for children in the deductive group than those in the inductive group as the effect sizes for those in the deductive group were relatively large (Erlam, 2003). Results also indicated that the deductive group also performed significantly higher on the posttest than the inductive and control groups both. With the deductive group making the greatest gains, this study supports that explicit instruction, along with a deductive method of teaching aids reading comprehension of a second language. This deductive style can be considered a type of immersion, which is the idea behind in a dual-immersion classroom (Erlam, 2003).

Mutmaz and Humphreys (2001) studied bilingual reading and showed that it may be possible to transfer general language and literacy skills from the first language to reading skills in the second language. They investigated the impact of Urdu as a first language on learning to read in English as L2. The study involved 60 bilingual Urdu-English speaking students and 60 monolingual English-speaking students. All students were tested individually over a period of eight weeks. They were tested on many skills, but for the purposes of this paper only vocabulary, reading of regular and irregular words and nonwords, and phonological processing will be reviewed. The bilingual children were better at reading regular words, nonwords and irregular words compared to their monolingual counterparts (Mutmaz & Humphreys, 2001). Also for the bilingual students, literacy was positively predicted by reading of regular words, irregular words,

and nonwords. The bilinguals were also found to have an advantage in phonological awareness at the earliest stages of reading as compared to the monolinguals. This investigation demonstrates a possible transfer of first language literacy skills to development of reading in a second language, and also supports that bilingual reading development may have an increased effect on the acquisition of certain literacy skills such as phonological awareness and memory, and regular-word reading (Mutmaz & Humphreys, 2001).

Dual-Immersion and Language Development

A national study by Thomas and Collier (2002), found that Spanish students in a 90/10 dual-immersion class reached the 76th percentile for grades 1-4, and in grade 5 outperformed the two other comparison groups (transitional bilingual education, TBE; and developmental bilingual education, DBE) at the 70th percentile on nationally standardized tests. This longitudinal study was conducted at the school district level as data was collected from administrative offices of school districts in the areas of standardized testing, bilingual/ESL education, curriculum development, and data processing. This study supports that a socioculturally enhanced school environment for language minority students may offer a better experience for learning. This type of environment includes natural language, academic, and cognitive development to offer opportunities for students to flourish in the native and second language (Thomas & Collier, 2002). This study was a longitudinal study by Thomas and Collier (2002) to examine effects over time. Long-term studies of second language development are rarer, as will be discussed later, thus the need for longitudinal research is pressing.

Similarly, in a study in the Houston Independent School District, it was found that English learners in a dual-language classroom for five years reached the 51st percentile on the nationally normed English test Stanford 9, after having qualified five years earlier for English

learner services by scoring low on English proficiency tests (Thomas & Collier, 2003). A matched group of students participating in the district's bilingual education program scored only at the 34th percentile after five years. This suggests that dual-language programs provide integrated and inclusive education experiences for students as opposed to the segregated and exclusive characteristics of traditional bilingual education programs.

Thomas and Collier (2000) found that native English speakers who had been in the dual-immersion class for 4 years scored at the 70th percentile for reading scores on the Stanford 9, while the native English speakers in regular education scored at the 50th percentile (as cited in Thomas & Collier, 2003). When tested on Aprenda (Spanish counterpart to the Stanford 9), these students scored at the 87th percentile at the end of grades 2-5. Native English speakers who were now bilingual because of participation in a dual-immersion program scored higher than their English-only educated peers while also acquiring a second language and expanding their knowledge of customs of others.

Thomas and Collier have studied both short-term and long-term second language acquisition by examining many different types of bilingual education including, but not limited to, dual-immersion. Their findings support the dual-immersion model as they have shown that students in this program perform at higher levels than students in mainstream classrooms (2002).

Like many developmental processes, literacy development involves characteristics that are shared across cultures (McBride-Chang & Kail, 2002). When considering bilingual education whether through dual-immersion, bilingual education, or any other model, learning a L1 simultaneously with a L2 may present a positive effect on both languages in some cases for students (Barratt-Pugh & Rohl, 2001). A bilingual program in Western Australia was studied by Barratt-Pugh and Rohl (2001) in which they found that dual-language learning increases

cognitive skills overall and provides a means to participate fully in their community and home-lives. This study points to the potential benefits of bilingual programs in the early years for students. The languages were taught with resources that ensured meaningful and relevant instruction. This research suggests that younger children can master mechanical skills of both languages more quickly than older children. Also cited in other studies, this study found that children appeared to utilize knowledge of one language to support literacy development of the other language (Barratt-Pugh & Rohl, 2001). The ability to transfer strategies from one language to support another suggests that dual-language learning may support literacy development in both languages simultaneously.

Evidence from Freeman (2000), states that knowing two languages (regardless of how bilingualism occurs) can improve academic achievement, even in the student's native language. It has been theorized that acquisition of language attributes to cognitive growth and development in general. Research supports that equal competence of Spanish and English creates a greater likelihood of cognitive advantages in many areas (Lucido & McEachern, 2000). This research suggests that learning a second language can help a person score higher on tests over basic subjects even when they are presented in the person's native language.

A growing body of research suggests that dual-immersion in a bilingual classroom may have an effect on not only second language acquisition but also on reading development in general. Research shows that the integration of EFLS and ELL students may facilitate second language acquisition because it promotes authentic, meaningful interactions among speakers of each language (Christian, Howard, & Loeb, 2000). This language program allows the instruction to be provided in a meaningful context called comprehensive input, which seems in some cases to help acquisition of the second language (Krashen, 1987). With dual-immersion, students are

integrated into classes receiving content area instruction through both their native language and a second language (Freeman, 2000). Using the comprehensive input method, "students make connections across content areas and this seems to help in remembering the language through more than the definitional path of memorization that is presented in the traditional bilingual education approach" (Christian, Howard, & Loeb, 2000, p. 4).

<center>Long-Term Impacts vs. Short-Term Impacts</center>

Most prior research investigated only short-term impacts of dual-immersion bilingual education. Research on long-term impacts is rarer. However, one study by Muter and Diethelm (2001), examined 55 multilingual children from two kindergarten classes who were tested on phonological awareness and accuracy in predicting early progress in learning to read. All children were being educated in English and were administered the Phonological Abilities Test twice (once at time 1, and one calendar year later at time 2). Muter and Diethelm (2001) found that the EFLS students scored significantly higher on all tests than did the ELL students. Within the phonological domain, they studied three factors, rhyming, implicit segmentation, and explicit segmentation. Muter and Diethelm (2001) found that EFLS students scored higher on tests of general cognition, vocabulary, letter knowledge, and rhyme production at time 1 than did the ELL students. However, all other measures between the two groups showed no difference between EFLS and ELL students. They did find that language measures between EFLS and ELL students differed, but that phonological awareness measures did not. One calendar year later, at time 2, the two groups differed in letter knowledge and vocabulary only. There were few differences between the groups in phonological awareness at either time 1 or time 2. Muter and Diethelm's (2001) findings support that the same cognitive constructs account for reading skills in all students without respect to their language background.

