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Educational effects of implementing a K-12 dual language instruction program in a community with a high percentage of Hispanics and Hispanic English language learners

Mario A. Ferron
The University of Texas Rio Grande Valley

THE UNIVERSITY OF TEXAS AT BROWNSVILLE

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MARIO A. FERRON

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APPROVED BY THE DISSERTATION COMMITTEE:

DR. YVONNE FREEMAN	(CHAIR)	Yvonne S. Freeman
DR. DAVID FREEMAN	(CO-CHAIR)	David Freeman
DR. JOHN SUTTERBY	(MEMBER)	John A. Sutterby

APPROVED BY THE GRADUATE OFFICE:

DR. CHARLES LACKEY
DEAN OF GRADUATE STUDIES

Charles Lackey

Educational Effects of Implementing a K-12 Dual Language Instruction Program In a Community with a High Percentage of Hispanics and Hispanic English Language Learners

Dissertation

Submitted in partial Fulfillment of the requirements for the Doctorate in Education in Curriculum and Instruction with Specialization in Bilingual Studies

The University of Texas at Brownsville and Texas Southmost College

By

Yvonne Freeman, Ph.D. Chair

David Freeman, Ph.D. Committee Member

John Sutterby, Ph.D. Committee Member

DEDICATION

This work is dedicated in memory of my father who taught me the value of education and the importance of being committed to always do my best. This work is also dedicated to my family whose love and understanding support me every day.

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I want to thank all the people that supported me and encouraged me during all these years and helped me to reach this point in my academic career. I would like to thank Dr. Leo Gomez, who six years ago convinced me to pursue my Masters in Bilingual Education. Also, I want to thank Dr. Daniel King and the school district he represents for all the support provided for this dissertation.

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To all of you, thanks for your love and comprehension. I promise that all your sacrifice will be worthy. Above all, thanks God for giving me the time, and the spirit to accomplish this goal. You have always guided my path. Please guide this new path that is about to begin.

ABSTRACT

Hispanic students have historically exhibited an educational achievement gap in a variety of indicators when compared with grade-level peers from other racial, ethnic, and linguistic backgrounds. One of the goals of bilingual education research has been the identification of programs and instructional practices that have been shown to be effective in closing the academic achievement gap for Hispanic students. Therefore, the goal of this study was to examine the academic programs available in one school district in order to identify which program was most effective in helping Hispanic students reach full educational parity with their native English speaking peers as measured by 40 different indicators of academic achievement grouped into three categories: performance on standardized assessments, high school performance, and overall performance on college-readiness indicators. The records of 1,357 Hispanic students enrolled in the different academic programs from 1st to 12th grade were analyzed to look for differences in their academic performance. It can be concluded, from examining the 40 key indicators of academic achievement that dual language instruction proved more effective than transitional bilingual education or Mainstream instruction in promoting academic achievement for students. Dual language instruction surpassed transitional bilingual education and mainstream instruction in all 40 indicators. This claim hold true for Hispanic students from both English and Spanish language backgrounds. The native Spanish-speaking Hispanics enrolled in dual language instruction outperformed their native English-speaking peers enrolled in Mainstream instruction in 39 of the 40 indicators of academic achievement analyzed.

Keywords: bilingual education, dual language instruction, Hispanics, education.

TABLE OF CONTENTS

DEDICATION 2
ACKNOWLEDGMENTS 3
ABSTRACT 4
TABLE OF CONTENTS 5
LIST OF TABLES 14
LIST OF FIGURES 21
CHAPTER 1: INTRODUCTION 24
Background 24
Theoretical Framework 27
The Evolving Perspective about Bilingualism 27
Relationship between First and Second Language Development 29
School Orientations 31
Assimilationist Orientation 31
Intercultural Orientation 31
Research Problem 32
Significance of the Problem 37
Research Question 39
Context of the Study 40
Purpose of the Study 42
Significance of the Study 42
Definition of Terms 44
Limitations of the Study 47
Summary for Chapter 1 47
CHAPTER 2: LITERATURE REVIEW 49
Introduction 49
The Condition of Education 50
Roles of Education 50
Goals of Education 51
Indicators of Educational Achievement 52
Condition of Education in the U.S., Texas, and Rio Grande Valley 53

TABLE OF CONTENTS

CHAPTER 2: LITERATURE REVIEW (continues)

Participation in Education …… 53

Public School Pre-K to 12th Enrollment …… 55

Hispanic Pre-K to 12th Enrollment …… 56

English Language Learners Pre-K to 12th Enrollment …… 59

Post-Secondary Education Enrollment …… 63

Hispanic Post-Secondary Education Enrollment …… 64

Academic Performance …… 65

Standardized Assessments in Core-Content Areas …… 66

Standardized College-Admission Assessments …… 72

Participation in College-Level Courses …… 69

Grade Point Average (GPA) …… 75

Status Dropout Rate …… 76

Immediate Transition to College …… 77

Education Attainment …… 78

Hispanic Education Attainment …… 80

Benefits of Education …… 81

Investing in Education …… 83

Summary of the Condition of Education …… 84

Conditions that Impact the Academic Achievement of Hispanics …… 86

Personal Conditions …… 87

Social Conditions …… 88

Parent Education …… 89

Poverty …… 90

Single-Parent Families …… 91

Neighborhood Characteristics …… 91

Immigrant Status and Mobility …… 92

Home Language …… 92

Schooling Conditions …… 92

Segregation …… 93

TABLE OF CONTENTS

CHAPTER 2: LITERATURE REVIEW (continues)

High-Poverty Schools …………………………………… 94

Less-skilled and Non-supportive Teachers ……………… 96

Inadequate School Facilities and Funding ……………… 97

Inadequate Access to Technology ……………………………………… 98

Non-supportive Learning Environments ………………………............ 99

Cultural and Linguistic Prejudice ………………………………………… 99

School Orientations …………………………………………………….. 103

Summary of Conditions that Impact Academic Achievement of Hispanics 103

Instruction of Emergent Bilinguals ………………………………………………. 105

Language Instruction ……………………………………………… 105

First Language Acquisition and Development …………… 105

Second Language Acquisition and Development ………… 106

Role of L1 Development in the Acquisition of an L2 …….. 111

English Language Proficiency Development ……………... 111

The Bilingual Education Debate ………………………………….. 114

The English-only perspective ……………………………………... 114

The Bilingual Instruction Perspective …………………………… 116

Federal Policy Related with Bilingual Education ………………… 117

Searching for Effective Models for the Education of EB ………… 120

Bilingual Education Goals and Orientations ……………… 121

Long-term LEPs: Outcomes of a Faulty Education ………………………. 122

The Reclassification of LEP Students: A Measuring Problem……………. 125

Summary of the Instruction of Emergent Bilinguals ……………………. 127

Prevalent Models of Instruction for Emergent Bilinguals ……….……… 128

The English-only Approach ………………………………………. 128

English Submersion ……………………………………….. 129

Structured English Immersion …………………………… 129

English as a Second Language (ESL) …………………… 131

Sheltered English Instruction …………………………….. 132

TABLE OF CONTENTS

CHAPTER 2: LITERATURE REVIEW (continues)
The Transitional Bilingual Education (TBE) Approach ………… 132
Early-exit Transitional Bilingual Education ……………..... 133
Late-exit Transitional Bilingual Education ……………..… 134
The Enrichment Bilingual Development Approach ………….…. 135
Dual Language Instruction (DLI) ……………………………..... 137
Characteristics of Dual Language Instruction Programs ….. 138
Population …………………………………..................... 138
Languages of Instruction ……………………………..… 141
Curriculum …………………………………….………….. 142
Structure ……………………………………….………….. 142
Length of Implementation ……………………………..….. 143
Dual Language Instruction and Federal Policy …………… 145
Benefits of Dual Language Instruction …………………… 145
Academic Achievement ……………………….….. 145
Second Language Acquisition and Development 147
Bilingualism, Biliteracy, and Cultural Awareness ... 147
First Language Maintenance and Development …... 148
Summary of Prevalent Models of Instruction for Emergent Bilinguals…… 148
CHAPTER 3: METHODOLOGY ……………………………………………….. 151
Introduction ……………………………………………………………. 151
Measuring Educational Achievement …………………….……….. 152
Measuring Educational Achievement of Hispanics …………………. … 154
Research Design ……………………………………………………….... 155
Setting …………………………………………………………………….. 158
Participants ……………………………………………………………… 165
The 2005-2009 Cohort groups. …………………………………………… 170
The 2006-2010 Cohort groups …………………………………………… 172
Data Collection …………………………………………………...……… 174
Data Analysis ……………………………………………………………… 176

TABLE OF CONTENTS

CHAPTER 3: METHODOLOGY (continues)

