

A QUANTITATIVE ANALYSIS OF LATINX ENGLISH LEARNER READING AND
MATHEMATICS ACHIEVEMENT IN A DUAL LANGUAGE IMMERSION PROGRAM IN
THE NEW LATINX DIASPORA

by

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DEDICATION

To my wife, Mackenzie, who has been my inspiration since the day we met. This journey of life we spend together has its bumps, but we take care of each other in every moment. Over the course of working through the doctoral program and writing this dissertation, you have been so gracious and continued to be Super Mom and Super Wife. You always put the kids and me above yourself, and I admire you so much for your sacrifices. Each day I felt defeated, you kept encouraging me and helped me achieve this great accomplishment. Without you, there is no way I could have made it through the program. We have three beautiful kids, two of whom were born during this program, and we are so blessed to have you support our family each and every day.

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ABSTRACT

GABRIEL L. ZARAGOZA

A QUANTITATIVE ANALYSIS OF LATINX ENGLISH LEARNER READING AND MATHEMATICS ACHIEVEMENT IN A DUAL LANGUAGE IMMERSION PROGRAM IN THE NEW LATINX DIASPORA

Under the direction of TRACEY DEAGLE, Ph.D. and CAROL ISAAC, Ph.D.

Research indicates that dual language immersion programs support English learners to achieve high results in core academic areas. Current research related to dual language immersion has been conducted in parts of the United States that are traditional Latinx Diaspora areas. The influx of English learners in schools has changed demographics drastically, which directly impacts student learning and schools' abilities to meet all students' instructional needs, especially related to English acquisition.

The purpose of this research was to determine if English learners enrolled in dual language immersion programs have significantly different achievement results than their peers in traditional education settings in the New Latinx Diaspora. Student assessment data were collected from end-of-year assessments within a large urban school district in the southeastern part of the United States. This school offered dual language immersion and traditional education programs to English learners. A two-way multivariate of analysis (MANOVA) was used to determine if there was an interaction effect between grade level and program. Then multiple one-way MANOVAs were used to determine if there were differences by grade level of program.

The results of this study showed that there was no difference in student achievement for English learners in the dual language immersion (DLI) program or the traditional program. The results also showed that first grade scores were significantly higher than other grade levels in

reading and mathematics. Finally, although there was no significant difference, the data show that English learners in the DLI program achieved similar mean scores to English learners in the traditional program. The results of this study do not align with prior research as many students in DLI programs achieve higher than their traditional program peers in the upper grades.

The implications of this research include further analysis through case studies for school and district level administrators. There were potential benefits of bilingual education provided to Latinx English Learners in this study that can be explored since both group of students performed similarly. Program goals should be analyzed to further understand the student outcomes. Potential factors that could have impacted student scores include the impact of the Covid-19 pandemic school closures, teacher experience, and student English language proficiency levels.

Future research for this study should include an analysis of program implementation to determine factors that impact Latinx English learner student achievement in dual language programs. Schools in the New Latinx Diaspora are very new to dual language immersion. Additional analysis of bilingual proficiency should also be considered when analyzing student data for academic instructional gains. A case study analysis would further the research that can include cross functional action teams with insight from local and district level leaders, teachers, and other school staff. This future research can support district level planning for DLI expansion and reevaluation of DLI program implementation to support Latinx English learners.

CHAPTER 1

INTRODUCTION TO THE STUDY

Freire (1968/2018) stated, “Human existence cannot be silent, nor can it be nourished by false words, but only by true words, with which men and women transform the world” (p. 88). Humans have the capacity to make the world hospitable and supportive of all people, yet inequities to marginalized groups continue to exist. In education, Black and Brown students have consistently demonstrated lower achievement rates when compared to White and Asian students, yet there has not been a solution found to support this persistent achievement gap (Hanushek et al., 2019; Hemphill & Rahman, 2011; Musu-Gillette et al., 2017). Historically, Latinx and Black students have trailed well behind their White and Asian peers in academic achievement in reading, language arts, mathematics, science, and social studies on standardized assessments (National Center for Education Statistics, 2022). Considering the quickly growing population growth of Latinx English learners, it is important to consider targeted language support to address the concerns related to academic achievement (USDOE, n.d.). Areas that have experienced a large influx of Latinx English learners are states now considered the New Latinx Diaspora (Hamann et al., 2015).

Versions of bilingual education programs have been implemented to support Latinx English learners, such as English as a second language (ESOL) (Lindholm-Leary, 2001). Recently, however, dual language immersion (DLI) programs have become a trend to target academic language for English learners and students who wish to learn a second language beginning at the elementary age (Thomas & Collier, 1997). Critics have argued that DLI programs are not benefiting Latinx students because of English-only legislation and policy, but

ongoing research supports DLI programs as strong interventions to close the achievement gap (Cervantes-Soon et al., 2017; Lindholm-Leary, 2001). With the implementation of DLI programs, school and district leaders should consider the factors that support the implementation of current and new DLI programs to address the needs of Latinx students and their lagging academic achievement. The purpose of this study was to conduct quantitative research of student reading and mathematics achievement of English learner Latinx students in a dual language immersion education program in the New Latinx Diaspora.

Statement of the Problem

Latinx and English learners are consistently demonstrating lower academic achievement performance as compared to their White and Asian peers (Hanushek et al., 2019; Hemphill & Rahman, 2011; Musu-Gillette et al., 2017). On national assessments, English learners have performed under 15% proficiency for reading and mathematics (Musu-Gillette et al., 2017). To address the concern for language proficiency in the classroom, school districts have implemented DLI programs.

Recently, DLI programs have gained popularity among school districts that provide a branch of bilingual education for English learners and native English-speaking students (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012). In DLI programs, students spend at least half of their instructional day learning a target language, such as Spanish, which is the most widely implemented (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012). In each program, students are mixed heterogeneously by language so native English and native target language students are paired to support one another in the language of instruction throughout the day. In some instances, one-way models are implemented where the student demographic represents majority

English or the target language, such as mostly English- or Spanish-speaking students in a dual language program, with no clear heterogeneous grouping (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012).

School districts have employed DLI programs, yet there has been a commodifying factor to these programs to attract native English speakers to build a second language, rather than focus on the minority language, such as Spanish for Latinx students (Alanís & Rodríguez, 2008; Brooke-Garza, 2015; Hernandez, 2017). A limited number of studies have been conducted in the New Latinx Diaspora related to DLI. The problem addressed by this research study was the concern related to the student achievement outcomes of DLI programs in addressing the achievement of reading and mathematics of Latinx English learner students.

Purpose of the Study

The purpose of this study was to determine if DLI programs demonstrate differences for Latinx English learners in the New Latinx Diaspora in reading and mathematics achievement data.

Research Question and Hypothesis

The following research question was used to understand the difference of achievement gap between English Learner Latinx students in a DLI program and those not in a DLI program: What is the difference in student reading and mathematics achievement data for Latinx English learners who participated in an elementary dual language immersion program and Latinx English learners who participated in a traditional program in the same elementary school?

The following hypothesis was identified in alignment with the research question: There is a statistically significant difference in student reading and mathematics achievement data for

Latinx English Learner students who participated in an elementary dual language immersion program and Latinx English Learner students who did not in the same school.

Theoretical Framework

The theoretical framework used to create the research question and guide the quantitative research was the second language acquisition theory by Cummins (1979), which distinguishes between academic and social language acquisition. The researcher utilized Cummins's second language acquisition theory to analyze data and draw conclusions of the impact of a DLI program for Latinx English learners in the New Latinx Diaspora. Language acquisition in DLI programs is necessary in order for Latinx English learners to receive equitable opportunities to participate in and benefit from programs in a language and culturally supported environment from teachers and school and district administrators (Cummins & Swain, 1986).

Basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) lie within Cummins's (1979) second language acquisition theory. Cummins (2000) described the history of bilingual education, relating that implementation of bilingual education began in Europe and only recently occurred in the United States. Through the course of implementation, bilingual education faced challenges because of English-only policies and the lack of support of English language acquisition in the bilingual education model, since the model progressively eliminated native languages to learn English (Cummins, 2000). The argument of developing bilingualism among English learners in bilingual education focused on the idea that literacy should use *both/and* languages, instead of *either/or* when learning language (Cummins, 2000). Despite the academic and language growth demonstrated by Latinx students in bilingual

education, policy makers distorted the rationale for the program, which continued the debate for effective practices that should be in place in schools for bilingual students.

Cummins (2000) further examined how standards-based educational reforms and English learners should meet expectations based on language. He argued that the focus of standards-based educational reforms should be on assessments and their appropriate assessment of English learners, which accounts for language. Inclusion of English learners in mainstream assessment data results in meaningless data that do not address the learning of English learners (Cummins, 2000). Assessments should involve various instruments that measure different aspects of language and could even be delivered in students' primary language, such as Spanish (Cummins, 2000). The delivery of instruction of bilingual education should shift to a transformative pedagogy that includes second-language immersion programs, developmental bilingual education programs, and two-way immersion or dual language programs (Cummins, 2000). Cummins (2000) suggested that the need for implementation of bilingual education across schools is necessary for the success of English learners to provide them a quality education that will close the achievement gap.

Significance of the Study

The number of Latinx English learners in the United States is growing significantly, emphasizing the critical need for school personnel to understand educational models like DLI as options to promote academic success for all students (Lindholm-Leary, 2001). The research related to DLI models has primarily focused on regions with established Latinx communities, such as Arizona, California, Colorado, Florida, Illinois, New Mexico, New Jersey, New York, and Texas as opposed to the New Latinx Diaspora. This research study provides additional

insight on how DLI programs can impact Latinx English learners in the New Latinx Diaspora. Local school and district leaders can use this information to consider dual language education as an educational method to address the diverse language needs of Latinx English Learner communities. Additionally, educators can use the findings of this study to inform educational decisions related to overall models for Latinx English learners.

Procedures

This study aimed to determine a difference in student reading and mathematics achievement for Latinx English learners in DLI programs as compared to Latinx English learners in a traditional education program. The study analyzed data from one school with a Spanish DLI program by collecting district assessments for reading and mathematics. To analyze the difference among the groups, the researcher used a two-way MANOVA to compare two different means for the two groups for reading and mathematics district assessments.

This study used a retrospective two-group comparative research design to compare assessment scores for reading and mathematics from Latinx English learners enrolled in the DLI program and traditional program. The independent variables included in this study were the program models, DLI and traditional. The dependent variables were the assessment scores for reading and mathematics. Data were retrieved from a local school Microsoft Excel spreadsheet to determine specific assessment results per student. The researcher entered the data into SPSS with categorical data for nominal data that included English Learner status identification and grade level.

Limitations and Delimitations

The current study presented known limitations. First, this study focused on only one school with a DLI program and traditional education program, rather than multiple school sites. Secondly, the study site was a school with a high percentage of Latinx English learners from diverse Latin American backgrounds not captured in the data collection. Thirdly, there were gaps in student achievement scores from the local school. Finally, the data from previous years were incomplete due to the COVID-19 pandemic, which impacted assessment student participation and overall impact on consistent general and DLI instruction.

The delimitations present in the current study included a focus only on district assessment data. The reason for including only district assessment and not state or other widely used assessment was to understand the impact of instruction for DLI in a single district in the context of the New Latinx Diaspora. The DLI program focuses on target languages such as Spanish to support the language needs of Latinx English learners. Focusing on district level assessments used in the district where the researcher conducted the study facilitated the gathering of valuable data that addressed content instruction and progress made by Latinx English learners.

Definition of Terms

The following terms are defined to help the reader understand the context of each term in this study.

Cognate is “a language or linguistic form which is historically derived from the same source as another language/form” (Crystal, 2008, p. 83).

Latinx is a non-binary term to refer to people of Latino or Latina descent or heritage (Torres, 2018).

New Latino Diaspora refers to locations that are now residence to the recent increase of Latinx families in the United States that have not been traditional Latino communities, including Arkansas, Georgia, North Carolina, Maine, Indiana, rural Illinois, and Colorado resort communities (Hamann et al., 2015).

Dual language immersion (DLI) is an educational program model that supports language acquisition with language minority students integrated with native English speakers to promote the language and culture of the language minority students in elementary grades (Lindholm-Leary, 2001).

English language learner (ELL) refers to an individual who meets the following requirements:

(1) was not born in the United States or has a native language other than English; (2) comes from environments where a language other than English is dominant; or (3) is an American Indian or Alaska Native and comes from environments where a language other than English has had a significant impact on the individual's level of English language proficiency. (USDOE, n.d., para. 36)

Summary

Although the influx of Latinx English learners in schools is not a new trend, schools are still struggling to find effective models to support language development while teaching content standards. The role of DLI programs has increased in popularity, but schools in the New Latinx Diaspora are still well behind traditional states that have provided such programs over time, given the fewer number of programs available (American Councils for International Education, 2021). This research study provides additional information on the effect of DLI programs and the

impact on reading and mathematics achievement for Latinx English learners in the context of the New Latinx Diaspora. DLI programs can support the language needs for Latinx English learners so that the achievement gap can be addressed to provide adequate support for all language learners through informed school and district level leadership.

CHAPTER 2

REVIEW OF THE LITERATURE

This literature review explores the implementation of DLI programs to support the growing number of Latinx English learners and address the achievement gaps in the United States. Changing demographics in public schools have caused districts to adopt various forms of dual language programs that have transitioned from bilingual education models to DLI models, with varying impact on student learning (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). Additionally, dual language programs have evolved to address the language needs of Latinx English learners and provide an opportunity for native English-speaking students to acquire a second target language (Thomas & Collier, 1997, 1999, 2004; Lindholm-Leary, 2001, 2012; Thomas et al. 2002). The ultimate questions are as follows: (a) How are programs designed to address language needs of Latinx English learners, and (b) Are there enough data to support priority for Latinx English learners in DLI programs? The purpose of this study was to determine if there is a difference in student achievement between Latinx English learners in a DLI program and those in a traditional education program in the context of the New Latinx Diaspora. This literature review provides discussions of topics related to the population growth of Latinx English learners, the history of bilingual education, context of the New Latinx Diaspora, dual language education program implementation, and the prospects for addressing the achievement gap for Latinx English learners.

Emergence of English Learners in the United States

In 2015, an estimated 4.8 million English learners (ELs) enrolled in U.S. public schools (USDOE, n.d.). According to the NCES (2022) and Bialick et al. (2018) from the Pew Research

Center, English learners in U.S. public schools accounted for slightly less than 10% of all students. Of this percentage, Hispanic/Latinx students accounted for 77% percent of all English learners (NCES, 2022). English learners range in language background, but the majority of the population speaks Spanish (Bialick et al., 2018; USDOE, n.d.).