<center>21</center>

Muter and Diethelm's (2001) study is particularly important because it is a longitudinal study that examined EFLS and ELL student's reading development over time. This relates to the purpose of this study which explores the impact of dual-immersion education started in kindergarten on 2nd and 3rd grade scores on reading development for both EFLS and ELL students. Examining effects over time allows researchers to examine whether the impact, if any, may last over time for students. In fact, it may take several years of participation for any effect to appear. This is important to measure because if there is a positive impact that seems to wear off after several years, future studies should focus on improving this method of bilingual education or perhaps exclude the program altogether if it is not supporting academic development.

Hypotheses

Most research and curricula related to bilingual education focuses on how it impacts ELL students, and any impact on EFLS students is ignored. This study will compare the impact, if any, of dual-immersion vs. regular and bilingual education classrooms on reading development in ELL students in addition to EFLS students. Current research supports that second-language acquisition may aid reading development for EFLS students (Kenner, et. al., 2002). It is expected that dual-immersion may be beneficial for both ELL and EFLS students concerning reading development. That is, that the dual-immersion students are expected to be doing at least as well as the regular education students who are not exposed to this program. Note, it is also expected that the dual-immersion program will not harm students enrolled in this classroom.

Because of the limited amount of prior research on the effectiveness of dual-immersion programs, the hypothesis tested in this study was that there would be no difference at any time on reading scores, including no difference related to classroom type or language status of the student. By testing this hypothesis, the possibility that students in dual-immersion were doing not

as well as their peers could be examined as well as the possibility that they were doing better. The need to be tentative is also important because this is the first assessment of this particular school's version of dual-immersion. However, based on the research, it was generally expected that if the two groups did differ, the dual-immersion students would have an advantage (Barratt-Pugh & Rohl, 2001; Christian et al., 2000; Thomas & Collier, 2002). Table 1 provides an overview of what was expected to be found should there be differences based on prior research findings.

<div align="center">Limitations</div>

It is proposed that this program may be beneficial to normally developing EFLSs and ELLs who have participated in dual-immersion beginning in kindergarten in 2000 through 3rd grade in 2004. It is thought that in dual-immersion, students acquire a second language with more experience because the language becomes part of daily speech as it is presented through many subjects. The term `typically developing' is used throughout this study to refer to students in mainstream classrooms with no language delay. Due to the nature of this study, children who attend resource or other special education services will be excluded because the study is examining non-delayed second language and reading development. This investigation is only intended to examine if there may be a difference in reading development between students in a dual-immersion classroom and students in a regular education classroom. The results of reading scores on standardized tests will be assessed and analyzed to determine whether there appears to be a difference between the two groups, but this study is not intended to be able to present why either program, if any difference is found, works better.

Table 1

Overview of Alternative Hypotheses

Measure	Hypothesis
Texas Primary Reading Inventory (TPRI) Beginning of kindergarten	1) Pretest will show no difference between dual-immersion (DI) and regular education/bilingual education students for both English language learner (ELL) and English as a first language speaker (EFLS) students 1.1 EFLS children will show no significant difference among each other 1.2 ELL children will show no significant difference among each other 1.3 Regardless of the classroom assignment, EFLS students will have higher reading scores than ELL students because TPRI is administered in English 1.4 There will be no interaction between classroom type (DI v. RE/BI) and language spoken (ELL v. EFLS)
TPRI End of kindergarten	2) Posttest will show difference between dual-immersion students and regular/bilingual education students for both ELL and EFLS students 2.1 ELL students in dual-immersion will score better than ELL students in bilingual education 2.2 EFLS students in dual-immersion will score better than EFLS students in regular education 2.3 EFLS students in dual-immersion will score better than ELL students in dual-immersion and both EFLS and ELL students in regular and bilingual education
Iowa Test of Basic Skills (ITBS) (Reading) 2nd grade and 3rd grade	3) Posttest will show difference between dual-immersion students and regular/bilingual education students for both ELL and EFLS students 3.1 ELL students in dual-immersion will score better than ELL students in bilingual education 3.2 EFLS students in dual-immersion will score better than EFLS students in regular education 3.3 EFLS students in dual-immersion will score better than ELLstudents in dual-immersion and both EFLS and ELL students in regular and bilingual education

Table 1 (*continued*)

Measure	Hypothesis
Texas Assessment of Knowledge and Skills (TAKS) (Reading) 3rd grade	4) Posttest will show difference between dual-immersion students and regular/bilingual education students for both ELL and EFLS students 4.1 ELL students in dual-immersion will score better than ELL students in bilingual education 4.2 EFLS students in dual-immersion will score better than EFLS students in regular education 4.3 EFLS students in dual-immersion will score better than ELL students in dual-immersion and both EFLS and ELL students in regular and bilingual education
Logramos (Reading)	5) ELL students will score better than EFLS students in dual-immersion at all levels tested in Logramos because Logramos is given in Spanish
General Expectations	Positive correlations are expected between the types of tests, both within and over time. Within dual-immersion, positive correlations are expected for ELLs and EFLSs between Logramos scores (based on test taken in Spanish) and standardized scores (from tests taken in English, at any given point in time). It is expected that EFLS students who have been placed in a dual-immersion classroom will have the highest reading scores of all children in their grade, starting at the end of the first year in the program.

Another limitation is that it has been suggested that being bilingual benefits cognitive and cultural development, as well as reading development. This does not mean that becoming bilingual through a dual-immersion program specifically enhances these areas of development (Thomas and Collier, 2003). As mentioned there are several methods of bilingual education with dual-immersion being only one. While dual-immersion is the focus of this study, it could be that being bilingual is actually the benefit here, regardless of how a student becomes bilingual.

Another limitation to the study is that the Texas Primary Reading Inventory (TPRI™) scores were unavailable for this study; therefore, preexisting scores on that early test were unable

to be used to match students on typical development. This represents a limitation to the study as external variables could not be controlled and therefore may have an effect on student scores. In addition, no data was collected from parents, which might have also been a source of information about external variables. For example, it is assumed that if the child is considered ELL, his home language use of English may be limited or nonexistent. However, the lack of parent data does not allow this to be confirmed.

Another limitation to the study is that each classroom has a different teacher and the quality of the teacher may affect the performance of students. Also, as will be discussed later, a disproportionately higher percentage of dual-immersion English speakers were enrolled in the Talented and Gifted program at the school than other groups.

There is some debate within the state of Texas about standardized testing and if it really is an accurate way of testing student's development. Many researchers explore this issue to examine whether or not this type of testing is appropriate for students in the early primary grades. This study discusses the implications of standardized testing, but does not explore whether or not it is accurate or appropriate for the age and development of the students. It is beyond the scope of this research to study standardized testing as its own separate issue. In Texas, standardized testing is how development of children is primarily assessed; therefore the scores have real meaning in children's lives and so these tests were utilized for analysis. Testing from standardized measures the state uses to gauge reading development offers a convenient method of collecting data and analyzing scores. For the purposes of this study, because the state supports and requires standardized testing as an adequate measure of development, this paper also uses the same guidelines supporting that standardized testing is at least effective in offering

a general outlook at how students are doing in reading development and second language

acquisition.

METHODS

Participants/Sample Data

The target data came from students from Research Elementary who began either the dual-immersion program or regular/bilingual education in kindergarten in 2000-2001 and who completed 3rd grade in 2004. All data (standardized test scores) for students for any given year has been received from the school district, even if the student eventually left the school. The data was received without any connection to students' actual names. The names were coded with a number by the school district and I only have scores and some demographic information attached to the number.