Summary of Chapter 3 ………………………………………………………… 178

CHAPTER 4: ANALYSIS OF DATA FOR THE 2005-2009 COHORT ……… 179

Introduction ……………………………………………………………… 179

Explanation of procedures used …………………………..…………… 180

The 2005-2009 cohort ……………………………………………............... 183

Demographics ………………………………………………………… 184

Age …………………………………………………………… 185

Gender ……………………………………………………….. 190

Economic Disadvantage …………………………………... 192

Summary for Demographics ……………………………… 194

Academic Outcomes of Program Participation …………………. 195

Results on standardized assessments ……………… …… 196

High School TAKS Score Averages ……………… 197

Additional TAKS tests taken ……….…………….. 203

Percentage of students Failing an Exit TAKS …… 210

Percentage of Students Meeting Commended ……. 216

Summary of results on Standardized Assessments 222

Overall high School Performance ………………………… 227

High School Graduation …………………………... 227

Distinguished Achievement Plan …………………. 229

Minimum Requirements Plan ……………………... 232

Weighted Grade Point Average …………………… 234

Students' Ranking …………..…………………….. 237

Percentage of students in the Top 10% …..……..… 238

Percentage of students in the Top 25% …..……….. 242

Percentage of students in the Top 50% …..……..… 244

Percentage of students in the last 25% …..…...…… 246

Summary of Overall High School performance …... 249

Performance on College Readiness Indicators ……………. 252

TABLE OF CONTENTS

CHAPTER 4: ANALYSIS OF DATA FOR 2005-2009 COHORT (continues)

Participation and Performance in AP Tests …..…… 253

Participation in AP tests ..…………………. 253

Successful participation in AP tests ..…….. 255

Participation in AP tests other than Spanish 258

Success in AP tests other than Spanish …… 260

Participation in College Admission Tests ………… 262

Percentage of students taking an ACT test 263

Students' average scores in ACT …………. 266

Successful participation in ACT tests……... 273

Summary of Performance on college-readiness …... 281

Summary of Chapter 4 …………………………. 285

CHAPTER 5: ANALYSIS OF DATA FOR THE 2006-2010 COHORT ………. 288

Introduction ………………………………………………………….. 288

The 2006-2010 cohort ……………………………………….............. 288

Demographics ……………………………………………………. 288

Age ……………………………………………………… 289

Gender ……………………………………………………. 291

Economic Disadvantage ………………………………... 292

Summary for Demographics ……………………………… 295

Academic Outcomes of Program Participation …………………… 295

Performance on standardized assessments ………………... 295

High School TAKS Score Averages ……………… 296

Additional TAKS tests taken ……………………… 301

Failing the Exit TAKS …………………………….. 308

Meeting Commended in Exit TAKS ……………… 314

Summary of results on Standardized Assessments .. 320

Overall high School Performance ………………………… 324

High School Graduation …………………………... 324

Distinguished Achievement Plan …………………. 326

TABLE OF CONTENTS

CHAPTER 5: ANALYSIS OF DATA FOR 2006-2010 COHORT (continues)

Minimum Requirements Plan …………………… 328

Weighted Grade Point Average …………………… 330

Students, Ranking ………..…………………….. 332

Percentage of students in the Top 10% …..…..…… 334

Percentage of students in the Top 25% …..……….. 336

Percentage of students in the Top 50% …..……….. 338

Percentage of students in the last 25% …..………... 340

Summary of Overall High School performance …... 342

Performance on College Readiness Indicators ……………. 346

Performance in Advanced Placement Tests ….…… 346

Participation in Advanced Placement (AP) tests ….. 346

Successful Participation in AP tests ..……………... 348

Participation in AP tests other than Spanish ……… 350

Success in AP tests other than Spanish ……….…... 352

Performance in College Admission Tests …..…….. 354

Percentage of students taking an ACT test ………... 354

Students' average scores in ACT …………………. 357

Successful participation in ACT tests…………...… 367

Summary of Performance on college-readiness …... 371

Summary of Chapter 5 ……………………………………………………. 374

CHAPTER 6: COMPARISONS BETWEEN COHORTS ……………………..… 376

Introduction …………………………………………………………….. 376

Demographics …………………………………………………………... 377

Academic Outcomes of Program Participation …………………………... 379

Performance on standardized assessments ……………….……….. 381

High School TAKS Score Averages ……………………… 381

Percentage of Additional TAKS tests taken ……………… 386

Percentage of students Failing an Exit-TAKS …………… 391

Percentage of students Meeting Commended …………….. 395

TABLE OF CONTENTS

CHAPTER 6: COMPARISON BETWEEN COHORTS (continues)

Summary of results on Standardized Assessments ……….. 400

Overall high School Performance ………………………………………… 412

High School Graduation …………………………………………... 411

Distinguished Achievement Plan …………………………………. 411

Minimum Requirements Plan ……………………………………... 414

Weighted Grade Point Average …………………………………… 414

Students' Ranking …………..……………………………………….. 416

Percentage of students in the Top 10% …..……………………….. 416

Percentage of students in the Top 25% …..……………………….. 417

Percentage of students in the Top 50% …..……………………….. 418

Percentage of students in the last 25% …..………………………... 419

Summary of Overall High School performance …………………... 420

Overall Performance on College-Readiness Indicators …………………... 431

Performance in Advanced Placement Tests ..……………………… 432

Participation in Advanced Placement (AP) tests ………….. 432

Successful Participation in AP tests ..…………………….. 436

Participation in AP tests other than Spanish ……………… 440

Success in AP tests other than Spanish …………………... 444

Performance in College Admission Tests …..…………………….. 448

Percentage of students taking an ACT test ……………….. 448

Students' average scores in ACT …………………………. 452

Successful participation in ACT tests………….………….. 457

Summary of Performance on college-readiness ……..……………. 463

Summary of Chapter 6 ………………………………………………………. 479

CHAPTER 7: CONCLUSIONS, RECOMMENDATIONS & LIMITATIONS … 482

Introduction ……………………………………………..…..………….. 482

Description of the study ……………………………………..…………. 484

Overall performance on Standardized Assessments ……………………… 486

Overall High School Performance ………………………………………………... 487

TABLE OF CONTENTS

CHAPTER 7: CONCLUSIONS, RECOMMENDATIONS & LIMITATIONS ….

Overall Performance on College-Readiness Indicators …………………... 488

Overall Performance on all 40 Indicators of Academic Performance …….. 489

Overall Comparison between Groups …………………………………….. 489

Overall Comparison between DLI-NES and Mainstream ………………… 490

Overall Comparison between DLI-NSS and TBE/ESL …………………... 491

Overall Comparison between Mainstream and TBE/ESL ………………... 492

Overall Comparison between DLI-NSS and Mainstream ………………… 493

Overall Comparison between DLI-NES and DLI-NSS …………………... 494

Hispanics and Science Instruction ………………………………………… 495

Recommendations ………………………………………………………… 497

Limitations Of The Study …………………………………………………. 501

REFERENCES ……………………………………………………….............. 503

LIST OF TABLES

Table 1: Schools with ethnic majority ……………………………..……………...… 57
Table 2: Population Distribution ……………………………………………………….. 57
Table 3: Participation in Education ………………………………………………….... 59
Table 4: Language Minorities Representation ………………………………………… 60
Table 5: ELL Enrollment Representation ……………………………………..…….. 63
Table 6: Academic Performance Measured by NAEP ……………………………….... 68
Table 7: National GPA by Ethnicity …………………………………………………… 75
Table 8: Immediate College Enrollment Rates ………………………………...……. 78
Table 9: Educational attainment …………………………………………..……… 79
Table 10: Economic benefits of education attainment by ethnicity ……………………. 82
Table 11: Demographic Characteristics of the First Two DLI Groups ………………. 162
Table 12: Variation in the number of participating students through the years ………. 163
Table 13: Demographic Characteristics of students enrolled in 9th grade ………...….. 166
Table 14: Cohort subgroups by language background ……………………..…….. 170
Table 11: Cohort Subgroups by Language Background …………………………..…. 172
Table 16: Students' average age per group …………………………..……………. 185
Table 17: Descriptive Statistics for Students' average age per group ………..……… 186
Table 18: Levene's Test of Homogeneity of Variances for students' average age ..…. 186
Table 19: ANOVA table for students' average age per group ……………...……… 187
Table 20: Contrast Coefficients ……………………………………..…………... 187
Table 21: Contrast tests for Students' average age per group ………………………... 188
Table 22: Percentage of male students per group ……………………………..…… 190
Table 23: Levene's test for percentage of male students per group …………..…… 191
Table 24: ANOVA table for Percentage of male students per group ……………..….. 191
Table 25: Contrast tests for Percentage of male students per group ……….……..….. 191
Table 26: Percentage of economically disadvantaged students per group ……….….. 192
Table 27: Levene's Test for percentage of economically disadvantaged students ..…. 193
Table 28: ANOVA table for percentage of economically disadvantaged students …... 193
Table 29: Contrast tests for Percentage of economically disadvantaged students ……. 193
Table 30: TAKS average scores on each content area per group ……………….…. 197