Approximately 62% of families of English learners fall in the lower income brackets, ranging from \$0-\$52,000 annually, which meet the requirement for free or reduced lunch in public schools (National Academies of Sciences, Engineering, and Medicine, 2017). Of the subpopulations of English learners, Black, Hispanic, and American Indian populations are the most disadvantaged as measured by percentages of children and families living below the U.S. poverty line (National Academies of Sciences, Engineering, and Medicine, 2017).

In a report for the U.S Census Bureau, Bauman (2017), the Latinx population was estimated to account for 57.5 million people, which constituted 17.9% of the population in 2016. The rise in percent of Latinx families in the United States paralleled the increase of Latinx students in schools. Further, Bauman (2017) estimated the 17.9 million Latinx students in schools, colleges, and universities accounted for 22.7% of students in schools overall. From 1996 to 2016, the Latinx population in schools doubled in enrollment and impacted the ability of local school instruction to meet the needs of Latinx students. A report from the NCES (2022) unveiled data that demonstrated factors that contribute to Latinx students' academic achievement gains, as compared to other ethnic and racial groups. In 2017, 32% of Latinx children under the age of 18 were living in poverty, closely followed by Black children at 38%, while White students were at 12% (Musu-Gillette et al. 2017). In terms of language, Latinx students made up 78.1% of all English learners enrolled in public education in 2014, overwhelmingly higher than any other

ethnic/racial group (Musu-Gillette et al., 2017). On the National Assessment of Educational Progress, Latinx and Black students have consistently performed below White and Asian students on fourth, eighth and twelfth grade reading and mathematics assessments from 2005 to 2015 (Musu-Gillette et al., 2017). Attendance trends demonstrate that Latinx and Black students are consistent with the number of days present and absent with White students, while Asian students have far fewer days absent (Musu-Gillette et al., 2017). In high school, White and Asian students have a larger number of high school credits for STEM academic subject areas than do Black and Latinx students (Musu-Gillette et al., 2017). Additionally, Latinx and Black students are more likely to drop out of high school than White or Asian students (Musu-Gillette et al., 2017). Within the subgroups of Latinx students, it is also important to understand that students from Central American or Mexican backgrounds have significantly higher percentages of high school dropout rates when compared to students from Cuban, Puerto Rican, Spaniard or South American backgrounds (Musu-Gillette et al., 2017). Finally, the low number of Latinx students who move on to postsecondary education results in minimal representation of Latinx students in degree-granting institutions (Musu-Gillette et al., 2017).

English Learner Achievement Gap

National measures of academic achievement demonstrate that English learners (ELs) are well behind other subgroups. The National Assessment of Educational Progress (NAEP) is an assessment conducted in grades four and eight every two years to measure academic performance across the United States (Musu-Gillette et al., 2017). The 2017 NAEP results indicated that for students in grade four, 14% of ELs were proficient or above in reading, and 9% were proficient or above in math; whereas ELs in grade eight measured lower results than ELs in

grade four, which was less than 10% (Musu-Gillette et al., 2017). Given that the majority of ELs are Hispanic/Latinx, it is important to note a significant academic achievement gap exists between Hispanic/Latinx and White students (Hemphill & Rahman, 2011). From 2001 to 2009, the free and reduced lunch application eligibility gap has remained steady between White and Hispanic/Latinx students and mirrors the achievement gap, which has also remained steady for almost 10 years between Hispanic and White students in mathematics and reading (Hemphill & Rahman, 2011). Hanushek et al. (2019) reported there has been little change in the achievement gap between Latinx/Hispanic and White students over the past 50 years in the United States.

The state of Georgia demonstrated exponential growth in Latinx populations over the recent years along with typical trends related to student achievement gaps for English learners. According to Sugarman and Geary (2018), in the years 1990-2000, the United States demonstrated 57.4% increase of foreign-born populations, while Georgia had 233.4% increase. In 2017-2018, Sugarman and Geary (2018) reported English proficiency and the number of students at the national level with Limited English Proficiency was at 5%, while in Georgia, English learners represented 8 percent. Additionally, most English learners in Georgia identified Spanish as their primary home language other than English, with 78.4% in 2015-2016 (Sugarman & Geary, 2018). In the 2016-2017 school year, Georgia Milestones assessment data revealed a disparity of academic achievement between English learners and non-English learners. For English language arts (ELA) proficient percentages, or meeting grade level expectations, English learners in grade 3 achieved 21.8% compared to 38.5% non-English learners; English learners in grade 4 achieved 24.4% compared to 44% non-English learners; English learners in grade 5 achieved 15.4% compared to 41.6% non-English learners; English

learners in grade 6 achieved 11.1% compared to 42.2% non-English learners; English learners in grade 7 achieved 5.3% compared to 38.1% non-English learners; and English learners in grade 8 achieved 5.5% compared to 44% non-English learners.

For mathematics, proficient percentages, or meeting grade level expectations, English learners in grade 3 achieved 32.4% compared to 44% non-English learners; English learners in grade 4 achieved 32.5% compared to 46.5% non-English learners; English learners in grade 5 achieved 20.7% compared to 39.2% non-English learners; English learners in grade 6 achieved 15.1% compared to 39.9% non-English learners; English learners in grade 7 achieved 13% compared to 43.1% non-English learners; and English learners in grade 8 achieved 13.7% compared to 35.4% non-English learners;

The statistical trends over time call for the examination of additional measures to offset the continued disparity between academic achievement of English learners and Latinx students. Several demographic differences exist between Hispanic/Latinx students and White students, such as socioeconomic status and ethnic background, but language is an area that can serve as an instructional tool to close the achievement gap. States like Georgia with an exponential growth in Latinx populations whose children are attending public schools are now considered the New Latinx Diaspora. It is urgent for school and district leaders to understand the New Latinx Diaspora to provide additional language support to bridge the achievement gap demonstrated by assessment results from Latinx English learners.

The New Latinx Diaspora

Over time, the migration of people from traditional homelands into new areas has contributed to the diversity that now exists in the United States. *Transnationalism* and *diaspora*

are terms that refer to people who have established residence in areas away from their typical countries or regions and established cultural identities of their identified communities in the new areas (Brettell, 2006). The Traditional and New Latino Diaspora are examples of how people from Latin America have migrated to the United States in particular regions (Hamann, 2003; Hamann et al., 2015).

The enrollment of Latino students in U.S. K-12 public education has demonstrated a dramatic increase for the past few decades. Historically, Latino families have resided in Arizona, California, Colorado, Florida, Illinois, New Mexico, New Jersey, New York, and Texas, but with the demand of immigrant labor, significant populations of Latino families now reside in the New Latino Diaspora (Hamann, 2003; Hamann et al., 2015; Murillo & Villenas, 1995). The New Latino Diaspora consists of locations that have received increased numbers of Latinx families in recent years, including the south, Midwest, and rural parts of the United States (Hamann, 2003; Hamann et al., 2015; Murillo & Villenas, 1995). The concern for public education stems from the responsiveness of schools to address the needs of the increased number of Latinx students, a significant percentage of whom may be English learners. In Georgia, the Latino Diaspora has developed in key metropolitan and rural areas (Sugarman & Geary, 2018).

History of Language Equity

Christian (2016) explained that the foundations of dual language education began in the 1960s when bilingual schools emerged at the request of parents for their children to become bilingual. Although dual language programs are growing in popularity, DLI programs are a byproduct of the long and arduous history of bilingual education. In 1968, the Bilingual Education Act, Title VII of the Elementary and Secondary Education Act, sought to address the

educational needs of students with limited English Proficiency and allowed for instruction to be implemented in other languages (Stewner-Manzanares, 1988).

A multitude of courts have weighed in on the educational rights of racial and language minority students in the United States over the past century. Wright (2010) reviewed court cases that have used the 14th Amendment of the U.S. Constitution to address educational equity for all students, such as segregation and native language use in the classroom, including *Plessy v. Ferguson* (1896), *Brown v. Board of Education* (1954), *Independent School District v. Salvatierra* (1930), *Alvarez v. Lemon Grove*, *Mendez v. Westminster School District* (1946), *Guey Heung Lee v. Johnson* (1971), and *Johnson v. San Francisco Unified School District* (1971). These court cases highlighted how segregation negatively impacts student achievement, especially student English language development (Wright, 2010).

Regarding teaching students in their native languages, Wright (2010) explained that *Myers v. Nebraska* (1923), *Farrington v. Tokushige* (1927), and *Stainback v. Mo Hock Ke Kok Po* (1949) offer grounds for students to be taught in their native languages. Furthermore, Wright (2010) highlighted that *Meyers v. Nebraska* (1923) addressed the protection for language minorities through the 14th amendment. Additionally, Wright (2010) discussed court cases that addressed the linguistic and educational needs of English learners. The Lau Remedies, which resulted from *Lau v. Nichols* (1974), were measures for all school districts across the United States to implement bilingual education for students with limited English proficiency, which was also included in the Equal Educational Opportunities Act of 1974 (Wright, 2010). At the forefront of contention related to education for Latinx and English learners, English-only policies

have continued to arise in several states, such as California, Texas, and Florida (Hinojosa, 2019; Lowenhaupt, 2015)

Hamann (2003) provided a firsthand account of how the state of Georgia was an example of local leaders taking initiative to address the changing demographics of Dalton, Georgia. Migrant workers moved to the city of Dalton in 1992 to work in the booming carpet mill industry (Hamann, 2003). In the Georgia Project, local community leaders partnered with the school district of Dalton City Schools to develop a partnership with Mexican educators from the University of Monterrey and pilot a program where teachers were able to cross train in the United States and Mexico to address the linguistic and cultural needs of Hispanic students. In his experience as a consultant with the Georgia Project, Hamman (2003) described how the intent of the program was a notable venture for the school district and county, but pitfalls included a clash of cultural inclusion of the Mexican teachers in the schools. Ultimately, the schools treated the visiting Mexican teachers more as paraprofessionals than certified educators (Hamman, 2003). The result of the Georgia Project provided insight to the need of Georgia schools to respond to the changing demographics of students, but it is essential that monitoring by trained individuals is important for the success of addressing the academic needs of Hispanic children.

Although legislation and judicial rulings have been implemented to address such problems on a systematic level, the achievement gap between Latinx students their White peers in schools continues to persist (Hemphill & Rahman, 2011). One of the efforts demonstrating positive results for student achievement is the implementation of DLI programs. The increase of Latinx English learners in schools has prompted the implementation of DLI programs in school districts across the United States to bridge language gaps and positively impact student

achievement. Much has been written to address the social and racial inequality that impacts Latinx communities throughout the United States and how DLI programs are avenues for reaching social justice.

Language Acquisition, Dual Language Immersion, and Social Justice

Language acquisition is part of a body of research that focuses on the learner and how language develops. Krashen (1982) developed a theoretical model based on comprehensible input presented in a second language where a person uses visuals and context to make meaning. Krashen's second language acquisition theory includes five hypotheses: Acquisition-Learning, Monitor, Natural Order, Input, and Affective Filter (Schutz, 2005). Krashen's most widely known hypothesis of Acquisition-Learning directs the importance of acquiring language through a subconscious process via natural communication between individuals, while learning in a formal setting is less important (Schutz, 2005). The use of dual language classrooms support this hypothesis by providing a space for students to interact authentically, while also gaining formal teaching. Additionally, Krashen's input hypothesis can support language learning because students receive comprehensible input from those around them that supports language acquisition (Schutz, 2005).

Cummins is another language acquisition researcher who explored language acquisition theory to support bilingual students. Cummins merged second language acquisition theory with social justice because bilingual students must make meaning through more linguistic input when compared to monolingual students (Soltero, 2004). In the book *Language, Power and Pedagogy*, Cummins (2000) described the struggle that bilingual students face in public education based on a disconnect among theory, researchers, policymakers, and practitioners. Cummins (2000)

described bilingual education historical context and how Europe first implemented bilingual education, which was only recently initiated in the United States. Through the course of implementation, bilingual education received great opposition, and the model did not support English language acquisition (Cummins, 2000). The argument of developing bilingualism among English learners in bilingual education focused on the concept that literacy should use *both/and* of languages instead of *either/or* when learning language (Cummins, 2000). Additionally, the acknowledgment of power of bilingualism is critical to student academic achievement to support marginalized groups (Cummins, 2000). Despite the academic and language growth demonstrated by Latinx students in bilingual education, policy makers distorted the rationale for the program, which continued the debate that effective practices should be in place in schools for bilingual students.

Moll (2014) provided an explanation of how Vygotsky's work with psychology had a tremendous impact on the implementation of education. Specifically, Moll (2014) described a study that focused on the social organization of instruction, which stems from a *teaching-learning experiment* derived from Vygotsky and the social construction of language. The study was conducted in a DLI program with a goal to observe how language resources are used among students and teachers to improve reading instruction (Moll, 2014). The study revealed that in dual language instruction, students' bilingual zone of proximal development was a foundation for their learning. The students in the study could use both languages in their interactions with one another and the teacher to build their reading comprehension and make meaning of the text. For the bilingual students, the use of Spanish facilitated their learning for English. This example highlights how dual language programs can support student learning and bridge language gaps.

As schools continue to implement programs such as this into their curriculum, more English learners and Latinx students can achieve academically to bridge the academic achievement gap.

Despite the increasing number of Latinx students in U.S. classrooms, schools are still trying to address their needs with traditional methods of schooling. DLI programs provide a way for educators to capitalize on Latinx students' language and cultural backgrounds. To truly meet the language and cultural needs of Latinx students, teachers and school leaders should understand their history. In *La Conciencia de la Mestiza*, Anzaldúa (1994) explained that Latinx students are products of a mix of people and cultures, which makes the individual greater. No longer should Latinx English learners be viewed as not understanding language; instead schools should integrate their rich history and background into instructional lessons. Anzaldúa (1994) provided an example that she must learn to identify herself as Indian and Mexican in both Mexican and Anglo cultures. These statements highlight the need for students to feel accepted for who they are and the knowledge that they bring into the classroom. Students should not feel they should be placed in a category or box; rather, they should be who they are, and receive academic instruction that meets their individual cultural and language needs.

In the report on human rights violations by the Human Rights Immigrant Community Action Network (HURRICANE), there is a focus on how immigrants are consistently being targeted based on new programs, policies, strategies, and laws (National Network for Immigrant and Refugee Rights, 2009). Raids by the Immigration and Customs Enforcement (ICE) have increased in targeted communities and workplace; immigrants have been incarcerated at a growing rate; workplaces have become enforcers of immigration status; record deaths are recorded at the ever-growing militarized border; and increased collaboration of local and state

police with ICE has impacted community safety for marginalized groups (National Network for Immigrant and Refugee Rights, 2009). These measures have created an unstable and insecure climate for the immigrant community, which includes children. When students from immigrant families are asked to attend a traditional school, it can be increasingly difficult for them to stay focused on the instruction when there has been a heavy load placed upon them by the systematic policies and structures that have marginalized their communities and families. Programs like DLI can help support these students and bring awareness of cultural differences in the classroom and methods for teachers and school leaders to support all students.