The original data set from the school district included a total of 68 students. Some students were excluded from the study because of special education status ($n = 8$) or other English language learner (ELL) students who were not in dual-immersion but whom were in a bilingual classroom but then exited the program for a reason unknown to me ($n = 5$). Also, students who were not enrolled at Research Elementary for at least their 2nd and 3rd grade years ($n = 9$) were excluded from the study. There are four main groups remaining in the set for analysis at this time. There are $n = 25$ regular education English as a first language speaker (EFLS) students, $n = 4$ bilingual education ELL students, $n = 9$ dual-immersion ELL students, and $n = 8$ dual-immersion EFLS students, giving a total of $N = 46$ to be analyzed. All students included in the data set have been at Research Elementary for at least their 2nd and 3rd grade years.

From the 25 regular education students, it was intended that a matched group would be pulled whose test scores and demographics correlate as closely as possible to the EFLS students in dual-immersion. This attempt was meant to create a matched control group of students to

compare to the dual-immersion students for EFLSs and to potentially eliminate some external variables. Unfortunately, after examining the data sets closely, there was no way to match the students because the number of participants was too low for each student to have a matched student on test scores and demographics. Another issue of concern is the number of bilingual education students ($n = 4$) as compared to the number of dual-immersion ELL students ($n = 8$). In any given year at Research Elementary there were several more bilingual education students, but only 4 had been at the school for at least their 2nd and 3rd grade years. I cannot say why the bilingual education students appeared to be more mobile than those ELL students in dual-immersion, and was unable to match this group because of group size. Also, because the Texas Primary Reading Inventory™ (TPRI™) (Texas Education Agency & University of Texas System, Austin, TX, www.tpri.org) scores were unavailable for this study, preexisting scores on that early test were unable to be matched.

Research Elementary is a Blue Ribbon school that serves an urban community of over 350 families and 1500 students in a large urban area of Texas. The Blue Ribbon Program honors kindergarten through 12th grade schools that are academically superior to other schools and that show superior gains in student achievement for their school (United States Department of Education [USDE], 2004). This school was also named a 2000 National School of Character, which is part of the Character Education Partnership that is committed to developing moral character among students in the United States (Character Education Partnership [CEP], 2004). Research Elementary has a basic demographic population breakdown of 68% Hispanic students, 20% Caucasian students, 10% African-American students, 2% Asian students, and less than 1% American Indian students (Research Elementary School administrator, personal communication, September 30, 2004).

Demographic information that has been provided by the school district includes:

- Child gender
- Child age – given in years, which was too broad to match students on
- Child race/ethnicity
- Whether or not child qualified for free lunch
- Whether or not child was considered an English language learner
- Whether or not each child was in the dual-immersion classroom
- Whether child was in any other special programs (gifted/talented, resource/content mastery, etc.). As noted in the discussion, it was found that a disproportionately increased percentage of dual-immersion English speaking students were also enrolled in the talented and gifted program at the school.

Table 2

Demographics

	DI Eng $n = 8$ %	DI Sp $n = 9$ %	RE Eng $n = 25$ %	BE Sp $n = 4$ %	Overall $N = 46$ %
Gender					
Female	37.5%	44%	60%	50%	52%
Male	62.5%	56%	40%	50%	48%
Ethnicity					
White	25.0%	--	24%	--	17%
Hispanic	37.5%	100%	60%	100%	68%
Black	37.5%	--	16%	--	15%
Other	--	--	--	--	--
Free Lunch	50.0%	100%	52%	100%	65%
Gifted/Talented	37.5%	11%	12%	0%	15%

Note. DI = Dual-immersion; RE = Regular education; BE = Bilingual education; Eng = English; Sp = Spanish

Measures

The data requested had already been collected by the school system. Several

standardized tests are given every year at this school to gauge reading development. I had access

to these scores for certain students enrolled at Research Elementary School in Texas. The reading scores for the Texas Assessment of Knowledge and Skills (TAKS), Iowa Test of Basic Skills® (ITBS®) (Riverside Publishing, Itasca, IL, www.riverpub.com), Logramos® (Riverside Publishing, Itasca, IL, www.riverpub.com), Stanford 9 and Aprenda are the specific tests that will be used for this study.

Texas Primary Reading Inventory. It was originally intended that scores from the Texas Primary Reading Inventory™ (TPRI™) (Texas Education Agency & University of Texas System, Austin, TX, www.tpri.org) would be utilized to match students on pre-existing factors at the beginning of kindergarten. This test is given at the beginning, middle and end of each school year (in Texas) starting in kindergarten through 2nd grade. This measure offers information for teachers and parents to understand how the student compares to a typically developing student learning to read. This scale was to be used as a baseline measure to ensure that all students included in this study were considered typically developing and generally scoring the same on this measure. Unfortunately this data was not available because it is controlled at the state level and could not be accessed by the district. In an attempt to counterbalance the fact that this information was not available, to control for students who are not typically developing, special education students (and other special needs and/or unique cases) were excluded from the study.

Texas Assessment of Knowledge and Skills. The Texas Assessment of Knowledge and Skills is a criterion-referenced assessment designed to evaluate instructional practice and to measure student learning (Texas Education Agency [TEA], 2004). The test is divided into several objectives including reading, mathematics, writing, and science, however, for the purposes of this research, only the reading objectives will be examined. The TAKS attempts to test students on the Texas Essential Knowledge and Skills (TEKS). The TEKS are the

instructor's required curriculum for classroom teaching. For the development of the TAKS,

drafts of the objectives and TEKS student expectations were developed based on data received

from over 27,000 Texas educators (TEA, 2004). After the second draft of objectives and TEKS

student expectations was developed, over 57,000 campus-consensus survey responses were

received and these, along with feedback from national experts, broad-based input was used to

ensure that TAKS assesses the parts of the TEKS that are most critical to testing student's

academic and learning progress (TEA, 2004).

The TAKS test is divided into objectives that are designed to be identical across grade

levels rather than grade specific. Objectives are defined as broad statements that "break-up"

knowledge and skills that are to be tested into subsets for which a test can be organized into

reporting units to help others understand the performance of students and schools. The reading

objectives were examined for this study. The TAKS reading assessments evaluate the stat-

mandated curriculum (TEKS), which is specifically designed to help students make progress in

reading by emphasizing the knowledge and skills most critical for student learning (TEA, 2004).

Because the TAKS reading objective is aligned with the TEKS, students who learn to read

proficiently with the TEKS will be able to perform successfully on the TAKS reading test.

TAKS reading is first given in 3rd grade in which the test is grouped under four TAKS

reading objectives. These objectives for 3rd grade (the grade that will be used for this study) are,

1) basic understanding of culturally diverse written texts; 2) knowledge of literary elements to

understand culturally diverse written texts; 3) utilize a variety of strategies to analyze culturally

diverse texts; and 4) apply critical-thinking skills to analyze culturally diverse written texts

(TEA, 2004). For objective 1, the specific skills measured include reading/word identification,

reading a variety of texts, reading/vocabulary development, and reading/comprehension.