Table 31: Levene’s test for TAKS average scores on each content area per group ….. 199
Table 32: ANOVA table for TAKS average scores on each content area per group 199
Table 33: Contrast tests for TAKS average scores on each content area per group ….. 199
Table 34: Percentage of additional tests taken per group …………………………….. 203
Table 35: Levene’s Test for percentage of additional tests taken per group …………. 205
Table 36: ANOVA table for Percentage of additional tests taken per group ………... 205
Table 37: Contrast tests for Percentage of additional tests taken per group ………….. 206
Table 38: Percentage of students failing the Exit-TAKS even after several attempts ... 210
Table 39: Levene’s Statistic for percentage of students failing the Exit-TAKS ……... 212
Table 40: ANOVA table for percentage of students failing the Exit-TAKS ………..... 212
Table 41: Contrast tests for percentage of students failing the Exit-TAKS …….……. 212
Table 42: Percentage of students who met commended in Exit-TAKS per group …... 216
Table 43: Levene’s statistic for % of students who met commended in Exit-TAKS 218
Table 44: ANOVA table for % of students who met commended in Exit-TAKS…….. 218
Table 45: Contrast tests for % of students who met commended in Exit-TAKS …..… 218
Table 46: Percentage of students who met graduation requirements on time ……..…. 227
Table 47: Levene’s statistic for % of students who met graduation requirements …... 228
Table 48: ANOVA table for % of students who met graduation requirements …...…. 228
Table 49: Contrast tests for % of students who met graduation requirements …...…. 228
Table 50: Percentage of students graduating under Distinguished Achievement …….. 230
Table 51: Levene’s for % of students graduating Distinguished ……………...……... 231
Table 52: ANOVA table for % of students graduating Distinguished ……………..… 231
Table 53: Contrast tests for % of students graduating Distinguished ………………... 231
Table 54: Percentage of students graduating with Minimum requirements ……….…. 232
Table 55: Levene’s Test for % of students graduating with Minimum requirements ... 233
Table 56: ANOVA table for % of students graduating with Minimum requirements ... 233
Table 57: Contrast tests for % of students graduating with Minimum requirements 233
Table 58: Mean weighted grade point average per group …………………………..… 235
Table 59: Levene’s Test for Mean weighted grade point average ……………………. 236
Table 60: ANOVA table for Mean weighted grade point average …………………... 236
Table 61: Contrast tests for Mean weighted grade point average …………...……... 236

Table 62: Students' average ranking per group ……………………………………… 237
Table 63: Levene's Test for Students' average ranking per group …………………… 238
Table 64: ANOVA table for Students' average ranking per group ………………...… 238
Table 65: Contrast tests for students' average ranking per group ……………….…… 238
Table 66: Percentage of students per group ranked in the Top 10% ………………… 240
Table 67: Levene's test for % of students per group ranked in the Top 10% ………... 240
Table 68: ANOVA table for % of students per group ranked in the Top 10% ……..… 241
Table 69: Contrast tests for % of students per group ranked in the Top 10% …...…… 241
Table 70: Percentage of students per group, ranked in the Top 25% ………………… 242
Table 71: Levene's test for % of students per group, ranked in the Top 25% …..…… 243
Table 72: ANOVA table for % of students per group, ranked in the Top 25% …..….. 243
Table 73: Contrast tests for % of students per group, ranked in the Top 25% …...…... 243
Table 74: Percentage of students per group ranked in the top 50% …………….…….. 243
Table 75: Levene's test for % of Students by group ranked in the Top 50% ……..….. 245
Table 76: ANOVA table for % of students per group ranked in the top 50% …...…... 245
Table 77: Contrast Test for % of students per group ranked in the top 50% …....…… 245
Table 78: Percentage of students per group ranked in the last 25% ………………….. 246
Table 79: Levene's test for % of students per group ranked in the last 25% ……..….. 247
Table 80: ANOVA test for % of students per group ranked in the last 25% ………... 247
Table 81: Contrast tests for % of students per group ranked in the last 25% ………… 248
Table 82: Percentage of students that took an AP test, by groups …………….……… 254
Table 83: Levene's test for % of Students per group taking an AP test ……..…….… 254
Table 84: ANOVA table for % of students per group taking an AP test ……...……… 254
Table 85: Contrast Test for % of students per group taking an AP test ……….…….. 255
Table 86: Percentage of students who passed an AP test …………………………..… 256
Table 87: Levene's test for percentage of students passing an AP test ………….…… 257
Table 88: ANOVA table for percentage of students passing an AP test …………….. 257
Table 89: Contrast Test for Percentage of students per group passing an AP test …... 257
Table 90: Percentage of students that took an AP test other than Spanish ………..….. 258
Table 91: Levene's test for % of students that took an AP test other than Spanish ….. 259
Table 92: ANOVA table for % of students that took an AP test other than Spanish 259

Table 93: Contrast Test for % of students that took an AP test other than Spanish ….. 259
Table 94: Percentage of students who passed an AP test other than Spanish ………… 259
Table 95: Levene's test for % of Students passing an AP test other than Spanish …… 261
Table 96: ANOVA table for % of students passing an AP test other than Spanish ..… 261
Table 97: Contrast Test for % of students passing an AP test other than Spanish …… 262
Table 98: Percentage of students that took an ACT test …………………..……….. 264
Table 99: Levene's test for % of Students that took an ACT test, per group ……..….. 264
Table 100: ANOVA table for % of students that took an ACT test, per group ..……... 264
Table 101: Contrast Test for % of students that took an ACT test, per group …..…… 264
Table 102: ACT average scores per content area per group ……………………….…. 266
Table 103: Levene's Test for ACT average scores per content area per group ………. 268
Table 104: ANOVA table for % of students that took an ACT test, per group ……..… 268
Table 105: Contrast Test for % of students that took an ACT test, per group ……...... 269
Table 106: percentage of students meeting ACT benchmarks ……………………..… 274
Table 107: Levene's test for percentage of students meeting ACT benchmarks …..… 275
Table 108: ANOVA table for % of students meeting ACT benchmarks ………..…… 276
Table 109: Contrast Test for % of students meeting ACT benchmarks ……..………. 276
Table 110: Students' average age per group ……………………………………….…. 289
Table 111: Levene's Test for students' average age …………………………………. 289
Table 112: ANOVA table for students' average age per group ……………………..… 290
Table 113: Contrast tests for students' average age per group ……………………….. 290
Table 114: Percentage of male students per group …………………………………… 291
Table 115: Levene's test for percentage of male students ……………………………… 291
Table 116: ANOVA table for Percentage of male students per group ……………….. 292
Table 117: Contrast tests for percentage of male students per group …………….….. 292
Table 118: Percentage of economically disadvantaged students per group ………….. 293
Table 119: Levene's Test for % of economically disadvantaged students ……….….. 293
Table 120: ANOVA table for % of economically disadvantaged students ……..……. 293
Table 121: Contrast tests for % of economically disadvantaged students ……………. 294
Table 122: TAKS average scores per content area per group ……………...……… 296
Table 123: Levene's Test for TAKS average scores per content area per group …….. 297

Table 124: ANOVA table for TAKS average scores per content area per group …….. 297
Table 125: Contrast tests for TAKS average scores per content area per group ……... 298
Table 126: Percentage of additional tests taken per group ………………..………. 302
Table 127: Levene's Test for % of additional tests taken per group …….………..…. 303
Table 128: ANOVA table for percentage of additional tests taken per group ……….. 304
Table 129: Contrast tests for Percentage of additional tests taken per group ………... 304
Table 130: Percentage of students failing the Exit-TAKS after several attempts ……. 308
Table 131: Levene's Statistic for percentage of students failing the Exit-TAKS …….. 310
Table 132: ANOVA table for percentage of students failing the Exit-TAKS ……..…. 310
Table 133: Contrast tests for percentage of students failing the Exit-TAKS ….……... 310
Table 134: Contrast tests for percentage of students failing the Exit-TAKS ….…….. 314
Table 135: Levene's Test for Percentage of students who met commended ….……… 315
Table 136: ANOVA table for Percentage of students who met commended ……..…... 316
Table 137: Contrast tests for Percentage of students who met commended ……..…… 316
Table 138: Percentage of students who met graduation requirements on time ………. 324
Table 139: Levene's test for % of students who met graduation requirements ……... 325
Table 140: ANOVA table for % of students who met graduation requirements ….…. 325
Table 141: Contrast tests for % of students who met graduation requirements ……... 325
Table 142: Percentage of students graduating Distinguished ………………….……... 326
Table 143: Levene's Test for percentage of students graduating Distinguished ……... 327
Table 144: ANOVA table for percentage of students graduating Distinguished …….. 327
Table 145: Contrast tests for percentage of students graduating Distinguished ……... 327
Table 146: Percentage of students graduating with minimum requirements …………. 328
Table 147: Levene's test for % of students graduating with Minimum requirements.... 329
Table 148: ANOVA table for % of students graduating with Minimum requirements.. 329
Table 149: Contrast tests for % of students graduating with Minimum requirements... 329
Table 150: Mean weighted grade point average per group …………………………… 330
Table 151: Levene's Test for mean weighted grade point average …………………... 331
Table 152: ANOVA table for Mean weighted grade point average ………………….. 331
Table 153: Contrast tests for Mean weighted grade point average …………………… 331
Table 154: Students' average ranking per group ……………………………………..… 332