The need for research to question the systems that inhibit students from succeeding falls under poststructuralism. Peters and Burbules (2004) explained that poststructuralism critiques the power and knowledge that exist to gain a better understanding of the environment to make changes that challenge the status quo and address positive changes to eliminate inequities that can occur in class, gender, or ethnicity. The reality in which individuals live should be challenged, as it is not permanent; rather, it is a socially constructed reality, and critical questioning is important to address the inherent oppression that exists in the world. Latinx English learners fall in a category of people who face language and social challenges not addressed by the school infrastructure. DLI programs are just one way to address the inequity so these students are not forgotten, and they can begin to gain a solid educational foundation.

Bilingual Classroom Environments and Teaching Staff

Dual language education is a part of the bilingual education model, yet there are foundational traits that make classrooms responsive to the language and cultural needs of diverse students. Whether students come from homes where Spanish is the primary home language or

another language, students benefit from rich home literacy environments (Zhang & Koda, 2011). Bilingualism is a complex concept with varying levels of understanding relating to a student's understanding of multiple languages in different contexts (Cummins & Swain, 1986). To develop adequate bilingualism in school programs, schools should incorporate language support for students' primary language and new language to bridge language learning for both languages (Cummins & Swain, 1986).

The increased enrollment of Latinx students in U.S. public schools has pushed educators to think critically about the instructional practices in place to support students linguistically, academically, and socially. Becerra's (2012) study of adult attitudes toward education from the Pew Hispanic Center in 2003 highlighted the perceived barriers that Latinx adults have about education and Latinx students. A significant finding indicated a perception that students believed White teachers were unable to relate to Latinx students (Becerra, 2012). In a study that addressed the School-to-Prison Pipeline for Latinx students, Rubin (2014) asserted that Latinx students' cultural knowledge is not included in the instructional environment, which further widens the achievement gap of Latinx students. Rubin (2014) also contended that literature should be included in the curriculum that relates to Latinx students' lives.

Standardized assessment subgroup data from high states tests is consistently used to measure the academic progress of all students. Although many Latinx students are identified as English learners, there have been disparities of analyzing data for English-only assessments, which does not differentiate academic progress of students in bilingual education programs. Latinx students are grouped together as one measurement in standardized assessment results, which does not unpack the various bilingual programs that exist (Escamilla et al., 2005). Overall,

the data from standardized assessments may demonstrate that bilingual programs are not effective, but a deeper examination of the data can offer specific data to language intervention programs that support Latinx students and English learners (Escamilla et al., 2005). The need for Latinx teachers is critical to support the cultural and linguistic connection that can support progress towards instructional goals. Additionally, both Latinx and non-Latinx teachers should be better equipped with strategies that support learning for Latinx students in prekindergarten through twelfth grades.

Attributes of Effective Teachers of Latinx Students

Both Latinx and non-Latinx teachers can embody effective characteristics and practices that support learning for Latinx students. Teachers' ability to understand Latinx student needs is critical in the classroom to truly engage and support Latinx students. The following articles address qualities and practices that support Latinx student learning.

Teacher interactions support student learning in the classroom, which can be supported when teachers and paraeducators share similar cultural and racial backgrounds with their students. The interactions in a study by Monzó and Rueda (2001) demonstrated that teachers and paraeducators who have a familiarity with students, such as language, culture, and communities, can foster supportive learning environments in the classroom by relating to students. These interactions encourage culturally relevant pedagogy that acknowledges the funds of knowledge that students embody (Monzó & Rueda, 2001). An interesting finding in this study is that the paraeducators had more opportunities to relate to students culturally because content material and academic progress placed more demands on teachers (Monzó & Rueda, 2001). The

partnership between the teacher and paraeducator is important to bridge the cultural knowledge that teachers can use to support instruction for students.

In many cases, teachers may not share similar backgrounds to their students, but their own skills can prove to be effective. A prekindergarten teacher used her relationship-building skills to foster a positive and inclusive environment for her Latinx students (Gillanders, 2007). The teacher in this study also incorporated Spanish by learning the language and linking the language to instruction to validate students' backgrounds. The students demonstrated academic growth and learned to engage in the lesson as all other students. This study highlights how the teacher's ownership of the instruction and understanding of her students provided a safe space to support all students linguistically (Gillanders, 2007).

Classroom learning is impacted mostly by the teacher, which is critical for Latinx student achievement. In another case study, Irizarry and Raible (2011) identified exemplary teachers of Latinx students as those with the ability to use instruction linguistically to enhance communication that supported community building with students and parents. These teachers, who were not of Latinx backgrounds, respected cultural identities, understood the sociopolitical context of the Latinx community, acknowledged the racialization in the classroom, incorporated language, acquainted themselves with the families, and tapped into the culture that students brought to the classroom (Irizarry & Raible, 2011). The breakthrough with these teachers who were revered in their communities was a result of their own cultural awareness and responsiveness to the communities in which they served.

Language use in the classroom is essential to develop rich dialogue for students and teachers to enhance their learning. The use of a mathematical communicative space between

teachers and Latinx bilinguals supports academic discourse among Latinx students (Musanti & Celedón-Pattichis, 2013; Turner et al., 2020). Turner et al. (2020) discovered that teachers were able to incorporate Spanish in the mathematics instruction, and students were able to use both English and Spanish to make mathematical sense and support their learning. This model eliminated the need for students to use only English, which can often create a barrier to learning because students may focus only on language and not the content (Turner et al., 2020). It is important to validate student responses and promote problem solving in real life situations with their existing knowledge (Musanti & Celedón-Pattichis, 2013).

Regardless of background, students have the potential to learn, but it is the teacher who can impact student achievement by understanding the student population. In a study conducted by Anhalt and Rodríguez Pérez (2013), Latinx and non-Latinx mathematics teachers of Latinx students explained that although social issues impact Latinx students' lives, they still have the skills to succeed in school. The study highlighted that the non-Latinx mathematics teachers were more sensitive to social issues concerning Latinx students because they were strangers to the community, and they did not want to be accused of having biases against students (Anhalt & Rodríguez Pérez, 2013). The awareness of these teachers that learning should be held to the same standard for all students, despite social issues, was essential.

The classroom learning environment is a direct result of teacher impact, which prompts students to react positively or negatively. Riconscente (2014) found that students' perceptions of their teachers' practices can greatly impact their success. Students reported that their self-efficacy in mathematics was linked to teacher caring in the classroom. Classroom relationships had direct positive impacts to students' overall outcomes (Riconscente, 2014).

In terms of student achievement, Dabach et al. (2018) found advanced placement teachers in a study demonstrated higher expectations from their students than did the ESL teachers. The teachers' lowered expectations came from the external factors that affect Latinx students, such as socioeconomic status or cultural backgrounds. The concern is that teachers have an impact on supporting student learning and their future tracks (Dabach et al., 2018).

Additionally, discipline outcomes can have effects on Latinx student achievement. Rueda (2015) explained that compared to Black students, Latinx students exhibited good behavior and failed to receive as dire consequences as did Black students. The notion that Latinx students should receive leniency may have more repercussions in the long run because failure to address student behavior appropriately does not teach students (Rueda, 2015). It is critical that students receive equal treatment in the classroom and exposure to the same expectations often hindered by racialization of the classroom.

Teacher perception of English learners and bilingual students is also a mitigating factor for student success. In a study that included both Latinx and Amish students, teachers and administrators generally demonstrated a hierarchy of language concerns when addressing both groups of students, even though there were English learners in both populations (Byfield, 2019). The difference among the two groups was race, so the urgency was to support teachers by having them reflect on their own biases and how social status and native language impact their daily instructional practices.

It is also important to understand teacher impacts on Latinx students in the special education setting. The most effective teachers demonstrate the willingness and determination to support Latinx English learners with disabilities by reaching out and enhancing their own skills

(Delgado, 2010). Effective teachers of Latinx students in special education and the ESL program solicit other teachers to learn about strategies, in addition to attending professional development opportunities (Delgado, 2010; Ferlis & Xu, 2016). Further, to better gauge students' abilities, teachers opt to use Spanish assessments. Battey (2013) found that teachers in a special education mathematics classroom displayed positive relationships, interactions with students to praise their efforts and progress, and incorporation of their language and culture. Bilingual education supports all students, including students in special education, as long as teachers utilize supports and administer appropriate assessments to gauge learning (Cummins, 1984).

Professional Development and Culturally Relevant Pedagogy

To better equip current teachers to support Latinx students, school districts and local schools have taken measures to incorporate varying levels of professional development to enhance teacher efficacy. When implemented with fidelity, professional development specifically designed to support English learners can yield positive results for student's literacy skills (Babinski et al., 2018). The following studies outline how the trajectory of professional development is important to support teachers of Latinx students.

In a case study focusing on EL education, a Texas institution analyzed the effectiveness of pursuing a federal grant to support a local program to enhance teacher instruction for ESOL (Beal & Rudolph, 2015). Although the goal of this federal grant was to improve teacher ability to support Latinx and English learners, many structural barriers arose to impact the program, which demonstrated that pockets of reform may not be sustainable (Beal & Rudolph, 2015). As school districts move to incorporate professional development, additional efforts should be made to ensure that programs function well to reap the benefits for student learning.

The professional development that supports teachers with Latinx and English learners should stem from students' strengths, which include their culture and language (Rubinstein-Avila, 2006). It is important for teachers to incorporate students' funds of knowledge, content-area cognates, graphic organizers, multiple modalities of learning, and language face-to-face conversations (Rubinstein-Avila, 2006). Students are more receptive to engaging with their learning when they can incorporate their cultural backgrounds, such as reading and using their language collaboratively among each other, in their curriculum (Rubinstein-Avila, 2006; Stuart & Volk, 2002). The use of cognates through instruction can help bridge Spanish background knowledge for English learners (Lubliner & Hiebert, 2011). When students can make connections with cognates, their vocabulary has the potential to gain many more words among the two languages (Lubliner & Hiebert, 2011). Furthermore, using assessments in the student's native language can truly assess student mastery of the content (Escamilla et al., 2005).

Although collaboration is critical in the Latinx and English learner classroom, teachers should teach students how to effectively engage with conversation among themselves (Stuart & Volk, 2002). By incorporating culturally relevant material, students can see themselves more authentically in their learning, which supports their own self-identity that can foster more confidence in themselves (Camacho et al., 2018; Martínez-Roldán & Heineke, 2011; Stuart & Volk, 2002). The relationships fostered between teachers and students are essential so that teachers may understand their students and give them avenues in which to validate themselves ethnically and racially (Camacho et al., 2018).

Other professional development to support Latinx students is integration related to caring. In a case study on how Latinx students interpreted their teachers' perceptions of them, students

provided detailed responses regarding their personal abilities and likelihood of being successful, leading the researchers to conclude that it is vital that teachers of Latinx and English learners believe in their students and foster a positive culture of learning (Garza & Soto Huerta, 2014). The understanding of the social context and barriers that influence Latinx students is a dynamic that must be understood by teachers. The use of border pedagogy in the southwestern part of the United States outlines particular teaching strategies that address the needs of Latinx students (Ramirez et al., 2016). With border pedagogy and conversations and discussions, teachers can address issues that Latinx students face daily and adjust the curriculum to “celebrate the diversity of students” (Ramirez et al., 2016, p. 320).

Culturally relevant pedagogy supports Latinx students because of the rich heritage and cultural knowledge that they demonstrate daily. Students in culturally relevant classrooms have opportunities to be successful because of teacher high expectations and establishment of a positive climate that acknowledges and uses students’ abilities (Garcia & Chun, 2016). The incorporation of Latinx literature can support Latinx students because of the dialogue that can arise related to culture and diversity (Martínez-Roldán & Heineke, 2011). Latinx literature supports a culturally relevant classroom that can continue to engage students and bring their experiences into the classroom curriculum. In the special education classroom, culturally responsive pedagogy can support Latinx students with learning disabilities (Orosco & Abdulrahim, 2017). Teachers who receive professional development on culturally relevant pedagogy experience improved student outcomes because of the various tools they can utilize to address all students related to cultural knowledge.

Another critical area for teachers to enhance their skills with Latinx students is parent engagement professional development. The increase of Latinx families in the United States requires a different approach for teachers to understand strategies to help Latinx families support their children at home (Torres & Hurtado-Vivas, 2011). Latinx families generally participate in school events and work to support the teacher, but many teachers ask for parents to teach their students using homework (Torres & Hurtado-Vivas, 2011). Teachers can gain benefits from understanding that the funds of knowledge that parents and students have from their cultural and racial backgrounds are an added value support to the educational experience (Rodriguez-Valls, 2011; Torres & Hurtado-Vivas, 2011; Zambrana et al., 2019). The use of culturally relevant content and family practices can support engagement from families to help literacy development in children (Friedrich et al., 2014). The recommendations include using nursery rhymes and bilingual books in the home to support learning (Friedrich et al., 2014; Kumar, 2014). School leaders should consider ways to provide caring environments that include families in school that do not create barriers (Monzó, 2013) and explore additional strategies to engage families in home literacy and support teachers who teach Latinx students.

Defining Dual Language Immersion

Dual language education, or two-way immersion, is a language-based teaching model in which students in elementary and secondary grades receive at least 50% of their academic content instruction in a target language, such as Spanish or Mandarin (Lindholm-Leary, 2001, 2012). The goal of dual language education programs is to build high levels of academic achievement through bilingualism and biliteracy (Christian, 2016). The results of dual language programs have proved to be highly effective for English learners and Native English speakers

alike in terms of academic achievement, which has sparked an increased popularity of the program across school districts in the United States (Lindholm-Leary, 2001, 2012). Although the program has gained popularity to address language needs of English learners, successful implementation of dual language education requires conscious effort to reap educational benefits for all students. DeMatthews and Izquierdo (2016) noted that with the increase in popularity of DLI programs, families have become more aware of the positive impact of the program for all students, which has indicators to closing the achievement gap. Alanís and Rodriguez (2008) delineated four essential elements to successful dual language education programs: pedagogical equity, effective bilingual teachers, active parent participation, and knowledgeable leadership continuity. Lindholm-Leary (2012) also described features of successful dual language program implementation that relies heavily on the understanding of dual language education and the nuances of bilingualism and biliteracy.

To implement and monitor dual language programs and their effectiveness, Howard et al. (2018) created the *Guiding Principles for Dual Language Education* as a framework for school districts and administrators. These guiding principles address program structure, curriculum and instruction, assessment and accountability, staff quality and development, family and community, support, and resources (Howard et al., 2018). In addition, the document contains rubrics for school leaders to rate their existing programs. Although this document exists, it is a guide, not law, so every school district may or may not use the information for program development. The following sections in the literature review identify the ways in which dual language programs are effective, as well as the problems that have arisen with program

implementation. In addition, the review addresses equity and the gaps in the alignment with the *Guiding Principles of Dual Language Education* and daily practice.