Objective 2 measures, reading/text structures and literary concepts. For objective 3, the skills assessed are reading/comprehension and reading/text structures/literary concepts. Finally, objective 4 tests reading/comprehension and reading/literary response. Although these objectives remain consistent from 3rd through 8th grade, only 3rd grade scores will be examined in this study because of the available data within the elementary school being used. For the 3rd grade reading test, the booklet is one in which the students can mark their answers directly in the booklet as opposed to having to use a separate answer sheet to mark their answers.

A total of 36 items are given for the reading section of TAKS, and the total range of raw scores is 0-36. This information is then converted to a scale score that ranges from 1356-2588. The standard scale score to pass the TAKS is 2064. Commended scale score is 2400. The conversion table starts with a raw score of 0 equaling a scale score of 1356 and ending with a raw score of 36 equaling a scale score of 2588. The raw score for meeting the standard criteria (passing the TAKS) is 23 and the equivalent scale score is 2064 (TEA, 2004).

Iowa Test of Basic Skills. The Iowa Test of Basic Skills® (ITBS®) (Riverside Publishing, Itasca, IL, www.riverpub.com) is a norm-referenced, standardized timed test that measures vocabulary, word analysis, reading comprehension, listening, language, mathematics, social studies, and science (University of Iowa, n.d.). For the purposes of this study, only the reading comprehension subtest was evaluated. The reading comprehension tasks include using print, context, and picture cues to identify words and to complete sentences and answer multiple-choice questions. Students are often asked to make inferences and generalize about the information they have read in the reading comprehension section. The complete test takes 5 ½ hours to administer for grades 3-8 (University of Iowa, n.d.).

The purposes of the ITBS are to describe the student's developmental level within a certain test area, identify a student's strengths and weaknesses within subject areas, and to monitor year-to-year growth in the basic skills tested (University of Iowa, n.d.).

The ITBS average standard score for 1st grade is 150, 2nd grade is 168, and 3rd grade is 185 (University of Iowa, n.d.). The percentile ranks range from 1-99 and the national average is 50 while the percent correct per test ranges from 0-100. For all tests except the TAKS, the national percentile rank (NPR) will be used.

Logramos-Level 7. Logramos® (Riverside Publishing, Itasca, IL, www.riverpub.com) is a standardized test measure given in Spanish designed to assess academic progress for Spanish-speaking students. Logramos was developed by Spanish-speaking test developers. The test content aims to measure student performance in reading, language, and mathematics. The basis of Logramos is modeled after the Iowa Tests attempting to provide the same testing opportunity for two-way immersion students as for students in English-only instructed classrooms. A multiple-choice format is used where there are four to five options per question. At the level investigated, level 7, the students indicate their answers by marking the circle in the test booklet itself, whereas at higher levels students mark answers on a separate answer sheet. For level 7 of Logramos, the tests are not timed with the exception of the math computation section. For the purposes of this study, only the lectura or reading section will be examined. The number of questions administered for the reading section at level seven is 34. The approximate time the test is administered for is 15-20 minutes (Logramos Interpretive Guide, 2003). As with the ITBS, the NPR scores will be utilized for this test.

Stanford 9. Stanford 9 is a standardized, norm-referenced, timed test that assesses reading, math, and language in a multiple-choice format (Arizona Department of Education

[ADE], n.d.). This study only evaluated the reading portion of this test, which assesses

comprehension of three types of reading material: textural (nonfiction, general information),

recreational (fiction), and functional (material encountered in everyday life). This test rates

typical student performance by percentile rank at the individual student level which provides a

comparison of a child's performance to a national norming group composed of student in the

same grade (ADE, n.d.).

Possible range of scores for Stanford 9 is 1-99 using the normal curve equivalent (NCE).

The national average is always 50; NCE scores below 34 are termed below average, scores

between 34 and 65 are average, and scores above 65 are above average (ADE, n.d.).

Aprenda. Aprenda was given in kindergarten and 1st grade to ELL students. These

students took Aprenda instead of Stanford 9 in these years. Aprenda was developed and is

administered in Spanish and the objectives in the test are the same as those measured by the

Stanford 9. The test is administered individually and estimated time is 60-80 minutes (Reading

Assessment Database, n.d.). Reading comprehension is the cognitive element of this test that was

used for this research. This element contains five subsets which include, 1) initial and final

phoneme matching, letter identification, letter sound correspondence, and identifying letters

within words, 2) match word with picture, and word identification, 3) match sentence with

picture, 4) match synonyms, define words in context, and 5) reading comprehension assessed by

riddles, modified cloze tests, and comprehension questions (Reading Assessment Database, n.d.).

National percentile rank. An individual's percentile rank indicates the percentage of

students in the norm reference whose raw scores fell below the individual's raw score.

Percentile ranks are most readily understood and useful scores as they range in units from 1-99

and are used in interpreting student achievement. The primary use of percentile rank is to

determine strengths and weaknesses in students' development across all content areas.

Percentile ranks are meaningful in and of themselves and describe performance in small, precise

units. They state performance relative to the norm group of students.

Procedures

No new data were collected from students because the school district felt that students

were already tested enough. All data scores were provided by the district and all tests were

conducted by the school district. The information provided included standardized test scores that

have already been collected by the school district for reading on TAKS, ITBS, Logramos,

Stanford 9, and Aprenda. Depending on the year, different standardized tests have been given at

Research Elementary (Table 3 provides an overview of data collection). In kindergarten, all

EFLS students took Stanford 9, while all ELL dual-immersion and some ELL bilingual

education students (LEP, ESL) took Aprenda. In 1st grade, EFLS dual-immersion students took

both Stanford 9 and Aprenda, the ELL dual-immersion students took Aprenda only, the EFLS

regular students took Stanford 9, and the ELL bilingual education students took Aprenda. In 2nd

grade, EFLS dual-immersion students took both ITBS and Logramos, while ELL dual-

immersion students took only Logramos, and EFLS regular and ELL bilingual education

students took ITBS only. Finally, in 3rd grade, all dual-immersion students (both EFLSs and

ELLs) took ITBS, Logramos, and TAKS, while EFLS regular and ELL bilingual education

students took while ELL dual-immersion students took only Logramos, and regular and ELL

bilingual education students took ITBS only. Finally, in 3rd grade, all dual-immersion students

(both EFLSs and ELLs) took ITBS, Logramos, and TAKS, while EFLS regular and ELL

bilingual education students took only ITBS and TAKS. The school district also provided Tejas

Lee scores for all dual-immersion students. However, these scores showed no variability and therefore are not discussed here.

Again, no new data was collected from students or parents. A brief interview with the 3rd grade teacher of the dual-immersion classroom was conducted on September 23, 2004, to better describe and clarify this context. The scale scores were given in an Excel database, with a copy of the scores and other information without ever having contact with students' names. It has been requested by the school district that the names of school and district be kept confidential. It is intended that the school and district will receive a copy of the final study and results. If requested, a letter describing the study appropriate for a school newsletter may also be provided. In any case, I have had no direct contact with students or their names.