Table 155: Levene's Test for Students' average ranking per group ………………….. 333
Table 156: ANOVA table for Students' average ranking per group …………………. 333
Table 157: Contrast tests for students' average ranking per group …………………... 333
Table 158: Percentage of students per group ranked in the Top 10% ………………... 334
Table 159: Levene's test for % of students per group ranked in the top 10% ………... 335
Table 160: ANOVA table for % of students per group ranked in the top 10% ………. 335
Table 161: Contrast tests for % of students per group ranked in the top 10% …..….... 335
Table 162: Percentage of students per group, ranked in the top 25% ………………… 336
Table 163: Levene's test for % of students per group, ranked in the Top 25% …..…... 337
Table 164: ANOVA table for % of students per group, ranked in the Top 25% …..…. 337
Table 165: Contrast tests for % of students per group, ranked in the Top 25% …..…. 337
Table 166: Percentage of students per group ranked in the top 50% …………………. 338
Table 167: Levene's test for % of Students by group ranked in the top 50% ………... 337
Table 168: ANOVA table for % of students per group ranked in the top 50% …..…... 337
Table 169: Contrast Test for percentage of students per group ranked in the top 50%.. 337
Table 170: Percentage of students per group ranked in the last 25% ……………….... 340
Table 171: Levene's test for % of students per group ranked in the last 25% ……..… 341
Table 172: ANOVA test for % of students per group ranked in the last 25% ……..… 341
Table 173: Contrast tests for % of students per group ranked in the last 25% ……….. 341
Table 174: Percentage of students that took an AP test, by groups …………………... 346
Table 175: Levene's test for % of Students per group taking an AP test …..………… 347
Table 176: ANOVA table for % of students per group taking an AP test ……..…….. 347
Table 177: Contrast Test for % of students per group taking an AP test ………..…... 347
Table 178: Percentage of students who passed an AP test …………………...………. 348
Table 179: Levene's test for Percentage of Students passing an AP test …………….. 349
Table 180: ANOVA table for Percentage of students passing an AP test ……………. 349
Table 181: Contrast Test for Percentage of students per group passing an AP test ….. 349
Table 182: Percentage of students that took an AP test other than Spanish ………….. 350
Table 183: Levene's test for % of students that took an AP test other than Spanish 351
Table 184: ANOVA table for % of students that took an AP test other than Spanish .. 351
Table 185: Contrast Test for % of students that took an AP test other than Spanish … 351

Table 186: Percentage of students who passed an AP test other than Spanish …..……. 353
Table 187: Levene's test for percentage of students passing an AP test …………..…. 353
Table 188: ANOVA table for % of students passing an AP test other than Spanish … 353
Table 189: Contrast Test for % of students passing an AP test other than Spanish ….. 353
Table 190: Percentage of students that took an ACT test, per group ………………… 355
Table 191: Levene's test for % of Students that took an ACT test, per group ……..… 355
Table 192: ANOVA table for % of students that took an ACT test, per group ……..... 355
Table 193: Contrast Test for % of students that took an ACT test, per group …......…. 356
Table 194: ACT average scores per content area per group ………………………….. 357
Table 195: Levene's Test for ACT average scores per content area per group ………. 358
Table 196: ANOVA table for ACT average scores per content area per group ……… 359
Table 197: Contrast Test for ACT average scores per content area per group ……….. 359
Table 198: percentage of students meeting ACT benchmarks per area per group …… 363
Table 199: Levene's Test for percentage of students meeting ACT benchmarks ……. 365
Table 200: ANOVA table for percentage of students meeting ACT benchmarks ….... 365
Table 201: Contrast Test for percentage of students meeting ACT benchmarks …..... 366
Table 202: Cohorts' demographics by groups ……………………...………………… 377

LIST OF FIGURES

Figure 1: Participation in education ……………………….…………………….………... 54
Figure 2: Public School Enrollment ………………………………………………………. 55
Figure 3: Public school enrollment between Regions ……………………………….……. 55
Figure 4: Percentage change between 1999 and 2009 ………………………………….… 56
Figure 5: Hispanic enrollment representation ……………………………………….….... 59
Figure 6: School-Age Children who had an Immigrant Parent …………………...…… 61
Figure 7: ELL Distribution across States ………………………………………………. 62
Figure 8: Post-Secondary education enrollment trends ……………………...……… 64
Figure 9: Hispanic Representation in Education ……………………………….…… 65
Figure 10: Academic performance in Texas measured by TAKS ……………….……. 66
Figure 11: Academic performance in Texas and the U.S. measured by NAEP …..……. 69
Figure 12: Academic performance by ethnicity & language measured by NAEP …..… 70
Figure 13: SAT performance ……………………………………………………...…. 70
Figure 14: Academic performance in Texas and the U.S. measured by SAT …………. 71
Figure 15: Academic performance by ethnic groups measured by SAT ………………. 72
Figure 16: AP participation and performance …………………………………….…. 73
Figure 17: White and Hispanic participation in AP in 2009 ……………………..….. 74
Figure 18: Trends in status dropout rates ……………………………………………. 77
Figure 19: Education Attainment in the U.S., Texas, and Rio Grande Valley ………... 80
Figure 20: Education attainment trends ……………………………………...…… 81
Figure 21: Economic Benefits of Education Attainment ……………………….....…. 81
Figure 22: Socioeconomic benefits of education in U.S., Texas, and RGV …………... 83
Figure 23: ELL population distribution by Regions ………………………………….. 160
Figure 24: Educational attainment gap ……………………………………………..… 160
Figure 25: National Education Attainment Gap between Ethnic Groups in 2009 ...….. 161
Figure 26: Gender distribution across cohorts …………………………………...… 167
Figure 27: Percentage of students labeled as economically disadvantaged…………..... 168
Figure 28: Percentage of students speaking a language other than English at home 169
Figure 29: Percentage of cohort students born outside the U.S. ……………………… 169
Figure 30: Grouping and Sub-grouping Pattern …………………………………..… 170

Figure 31: Background characteristics of DLI-NES and Mainstream for 2005-2009 .. 171
Figure 32: Background Characteristics of DLI-NSS and TBE/ESL for 2005-2009 …. 172
Figure 33: Background Characteristics of DLI-NES and Mainstream for 2006-2010 .. 173
Figure 34: Background Characteristics of DLI-NSS and TBE/ESL for 2006-2010 173
Figure 35: Students' average age per group …………………………………….…. 185
Figure 36: Percentage of male students per group ……………………….….…….. 190
Figure 37: Percentage of economically disadvantaged students per group ……….…. 192
Figure 38: TAKS average scores on each content area per group ……..………….... 197
Figure 39: Percentage of additional tests taken per group ……………………….... 204
Figure 40: Percentage of students failing the Exit-TAKS after several attempts …….. 210
Figure 41: Percentage of students who met commended in Exit-TAKS ………….…. 216
Figure 42: percentage of students who met graduation requirements on time ……….. 227
Figure 43: Percentage of students graduating Distinguished ………………………… 230
Figure 44: Percentage of students graduating with Minimum requirements ………..... 232
Figure 45: Mean weighted grade point average per group ………………………... 235
Figure 46: Students' average ranking per group ……………………………….…….. 237
Figure 47: Percentage of students per group ranked in the Top 10% ……………….... 240
Figure 48: Percentage of students per group, ranked in the Top 25% ……………….. 242
Figure 49: Percentage of students per group ranked in the top 50% …………………. 244
Figure 50: Percentage of students per group ranked in the last 25% ……………….... 247
Figure 51: percentage of students who took an AP test, by groups ……………..…. 254
Figure 52: percentage of students that passed an AP test …………………...……... 256
Figure 53: percentage of students that took an AP test other than Spanish ……….…. 258
Figure 54: percentage of students that passed an AP test other than Spanish ……...… 260
Figure 55: percentage of students that took an ACT test, per group …………………. 264
Figure 56: ACT average scores per content area per group ………………………….. 267
Figure 57: Percentage of students meeting ACT benchmarks per area per group …… 274
Figure 58: .Students' average age per group ……………………...……………….. 289
Figure 59: Percentage of male students per group …………………………………..… 291
Figure 60: Percentage of economically disadvantaged students per group …………... 293
Figure 61: TAKS average scores on each content area per group ……………….…… 296

Figure 62: Percentage of additional tests taken per group ……………………………. 302

Figure 63: Percentage of students failing the Exit-TAKS after several attempts …….. 308

Figure 64: Percentage of students who met commended in Exit-TAKS ….………….. 314

Figure 65: Percentage of students who met graduation requirements on time ……….. 324

Figure 66: Percentage of students graduating Distinguished …..........................…. 326

Figure 67: Percentage of students graduating with minimum requirements ……..….. 328

Figure 68: Mean weighted grade point average per group ……………...……………. 330

Figure 69: Students' average ranking per group ……………………….…….……….. 332

Figure 70: Percentage of students per group ranked in the Top 10% ……….…..……. 334

Figure 71: Percentage of students per group, ranked in the top 25% ……….…..……. 336

Figure 72: Percentage of students per group ranked in the top 50% …………...…….. 338

Figure 73: Percentage of students per group ranked in the last 25% ….……….…….. 340

Figure 74: Percentage of students who took an AP test, by groups ……………...…… 346

Figure 75: Percentage of students that passed an AP test ……………………………...348

Figure 76: Percentage of students that took an AP test other than Spanish ………...… 350

Figure 77: Percentage of students that passed an AP test other than Spanish ……...… 353

Figure 78: Percentage of students that took an ACT test, per group ……………...….. 355

Figure 79: ACT average scores per content area per group ………….…………...…357

Figure 80: Percentage of students meeting ACT benchmarks per area per group …... 363

Chapter 1

INTRODUCTION

Background

One traditionally accepted maxim in modern civilizations is the idea that the development and wellbeing of a country is intrinsically related with the educational attainment of its people; at least, most of its people. Economy and democracy both depend upon a significant mass of well-educated citizens to endure and flourish. This is especially true in a highly competitive global economy. Therefore, for our nation to maintain its leadership role in the global market, and to retain its democratic principles, it is important to ensure that all our youngsters attain their highest-possible levels of educational achievement (U.S. Dept. of Ed., 2010a). As claimed by President Obama, “Making sure we offer all our kids, regardless of race, a world-class education is more than a moral obligation, it’s an economic imperative if we want America to succeed in the 21st century” (The White House, 2010).