Dual Language Education and Student Impacts

The continued success with increased student achievement for English learners and Native English speakers alike has popularized dual language education programs, resulting in their spread to numerous U.S. school districts (Collier & Thomas, 2004; Thomas & Collier, 1997, 1999; Thomas et al., 2002). English learners who participate in DLI programs with their home language typically perform higher than do their peers who are not DLI programs (Collier & Thomas, 2004; Thomas & Collier, 1997, 1999; Thomas et al., 2002).

Collins (2014) investigated dual language proficiency of Latinx students in their first years of schooling by comparing scores and measuring their gains compared to age-appropriate proficiency. Collins (2014) found that Latinx students enrolled in classrooms that used English and Spanish made larger language gains over time when compared to students with minimal or no use of Spanish in the classroom. This study demonstrated the need for purposeful bilingualism in schools to promote language proficiency for Latinx students.

In terms of student perceptions of bilingualism, Lindholm-Leary (2016) surveyed a large sample of elementary and middle school students from Spanish and Mandarin dual language education programs. The results demonstrated that the students perceived bilingualism as a positive asset and learning from other cultures as beneficial. In addition, the students perceived they could converse better than their peers in non-dual language programs because they had strong language skills. This study revealed that dual language programs can positively influence

students because they exhibit greater receptivity to the benefits of bilingual education and use the skills among their peers (Lindholm-Leary, 2016).

A study conducted by Telli et al. (2018) described how students in a German-Turkish bilingual classroom used language for mathematical problem solving. The researchers observed that students were able to use pictorial representations to solve the word problems in either language. The student sample was a mix of native German- and Turkish-speaking students. The students were able to pull from their own language and that of the language they were learning to make sense of the word problems. The bilingual program provided students additional strategies that bridged the two languages as they processed the word problems in the target language that was not their own native language. By building on knowledge from two languages, students demonstrated how their additional skills can help them in academic content areas with extra language support (Telli et al., 2018).

Tran et al. (2015) examined dual language education from the mathematics and science perspective. With increased attention on STEM programs and the emphasis on mathematics and science, Tran et al. (2015) believed it was important to understand how DLI is an impactful instructional model that can help reach a broader group of diverse learners. The use of quantitative research provided statistical numbers in a case study to demonstrate how ELs and native English-speaking students performed just as well or higher than their English-only learning peers did in mathematics and science (Tran et al., 2015). To support the integrity of the research method, Tran et al. (2015) deliberately compared students of similar backgrounds and schools. In addition to high test scores in mathematics and science, students in the DLI program gained the added benefit of biliteracy through their DLI instruction (Tran et al., 2015).

These studies are examples of how dual language education can provide positive benefits to both Native English speaking- and Native Spanish speaking-students. Overall, dual language education programs support academic achievement growth for most of the students, as demonstrated in the studies. These positive impacts have fueled the overwhelming expansion of dual language programs in schools. However, the question remains if dual language education provides equity for all students based on local level program implementation.

Dual Language and the Prospect of Equitable Access

Conscious and appropriate implementation of DLI programs can achieve equitable educational access to students regardless of race, ethnicity, socioeconomic status, or language background. The goals of dual language programs include biliteracy, bilingualism, academic achievement, and cultural competency (Howard et al., 2018). The following studies highlight instances where dual language programs have explored how DLI achieves these goals and supports all students.

In a case study, DeMatthews et al. (2017) explored how a superintendent in Texas implemented the dual language classroom district-wide model to address injustices on Mexican and Mexican American emergent bilinguals. Building on his own background and understanding of how his students were being marginalized in the current school system, the superintendent used his knowledge of the education system and dual language education model as a remedy to address social justice for all students in his school district community (DeMatthews et al., 2017).). By taking an active role in social justice, the superintendent provided an example of how DLI can only be fully implemented if there is support from administrators at high district levels.

Through this investment, the program was able to flourish and meet the goals set out by dual language education (Howard et al., 2018).

Similarly, Gonzalez-Carriedo et al. (2016) also concluded that dual language education promotes equity. The researchers used a constructivist perspective describing pedagogical practices including learning as collaboration, teachers as facilitators, and how language and culture are intertwined in schools. The findings demonstrated that the students in the program experienced gains in both English and Spanish of their dual language program (Gonzalez-Carriedo et al., 2016). The use of the two languages proved to be effective with the instructional practices in the dual language education setting, which promoted equity for all students (Gonzalez-Carriedo et al., 2016).

Paciotto and Delany-Barmann (2011) explored how teachers interpreted language policy reform in their rural school district because of newly arrived English learners. The teachers revealed that although they had to change the ways in which they addressed teaching and learning for the newly arrived English learners, they became conscious of the effort that needed to go into planning to effectively implement dual language education for the students. The teachers shifted from being traditional teachers to acting as “central agents of language education policy creation and implementation” (Paciotto & Delany-Barmann, 2011, p. 237). The agency of the teachers in this study demonstrated that if provided opportunities to develop a program, they become more invested in the change to address language needs through dual language education programs (Paciotto & Delany-Barmann, 2011).

These studies highlight how individual leaders and teachers at the local school level have promoted a culture of social consciousness to address equity within the DLI context. Although

the schools implemented dual language programs, there was an apparent level of engagement from the practitioners of the programs that went beyond following the rules. The leaders and teachers understood how equity was part of the DLI program and the critical issue related to program implementation. Even though these studies are examples of the positive effects of attention to equity concerns in the DLI classroom, further studies have demonstrated that equity pivots on a delicate balance across other contexts.

Dual Language Education and Teacher Preparation

DLI program effectiveness relies heavily on local school and district support for teacher preparation (Alanís & Rodriguez, 2008). Although DLI requires that the teachers are academically fluent in the target language of instruction, dual language education hinges on consistent monitoring and understanding from local school administrators and district leaders (Alanís & Rodriguez, 2008). Additionally, Lindholm-Leary (2001) emphasized that effective dual language education programs have strong leadership with administrative and principal support and instructional leadership, and the school environment promotes a positive school culture, additive bilingual environment, and positive and reciprocal instructional climate. The following studies describe the impact of dual language programs in various settings on teachers.

As described in the *Guiding Principles of Dual Language Education* (Howard et al., 2018), dual language education programs have the common goals of bilingualism, biliteracy, and high academic achievement for all students. However, Palmer et al. (2015) reported how a team of teachers in a two-way dual language bilingual education program faced challenges to implement the program with fidelity while trying to manage the English-dominated requirements of the school system. In the study conducted by Palmer et al. (2015), a bilingual pair of teachers

implemented a dual language education program in a third-grade classroom setting. The teachers worked to try to implement the program, but the district level's emphasis on test scores, which were based on English language assessments, constrained them. The teachers did not receive support from their local school administrators on ways to deliver DLI program goals, while trying to meet the expectations of the district. This study revealed that teacher agency was critical for dual language programs to thrive, but that only occurs if there are supporting administrators in the school system (Palmer et al., 2015).

In another study, Capitelli et al. (2016) observed how a teacher received language-based professional development to integrate English Language Development strategies (ELD) into science instruction. The researchers found that inquiry-based science lessons encouraged teachers to become facilitators while the students completed activities that involved investigating, collaborating, and reporting with their classroom peers. This study addressed how inquiry-based science instruction can support English language learners (ELLs) in schools by targeting English language development (ELD) through science content (Capitelli et al., 2016). This case study also demonstrated that the use of ongoing professional learning encouraged transformational change of teacher mindsets and instructional strategies (Capitelli et al., 2016). Capitelli et al. (2016) related that the professional learning communities allowed teachers to discuss their shared experiences and develop reflection logs, which helped them internalize their new learning.

Lachance (2018) highlighted how teacher effectiveness in the middle school science dual language classroom is important for program effectiveness. The study focused on an interpretive case study that involved two middle level science teachers. The teachers revealed that there is

uniqueness in the middle-grades science dual language classroom and that specialized training should be given to teachers for more effective teaching of the content through language (Lachance, 2018). This study supports teacher perceptions that educators need modified professional learning development to maximize the results of a dual language education program.

In a study conducted in a Head Start program, Ramirez et al. (2020) identified teacher characteristics that support English language learning through children's bilingual abilities. Ramirez et al. (2020) examined the skills related to language, literacy, and math of 217 Latinx dual language learners who attended a Head Start program. Findings revealed that teachers with more teacher training, experience working with dual language learners, and competency related to cultural and linguistic needs of learners supported higher development of children's learning (Ramirez et al., 2020). The students observed in the study indicated a need for teachers to understand language learning to support classroom instruction by relying on students' home language, which in this study was Spanish.

With the growing demand for dual language and bilingual teachers, preservice teachers are beginning to explore the possibility of teaching in a dual language education classroom. A study conducted by del Rosario Zavala (2017) explored how preservice teachers who eventually work in dual language education settings in the target language are not fully prepared to teach academic content in a target language such as Spanish. The preservice teachers in the study practiced mathematics pedagogy in general education classrooms in English, but they did not feel confident with the content material, such as vocabulary knowledge in the target language. Although these teachers could speak the target language, teaching the content in the target

language requires a deep understanding of essential vocabulary and skills to translate to instruction of students (del Rosario Zavala, 2017). Further professional development is essential as the need for additional dual language education teachers with the growing demand of the program.

Dual Language Immersion Programs and School Leadership

The number of DLI programs present in the United States is well over 3, 000, most of which use Spanish as the target language (American Councils for International Education, 2021). Most of the programs are located in the traditional Latinx communities, while the New Latinx Diaspora has fewer programs (American Councils for International Education, 2021). In 2022, Georgia had 70 dual language programs, similar to other states in the New Latinx Diaspora with about 51-100 programs (American Councils for International Education, 2021; Georgia Department of Education, 2022)

Effective implementation of dual language programs relies heavily on school administrators and their understanding of bilingualism and biliteracy to support teachers and overall program effectiveness (Alanís & Rodríguez, 2008). Principals may have knowledge gaps about dual language programs, but there are also gaps with second language programs as a whole (Padron & Waxman, 2016). Principal leadership is important to all schools and programs, but there are specific traits that support dual language programs succeed (Rocque et al., 2016). Principals in dual language programs should also be immersion proponents, cultural unifiers, and agents for change (Lindholm-Leary, 2001; Menken & Solorza, 2015; Rocque et al., 2016).

The principal leadership role is a critical factor to the support and succession of dual language programs (Alanís & Rodríguez, 2008; DeMatthews et al., 2019). For emergent

bilinguals, a study indicated that principals are important advocates who support dual language teachers and Latinx immigrant communities to support social justice and effective instruction through the DLI model (DeMatthews et al., 2019). Additionally, principals have the responsibility to support teacher recruitment and provide strategic professional development to sustain dual language programs (DeMatthews & Izquierdo, 2016). The role of the principal is the foundation of DLI because the vision and aligned goals support teachers to provide effective instruction in a supportive teaching environment. Menken and Solorza (2015) found that principals who eliminated DLI programs did not have training in bilingualism, linguistic diversity or bilingual education, while those who had a background in DLI demonstrated strong beliefs to support emergent bilinguals and bilingual education. Principals can leverage dual language programs to support social justice by incorporating language and culture from their students into the classroom, which can promote academic and social growth (DeMatthews & Izquierdo, 2016).

Dual language teachers are evaluated under the same system as traditional monolingual teachers, so it is imperative that local school and district level school administrators are aware of how dual language programs function. When teachers feel as if there is no support for dual language programs, they begin to lean towards an English-dominated curriculum (Alanís & Rodriguez, 2008).

Furthermore, effective program implementation of dual language education is imperative to provide an equitable opportunity for students. The foundation of education begins with effective implementation and monitoring of programs. Although the preceding studies did not deliberately address equity, there are inherent equity concerns when implemented programs do

not receive full support or monitoring. The following section reviews explicit equity concerns related to DLI program implementation.

Dual Language Immersion and the Equitable Access Dilemma

With the increase of the population of English learners in the United States, school districts have increased the number of dual language programs offered at elementary and some middle school levels to promote higher student achievement and meet language needs. A report from the Brookings Institution explained that the population of English learners is rapidly increasing and accounts for 10% of all students in the United States (Quintero & Hansen, 2017). Effective dual language programs maintain characteristics to meet the needs of English learners and native English speakers that include collaboration among school and district staff to maintain equity (Alanís & Rodriguez, 2008).

According to the *Guiding Principles of Dual Language Education* (Howard et al., 2018), dual language education encompasses the goals of bilingualism and biliteracy, high student achievement, and sociocultural competence. In addition, the Center for Applied Linguistics characterizes DLI education as a model that promotes equity among all groups (Howard et al., 2018). However, DLI programs have shifted from prioritizing language of minority students, such as Latinxs, to focusing on providing a language enrichment opportunity for students with limited language or socioeconomic challenges. Dual language program effectiveness can yield higher student achievement for ELs if key areas are addressed during program implementation and monitoring of instructional goals (Alanís & Rodriguez, 2008).

To determine how the Utah dual language program addressed language, Delavan et al. (2017) conducted a critical discourse analysis. Delavan et al. (2017) found that the discourse

among the Utah dual language program targeted and favored predominantly White affluent families by advertising that the program would provide a beneficial skill, instead of encouraging language minority families to participate as a resource for improved achievement.

Valdez et al. (2016) also examined the Utah dual language program by using a critical language policy lens and a mixed methods approach. Valdez et al. (2016) found what appeared to be a gentrification of dual language education through the language of the policy texts, which included phrases such as enrichment education and foreign language immersion. The hegemony of English prevailed through the analysis of the policy texts (Valdez et al., 2016). Despite the citing of the state of Utah in numerous program development cases across the United States, Valdez et al. (2016) reported how a model of dual language education has unintentionally caused inequity through the language of policy texts. Like public educators, the community should understand DLI but not at the expense of discouraging language minority families from taking interest.

In a study of a California middle school dual language program, Hernandez (2017) found that, although Latinx families received DLI programs well, there were still inequities that stemmed from school system labeling of students. In a dual language program, students who have a primary home language other than English are labeled as English learners, but students who are native English speakers in a dual language program do not receive the same label. Because of labeling, English learners are subject to additional testing to measure language growth, which takes them away from instruction more frequently, as well as places them on a continuum to be removed from being identified as an English learner. Native English speakers in the dual language program are not subject to strict criteria or expectations as are native Spanish

speakers; thus, they favor native English speakers. If English learners are subject to assessment of their levels of English, then native English speakers should be tested for language proficiency in the DLI target language as well for measurable success of language acquisition. This equalizer could place all students on the same leveling field to be assessed on their language goals, both English and the target language of DLI (Montague, 1997).