Table 3

Overview of Timing of Data Collection

Test	DI Eng	DI Sp	RE Eng	BE Sp
Stanford-9 (English)				
Kindergarten	X	--	X	--
1st Grade	X	--	X	--
Aprenda (Spanish)				
Kindergarten	--	X	--	X
1st Grade	X	X	--	X
Iowa Test of Basic Skills (English)				
2nd Grade	X	--	X	--
3rd Grade	X	X	X	X
Logramos (Spanish)				
2nd Grade	X	X	--	--
3rd Grade	X	X	--	--
Texas Assessment of Knowledge and Skills				
3rd Grade	X	X	X	X

Note. DI = Dual-immersion; RE = Regular education; BE = Bilingual education; Eng = English; Sp = Spanish

RESULTS

In all cases the national percentile rank (NPR) was used except for the TAKS test. For all

results, Table 4 provides information for the number of participants, standard deviation, and

mean scores; Figure 1 presents the means in visual format for Iowa Test of Basic Skills®

(ITBS®) (Riverside Publishing, Itasca, IL, www.riverpub.com) and Logramos® (Riverside

Publishing, Itasca, IL, www.riverpub.com), and Figure 2 presents the TAKS means in visual

format. The original hypotheses indicate that Texas Primary Reading Inventory™ (TPRI™)

(Texas Education Agency & University of Texas System, Austin, TX, www.tpri.org) data would

match students on reading ability to ensure that every child was starting from a similar point of

typical development, see table 1. However, this data is mandated by the state rather than the

district and was unavailable for this study. It was hoped that this information would give a clear

picture of all students and their background knowledge of language and reading (in kindergarten)

in their native tongues as they first started school. However, because TPRI scores were not

received from the district, a limitation to this study is that it is not possible to compare students

prior to participation in school.

Comparison of Mean Scores

2nd grade. A series of separate independent samples *t*-tests was run to compare students

in 2nd grade on ITBS-NPR reading test scores. It was expected (hypothesis 3.1) that by 2nd grade,

dual-immersion English speakers would score better than regular education English speakers on

the ITBS reading test. The hypothesis was not supported as the first *t*-test compared dual-

immersion English speakers ($M = 75.63$) to regular education English speakers ($M = 64.60$)

showing no significant difference between these groups (t (31) = 1.069, $p = .29$). In 2nd grade,

there was no difference between dual-immersion English speakers and regular education English speakers on ITBS-NPR reading test scores.

Table 4

Comparison of Mean Scores for All Groups

Test	DI Eng $n = 8$		DI Sp $n = 9$		RE Eng $n = 25$		BE Sp $n = 4$	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
ITBS								
2nd Grade	75.63	28.85	--	--	64.60	24.30	53.25	29.65
3rd Grade	56.13	31.08	44.11	27.37	59.04	23.37	46.50	28.60
TAKS								
3rd Grade	2242.38	154.12	2180.89	157.43	2307.20	153.84	2092.00	98.18
Logramos								
3rd Grade	51.25	26.95	68.67	18.66	--	--	--	--

Note. DI = Dual-immersion; RE = Regular education; BE = Bilingual education; Eng = English; Sp = Spanish; ITBS = Iowa Test of Basic Skills; TAKS = Texas Assessment of Knowledge and Skills.

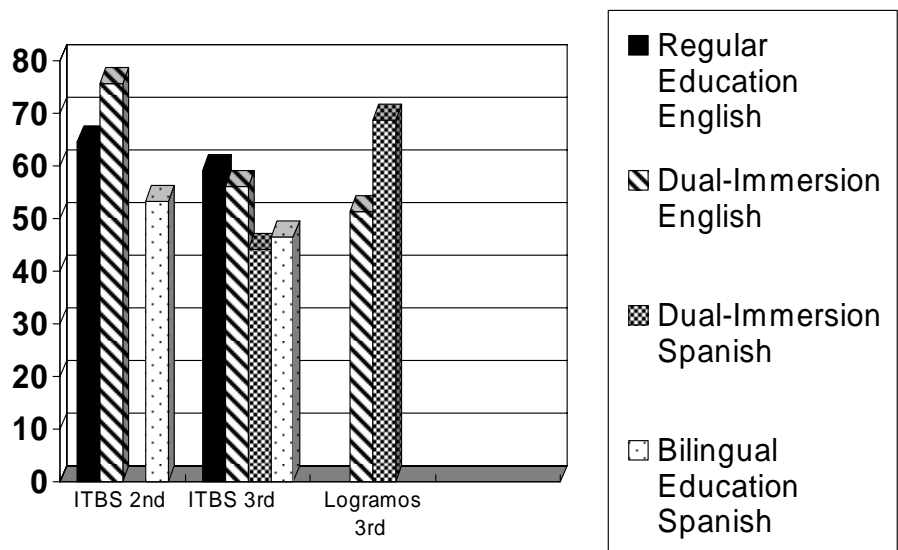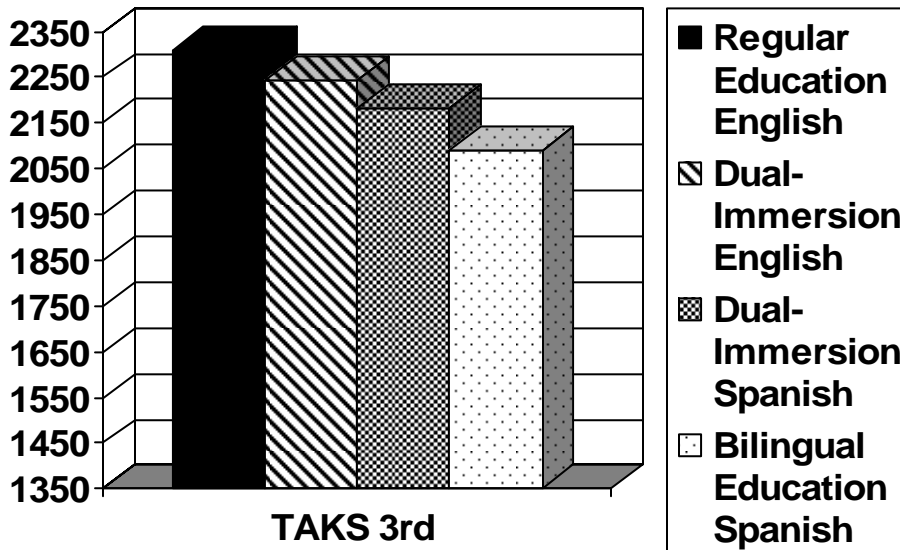*Figure 1.* Iowa Test of Basic Skills/Logramos mean score graph.

Figure 2. Texas Assessment of Knowledge and Skills mean score graph.

Next, it was hypothesized (3.2) that dual-immersion English speakers would score better in 2nd grade on ITBS than bilingual education Spanish speakers in 2nd grade. No significant difference was found, t (10) = 1.256, p = .24 as dual-immersion English speakers (M = 75.63) were compared to bilingual education Spanish speakers (M = 53.25), therefore the hypothesis (3.2) was not supported.

3rd grade. Independent samples t-tests were run for ITBS-NPR scores in 3rd grade. First, the t-test was run to check the hypothesis (3.1) that dual-immersion Spanish speakers would score better on ITBS reading in 3rd grade than bilingual education Spanish speakers. No significant difference was found, (t (11) = -.143, p = .89) as the dual-immersion Spanish speakers in 3rd grade (M = 44.11) were not significantly different from the bilingual education Spanish speakers in 3rd grade (M = 46.50) for this test; therefore, hypothesis (3.1) was not supported.