During the past decades, the United States has experienced a significant increase in it Hispanic population (García, Kleifgen, & Falchi, 2008; National Clearinghouse for English Language Acquisition, 2006). This growth impacts not only the ethnic and linguistic diversity of our nation, but especially affects the schooling systems nationwide (Callahan, Wilkinson, Muller, & Frisco, 2009; Cerna, Perez, & Saenz, 2009; Batalova, Fix, & Murray, 2007). Today, Hispanics represent more than 20% of the public schools’ student population and 75% of the English language learners (ELLs) across the nation (NCES, 2005). As Gándara and Contreras (2009) claim, most major urban school districts have large enrollment percentages of Hispanic students. Therefore, the future of our nation largely depends upon the adequate education of Hispanics and Hispanic ELLs (Gándara & Contreras, 2009).

Researchers, educators, and policy makers have been unable to reach a consensus about how to effectively educate ethno-linguistic minorities, especially Hispanics and Hispanic ELLs. Conflicting cultural paradigms and educational perspectives have influenced the education of Hispanics, but the key debate has centered on the language of instruction (Callahan, et al., 2009; Tong, Irby, Lara-Aalecio, & Mathes, 2008; Lopez & Tashakkori, 2006; Callahan, 2005). Despite research evidence supporting the use of the home language to scaffold the instruction of students who come to school as English language learners, the dominant approach to teaching these students is to immerse them in all English instruction (García, 2009, 2010).

The English-only cultural paradigm is based in two main arguments. The first claim is that language is a bond that keeps nations together; therefore, “to be American is to speak English” (Lee, 2006; p. 108). English-only advocates believe that to integrate successfully into society, ethno-linguistic minorities need to leave behind their cultural and linguistic heritage and acquire the dominant culture and language (Ruiz, 1984). At the same time, those who hold to the English-only cultural paradigm perceive English as the world’s dominant language. They consider English academic literacy the main key for school success (Echevarria, Vogt, & Short, 2008; Lemke, 1988), and believe that the education of ELLs must focus on English language acquisition and development. The Time-on-Task hypothesis claims that any form of education that makes use of another language for instruction is detrimental because it is sacrificing exposure to English (Porter, 1990; Rossell & Baker, 1996, Baker & de Kanter, 1981).

Those who hold a multicultural paradigm claim that, due to its diversified nature, our society can benefit if different cultures and languages are not only tolerated but identified as valuable socio-economic assets (Wallstrum, 2009, Cummins, 1988). Bilingual researchers have shown that the maintenance and development of a first language other than English not only does not interfere with the acquisition and development of English, but actually facilitates English oracy and literacy acquisition (August & Hakuta, 2005; Reese, Garnier, Gallimore, & Goldenberg, 2000).

Since the passage of Title VII of the Elementary and Secondary Education Act, which began to promote bilingual education, the debate between supporters and detractors has been complicated by conflicting definitions, objectives, and expected outcomes (García et al., 2008; Gersten & Woodward, 1995; Torres-Guzman, Abbate, Brisk, & Mrnaya-Rowe, 2002).

Within the debate surrounding bilingual education, one issue that supporters and detractors agree upon is in the fact that Hispanics in general, and Hispanic ELLs in particular, enrolled in public school systems across the United States, have historically exhibited an educational achievement gap when compared with grade-level peers from other racial, ethnic, and linguistic backgrounds (Gándara & Contreras, 2009; Brown, 2008; Coulter & Smith, 2006).

In response to the lack of academic success, different educational programs aligned to different and sometimes even conflicting sets of paradigms, definitions, objectives, and expectations for the education of Hispanics have been tried (García, et al., 2008).

One of the main goals in bilingual education research has been the identification of programs and instructional practices truly effective in closing the academic achievement gap. Although some programs have been successful at reducing the gap, there is still much to be understood in order to know how to best help Hispanics succeed academically. Even though the levels of academic achievement for Hispanics increased during the last 30 years, the difference between the achievement of Hispanics and the achievement of their White peers remains wide (Aud, Hussar, Planty, Snyder, Bianco, Fox, Frohlich, Kemp, & Drake, 2010). Therefore, there is an urgent need to identify and implement effective instructional programs than can ensure the academic success of Hispanics and Hispanic ELLs and the closing of this gap.

Theoretical Framework

The evolving perspectives about bilingualism and bilingual education.

The perspective of bilingualism and bilingual education has evolved during the last century. At the beginning of the 20th century, bilingualism was considered a cognitive weakness, when compared with English monolinguals (Saer, 1923). Based on the idea that the brain had a limited space for languages, bilinguals were considered mentally-baffled. This is connected to a false belief that Cummins (1980) identifies as a Separate Underlying Proficiency (SUP), where the two languages are viewed as operating separately, without knowledge transfer. According to this view, each language occupies brain space, hindering the possibility of fully developing both languages. In this Balance Theory (Baker, 2006) for one language to fully develop, the other language had to decrease. Having a language other than English was perceived as a problem that could hinder the educational and socio-economic development of an individual (Ruiz, 1984).

This period of viewing bilingualism as having detrimental effects eventually evolved into a period of neutral effects where researchers such as Jones (1959) found no correlation between verbal and non-verbal IQ and bilingualism, concluding that there was no significant difference between monolinguals and bilinguals.

During the second half of the 20th century, the perspective evolved again into what is known as the Period of Additive Effects, where bilingualism was identified as positive because it could actually lead to cognitive advantages over monolingualism. The seminal study initiating this paradigm shift was a study by Peal and Lambert (1962) which showed that bilingualism can provide greater mental flexibility, higher abstract thinking, and superiority in concept formation. According to Peal and Lambert, a bilingual and bicultural environment can benefit IQ development.

According to Bialystok (1978, 2001), proficient bilinguals have higher communicative sensitivity, stronger divergent thinking and greater meta-linguistic awareness, due to their proficiency in two languages. To perform adequately in a bilingual and bicultural environment, bilinguals need to be more flexible in their thinking (Ricciardelli, 1992; Lauren, 1991) increasing their range of linguistic and cognitive experiences (Cummins, 1976), and their meta-linguistic awareness to avoid linguistic interference (Galambos & Hakuta, 1988).

Due to their linguistic versatility, bilinguals can develop higher levels of communicative sensitivity, becoming more aware of which language to speak, with whom, and in which situations. Such communicative sensitivity develops higher sociolinguistic competence and higher social awareness (Mohanty, 1994). According to Ben-Zeev (1977a, 1977b) due to their bilingual environment, bilinguals are more sensitive to language and therefore can correct their errors faster in an experimental situation. According to Mechelli and associates (2004), learning a second language can even lead to increases in gray matter density in the brain.

Relationship between first language and second language development.

Instead of a Separate Underlying Proficiency Model, Cummins proposed a Common Underlying Proficiency Model (CUP), claiming that people can acquire and store two or more languages without hindering their possibilities to achieve proficiency in each language. Because both languages operate through the same processing system, any knowledge acquired through one of the languages is easily transferred to the other language and therefore supports knowledge acquisition in the second language. According to Cummins' (1978, 2000b) Developmental Interdependence Hypothesis, second language proficiency is dependent on the level of competence achieved in the first language. Therefore, the more the learners develop their first language, the greater their possibilities to develop their second language.

Together, the Common Underlying Proficiency Model and the Developmental Interdependence Hypothesis bring forward an important claim. If the development of one language is directly correlated to the development of the other language, and together, both languages are the path for knowledge acquisition and cognitive development, then, there is a positive correlation between the level of bilingualism and the level of cognitive development. As the level of bilingual proficiency increases, it increases the likelihood of higher levels of cognitive development. According to Cummins' Threshold hypothesis, bilinguals can achieve different levels of bilingual competence and therefore reach different cognitive effects.

In the lower level, limited bilinguals have both languages inadequately developed and are unable to achieve grade level proficiency in either. This limited competence in both languages can generate negative cognitive effects. Halting first language development at an early stage can limit the development of the second language and therefore hinder cognitive development. Many English language learners placed in English-only, sink-or-swim environments eventually become limited bilinguals and experience detrimental cognitive effects

At the intermediate level, imbalanced bilinguals can reach adequate competence in one language but not on the other. Their bilingual advantage above monolinguals is minimal and therefore there are no significant positive or negative cognitive effects. This is evident in monolinguals exposed to limited foreign language instruction or in English language learners who experienced a linguistic shift, moving from their first language to monolingualism in English. English language learners who achieve English proficiency may eventually become imbalanced bilinguals and experience no positive or negative cognitive effects.

At the highest level, balanced bilinguals reach grade level proficiency in both languages. Even though they may be more proficient in one language than in the other, they can successfully participate in challenging grade-level courses in both languages. It is at this level that positive cognitive effects can take place. To achieve this level of bilingualism and biliteracy, students must be exposed to a bilingual and bicultural learning environment and core content instruction must be delivered in both languages.

School orientations

School orientation is the way schools perceive and treat cultural diversity within the school; and it can have critical implications upon the academic development of language minority students (Cummins, 1996). Cummins identifies two main school orientations; assimilationist and intercultural.

Assimilationist orientation.