In addition to the label of English learner, Brook-Garza (2015) determined that social class has an instructional impact on Latinx students in two-way bilingual education programs. Through a participatory action research study, teachers provided descriptions and conducted observations of Latinx students during instruction (Brook-Garza, 2015). The teachers shared that native English-speakers shared a middle-class background that gave them an advantage in the classroom in terms of confidence and participation, as opposed to the Latinx students, who came from a shared lower-class background with limited knowledge related to classroom instruction. Overall, the teachers shared that the native English-speakers maintained a dominance in the classroom with participation. This study highlights that even in DLI programs, native English speakers maintain advantages over Latinx students, so teachers should address equity to circumvent a classroom culture that favors one group over the other (Brook-Garza, 2015).

In a study conducted by Scanlan and Palmer (2009), two schools examined how inequalities permeate dual language programs. A cross-case comparison of the schools demonstrated that African American or special needs students were two groups not actively recruited or retained in dual language programs. Palmer (2010) further examined one of the schools and determined that although the school had a large percentage of African American students, there were very few enrolled in the dual language program, which constituted majority

Latinx and White students. The inherent inequality of services at this school to all students brings to light the way in which dual language programs can cater to populations based on local recruitment efforts (Palmer, 2010).

Dual language programs offer benefits to both English learners and native English speakers with additive language abilities. Although DLI bridges language gaps for English learners, other populations, such as students with special needs or African American students, can benefit from learning a second language. These two groups also experience social challenges that have kept them from achieving as well as their White or affluent peers. DLI could be an avenue to provide additional support to marginalized students to achieve academically.

Babino and Steward (2017) interviewed Latinx students to determine their level of engagement and investment with Spanish. The results demonstrated that the students preferred to speak English over Spanish because of the overwhelming presence of English throughout the school and culture. Although these students are in an English-dominant society, DLI provides a setting for students to utilize language and become comfortable in both English and Spanish. As this example shows, if dual language programs do not model an investment in bilingualism and biliteracy, students will not fully engage with language and fall into the hegemonic power of English. This study demonstrates that students will understand the importance of language based on their environment. If students feel more comfortable with English, both native English speakers and English learners, then DLI may not be supporting an environment that promotes all languages equally. Language aligns closely with culture, so if Latinx students feel that English is better than Spanish, then there are issues within a dual language program that places a hierarchy of language and culture that is expressed to students. Within the greater context of the world,

English dominates general communication, but DLI programs are spaces that can equalize language to support student learning.

Through a literature search and respective analysis, Cervantes-Soon et al. (2017) found that several inequalities permeate dual language education programs, so the researchers proposed an additional pillar: critical consciousness. The inequalities discovered by Cervantes-Soon et al. (2017) included the following: (a) two-way immersion programs were more easily accessible to White, English-speaking families, as opposed to Spanish-speaking families; (b) English language hegemony was prevalent in regards to testing and accountability measures; (c) a linguistic imbalance during the instructional day existed with non-classroom blocks such as specials classes; and (d) English dominated communication throughout the school and in the classroom. The addition of the DLI fourth pillar, critical consciousness, could address equity concerns that negatively impact language minority students. Again, the theme of an English-dominated culture arose in this study as others previously described. District and local schools with DLI programs have responsibilities to examine language and culture integration within school culture. Although it is possible to implement DLI on the instructional level in accordance with language of instruction, educators can take further action to ensure language is not used to separate communities and make a ranking order of importance.

Dual language programs are continuing to grow across the country, but the efficacy of these initiatives depends on program implementation and monitoring to measure their effectiveness in meeting specific goals. The *Guiding Principles of Dual Language Education* (Howard et al., 2018) provide a framework for school districts to use when implementing dual language programs at varying levels for all contexts. Researchers concurred that equity was not

addressed appropriately based on recruitment, retention, instructional models, and language use (Alanís & Rodríguez, 2008; Brooke-Garza, 2015; Cervantes-Soon et al., 2017; Hernandez, 2017). Across the studies there was an apparent notion that the hegemony of English prevailed in all schools and community contexts. Observational and interview data demonstrated that the preferred method of communication for students, teachers, and administrators was English. In addition, the emphasis of assessment was a key component regarding the importance of English over Spanish or other target languages. Students participated to standardized measurements developed only in English to demonstrate content mastery. Finally, there were no specific standards for Spanish language instruction in teacher preparation. Teachers who taught in English received stricter certification requirements in academic content but not English language acquisition. Researchers included data that stressed the importance of dual language programs and how English continually dominated over other languages as the preferred language (Alanís & Rodríguez, 2008; Brooke-Garza, 2015; Cervantes-Soon et al., 2017; Hernandez, 2017).

Purposeful examination of dual language program implementation is integral to provide equity for all students (Cervantes-Soon, et al., 2017). The intent of dual language programs is not to be premier programs, but methods to address language barriers that many English learners face when in a traditional public school. If dual language programs are advertised only as additive opportunities to communities that have resources and limited language challenges, then the purpose of DLI programs is null and void. Determining the goals of DLI programs requires the defining of equity locally at school and district levels. If left unattended, school districts create an inequitable balance in public education by gearing dual language programs to students who are already ahead and do not necessarily need language support. Several studies have found

DLI programs bring about equity for English learners and Latinx students, so how can school districts take a more critical look at holding true to the program's purpose?

Theoretical Framework: Second Language Acquisition Theory

This study used the second language acquisition theory (Cummins, 1979) to understand the relationship between academic and social language as it relates to Latinx English Learner student ELA and mathematics achievement data (Cummins, 1981a, b; Cummins & Swain, 1986). DLI programs support second language acquisition through the consistent exposure to comprehensible input and language development from peers and instruction, which support promoting success for language-minority students (Cummins, 1981b). Cummins and Swain (1986) differentiated second language acquisition theory through Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP). Cummins (1979, 1980, 1981a) found that supporting students learning social language prior to academic content language increases overall language proficiency. According to Cummins (2008), the distinction between BICS and CALP is that “BICS refers to conversational fluency in a language while CALP refers to students’ ability to understand and express, in both oral and written modes, concepts and ideas that are relevant to success in school” (p. 487). Cummins (2008) argued the importance of measuring students separately based on CALP and BICS because students receive exposure to different types of language at different ages. Additionally, Cummins (1980) developed the Common Underlying Proficiency Model of Bilingualism that explains how bilingual students can bridge literacy-related skills between languages to transfer learning. As students learn academic skills in their first language (L1), they are better able to transfer knowledge and understanding to the new language they are learning (L2).

The contributions of Cummins's second language acquisition theory have led to various measures to support English learners. The BICS/CALP distinction has supported designated funding for English learners, instructional support for conversation and academic English, adjustment of English Learner participation in high-stakes testing, and reevaluation of psychological testing for English learners based on their English language proficiency (Cummins, 2008).

Summary

This chapter provided insights into historical, legal, theoretical, and empirical perspectives of equity of culture and language in DLI. Dual language programs are examples of how educators can infuse culturally relevant pedagogy into content curriculum and bridge background knowledge of Latinx English learners from Spanish-speaking backgrounds. Through the deliberate use of Spanish in dual language programs, the curriculum lends itself to offering students' academic content knowledge in a language-specific context (Alanís & Rodriguez, 2008; Brooke-Garza, 2015). The intertwining of language and culture can have positive effects on student achievement for Latinx students. To meet the foundational goals of bridging language and academics for English learners, the deliberate efforts of school administrators and teachers are critical for dual language programs. The ability to navigate the world as bilingual and bicultural can provide students experiences to change themselves and their knowledge. All students can benefit from a dual language program, but dual language programs should not stray away from the core purpose: providing an educational experience to English learners so they can bridge language and excel academically in a language-supported environment (Alanís & Rodriguez, 2008; Brooke-Garza, 2015).

Although DLI programs offer an innovative instructional model to address language, equity has become a critical area that takes importance away from effectively addressing language needs of Latinx English learners. Dual language programs have become language enrichment opportunities for predominantly White and affluent communities instead of an avenue to address marginalized communities' instructional needs, specifically Latinx English learners. Latinx English learners have—and continue to—perform well below their monolingual peers in terms of academic achievement. The achievement gap of language learners prompted the development of dual language programs, but now studies have demonstrated how school districts and local schools have shifted to making dual language programs a pinnacle program for the well-educated and wealthy.

With the increase in the number of dual language programs across the United States, DLI is still a relatively new educational model, and many programs are still in the early phases of implementation. While there is a need to bridge language gaps for Latinx English learner students, the implementation of dual language programs should occur only if equity is a factor in program development. The state of Utah is one of the pioneers of dual language education and a model for many other states, but even so, researchers have uncovered inequities (Delavan et al., 2017; Valdez et al., 2016).

Research on equity in dual language programs is important for the success of language learning support for English learners and Latinx students. If left unattended, DLI programs could become a model program to continue to advance students who come from families with generational success and consequently continue to leave behind marginalized communities such as Latinx English learner students. With that in mind, the goal of the research was to determine if

a DLI program impacted Latinx English learners in the New Latino Diaspora by examining student achievement results on district reading and mathematics assessments. The researcher examined a diverse urban school to determine how a DLI program supported Latinx English learners in the New Latino Diaspora. In addition, this examination of schools provided information on how a school district supported DLI programs and how closely equity aligned to program initiatives to support all Latinx English learners. Chapter 3 presents the research design and methodology chosen by the researcher to accomplish this goal.

CHAPTER 3

METHODOLOGY

Latinx English learners have increased in population tremendously over the past few decades, yet there is little research done on the impact of DLI programs and their effectiveness to support the language needs of the students in the context of the New Latinx Diaspora. The purpose of this quantitative study was to determine if there was a significant difference in mean achievement between the reading and mathematics scores for Latinx English learners enrolled in a DLI program compared to Latinx English learners enrolled in a traditional education model in the same school. The researcher chose a quantitative retrospective comparative analysis design to compare the achievement levels among the students studied in the dual language program and those not in the program at the same school. This chapter includes a reiteration of the research question and descriptions of the research design, participants, ethical procedures, data collection procedures and instruments, and data analysis.

Research Question Reiterated

The following research question guided this investigation: What is the difference in student reading and mathematics achievement data for Latinx English learners who participated in an elementary dual language immersion program and Latinx English learners who participated in a traditional program in the same elementary school?

The corresponding hypothesis to the research question was as follows: There is a statistically significant difference in student reading and mathematics achievement data for Latinx English Learner students who participated in an elementary dual language immersion program and Latinx English Learner students who did not in the same school.

Research Design

This study used a retrospective two group comparative design to measure the difference of a treatment group compared to a nontreatment group. The independent variables included in this study were educational program models that included DLI (treatment) or traditional models (nontreatment). The dependent variables were the reading and mathematics student achievement outcomes of approximately 248 students; half of the students were from the DLI program, and the researcher selected the other half of students using random sampling from the traditional education program. Random sampling was used to equalize the number of students in both groups, since there were far more students enrolled in the traditional education model for grades first through fifth. The researcher retrieved data from a local school Microsoft Excel spreadsheet to determine specific assessment results for each student, then entered the data into SPSS with categorical data for nominal data that included ethnicity, English Learner classification, and grade level. Data analysis involved examining district reading and mathematics assessment data from one school with a Spanish DLI program and traditional program. To analyze the difference among the groups, the researcher used a two-way MANOVA to compare two different means for the various comparisons.

Participants and Study Site

The researcher retrieved student achievement data from an elementary school with a DLI Spanish language program and traditional education program in first through fifth grades. The dual language program consisted of a cohort model where two classes of each grade level received 50% of their instruction in English for ELA and social studies, and 50% of their instruction in Spanish for Spanish language arts, mathematics, and science. The students in the

traditional program for the remaining classes on each grade level received all instruction conducted in English for all content areas.

The study site was a large, suburban metro-Atlanta elementary school with a total student enrollment of about 1000 students in grades kindergarten through fifth. Eighty-seven percent of students qualified for free and reduced lunch. Student demographics were as follows: 79% Hispanic/Latino, 10% Black/African American, 5% Asian, 3% White, and 2% Multiracial, two or more races. For instructional needs, 12% were in special education, 6% qualified for gifted services, and 70% of students were English learners.

Ten dual language teachers taught one class each containing 20 to 30 students. The number of students in each class was lower in upper grades third through fifth with general attrition from the program. The researcher solicited student achievement data from classes that were not part of the DLI program as part of the comparison. The student data used for this study derived from locally developed district assessments administered in English. The data used in this study included only student achievement data from first through fifth grade level students during the 2021-2022 school year. The researcher did not solicit data of individuals who were not part of the first through fifth grade levels or outside of the school.

Protection of Subjects and Participants

The researcher conducted the collection of data solely by requesting raw data scores and demographic information from the school study site. For the purposes of the Mercer University institutional review board (IRB) (Appendix A) and the protection of students' anonymity, the researcher did not use student identities. The purpose of this study was to explore DLI learning to provide recommendations for further curriculum development, inclusion, and educational

leadership. This study did not seek to cause any students or staff physical, emotional, or social harm or place them at risk in any part of the research process.

Research Procedures

The researcher followed these procedures in the conducting of this study:

- received Mercer IRB approval;
- received local school approval;
- emailed initial meeting request to local school principal to discuss requested data;
- set up meeting within 2-3 weeks to gather data;
- after two weeks of data review, emailed principal for any additional data needed for study;
- input data into SPSS software for a two-way MANOVA analysis.
- Password protected data so only the researcher had access to student assessment scores.

Instruments

The data collected in this study from the local school generated from end-of-year reading and mathematics district assessments developed by the district assessment office for grades first through fifth grade. A review of the assessments occurs annually, with input from local and district level teachers, content experts, and curriculum specialists for reliability and validity. The assessments are administered to all students in grades first through fifth grade in the district four times a year: October, December, March, and May. Administration of the assessments is typically in an online format for students, with optional paper and pencil formats for student accommodations. The local school uses the district assessment data to inform local school

improvement plans and measure instructional effectiveness to meet individual student needs. Each assessment consists of 21-24 multiple choice questions and a constructed response portion, rated using a standard rubric by grade level. The assessments, developed with varying levels of depth of knowledge, address grade level standards. End-of-year reports are generated to identify key standards that support teacher planning to bridge learning gaps throughout the year. The district assessments align to the state standardized tests administered to students in grades third through eighth. Each school has access to the district assessment data yearly. The cut scores for proficiency level for grades first through fifth are Beginning Level 0-54.99, Developing Level 55-69.99, Proficient Level 70-84.99, and Distinguished Level 85-100. The researcher solicited the data from the local school administration, which then shared the data using Microsoft Excel spreadsheets. The data had identified demographic information, but all personal information such as student identification numbers and names were omitted.