Next a t-test was run to test if dual-immersion English speakers were scoring better than regular education English speakers on ITBS by the 3rd grade (hypothesis 3.2). No significant

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difference was found, (t (31) = -.283, p = .78) as dual-immersion English speakers (M = 56.13) were not significantly different from regular education English speakers (M = 59.04); therefore, hypothesis (3.2) was not supported.

Another test was run comparing the dual-immersion students. It was expected that dual-immersion native English speakers would score better than dual-immersion native Spanish speakers. No significant difference was found, (t (15) = .848, p = .41) for dual-immersion native English speakers (M = 56.13) as compared to dual-immersion native Spanish speakers (M = 44.11) for the NPR on ITBS in 3rd grade between these two groups; therefore, hypothesis was not supported.

Independent samples tests were run for TAKS scores in 3rd grade (this is the first year TAKS is given). In addition to the t-test results reported here, ANOVAs were also run on the TAKS reading scores. Given the small n, it was decided to focus primarily on discussing the t-tests. ANOVA results are reported in Appendix A. As can be seen there, the findings from the ANOVAs basically replicate the t-test findings reported here.

The first t-test was expected to find that dual-immersion Spanish speakers would score better than bilingual education Spanish speakers, hypothesis 4.1. No significant difference was found, (t (11) = 1.029, p = .33), as dual-immersion Spanish speakers (M = 2180.89) did not significantly differ from bilingual education Spanish speakers (M = 2092.00) so hypothesis 4.1 was not supported.

The next test was expected to find that dual-immersion English speakers would score significantly higher than regular education English speakers per hypothesis 4.2. Again, no significant difference was found, (t (31) = -1.037, p = .31), between dual-immersion English

speakers (M = 2242.38) and regular education English speakers (M = 2307.20). Therefore, hypothesis 4.2 was not supported.

Next, the *t*-test compared means between the dual-immersion English and Spanish students. It was hypothesized (4.3) that dual-immersion English speakers would score higher than dual-immersion Spanish speakers on TAKS in the 3rd grade. No significant difference was found, (t (15) = .812, p = .43), between dual-immersion English (M = 2242.38), and dual-immersion Spanish (M = 2180.89). Therefore, hypothesis 4.3 was not supported.

The final TAKS *t*-test was run to compare dual-immersion English speakers to see if they were scoring higher than bilingual education Spanish speakers, hypothesis 4.3. No significant difference was found, (t (10) = 1.758, p = .11), between dual-immersion English speakers (M = 2242.38) and bilingual education Spanish speakers (M = 2092.00). Therefore, hypothesis 4.3 was not supported.

Independent sample *t*-tests were compared for Logramos in 3rd grade for only the dual-immersion students because that is the only class that takes this test. It was expected that dual-immersion Spanish speaking students would score better than dual-immersion English speaking students, hypothesis 5. No significant difference was found, (t (15) = 1.565, p = .14) between dual-immersion Spanish speaking students (M = 68.67) and dual-immersion English speaking students (M = 51.25). Therefore, hypothesis 5 was not supported.

<div align="center">Correlations</div>

Correlations were run between the tests separately for each year and for each education program. The bilingual Spanish group was eliminated from these correlations because the N was only equal to 4.

Regular education English speaking students (see Table 5). The correlations among scores for regular education English-speaking students showed that by 2nd grade, the ITBS scores were significantly correlated at the $p < .01$ level to the 3rd grade TAKS scores. Similarly, the 3rd grade ITBS scores were correlated to the TAKS scores at the $p < .05$ level for this group. Also, the kindergarten Stanford 9 scores were strongly correlated to the ITBS scores for 2nd grade at the $p < .01$ level and the 3rd grade TAKS scores at the $p < .05$ level. Regular education native English speakers did not take the Logramos test.

Table 5

Correlations for Regular Education English on all Tests taken from Kindergarten to 3rd Grade

	TAKS	ITBS 3rd	ITBS 2nd	Stanford-9 1st	Stanford-9 Kindergarten
TAKS	--				
ITBS 3rd	.460*	--			
ITBS 2nd	.531**	.691**	--		
Stanford-9 1st	.322	.660**	.837**	--	
Stanford-9 Kindergarten	.271	.594*	.484*	.608*	--

Note. ITBS = Iowa Test of Basic Skills; TAKS = Texas Assessment of Knowledge and Skills.
** $p < 0.01$; * $p < 0.05$

Dual-immersion Spanish speaking students (see Table 6). For the dual-immersion native Spanish-speaking students, the correlations showed that by 2nd grade the Logramos scores were strong predictors of 3rd grade TAKS scores at the $p < .01$ level. Again in 3rd grade, the Logramos scores were strongly correlated with the TAKS scores for this group at the $p < .05$ level. See Table 4. The ITBS scores in 3rd grade were correlated with the 2nd grade Logramos scores at the $p < .05$ level for this group of students.

Dual-immersion English speaking students (see Table 7). For the native English-speaking dual-immersion students the kindergarten Stanford 9 scores were strongly correlated

with the 3rd grade TAKS scores at the $p < .01$ level. Also, the ITBS scores for both 2nd and 3rd grade were significant to the TAKS score at the $p < .01$ level. The Stanford 9 in kindergarten for this group was correlated at the $p < .01$ level with the ITBS score in 3rd grade. Similarly, the Logramos score in 2nd grade was correlated at the $p < .05$ level to the 2nd grade ITBS score.

Table 6

Correlations for Dual-Immersion Spanish speaking Students on all Tests taken from Kindergarten to 3rd Grade

	TAKS	ITBS 3rd	Logramos 3rd	Logramos 2nd	Aprenda 1st	Aprenda K
TAKS	--					
ITBS 3rd	.648	--				
Logramos 3rd	.792*	.632	--			
Logramos 2nd	.884**	.733*	.652	--		
Aprenda 1st	.308	.646	.345	.345	--	
Aprenda K	.288	-.045	.558	-.130	.233	--

Note. ITBS = Iowa Test of Basic Skills; TAKS = Texas Assessment of Knowledge and Skills. ** $p < 0.01$, * $p < 0.05$

Table 7

Correlations for Dual-Immersion English speaking Students on all Tests taken from Kindergarten to 3rd Grade

	TAKS	ITBS 3rd	Log 3rd	ITBS 2nd	Log 2nd	Aprenda 1st	Stan-9 1st	Stan-9 K
TAKS	--							
ITBS 3rd	.838**	--						
Log 3rd	.308	.473	--					
ITBS 2nd	.873**	.617	.195	--				
Log 2nd	.509	.194	.362	.707*	--			
Aprenda 1st	.464	.089	.215	.735	.644	--		
Stan-9 1st	.931**	.930**	.591	.776*	.456	.419	--	
Stan-9 K	.782	.957**	.099	.734	.038	.336	.849*	--

Note. ITBS = Iowa Test of Basic Skills; TAKS = Texas Assessment of Knowledge and Skills; Stan-9 = Stanford-9; Log = Logramos. ** $p < 0.01$, * $p < 0.05$

DISCUSSION

The purpose of this study was to examine whether or not by the 3rd grade a significant difference exists between a dual-immersion classroom's standardized reading test scores vs. regular education and bilingual education classroom's standardized reading test scores at a public elementary school in an urban area of Texas. Standardized reading test scores for English language learner (ELL) and English as a first language speaker (EFLS) students was given for TAKS, Iowa Test of Basic Skills® (ITBS®) (Riverside Publishing, Itasca, IL, www.riverpub.com), Logramos® (Riverside Publishing, Itasca, IL, www.riverpub.com), Tejas Lee, Stanford 9, and Aprenda for the years 2000-2004 (kindergarten through 3rd grade). The scores for all students at Research Elementary for any given year on these standardized tests during this time period were given in an Excel database by the district.