When schools carry an assimilationist orientation, they perceive cultural and linguistic diversity as a problem to be eradicated. Therefore, such schools promote a swift assimilation into the dominant language and culture. The home languages other than English are excluded from the curriculum as soon as possible, language-minority community members are excluded or relegated, and traditional methods of instruction and assessment are used regardless of the implications they have upon the students' learning and upon their ability to express what they have learned. This kind of orientation marginalizes language-minority students by devaluating their languages and cultures. An assimilationist orientation is remedial and subtractive because is based upon the idea that language minority students have a cultural and linguistic problem that has to be remediated by the eradication or subtraction of the home language and culture, and by promoting the students' assimilation into the dominant –English- language and culture.

Intercultural orientation.

When schools carry an intercultural orientation, diversity is perceived as a socio-economic asset and multicultural appreciation is promoted. The use of primary languages and cultures is encouraged and integrated to the school curriculum, empowering language minority students and families. Minority members are included and involved in the school and innovative and transformative methods of instruction and assessment are used to facilitate students' learning and to help them show what they have learned. This kind of orientation empowers language-minority students by incorporating their languages and cultures. An intercultural orientation can be considered enriching and additive, because is based upon the idea that language minority students have a cultural and linguistic asset that has to be validated and enhanced by the incorporation or addition of the home language and culture into the curriculum, and by promoting a positive intercultural perspective and the students' acculturation.

Bilingualism and biliteracy can bring forward socioeconomic and cognitive benefits. However, to attain such benefits, bilinguals must develop grade level proficiency in both languages. By supporting the development of the first language, educators not only enhance the learners' possibilities to fully develop their second language, but also increase the students' possibilities to learn content more thoroughly. However, for bilingual education to be successful, educators and policymakers must revise the cultural orientation of the schools and the curriculums these schools follow. For minority learners to be more successful they need enriching, additive instructional programs and curriculums that validate and incorporate their home languages and cultures. This kind of learning environment can be provided by schools following an intercultural orientation.

Research Problem

Educational advancement has been historically linked with individual and collective socioeconomic improvement (National Academy of Sciences, 2010). Today, post-secondary education is considered a basic goal in education and a crucial requirement to satisfactorily participate in the labor market (Fry, 2002). According to the U. S. Department of Education, the goal for the educational system should be for “every student to graduate from high school ready for college or career” (U.S. Department. of Education, 2010a). The National Academy of sciences (2010) calls for a significant increase in educational attainment at the post-graduate level is crucial for the U.S. to maintain its global leadership and competitiveness.

Today, more Americans have access to educational opportunities at all levels. During the last three decades, enrollment has significantly increased across all levels of education, at a faster pace than its population growth (NCES, 2010). Today, more Americans are going to school, attending college, and attending graduate school than ever. However, ethno-linguistic minorities are not reaching these higher levels of education in similar proportion to other groups.

The significant growth of ethnic and linguistic minorities during the last century has changed the composition of the nation (García et al., 2008; NCELA, 2006; Capps, Fix, Murray, Ost, Passel & Hernandez, 2005). During the past decades, this growth has affected the schooling system in general and the education of English language learners (ELLs) in particular (Callahan, et al, 2009; Cerna et al, 2009; Brown, 2008; Batalova et al., 2007). During the last decade, the number of ELLs almost doubled and today, language-minority students comprise a significant portion of schoolchildren in several large states of the nation, including California, Texas, Florida, and New York. Some researchers predict that by 2030, the LEP student will represent more than 40% of the school-age population in the United States (Thomas & Collier, 2002).

According to Thomas & Collier, “Language minority students … have been traditionally under-served by U.S. schools” (1997; p.3). Several authors recognize that the academic performance of English language learners is much lower than the performance of their White, native-English-speaking peers (NCES, 2010; García et al., 2008, Batalova et al., 2007; Valencia, Valenzuela, Sloan, & Foley, 2004; McKenzie, 2004). At the same time, the Hispanic dropout rate is three times higher than the White rate (García, et al., 2008; Hopstock & Stephenson, 2003), and Hispanics are underrepresented in higher education, even though their participation in higher education has significantly increased during the past two decades (Aud et al., 2010; Olsen, 2010; Batalova & McHugh, 2010, Balfanz & Legters, 2004, Anderson, 2002).

While societal factors such as family socioeconomic conditions and neighborhood environment, impact the educational opportunities of students (Gándara & Contreras, 2009; Brisk, 2006), the academic gap can also be partially attributed to schooling conditions such as the implementation of remedial and subtractive instructional programs (Baker, 2006) designed for the education of second language learners. These programs include English Immersion (EI), English as a Second Language (ESL) and Transitional Bilingual Education (TBE).

In English Immersion, language minority students are placed in mainstream English classrooms with no linguistic support. In ESL environments, language-minority students are placed in secluded classrooms designated exclusively for English language learners, were instruction is provided in English only, but at a pace and language level more adequate for the learners. However, due to language simplification and slow pacing, the curriculum may be watered down. In TBE, initial instruction is provided in the home language. However, first language instruction is terminated as soon as the learner acquires enough English language proficiency to participate in mainstream English classrooms. All these programs are considered remedial and subtractive because, their ultimate goal is to strip the students from their home language, which is perceived as detrimental, and to develop English language literacy; not bilingualism and biliteracy (Freeman & Freeman, 2001).

The goal of traditional programs such as English Immersion and early-exit Transitional Bilingual Education is to eventually replace the learners' first language (L1) with a second language (L2), considered more academically and socially valuable by the school (García et al., 2008). Therefore, through such programs, the first language is forcefully subtracted from the linguistic repertoire of the learners. In such programs, content instruction is often delayed in order to first teach the language students lack. Once students reach a sufficient level of English proficiency, they are placed in mainstream courses where they must make extraordinary gains to catch up with their native English speaking peers.

The gaps in academic proficiency and academic attainment have fueled a debate about effective instructional practices for ELLs (García et al., 2008; Skrla & Scheurich, 2004b; Ramirez, 1986; Padilla, Fairchild, & Valadez, 1990), and bring to the forefront the disagreements about the length of time that instruction in the home language is necessary (Collier, 1989; Fradd, 1987). Several researchers claim that the effectiveness of bilingual education depends on the degree of proficiency students develop in their home language (García & Gonzalez, 2006; Thomas & Collier, 2002; 2004; Cummins, 2000a). Research on the achievement effects of additive bilingual education has shown that Spanish-speaking Hispanics, who were first taught to read in Spanish, were more likely to become better readers in English than similar students who were initially taught to read in English (García, 1991; Wong-Fillmore & Valadez, 1986). Some research has shown that simultaneous literacy development is also effective (Goldenberg, 2008). In addition, proficient bilingualism and biliteracy can actually provide a variety of cognitive benefits to the learners (Baker, 2006; García & Gonzalez, 2006; Thomas & Collier, 2002; 2004; Cummins, 2000).

Additive programs provide an alternative approach for the instruction of language minorities. Rather than displacing the first language, the second language expands the linguistic and communicative repertoire of the learner. The ultimate goal of such programs is for students to become biliterate and bilingual (García et al., 2008). In additive programs, there is no need to water down or halt content instruction, which can be delivered in the first language. This allows learners to not only develop enough academic language proficiency in English, but all along their educational experience, to fully develop academic bilingualism and biliteracy.

Dual language instruction (DLI) is an additive program that has proven successful in closing the academic gap for bilingual students at the elementary level (Lindholm-Leary, 2005a, 2005b; Thomas & Collier, 2004). In DLI, students from two different linguistic backgrounds receive literacy and content instruction in both languages and develop academic proficiency in both languages simultaneously. DLI programs are enriching and additive by nature, because they add a second language and culture to each one of the linguistic groups involved. Because they use both languages for instruction, the curriculum is not watered down but enhanced. The bilingual, biliterate environment of DLI programs validates both cultures and languages, promoting an intercultural school orientation and empowering all students. In DLI programs, no language and language group is provided a superior status.

However, most school districts nationwide stop DLI at 5th grade, even when DLI facilitates the development of academic language proficiency, especially at higher grades, when instruction becomes more challenging and less supported by context (Thomas & Collier, 2002). If the ultimate goal is to truly develop bilingual and biliterate individuals, schools must help students to develop as much as possible their academic language proficiency in both languages. Such challenge can be achieved through exposing learners to cognitively challenging and meaningful content courses in both languages throughout their academic experience. Therefore, the implementation of DLI at middle and high school levels seems highly recommended; especially in communities with high percentages of language-minority students, or receiving large numbers of ELLs into their secondary schools.

There is no research evidence, especially in the United States, about the academic outcomes of implementing a dual language instruction (DLI) program from kindergarten to high school, mainly because there are few DLI programs being implemented at the secondary and high school level (Bearse & De Jong, 2008; Howard, Sugarman, Christian, Lindholm-Leary & Rogers, 2007; Montone & Loeb, 2000).

Significance of the Problem

The effective education of Hispanics and Hispanic ELLs has gained national attention due both to the increasing numbers and to their poor educational outcomes. However, the effective education of Hispanics is critical in some regions of the U.S.

where they represent an extremely high percentage in the school population (McKenzie, 2004). For example, In Texas' Lower Rio Grande Valley, the location of this study, Hispanics represent 97.2% of the school-age population, and 36.5% of them are identified as limited English proficient (Texas Education Agency, 2010a). Most Hispanics in this area are placed in subtractive programs that provide little or no instructional support in Spanish (Olsen, 2010; Freeman, Freeman & Marcury, 2005)

There are many regions in the country with conditions similar to the Lower Rio Grande Valley, where the implementation of educational programs effective in closing the Hispanic achievement gap is crucial (Valencia et al., 2004). In many other regions, the percentage of Hispanics and Hispanic ELLs is growing rapidly (NCES, 2010). Therefore, it is important for these regions to also start implementing effective instructional programs.