Measures

The forms of assessments, reading and mathematics, provided by the district determined the independent variables. For the purpose of this study, reading and English Language Arts is used synonymously. Thus, the independent variables were the forms of educational programs that included DLI or traditional models. The dependent variables were student achievement average numerical scores with a cut for levels of proficiency as a result of participation in a dual language program or a traditional educational model. The cut levels varied for each assessment that included beginning level, developing level, proficient level, and distinguished levels based on numerical percentages for mastery.

Data Analysis

The researcher entered the data into SPSS and used a two-way MANOVA to compare the data of Latinx English learners who participated in a DLI program and those who participated in a traditional education program. The data had demographic data, such as English Learner program participation and grade level. Upon receipt of the data, the researcher analyzed gaps to account for missing values, outliers, and appropriate assumptions. The researcher chose two-way MANOVA for this analysis because it was appropriate to compare two groups for each grade level, students who participated in a DLI program and those who did not, with multiple related continuous dependent variables that included reading and mathematics achievement scores.

Summary

The purpose of this study was to determine the academic achievement differences of Latinx English learners enrolled in an elementary DLI program in the New Latinx Diaspora and Latinx English learners enrolled in a traditional education program in the same school to understand the achievement gap. The research explored the difference in students' reading and mathematics achievement data for Latinx English learners who participated in an elementary DLI program and Latinx English learners who participated in a traditional program in the same elementary school. The participants in the study were student achievement results for Latinx English learners in a DLI elementary program and those in a traditional program in the same school. The researcher used a quantitative comparative analysis to determine a difference between student district assessment results for Latinx English learners in a DLI program and those who were not in a DLI program. Using a two-way MANOVA, the researcher compared group means by grade first through fifth in an elementary school with a high density of Latinx

English learners in a large urban school district. Chapter 4 presents the results the data collection and analysis.

CHAPTER 4

RESULTS

In the present study, the researcher examined the effect of a DLI model and a traditional educational model on student ELA and mathematics scores in an elementary school for grades first through fifth. In this chapter, the researcher first explains fidelity of implementation, data cleaning, and assumption checking procedures. Then the researcher provides descriptive statistics analyses. Following this, the researcher reports the comparison of student achievement results for ELA and mathematics in a two-way MANOVA. Lastly, the researcher reports the results based on the data analyses.

Fidelity of Implementation

The data used in this study derived from district developed end-of-year assessments for grades first through fifth for reading and mathematics. The yearly assessments receive input from local and district level teachers, content experts, and curriculum specialists for reliability and validity. The students involved in the educational models are enrolled students from the school district and local school site. The students participated in DLI or traditional educational models at the selected school, as verified through course rosters from the school site.

Data Cleaning Procedures

To establish equal groups, the researcher collected data through random sampling from students in the traditional model and all students enrolled in the DLI program at one elementary school. The student data included both reading and mathematics scores; however, there were some instances where data were not available for both subject areas, which prevented true random sampling. For the participants with a missing ELA or mathematics score, the researcher

used an identified variable to identify the missing score. For missing values, the researcher used a code to account for the missing information during data analysis. The researcher eliminated the information of students with missing data in both categories, due to absences during the test administration, from the dataset. Some outliers in the grade levels were present but verified as valid; thus, they remained in the dataset for analysis because they indicated students' actual scores.

Assumption Checking

A two-way multivariate of analysis (MANOVA) was the most appropriate statistical analysis for this data because the researcher was examining the interaction effect of two independent variables that included grade levels, first through fifth grades, and educational program types, traditional education program and DLI program, on student academic achievement results for ELA and mathematics end-of-year assessments. The sample size included 248 individual student data points that included ELA and mathematics end-of-year assessment results. Normality was assumed due to central limit theorem because of the large sample size (see Appendix B). There were 11 student scores between the DLI and traditional program that were univariate outliers. These scores remained in the sample as they were true representations of the student scores, and omission of the scores did not change the analysis. There was no multicollinearity because the Pearson Correlation was $r = .606$, which is between 0.30 and 0.90 (see Appendix C). The linearity was assessed using a scatterplot matrix, and the assumption was met (see Appendix D). There were no multivariate outliers per the Mahalanobis distance, with a critical value for 2 df greater than 13.82; the largest value was 9.49. Box's Test of Equality of Covariance Matrices showed that the assumption was met for $p > .001$, Box's $M =$

4.76, $F(27) = 1.60$, $p = .025$. Homogeneity of variance was checked using Levene's Test; the assumption was met, for both the ELA, $p = .037$, and math $p = .034$.

Descriptive Statistics

The two independent variables included the grade levels and type of educational program. The grade levels used in this study included grades first, second, third, fourth, and fifth grades in an elementary school that provided two types of education programs: a traditional program and a DLI program. The two dependent variables included student assessment score results from district end-of-year assessments for ELA and mathematics.

Descriptive analyses of the data showed that first grade students had the highest ELA and mathematics mean score in the DLI program and traditional program. Fifth grade students scored the lowest ELA mean scores in the DLI program and traditional program. For mathematics, fifth grade students scored the lowest mean score in the DLI program, while second grade students scored lowest in the traditional program. As a total mean score for both DLI and traditional programs, fifth grade students scored the lowest for ELA and mathematics (see Table 1). There was a total of forty-six students, twenty-six in DLI and twenty in the traditional program, who scored at the proficient levels for English language arts and eighty-two students, forty-three in DLI and thirty-nine in the traditional program, who scored at the proficient levels for mathematics.

Table 1*Means and Standard Deviations of ELA and Math by Scores, Program, and Grade Level*

	Type of Program	Grade Level	Mean	Std. Deviation	N
ELA Score	DLI Program	1	59.48	21.55	27
		2	48.26	17.10	23
		3	57.31	26.79	23
		4	48.24	18.56	31
		5	41.79	19.39	20
	Traditional Program (Non-DLI)	1	58.03	21.38	27
		2	41.30	17.53	23
		3	44.87	18.04	23
		4	42.92	22.38	31
		5	36.36	21.98	20
Math Score	DLI Program	1	69.85	19.90	27
		2	66.26	17.70	23
		3	58.10	23.31	23
		4	52.56	19.77	31
		5	48.13	14.33	20
	Traditional Program (Non-DLI)	1	68.08	22.45	27
		2	50.93	25.42	23
		3	51.78	24.63	23
		4	53.10	26.83	31
		5	54.17	23.84	20

Instructional Program and Grade Level Interaction

A two-way MANOVA was used to determine if there was an interaction effect between the two independent variables, program type and grade level, on the two combined dependent variables of ELA and mathematics scores. The results revealed there was not a significance interaction effect between programs and grade level, $F(8, 476) = 1.16, p = .321, V = .04$. There was no difference for student achievement mean scores from participants in either DLI or traditional program and their grade levels. The results did not support the research hypothesis, and the researcher was not able to reject the null hypothesis. Therefore, follow up one-way MANOVAs were used to determine if there was significance by instructional program and grade level independently.

A one-way MANOVA conducted for instructional program showed no significance main effect between programs, so there were no differences between the DLI program and traditional program with $F(2, 237), p = .60, V = 2.84$. There was no difference of student achievement mean scores for participants in DLI or traditional programs. There was a significant main effect for grade levels and academic achievement, $F(8, 476) = 4.25, p < .05, V = .13, \text{partial } n^2 = .07$. The data showed that the participant mean score by grade level demonstrated a difference for students in DLI and traditional programs by grade level.

Post hoc comparisons using Tukey (see Appendix E) demonstrated significant differences between ELA scores for first graders and all grades except for third grade, $p = .349$. There were also significant differences between first grade mathematics scores for all grades except for second grade, $p = .141$. First grade participants' mean scores for ELA and mathematics

demonstrated higher scores for all grade levels except for third grade ELA and second grade mathematics.

Summary

This chapter reported the analysis of student achievement results for ELA and mathematics student scores from DLI and traditional education models in grades first through fifth grade using a two-way MANOVA. The researcher conducted a two-way MANOVA and did not find an interaction effect between grade level and program. To determine if there were differences by grade level or program the researcher conducted two one-way MANOVAs. The two-way MANOVA demonstrated that there was no significance of student achievement for students in the DLI program or traditional program for ELA or mathematics. The one-way MANOVA demonstrated that there was significance with first grade compared to second, fourth, and fifth grades for ELA. Additionally, the one-way MANOVA demonstrated that there was significance with first grade compared to third, fourth, and fifth grades for mathematics. Overall, first grade had higher mean scores, while fifth grade had the lowest mean scores for both ELA and mathematics. Chapter 5 presents a summary of results, limitations of the present study, and recommendations for future research.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This quantitative research study sought to determine if DLI programs impact student achievement data of English learners as compared to their peers in traditional programs. Because of the New Latinx Diaspora, this study focused on student achievement results for English learners in ELA and mathematics on year-end district assessments for students in a DLI and traditional educational settings in an elementary school. The researcher used quantitative statistical analysis to compare end-of-year assessments in a large urban school district that provided a DLI program and a traditional program in grades first through fifth for English learner students. The participants included 248 students identified as English learners in an elementary school that implemented both DLI and traditional programs. The significance of this research lies in its ability to help district level and local school administrators understand the impacts of academic achievement of English learners who participate in DLI programs as compared to traditional programs.

Statement of the Problem Revisited

Schools in the United States are continuing to enroll English learners across all states, especially the New Latinx Diaspora (USDOE, n.d). The urgency for schools to address learning needs of English learners with programs like DLI have increased, but there are gaps when DLI focus on being a commodity as opposed to a language support (Alanís & Rodríguez, 2008; Brooke-Garza, 2015; Hernandez, 2017). Dual language programs in the New Latinx Diaspora are based on prior research, but these programs require review for academic impact on English

learners who could benefit from native language instruction (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002).

Research Question Revisited

To determine if DLI and traditional instructional models had different impacts on student achievement for English learners in ELA and mathematics, the researcher developed the following research question to guide this study: What is the difference in student reading and mathematics achievement data for Latinx English learners who participated in an elementary dual language immersion program and Latinx English learners who participated in a traditional program in the same elementary school?

Summary of Major Findings

This study demonstrated several findings related to the interaction between DLI and traditional instructional models and student achievement for ELA and mathematics. There were no differences between the scores of students enrolled in the DLI program compared to the scores of students enrolled in the traditional program. There was a difference of mean scores by grade level where first grade students performed significantly higher than second, fourth, and fifth grade students in ELA. Additionally, there was a difference of mean scores by grade level where first grade students performed significantly higher than third, fourth, and fifth grade students in mathematics.

Discussion of Major Findings

This study examined a diverse urban school to determine how a DLI program supported Latinx English learners in the New Latino Diaspora. In addition, this examination of schools provided information on how a school district supported DLI programs and how closely equity

aligned to program initiatives to support all Latinx English learners. The goal of the research was to determine if a DLI program impacted Latinx English learners in the New Latino Diaspora by examining student achievement results on district reading and mathematics assessments. The following sections provide a discussion of the major findings in regard to DLI versus traditional program, ELA performance, math performance, and overall achievement.

Dual Language Immersion Versus Traditional Program

In past studies, students enrolled in DLI generally outperform students in traditional programs (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). The results of this research do not agree with other studies, as student scores from the dual language program were lower than student scores from the traditional program. There is limited research of DLI student achievement gains in the New Latinx Diaspora since most research for DLI has been conducted in traditional Latinx diaspora regions. The results of this research study revealed additional research is necessary to understand other factors that affect student achievement scores. Factors such as entry into the United States were not considered as part of the sampling, so there could have been students who recently entered the country and failed to benefit from DLI from kindergarten through fifth grades. The data show that English learners were making similar gains in both programs, but that DLI did not overwhelmingly impact English learners. The data collected demonstrated that students who received DLI education performed comparable to their peers in traditional settings.

While the student achievement results did not show higher gains in DLI, students in the DLI program were able to learn in their native language of Spanish, which can support their bilingualism. Although this study did not measure bilingualism, it is important to note that there

may be additional positive results for English learners who participated in DLI, such as culturally relevant instruction that supports engagement in their native language in the classroom (Camacho et al., 2018; Martínez-Roldán & Heineke, 2011; Monzó & Rueda, 2001; Stuart & Volk, 2002). Additionally, since students in the traditional program did not have significant differences from the DLI program, there are not enough data to support that one way is more effective for academic language. Measures should be included to determine the language development of all participants to ascertain language growth, which can result in more significant student outcomes in later years (Cummins, 2000, 2008; Cummins & Swain, 1986).

English Language Arts (ELA)

This research study indicated that, although by program the results for student scores in DLI were not higher than students in the traditional program, there were differences in ELA student scores for first grade when compared to second, fourth, and fifth grades. First grade students performed higher than the other grade levels except for third grade. First grade students received the same instructional model of DLI as the other grade levels, which included 50% English and 50% Spanish instruction.

According to the *Guiding Principles of Dual Language Education* (Howard et al., 2018), programs should consider factors such as staff quality, professional development, family and community, support resources, curriculum, instruction, and program structure to support high quality DLI programs. This research study did not examine qualitative factors related to program implementation that could reveal factors related to the student outcomes. Additionally, data analysis did not include teacher preparation and administrative training, which could account for instructional strategies used in DLI programs (Alanis & Rodriguez, 2008; Howard et al., 2018;

Palmer et al., 2015). Teacher effectiveness, which is supported through adequate training and monitoring from local school administrators, has a direct impact on student achievement in DLI classrooms (del Rosario Zavala, 2017; Lachance, 2018; Ramirez et al., 2020).

Mathematics

Comparable to ELA, there was not a difference in student scores for DLI when compared to the traditional program for mathematics. However, there were higher scores for students in DLI for first grade compared to third, fourth and fifth grades for mathematics. First grade students had higher mean scores than all other grade levels except for second grade.

Similarly to reading, several qualitative factors not analyzed in this research study may have impacted the mathematics scores. The DLI program used in this research study focused on Spanish language instruction during mathematics and science. According to Turner et al. (2020), the use of Spanish as a means to support mathematics learning helps English learners focus on the content knowledge and lessens the challenges of the English language. Additionally, student perception of appreciation and integration of their culture and language in the classroom can support student learning (Battey, 2013). Howard et al. (2018) recommended using the *Guiding Principles of Dual Language Education* to understand factors of program implementation that affect overall student outcomes.