Exclusions

It was originally intended that scores from the Texas Primary Reading Inventory™ (TPRI™) (Texas Education Agency & University of Texas System, Austin, TX, www.tpri.org) would be used as pretest and posttest data in order to identify the students as typically developing with their peers at the school. However, the data is stored at the state and school levels and was unattainable to me. The Tejas Lee measure was also excluded because the data given had no variability. This study also originally intended to include all students for whom information was given by the school district for students in kindergarten through 3rd grade from 2000-2004 at Research Elementary School, however, several populations were excluded from the analysis because they were coded as either special education, or had another code that did not fit with the typically developing students of the dual-immersion classroom and/or, they were not students at Research Elementary for at least their 2nd and 3rd grade years. Students who were not enrolled at

the school for at least one year prior to the 3rd grade TAKS assessment were eliminated because the study was meant to examine the programs within this one school and external variables related to where students came from were not measured. Several analyses were conducted to examine ELL dual-immersion and bilingual education students and EFLS dual-immersion and regular education students across several variables over the period of 2nd grade (2002-2003) and 3rd grade (2003-2004).

Summary of Results

Several independent sample *t*-tests were run for the dependent variables: ITBS in 2nd grade (2002-2003), ITBS in 3rd grade (2003-2004), TAKS in 3rd grade (2003-2004), and Logramos for 3rd grade (2003-2004) with the independent variable type of student (ELL bilingual education, ELL dual-immersion, EFLS regular education, and EFLS dual-immersion). No significant difference was found on the *t*-tests (see Table 2). That is, the hypotheses were not supported by the *t*-tests as no significance appeared in the comparison of means on these analyses. As discussed in the limitations for this study, the lack of significance could be because of the small number of participants that results in a lack of power in this study. In addition, ultimately students are assessed on the TAKS as passing or not. While an analysis was not run, it appears that students in the dual-immersion classroom were no less/no more likely to have failed the TAKS (dual-immersion English, 25% failed; dual-immersion Spanish, 11% failed; regular education English, 16% failed; and bilingual education Spanish, 75% failed).

Statistical power. Statistical power is the probability that an effect can be detected if there really is one. It is highly influenced by the size of a study (the number of participants). Sometimes studies are discounted that show elevated, but not statistically significant differences. How large the relative difference has to be for significance to be detected depends on the study.

Often, negative studies such as this one have very low power. The total number of participants for this study is 46 (regular education English, n = 25; bilingual education Spanish, n = 4; dual-immersion Spanish, n = 9; and dual-immersion English; n = 8). Each group varies in number of students who were enrolled in the program, meaning that for those groups with a smaller number of participants' scores, there is a lack of power and insignificant results that actually may have some value. As discussed in the limitations, the number of participants in a study decreases the power of the study, meaning that although no significant difference may be found for this study, it could be suggested that if there were a larger population for the study to increase the power, a significant difference may be found. Therefore, discounting a dependent variable because this study does not show a statistically significant effect may be wrong. It may be that the effect is simply smaller than can be shown with the design used, but is important nonetheless.

Although no significant difference was found in this study, there were some trends that are worth noting. In 2nd grade, the dual-immersion English speakers had a higher mean ITBS score (M = 75.63) than the regular education English speakers (M = 64.60), refer to Table 4. This is somewhat surprising considering the dual-immersion English speakers until this point had been receiving 90% instruction in Spanish during kindergarten and 1st grade and 80% Spanish and 20% English in 2nd grade; whereas, the regular education students received 100% instruction in English all three years. On the ITBS in 3rd grade, dual-immersion English speakers (M = 56.13) and regular education English speakers (M = 59.04) scored slightly higher than the dual-immersion Spanish speakers (M = 44.11) and the bilingual education Spanish speakers (M = 46.50), see Table 4). Again, no significance was found; however, it is important to note that with more participants a significant effect may have been present. On the TAKS in 3rd grade the trend showed that although all groups seemed to score about the same with no significance, the regular

education English speakers ($M = 2307.20$) were the highest and the bilingual education Spanish speakers had the lowest mean ($M = 2092.00$). Although this again had no significance, with more participants the study would have had more power, which may have show significance. Thus, the trends still have value even though no statistical significance was found.

Correlations between standardized tests. Correlations were run between tests separately for each year and for each education program. Many of the correlations between tests were significant at the .05 and the .01 levels. It is important to note that the standardized test scores do strongly correlate with one another. Tables 5 – 7 show that these tests are strongly related, and this is important because it suggests that educators may be able to detect and track below-average scores for students to offer more support in reading development for those students falling behind. For all groups, the correlations show that by 2nd grade testing, teachers should be able to tell how the students are performing. All 2nd grade tests were strongly correlated with the TAKS test in 3rd grade. It is important for educators to recognize the importance of these early tests, because they are required by the state, in order to offer a better educational experience for students who need more support. With this information, teachers can help all students accordingly at the appropriate time in order to promote reading development based on the scores from the required tests.

Importance of Study

Although the current study did not find significant effects for the hypotheses formulated, it is important to note that the students in the dual-immersion class are not falling behind the students in the regular education class. Because dual-immersion offers an opportunity for native English speakers to learn a second language at an early age and in this case perhaps to offer the chance to become truly bilingual, it also may offer native Spanish speakers the opportunity to

learn English through a supportive environment through their native language and to also become bilingual while retaining their native language. That is, while they are not doing significantly better, they are not doing significantly worse either, and may have the opportunity to become bilingual

One variable that could not be controlled was that the dual-immersion Spanish students appeared to be less mobile than the bilingual education Spanish students. There could be many reasons for this; however, it is likely that bilingual education Spanish speakers are not offered the Spanish language support that the dual-immersion Spanish speakers experience. As noted earlier, beginning in Kindergarten and 1st grade, the dual-immersion class spent 90% of the day learning in Spanish and 10% of the day in English, changing to 80% Spanish and 20% English in 2nd grade, and becoming 50/50 Spanish/English in the 3rd grade. This has suspected benefits for native Spanish speakers as they are supported through their native language, as well as offering native English speakers a chance to become bilingual.

It must be noted that even though the hypotheses were not supported, at least the dual-immersion group is performing as well as the regular education group on the reading test scores for the standard tests given each year. Although the dual-immersion group is not performing significantly better on the reading test scores, they are also not doing significantly worse. As noted in the issue of power, there is some chance that a significant effect would have been found if this study had a larger number of participants. Even with the lack of power, it is important to note that this group is performing as well as the regular education offered at this school.