The lack of educational programs that validate and incorporate the language and culture of the students not only perpetuates the academic gap; it can also generate cultural isolation and social fragmentation. Many language minorities are either socially isolated by the host culture or they intentionally isolate themselves in an attempt to retain their language, culture, and traditions (Gándara & Contreras, 2009; Portes & Rumbaut, 2001; Ogbu, 1992, Cummins, 1996).

There is an urgent need to identify and implement effective instructional programs such as K-12 dual language instruction that can ensure the academic success of ethnic and linguistic minorities in specific communities such as the Rio Grande Valley, where a large number of language minority students live in a bilingual and biliterate environment. Such an environment can be an asset for the bilingual and biliteracy development of emergent bilinguals, regardless of their linguistic background, by constantly exposing them to both languages.

The implementation of traditional subtractive programs such as English Immersion (EI), English as a Second Language (ESL) and Transitional Bilingual Education (TBE) limits the educational development of linguistic minorities and sends a message of linguistic supremacy. Through the implementation of additive bilingual programs, such as Dual Language instruction, communities such as those in the Lower Rio Grande Valley can enhance not only the educational and socioeconomic expectations of all their students, but also increase their self-esteem and strengthen the bonds between all members of the community (Howard & Sugarman, 2001).

Research Question

Given the need for research on the effectiveness of additive bilingual education models, such as Dual Language Instruction, against traditional models such as TBE and ESL in terms of long-term academic and linguistic proficiency development, that extends to the secondary level, and the effectiveness of such programs in areas densely populated by members of ethno-linguistic minorities, this study will address the following question:

How does the long-term academic achievement of Hispanic students schooled in a Dual Language Instruction (DLI) program compare with the academic achievement of comparable students schooled in a Transitional Bilingual Education (TBE) program and students enrolled in the English as a Second Language (ESL) program; all within the same school district?

Context of the Study

The study takes place in a school district located at the Texas border with Mexico. In this district, Hispanics represent 98.7% of the more than 30,500 students enrolled, and 41.5% of them are identified as limited English proficient (TEA Webpage 2010, AEIS 2008-09 District Profile). This is more than five times larger than the national figures of 21.7% of Hispanic students and four times larger than 10.3% of ELLs nationwide (Aud, et al., 2010).

The educational levels of the people in this area are extremely low. Only 56.5% of the population 25 years and over is a high school graduate or higher and only 12.8% of them hold a bachelor's degree. These percentages are much lower than the national averages or 84.5% and 27.4% respectively for high school and bachelor's degrees (U.S. Census Bureau, 2008).

Poverty is an important factor in the area. The median family income for the area, $29,072, is less than half that of the nation, $63,211. More than 35% of the area families live below the poverty level, almost four times the 9.6% national average (U.S. Census Bureau, 2008). 88.6% of the students in the district are labeled as economically disadvantaged; more than double the national average of 42.9% (TEA, 2010a).

Most of the Hispanics and Hispanic ELLs in the school district are placed in subtractive programs that provide them with little or no instructional support in Spanish. Even though 84.2% of the population in the community speaks a language other than English at home (U.S. Census Bureau, 2008), only 41.5% of the students in the district are enrolled in bilingual/ESL education (TEA, 2010b). The demographic, economic, and educational data of the selected school district is quite similar to the other school districts in the Rio Grande Valley and across the country.

In the 1995-96 school year, the school district implemented a DLI program in three of the 21 elementary schools within the district. In all cases, the program was developed as a strand within the school, starting at the kindergarten level, and growing up with the students. The school district was not the only school district in the region to implement a DLI program. Many other school districts in the area took advantage of federal funds earmarked specifically for the support of Dual Language Instruction by the Bilingual Education Act Amendment of 1994. Unfortunately, as the political winds changed and the funds available to support Dual Language instruction waned, many school districts across the Rio Grande Valley limited or terminated their DLI programs.

However, while other school districts were dismantling their Dual Language Instruction programs, the school district selected for this study not only maintained their program at the elementary program, but expanded it into the secondary school level. By 2002-03, the program reached one of the five middle schools in the district and by the 2005-06 school year, the program reached two of the three district high schools. In 2008-09, the first cohort of DLI students graduated from high school. By then, the school district was so confident about the effectiveness of Dual Language Instruction that it decided to expand the program district wide. Today, 27 elementary schools, 7 middle schools and 4 high schools have a DLI strand within the school and 2 elementary schools are DLI school-wide. However, such academic effectiveness has to be carefully analyzed and documented; and information about its success needs to be distributed.

Purpose of the Study

In order to fulfill the demands of educational accountability programs such as No Child Left Behind that hold schools liable for the academic development of all students (García et al,, 2008) and to achieve the educational goal established by the Federal administration for all students to graduate from high school ready for college or career (Dept. of Ed. 2010a), it is critical to identify which instructional programs lead to the academic success of Hispanics and Hispanic ELLs. Decision-makers and stake-holders need instructional recommendations based on strong data to clearly understand the long-term outcomes of their programmatic decisions (Thomas & Collier, 1997, 2004).

The goal of this research study is to compare the long-term academic achievement of students schooled in each of three different instructional programs available to Hispanic students in a school district located in the Lower Rio Grande Valley, along the Texas border with Mexico. The programs available include transitional bilingual education, English as a Second language, and Dual Language Instruction. The ultimate goal of the study is to identify the long-term academic effects of implementing a K-12 DLI program in a community with a high percentage of Hispanics and Hispanic ELLs.

Significance of the Study

Regardless of the recent popularity of Dual Language Instruction, few research studies have compared the effectiveness of additive bilingual education models, such as DLI, against traditional models such as TBE and ESL (Irby, Tong, Lara-Alecfio, Mathes, Rodriquez, Guerrero, Cox, Quiroz, & Nie, 2008; Lindholm-Leary & Borsato, 2005; Gottlieb and Nyuyen, 2007; Lopez & Tashakkori, 2004; Thomas & Collier, 2004, 2003, 2002; De Jong, 2002; Senesac, 2002). When comparisons have been established, they have been done either by comparing small population samples or through the comparison of samples from different background groups. In most cases, comparisons are limited to short periods of evaluation time, or based upon a limited number of academic proficiency indicators (Wallstrum, 2009; Bearse & De Jong, 2008; Carhill & Paez, 2008; Cox, 2008; Irby et al., 2008; García & Bartlet, 2007; Ramos, 2007; Lindholm-Leary & Borsato, 2005; Alanís, 2000; Montone & Loeb, 2000)

Dual language Instruction research is especially limited in terms of long-term academic and linguistic proficiency development that extends to the secondary level, and the effectiveness of such programs in areas densely populated by members of ethno-linguistic minorities. According to researchers such as Tong and associates (2008), August and Shanahan (2006), and Slavin and Cheung (2005), long-term research about DLI is crucial because it takes several years for ELLs participating in Dual Language Instruction to reach the academic, social and linguistic benefits granted by the program. Several authors including Bearse and De Jong (2008), Lindholm-Leary and Borsato, (2005), Thomas and Collier (2004), and Montone and Loeb (2000) have noted lack of research analyzing the educational outcomes of DLI at secondary school level. Alanís (2000) also has written that there is a need for research along the border region of Texas, due to the high concentration of Hispanics, Hispanic ELLs and economically disadvantaged students. In fact, there is no research available about the effects of implementing a Dual Language Instruction program, from kindergarten to 12th grade, in a school district with a high percentage of ELLs.

Definition of Terms

One major problem for the field of bilingual education is the confusion generated by the lack of standard definitions for some crucial concepts (García et al., 2008). The first and perhaps the most important misunderstanding in bilingual education is what it is meant by Bilingual Education. For some educators and researchers bilingual education refers to any instructional program used to educate those students that come from homes that speak a language other than English (LOTE students). Other stake-holders identify bilingual education as a program of instruction that makes use of two languages for instruction, regardless of the length of use of the first language. A third perspective perceives bilingual education as an educational program that aims to develop fully proficient bilingual and biliterate learners. Therefore, bilingual education can be perceived in terms of the population being served, the languages of instruction being used, and the long-term linguistic goals to attain (García et al., 2008).

Another source of confusion is the variety of labels used to identify the student population. Labels such as Language Minority Student (LMS) and Linguistically and Culturally Diverse Student (LCDS) are commonly used to identify students who were born and raised in homes where a language other than English is mainly spoken (Gotlieb, 2006; Thomas & Collier, 1997). English Language learner (ELL) and Limited English proficient (LEP) are labels frequently used to identify those language minority students who are still learning English at school (García et al., 2008). The Elementary & Secondary Act of 2001, also known as No Child Left Behind (NCLB) describes LEP students as those learners not having enough English mastery to meet the state's proficiency levels of achievement on State assessments (U.S. Department of Education

2002). The problem with both labels is the implicit deficiency they place upon the student, treating their home languages as problems to be fixed, rather than assets to be enhanced. Emergent Bilingual is a more positive label to indentify these learners (García et al, 2008). Beyond providing more value to the home language of the learners, this label also incorporates the contextual reality of students who live in environments that support their bilingual/biliterate development, by recognizing that through their daily exposure, all learners in such communities have higher possibilities to become bilingual and biliterate. An additional benefit of the Emergent Bilingual label is that it does not change when students reach grade-level English proficiency. A fourth, but most important benefit of this label is that it makes no distinction between learners regardless of their linguistic background; placing all students at rather similar starting points and towards similar learning goals. Therefore, this research study will use the label Emergent Bilingual from Spanish background as a more adequate identifier for students otherwise identified as ELL or LEP. One limitation to this label will be those students identified as Long Term English Language Learners (LTELLs). According to Menken and associates (2010), LTELLs are those students that even though they have been in the U.S. schooling system for seven years or more, they have been unable to reach grade-level English language proficiency and still have difficulty performing ordinary class work in English.