Achievement

The number of dual language programs in the New Latinx Diaspora has increased over the years as the enrollment of English learners in public K-12 schools has increased (Hamann, 2003; Hamann et al., 2015; Murillo & Villenas, 1995; USDOE, n.d). This increase in English learners has prompted the large expansion of dual language programs to address language

acquisition through core academic instruction (American Councils for International Education, 2021). Given the increase of English learners and Latinx students in the United States, many of the dual language programs have been implemented in the New Latinx Diaspora (Hamann, 2003; Hamann et al., 2015; Murillo & Villenas, 1995). This research indicates that English learners in a DLI program did not demonstrate differences on their ELA or mathematics assessments when compared to their peers in traditional programs at a school in the New Latinx Diaspora. Most research related to DLI programs has occurred in traditional Latinx states; whereas this research was in the New Latinx Diaspora, where dual language programs have increased dramatically (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). This research was conducted in the southeastern part of the United States in a large urban school district that had DLI programs as strands in some high-density English learner communities (Sugarman & Geary, 2018). The results indicate an evaluation of the program is necessary to determine if program goals align to support ELs, or if the program is focused as a commodity to recruit native English speakers to learn a second language as an additive skill.

Although the results of this study indicate no differences between English learners in the DLI and traditional programs, the results did show that English learners are comparable with student achievement for ELA and mathematics. Further examination of the dual language programs, such as program implementation, can be included to determine how bilingualism is developed to support academic achievement (Cummins, 2000, 2008; Cummins & Swain, 1986). English learners in the dual language program received half of their instruction in Spanish, so they could continue learning in their native language, which can support bilingualism. Additional

measures can be included to measure bilingualism, but for the purpose of this study, only student academic achievement in ELA and mathematics were analyzed.

Limitations of the Study

This research study was conducted in the New Latinx Diaspora where there has been a recent influx of Latinx English learners enrolled in public schools. The school district used in this study was new to DLI compared to schools where the majority of DLI research has been conducted. The number of participants was also small compared to the overall number of ELs in the school district. Additionally, the students who participated in either the DLI or traditional program had entered the United States at various years, which could have impacted the overall student achievement results of DLI. Although data cleaning was conducted, the mobility rate of student enrollment in the selected research site reflects the participant data collected. The elementary school study site was an urban area with a higher percentage of students who transferred in and out of school due to movement of families in and out of the United States.

There were some gaps in data for students in this research study due to assessment score availability. Additionally, enrollment in the program over a period was not assessed to determine if English learners who were in the DLI program longer would have demonstrated higher performance on the assessments. The mobility rate of students in both the DLI and traditional group was not analyzed to determine how student attrition of enrollment and withdrawals from school over their kindergarten through fifth grade schooling would have impacted their education.

The data analysis resulted in statistical conclusions with confidence. The data did not support causation because there were no statistical differences between DLI and traditional

programs. However, there were differences among first grade scores in ELA and mathematics where the students performed higher than other grade levels. Prior research indicates that high-performing DLI programs utilize the *Guiding Principles of Dual Language Education* (Howard, et al., 2018). Further case study analysis of the school in this research study can address components of program implementation that could identify areas of the first-grade program and high performance compared to other grade levels. The measurements of the putative constructs were fully adequate because the study used district-developed assessments evaluated on an annual basis for validity and reliability. This research study can provide local and district level administrators of DLI programs information to address the needs of English learners. However, due to sample size and varying demographic data related to entry into the United States and English proficiency, results cannot be generalized to all English learners.

Implications

This research study supports that English learners in DLI programs have the potential to perform just as well as their peers in traditional programs (Collier & Thomas, 2004; Thomas & Collier, 1997, 1999; Thomas et al., 2002). This study did not show differences, but it revealed that English learners still demonstrated similar academic results when receiving DLI instruction. School districts that seek to implement DLI programs to support English learners can gain understanding that English language acquisition has an impact on instruction, but the additive component of bilingualism can support students with academic content while meeting grade level standards. It is important to understand that further case study analysis is necessary to measure the program implementation based on the *Guiding Principles of Dual Language Education*. Factors such as staff and administrator training, community dynamics, teacher and

student attrition may have been present in the DLI program in this research study and may have impacted overall scores. Additionally, program goals should be assessed to determine the metrics to utilize DLI as an English language support for academic knowledge. Further program analysis can provide greater understanding of DLI in the New Latinx Diaspora.

It is also important for school districts to understand the demographics of their English learners to determine the total impact of DLI over a period, as demonstrated in prior research (Collier & Thomas, 2004; Thomas & Collier, 1997, 1999; Thomas et al., 2002). Due to limitations, additional data such as teacher experience, professional training, leadership training, among others were not analyzed in this study. This approach to the research provides an opportunity for researchers to examine student outcomes of DLI programs in the New Latinx Diaspora where DLI research is limited.

When determining if implementation of a program such as DLI is appropriate, it is necessary to address further questioning of the program goals. DLI can serve as a support for English acquisition through core academic content instruction. Although the results of this study demonstrate no differences, there may be additional positive results from DLI, such as biliteracy and multiculturalism. Given the nuances of student demographics, mobility, and entry date in the United States, it is not feasible to generalize the results of this research study; however, DLI can be an avenue to engage students in education and provide them language equity to access the curriculum (DeMatthews et al., 2017; Gonzalez-Carriedo et al. 2016; Howard et al., 2018; Paciotto & Delany-Barmann, 2011).

This research study showed that the traditional program scores were not higher than DLI, but there are components of traditional programs that may lack support of bilingualism or

multiculturalism that DLI provides to English learners. Understanding that U.S. classrooms are heavily populated with English learners, school districts, especially in the New Latinx Diaspora, can consider educational models like DLI to engage students in their learning through language to provide equity of education to engage students in culturally relevant classrooms (Camacho et al., 2018; Martínez-Roldán & Heineke, 2011; Monzó & Rueda, 2001; Stuart & Volk, 2002).

Schools have the obligation to meet each student's learning needs, including language needs, to support student achievement.

As U.S. schools become more diverse ethnically and linguistically, DLI can provide students opportunities to thrive academically and support English language development. The present study brings attention to the complexity of schools in the New Latinx Diaspora with high numbers of English learners and implementation of DLI programs. School districts should identify the program goals of DLI to support schools with program implementation. The current district in the study focused DLI as a way for students to learn a new language, such as Spanish, for English speakers rather than focus DLI as a support for English learners. The data from this study show that program implementation should be evaluated to determine how program goals align to student language needs based on student demographics and school dynamics.

Recommendations for Future Research

The current study has provided the field of DLI a new perspective on the academic achievement of English learners in DLI programs at high-density English learner schools. Based on prior research, the present study did not yield similar results where students in DLI programs outperformed students in traditional programs (Collier & Thomas, 2004; Lindholm-Leary, 2001,

2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). Future research should include a case study utilizing mixed methods to understand the factors that affected both groups.

This study highlighted how student achievement outcomes from the New Latinx Diaspora compare with established DLI programs in the traditional Latinx Diaspora. Given that the New Latinx Diaspora is new to DLI, school districts should consider evaluating program implementation to understand the support needed for schools in high-density English learner schools to use DLI as a language support rather than a commodity for native English speakers. Further research can help identify the factors, such as teacher experience or instructional strategies, that support language development and academic achievement gains for English learners in DLI programs as programs continue to expand in school districts.

There are opportunities for school districts to assess program implementation and address student needs based on student demographics to account for variables that may have impacted the present study. Further review and exploration of teacher and leader training in the New Latinx Diaspora may help determine gaps of language understanding in DLI and traditional programs to meet the needs of English learners. Prior research overwhelmingly supports DLI as a method to support English learners as compared to traditional programs, yet the present study showed little difference between the two groups (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002).

Understanding the program goals and district and school level support from administrators and instructional coaches can help identify opportunities for improvement. Schools in the New Latinx Diaspora are still new to DLI; thus, they have much to learn from schools with an established DLI program that has yielded typical results of positive student

learning. Learning models such as DLI require monitoring and implementation to support English learners. Since DLI programs are relatively new to Georgia, school districts should provide more time to develop strategic programs supported by professional development and financial obligations to fully implement dual language programs according to the *Guiding Principles of Dual Language Immersion* (Howard et al., 2018).

Additionally, more research in schools with high mobility rates of English learners new to the country who move among schools can provide data to support modifications to DLI programs to meet student needs based on their entry points into DLI programs. Students who enter DLI programs in upper elementary grades from third, fourth or fifth grades may not yield the same academic or language gains as students who participated from kindergarten, so they may benefit from modified DLI models. Improvements upon this research can include focusing on students who have been in the program for their entire elementary years; however, this can impact sample size, as the school site in this study had high mobility (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). Additionally, schools that offer DLI programs see typical attrition as families move in and out of schools, which impacts class sizes as students matriculate through the upper grades. When schools add to their classes, this can skew overall data, but it is a reality of schools to keep their programs thriving for their school communities. Inasmuch as possible, a larger sample size from multiple schools with similar English learner demographics can support further generalizability of the study. Schools with high-density numbers of English learners are ideal to include in a larger study to determine more consistent data across the New Latinx Diaspora.

Summary of the Study

The purpose of this quantitative study was to determine if DLI programs are supporting English learners in the New Latinx Diaspora to close the student achievement gap. The researcher used data from ELA and mathematics end-of-year district assessments of English learner students in DLI and traditional instructional classroom settings from the 2021-2022 school year from grades first through fifth from a single school in a large urban school district. In total, the researcher analyzed 248 individual student scores, half from students enrolled in the dual language program and half from students enrolled in the traditional program.

This study found that there was no difference in student achievement for English learners in the DLI program when compared to the traditional program for all combined grade levels. However, there were differences in first grade scores, which had higher mean scores in both ELA and mathematics when compared to other grade levels. Student assessment results in the DLI program were comparable to student assessment results in the traditional program. The findings highlight that the dual language program within the New Latinx Diaspora did not yield similar results as in previous studies where students in the dual language program performed significantly higher than their traditional program peers (Collier & Thomas, 2004; Lindholm-Leary, 2001, 2012; Thomas & Collier, 1997, 1999; Thomas et al., 2002). Additionally, this study highlights that, although the results were not higher for students in the dual language program, English learners still achieved comparable results with an additive bilingual instructional support, which can have academic impact in middle or high school years.

The findings of this study support the need for the conducting of additional research related to DLI programs in the New Latinx Diaspora. Further data analysis of student

achievement results for English learners in dual language programs and traditional programs can have long-term implications for program implementation. School districts in the New Latinx Diaspora that seek to address learning needs of English learners should review dual language programs to determine English learner supports to enhance program implementation that bridges language and academic content to yield stronger language acquisition and improve student achievement.

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APPENDICES

APPENDIX A
IRB APPROVAL

MERCER
UNIVERSITY
*Institutional Review Board
For Research Involving Human Subjects*

Monday, July 25, 2022

Mr. Gabriel L Zaragoza
3001 Mercer University Drive,
Educational Leadership
Atlanta, GA 30341

RE: A Quantitative Analysis of Latinx English Learner Reading & Mathematics Achievement in a Dual Language Immersion Program in the New Latinx Diaspora (H2207181)

Dear Mr. Zaragoza:

On behalf of Mercer University's Institutional Review Board for Human Subjects Research, your application submitted on 22-Jul-2022 for the above referenced protocol was reviewed in accordance with the 2018 Federal Regulations 21 CFR 56.110(b) and 45 CFR 46.110(b) (for expedited review) and was approved under category(ies) _5 per 63 FR 60364.

Your application was approved for one year of study on 25-Jul-2022. The protocol expires on 24-Jul-2023. If the study continues beyond one year, it must be re-evaluated by the IRB Committee.

Item(s) Approved:

This research study will provide additional insight on how dual language immersion programs can influence Latinx English Learner student achievement for grades first through fifth in reading and mathematics in the New Latinx Diaspora.

NOTE: You **MUST** report to the committee when the protocol is initiated. Report to the Committee immediately any changes in the protocol or consent form and **ALL** accidents, injuries, and serious or unexpected adverse events that occur to your subjects as a result of this study.

We at the IRB and the Office of Research Compliance are dedicated to providing the best service to our research community. As one of our investigators, we value your feedback and ask that you please take a moment to complete our Satisfaction Survey and help us to improve the quality of our service.

It has been a pleasure working with you and we wish you much success with your project! If you need any further assistance, please feel free to contact our office.

Respectfully,



Ava Chambliss-Richardson, Ph.D.
Director of Research Compliance
Member
Institutional Review Board

"Mercer University has adopted and agrees to conduct its clinical research studies in accordance with the International Conference on Harmonization's (ICH) Guidelines for Good Clinical Practice."

Mercer University IRB & Office of Research Compliance
Phone: 478-301-4101 | Email: ORC_Mercer@Mercer.edu | Fax: 478-301-2329
1501 Mercer University Drive, Macon, Georgia 31207-0001

APPENDIX B
ASSUMPTION CHECKING

FIGURE B1

DLI Program

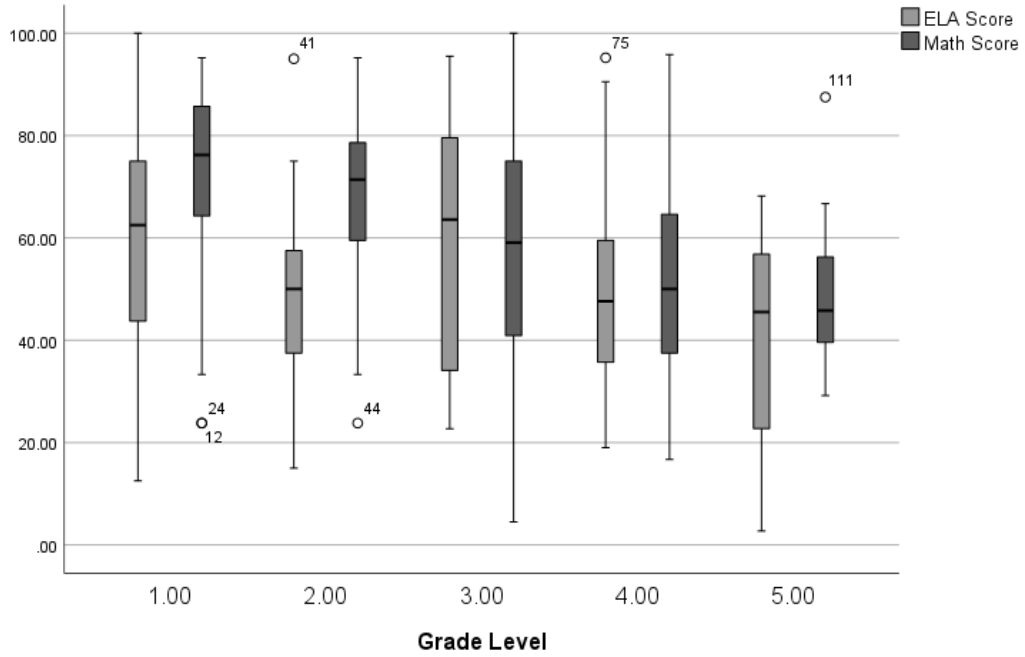


FIGURE B2

DLI Program

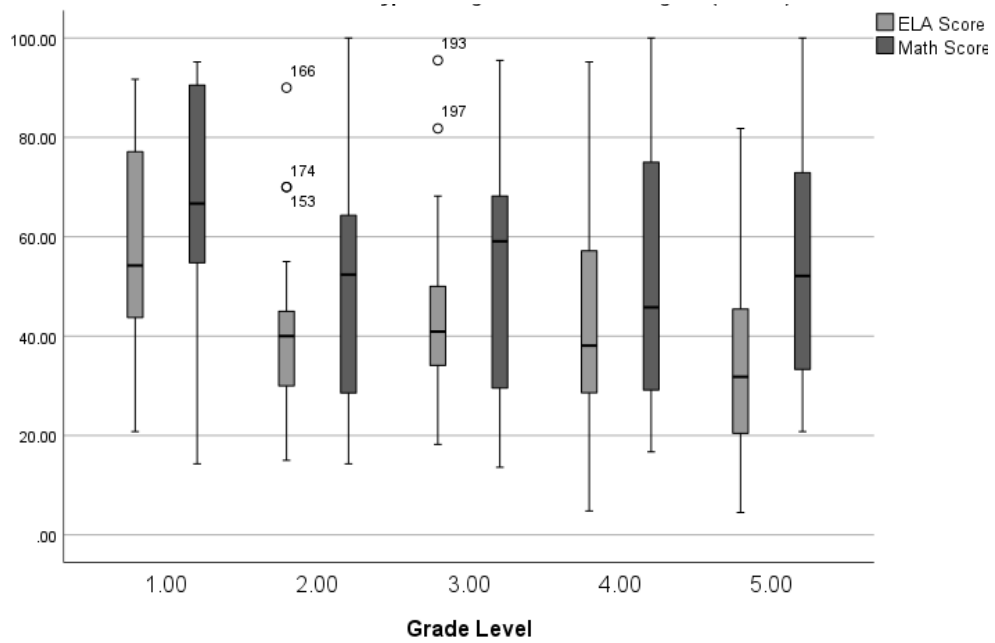


TABLE B1*Box's Test of Equality of Covariance Matrices^a*

Box's <i>M</i>	44.763
<i>F</i>	1.601
<i>df</i> 1	27
<i>df</i> 2	124028.711
Sig.	.025