The Logramos scores for the dual-immersion students (the only group that took this test) also did not differ significantly in the 3rd grade. This is an important point because it suggests that the EFLS students were not scoring significantly lower than native Spanish speakers on a

Spanish reading test. Again, although there may be several factors for this, it is suggested that dual-immersion may be somewhat offering a bilingual opportunity for native English speakers to acquire a second language while promoting native Spanish speakers' acquisition of English. These scores may or may not translate to spoken Spanish; however, the results suggest that the native English speakers were successful on this reading test. Future research is needed to determine the extent to which dual-immersion students actually do become bilingual.

It is also important to point out that Research Elementary is an exemplary school and that the success of students could be from not the program itself in which they are enrolled, but the teachers, administration and atmosphere of the support of a superior school. As stated before, Research Elementary is a National School of Character and also a Blue Ribbon School. Also, each classroom has a different teacher, which can also have an effect on test performance for students. Teaching style among instructors can differ and students will not all have the same experience because of this reason. It could be that the instructor of the dual-immersion class is simply an exemplary teacher who would make any class successful.

Another interesting finding was that in looking at the demographic information, a disproportionately increased percentage of dual-immersion English speakers were also enrolled in the talented and gifted program (TAG). The TAG program is for students who are performing above average and the program is supposed to present a more challenging environment for these students. It could be that these students in dual-immersion were performing as well as the regular education students simply because they are somewhat brighter than their typically developing peers. It cannot be assumed that dual-immersion is the reason that these students are performing as well as regular education students because of external variables such as this.

I was also unsure of the home environment of each student. It may be that students in dual-immersion have parents who speak two languages at home, and/or the opposite for students in regular education. Parents of dual-immersion students could be supporting their children because they know they are in a special program other than regular education. Also, parents of regular education students could have the same or different experiences at home. It does appear that the bilingual education students were more mobile over time so it would seem that for those students the home experience is different than the children who were at Research Elementary for all years (kindergarten through 3rd grade).

Although this study did not find significance for reading development concerning dual-immersion, it should be noted that there could be other benefits from dual-immersion that were not tested in this research. As noted at the beginning of this paper, Gilroy, (2001) mentions that for native Spanish speakers, culture is diminished when they are placed into an English only environment. Dual-immersion offers an environment where native Spanish speakers can maintain their native language (thus enhancing culture), while not harming their reading test scores.

One possible interpretation of this study is that the findings support that the dual-immersion model is not harming students' standardized test scores. At the same time, the scores do not differ significantly from the regular education class, while the dual-immersion students are offered an opportunity to learn a second language. While the dual-immersion class and the bilingual education class scores did not differ either, the bilingual class scores had the lowest mean of all groups. This suggests that tentatively, schools may want to look into dual-immersion programs more seriously and put money into this program instead of traditional bilingual education programs. Dual-immersion programs are more expensive however, but this study

supports that this model may offer a better experience for students than traditional bilingual education classrooms.

Future Research

Future research concerning reading development for students learning two languages at the same time should focus on programs such as dual-immersion and bilingual education to offer a greater understanding of how development takes place for native Spanish speakers acquiring English, as well as native English speakers being offered a chance to learn a second language at the primary grade levels. The dual-immersion program is not offered in many public schools, but possibly future studies could examine the language classes offered at many private schools that integrate several languages for native English and Spanish speakers. A study with a larger number of participants may show significant effects for these groups of students. Because most bilingual education studies refer to native Spanish speakers and their experience learning English, it is emphasized that future research examine the opportunity for native English speakers to learn a second language along with the Spanish speakers' experiences to offer information concerning this aspect of bilingual education as well.

The correlations show that early standardized test scores are predictive of later tests in reading development. This is important for future research because it can be a tool to help teachers track students early to offer chances to improve reading development for students falling behind. Future studies might examine more closely how and in which subjects early tests are correlated to later tests. Explaining this relationship may help teachers and administrators implement and offer programs for below average students.

As noted earlier, this study did not look at other areas that dual-immersion may impact. Other academic areas and cultural sensitivity are areas that should be studied in the future. As

stated earlier, learning two languages may benefit children's cognitive development as well as their cultural development (Hakuta et al., 2003; Jiminez, 1998). This study did not assess other aspects of cognitive development nor cultural development, but it would make a worthwhile study to look at these other factors with a dual-immersion program. Also noted before, being bilingual does not mean that a person became bilingual through the dual-immersion model, however, if this model is not causing harm and is offering a chance to become bilingual, it may offer an opportunity that many elementary school students would not typically get to experience. With this, Hakuta et al. (2003) and Kenner and colleagues (2002) both report that cognitive abilities may be enhanced by learning two languages, and this would also be valid future research.

Another suggestion for future research is to conduct a qualitative study that would specifically examine the dual-immersion class on a day-to-day basis. Because few studies have looked at the dual-immersion program as it impacts both ELL and EFLS students, it would appropriate to explore the actual classroom in a qualitative manner. This study had a brief interview with the instructor of the dual-immersion class; however, it did not study the daily activity of each type of student (ELL or EFLS) as far as lessons, extra tutoring, and learning style. A qualitative study would offer more information concerning how the children in this class learn their native language and a second language while explaining specifically what/how instruction is being offered.

APPENDIX

ANALYSIS OF VARIANCE

A one-way ANOVA was run to compare means on the TAKS test between the four groups: Regular education English v. bilingual education Spanish v. dual-immersion Spanish v. dual-immersion English (F (3, 42) = 3.27, $p < .03$; see Table 8). This ANOVA was run with the bilingual education Spanish group (n = 4) included. In order to understand this main effect, post-hoc Tukey tests were then run comparing the pairs of means. Only the highest mean (regular education English, $M = 2307.20$) versus the lowest mean (bilingual Education Spanish, $M = 2092.00$) reached borderline significance ($p = .054$).

Two separate 2 class type (regular education v. dual-immersion) x 2 language spoken (English v. Spanish) ANOVAs were run, once with TAKS (3rd grade) as the dependent variable, and once with ITBS (3rd grade) as the dependent variable. The only significant finding was a language spoken main effect for TAKS scores (F (1, 42) = 6.357, $p = .016$). This was due to English speakers scoring significantly higher on the TAKS than Spanish speakers. There were no other significant main effects nor was there a significant interaction effect for TAKS. No significant differences were found on ITBS scores.

Table 8

One-Way ANOVA between Groups for Texas Assessment of Knowledge and Skills (TAKS) in 3rd Grade

	df	SS	MS	F	p
Between groups	3	224816.74	74938.912	3.27	.03*
Within groups (error)	42	961424.76	22891.066		
Total	45	1186241.5			

*p < .05

Table 9

Two-Way ANOVA between Subjects Effects on Texas Assessment of Knowledge and Skills (TAKS) and Iowa Test of Basic Skills (ITBS) in 3rd Grade

	TAKS					ITBS				
	df	SS	MS	F	p	df	SS	MS	F	p
Class	1	1100.66	1100.66	.05	.83	1	53.47	53.47	.08	.78
Language	1	145511.48	145511.48	6.36	.02	1	1145.94	1145.94	1.70	.20
C x L	1	44910.59	44910.59	1.96	.17	1	.526	.526	.001	.98
Error	42	961424.76	22891.07			42	28311.72	674.09		
Total	46	234579029.00				46	166816.00			

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