Note. Tests the null hypothesis that the observed covariance matrices of the dependent variable are equal across groups.

^a Design: Intercept + Instructional Program + Grade Level + Instructional Program * Grade Level

TABLE B2*Levene's Test of Equality of Error Variances^a*

		Levene Statistic	<i>df</i> 1	<i>df</i> 2	Sig.
ELA Score	Based on Mean	2.025	9	238	.037
	Based on Median	1.761	9	238	.077
	Based on Median and with adjusted <i>df</i>	1.761	9	228.993	.077
	Based on trimmed mean	2.056	9	238	.034
Math Score	Based on Mean	2.447	9	238	.011
	Based on Median	2.091	9	238	.031
	Based on Median and with adjusted <i>df</i>	2.091	9	227.405	.031
	Based on trimmed mean	2.503	9	238	.009

Note. Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

^a Design: Intercept + Instructional Program + Grade Level + Instructional Program * Grade Level

APPENDIX C
NO MULTICOLLINEARITY

TABLE C*Correlations*

Type of Program			ELA Score	Math Score
DLI Program	ELA Score	Pearson Correlation	1	.606**
		Sig. (2-tailed)		<.001
		<i>N</i>	124	124
	Math Score	Pearson Correlation	.606**	1
		Sig. (2-tailed)	<.001	
		<i>N</i>	124	124
Traditional Program (Non-DLI)	ELA Score	Pearson Correlation	1	.583**
		Sig. (2-tailed)		<.001
		<i>N</i>	124	124
	Math Score	Pearson Correlation	.583**	1
		Sig. (2-tailed)	<.001	
		<i>N</i>	124	124

Note. **. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX D
LINEARITY (SCATTERPLOTS)

FIGURE D1

Scatterplot Matrix: ELA Score, Math Score in DLI Program

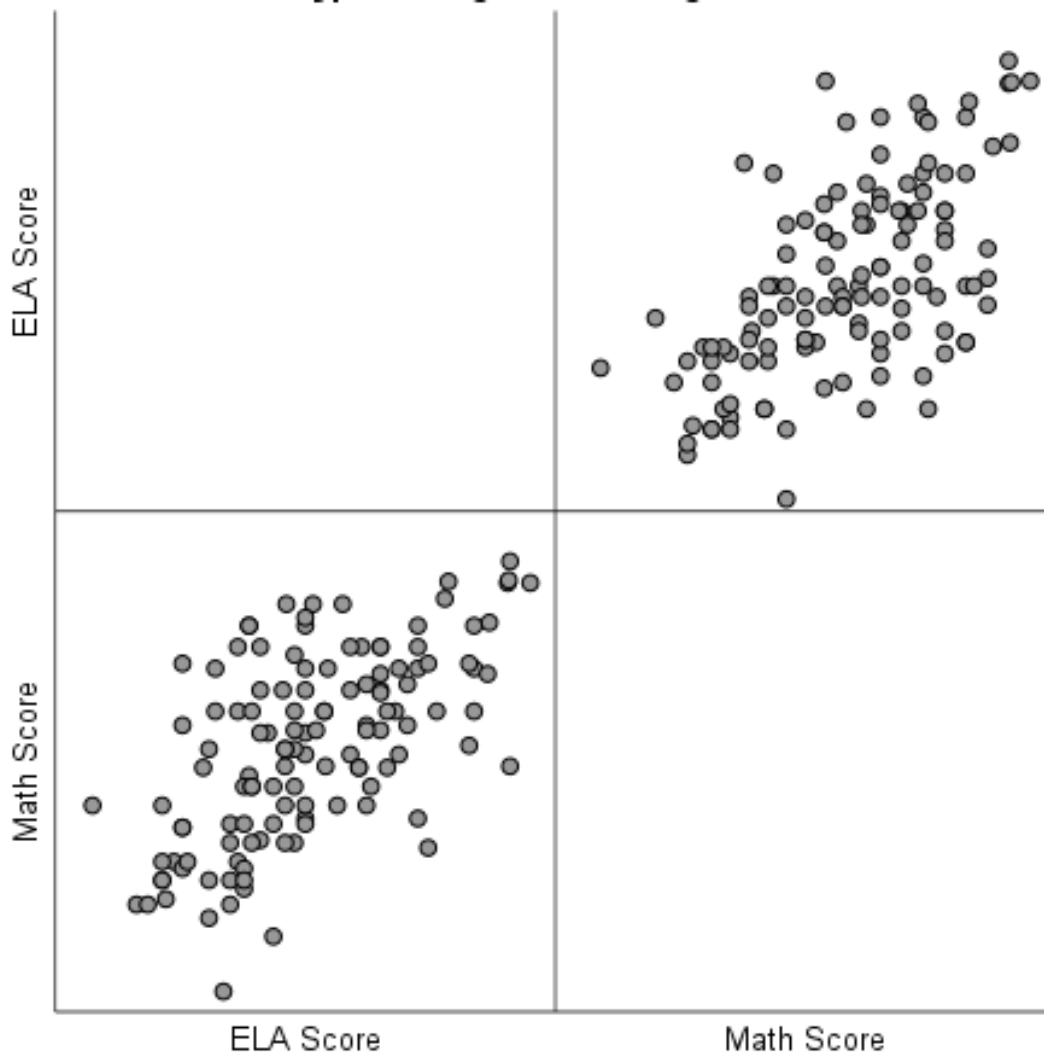
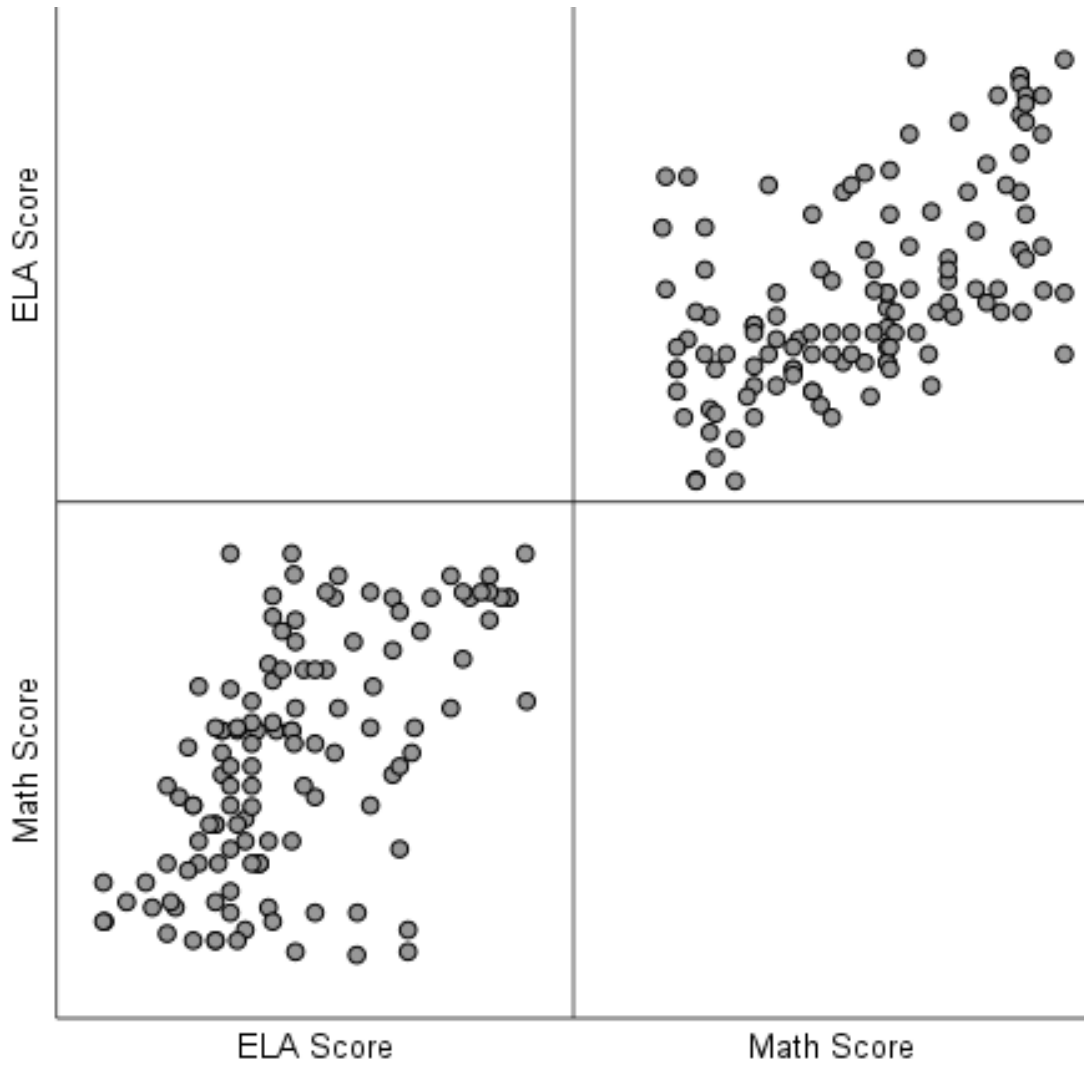


FIGURE D2

Scatterplot Matrix: ELA Score, Math Score in Non-DLI Program



APPENDIX E
MULTIPLE COMPARISONS

TABLE E

Multiple Comparisons: Tukey HSD

Dependent Variable	(I) Grade Level	(J) Grade Level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
ELA Score	1.00	2.00	13.9692*	4.14941	.008	2.5633	25.3752	
		3.00	7.6627	4.14941	.349	-3.7432	19.0686	
		4.00	13.1757*	3.84945	.006	2.5944	23.7571	
		5.00	19.6769*	4.31419	<.001	7.8180	31.5357	
		2.00	1.00	-13.9692*	4.14941	.008	-25.3752	-2.5633
	2.00	3.00	-6.3065	4.31219	.588	-18.1599	5.5469	
		4.00	-.7935	4.02438	1.000	-11.8557	10.2687	
		5.00	5.7076	4.47098	.706	-6.5822	17.9975	
		3.00	1.00	-7.6627	4.14941	.349	-19.0686	3.7432
		2.00	6.3065	4.31219	.588	-5.5469	18.1599	
	3.00	4.00	5.5130	4.02438	.648	-5.5492	16.5753	
		5.00	12.0141	4.47098	.059	-.2757	24.3040	
		4.00	1.00	-13.1757*	3.84945	.006	-23.7571	-2.5944
		2.00	.7935	4.02438	1.000	-10.2687	11.8557	
		3.00	-5.5130	4.02438	.648	-16.5753	5.5492	
	5.00	5.00	6.5011	4.19408	.531	-5.0276	18.0298	
		1.00	-19.6769*	4.31419	<.001	-31.5357	-7.8180	
		2.00	-5.7076	4.47098	.706	-17.9975	6.5822	
		3.00	-12.0141	4.47098	.059	-24.3040	.2757	
		4.00	-6.5011	4.19408	.531	-18.0298	5.0276	
Math Score	1.00	2.00	10.3717	4.46469	.141	-1.9009	22.6442	
		3.00	14.0238*	4.46469	.016	1.7513	26.2964	
		4.00	16.1355*	4.14193	.001	4.7502	27.5209	
		5.00	17.8180*	4.64199	.001	5.0580	30.5779	
		2.00	1.00	-10.3717	4.46469	.141	-22.6442	1.9009
	2.00	3.00	3.6522	4.63984	.934	-9.1018	16.4062	
		4.00	5.7639	4.33016	.672	-6.1389	17.6667	
		5.00	7.4463	4.81069	.532	-5.7773	20.6699	
		3.00	1.00	-14.0238*	4.46469	.016	-26.2964	-1.7513
		2.00	-3.6522	4.63984	.934	-16.4062	9.1018	
	3.00	4.00	2.1117	4.33016	.988	-9.7911	14.0145	
		5.00	3.7941	4.81069	.934	-9.4295	17.0178	
		4.00	1.00	-16.1355*	4.14193	.001	-27.5209	-4.7502
		2.00	-5.7639	4.33016	.672	-17.6667	6.1389	
		3.00	-2.1117	4.33016	.988	-14.0145	9.7911	
	5.00	5.00	1.6824	4.51275	.996	-10.7222	14.0871	
		1.00	-17.8180*	4.64199	.001	-30.5779	-5.0580	
		2.00	-7.4463	4.81069	.532	-20.6699	5.7773	
		3.00	-3.7941	4.81069	.934	-17.0178	9.4295	
		4.00	-1.6824	4.51275	.996	-14.0871	10.7222	

Note. Based on observed means.

The error term is Mean Square (Error) = 495.147.

*. The mean difference is significant at the .05 level.