An area that requires clear definitions is the types of programs provided to the students' home languages and cultures. As previously mentioned Additive programs aim to maintain and develop the linguistic skills of the students in both languages, while Subtractive programs aim to develop proficiency in the dominant second language at the expense of the home language (García et al., 2008; Baker, 2006; Freeman & Freeman, 2001). This differentiated treatment is caused by the discrepancy in value placed upon the minority languages and cultures. Remedial models hold a cultural and linguistic supremacist perspective, placing no value at the students' home language and culture, and perceiving them as obstacles to be eliminated (García et al., 2008; Ovando, 2003). The ultimate goal is to detach the learners from their detrimental cultural and linguistic heritage and endow them with the more beneficial dominant language and culture. Enrichment Models hold a multicultural perspective that perceives the minority languages and cultures of the learners as valuable assets to promote, maintain, and thoroughly develop, aiming for students to attain full bilingualism and biliteracy. According to Cloud, Genesee, and Hamayan (2000), enrichment models emphasize high levels of achievement in challenging standards in the core curriculum domains while enriching students' development in both languages, and the understanding and appreciation of the cultures associated with those languages. According to Valdés, (2003), Bilingualism is a language oral proficiency continua between two languages that goes from being proficient in language A and incipient in language B to proficient in language B and incipient in language A. Therefore, a balanced bilingual is located at the center of the continua, having the ability to speak and understand two languages proficiently, while Biliteracy includes reading, writing, and thinking in both languages at grade level. According to Cook (2002), bilingual proficiency is dependent upon the context and purpose to use the language.

Following the example of Oseguera, Locks and Vega (2009), this study will use the term Hispanic interchangeably with Latina/o to describe native U.S. and foreign born students with a similar linguistic and cultural heritage from various Latin-American, European, and Caribbean Island countries including Mexico, Central America, South America, Spain, Portugal, and the islands of Cuba, Puerto Rico, and the Dominican Republic.

Limitations of the Study

Due to its quantitative approach, this study does not explore the implications from a qualitative perspective. The effects that its implementation has upon the students' motivation, self-esteem, and self-efficacy are crucial and should be thoroughly analyzed.

Another research limitation is that some indicators, such as home language proficiency, can only be measured upon results in elective classes which are voluntary by design. This creates a disparity of measures available among groups of students.

A third limitation is that the study was conducted in a setting with an extremely large percentage of Hispanics; its replication in a different setting implies modifications that could affect its replication validity.

Because the researcher implemented a retrospective research, where independent variables have already occurred and participants were not randomly assigned, the study is considered non-experimental (Cox, 2008). However, ethical and legal considerations limit the possibilities of conducting long-term research in a laboratory-style experimental environment. Such considerations would be explained in the Chapter III.

Summary of Chapter 1

The education of Hispanics and Hispanic ELLs is a national priority for America to maintain its economic and technological supremacy. However, researchers and policy makers have been unable to reach a consensus about how to effectively educate this ethno-linguistic minority.

Although some programs have been successful reducing the Hispanic academic gap, there is yet an urgent need to identify, develop and implement instructional programs effective in closing the gap. Even though many policy-makers support an English-only approach, there is a significant amount of theory and research to support an enrichment approach, such as DLI, that not only makes use of the home language to scaffold instruction, but validates the students' language and culture as instructional assets to promote and enrich their education.

This study addresses the need to research the effectiveness of Dual Language Instruction against traditional models such as TBE and ESL in terms of long-term academic and linguistic proficiency development in areas densely populated by Hispanics. The study is significant because few research studies have analyzed the long-term effectiveness of DLI and there is no research available about the effects of implementing a Dual Language Instruction program, from kindergarten to 12th grade, in a school district with a high percentage of Hispanic ELLs.

Chapter 2

LITERATURE REVIEW

Introduction

This review of literature focuses upon different aspects of the educational experience of Hispanic students. The review starts by analyzing the condition of education in the United States, Texas, and the Rio Grande Valley to establish parameters to understand the condition of education of Hispanics and Hispanic ELLs. The review includes the condition of education in the State of Texas because it's the state with the second largest Hispanic population in the nation, and because as claimed by USA Today, "the Texas of today is the U.S. of tomorrow" (Jervis, 2011, P. 3A). The population conditions experienced today by Texas are similar to the conditions predicted for the nation in the near future. The review also includes the Rio Grande Valley because it's overwhelming Hispanic population and because it is where the school district, focus of this study, is located. The indicators reviewed include: participation in education, academic performance in a variety of indicators, education attainment, economic benefits of education, and education investment.

The review analyzed the personal, societal, and schooling conditions that influence the academic achievement of Hispanics, and how the different instructional programs available for the education of Hispanics and Hispanic ELLs impact their long-term academic achievement. Different educational programs are explained to establish a framework for a comparison between Dual Language Instruction and Transitional Bilingual Education/English as a Second Language. The objective of this review is to provide a demographic, academic, and socioeconomic picture of the education of

Hispanics and Hispanic ELLs at the local, regional, and national levels, and to compare and evaluate existing models of instruction for Hispanic and Hispanic ELLs

The Condition of Education

To understand the condition of education, it is important to define three basic issues. First, it is important to understand the role that education plays in society. Second, it is crucial to define the goals to be achieved by the educational systems. Third, it is essential to define how the achievement of these goals is measured.

Roles of education.

According to the literature reviewed, education plays two important and intertwined roles in society. First, educational attainment has historically been related to individual economic progress and social mobility. During the colonial era, the revolution, and early republic, the masses were taught just enough to read the Bible, while the first universities in America were established for the education of the rich who were to be future socioeconomic and political leaders. However, during the 19th century, urbanization and industrialization brought forth a new system where individuals could positively change their socioeconomic condition through education (Berkin, Miller, Cherney & Gormly, 1999). Across the nation, public schools were established to develop the scores of mid-managers required by the economy. As scientific and technological innovation evolved, so did the educational demands of society. Eventually, a high school diploma was not enough to guarantee socioeconomic mobility. Today, the labor market highly rewards post-secondary education (Fry, 2002). Therefore, any individual, eager to retain a position or move upward in the socioeconomic ladder must pursue post-secondary education (Gándara & Contreras, 2009).

At the same time, education plays a second, crucial role. Historically, the political and economic success of a society has been associated with the educational attainment of its population (García, Ogle, Risinger, Stevos & Jordan, 2002). Ingenuity and economic global leadership are connected to the educational attainment of the people (National Academy of Sciences (NAS), 2010). During the 20th century, the United States gained political and economic leadership around the world, because of the ingenuity of its educated people. The importance of education for national status became evident during the Cold War era, when the U.S. government positioned education as a national priority (Blanton, 2004). However, during the past decades, the U.S. has been losing economic and academic ground. For the United States to maintain its leadership in today's global economy, it is important to invest in and increase its education capacities (NAS, 2010).

Goals of education.

During the past decades, the supremacy of the United States diminished in certain areas because other developed nations increased their investment in education. For example, in 2000, the U.S. ranked 20th out of 24 industrialized nations, in the percentage of individuals who have a degree in science or engineering (NAS, 2010). In 2009, and according to the Program for International Student Assessment (PISA), 17 of the 33 member countries of the OECD had higher average scores and 11 had similar scores to those of the United States in math and 12 countries had higher average scores and 12 had similar average scores than the U.S. in science (OECD, 2009).

For the U.S. to maintain its global competitiveness, it is critical to encourage and support the development of a workforce highly educated in all content areas. The ultimate goal of public education can no longer be for students to attain a high school diploma.

The goal must be to ensure that every student graduates from high school ready for college (U.S. Dept. of Ed., 2010a). School systems nationwide must improve the effectiveness of their K-12 education for all students, and provide incentives for students to pursue an education at the undergraduate and graduate levels (NAS, 2010).

Indicators of educational achievement.

During the last twenty years, the standardization reform provided a framework for educational achievement through the development of specific content-area standards written to define and measure educational performance (Echevarria et al., 2008; García & Bartlet, 2007; Eisner, 2000). Federal initiatives such as the Improving America's Schools Act of 1994 and the No Child Left Behind Act of 2001 transformed the standardization reform into national, state and local policies, making states, school districts, schools, and educators accountable for their ability to meet the standards (Nesselrodt, 2007; Capps et al., 2005; U.S. Dep. of Ed, 1994, 1998, 2002).

However, as the U.S. Department of Education claims, "many state standards do not reflect the knowledge and skills needed for success after high school" (2010a, p. 3). The U.S. Department of Education provides a set of indicators used by an increasing number of states to measure their ability to prepare students ready for college. Such indicators include: participation in college-level courses such as Advanced Placement (AP); scores on standardized college admission assessments such as the SAT; the percentage of high school graduates attending college immediately after high school graduation; the percentage of high school graduates taking remedial courses in college; and the percentage of high school graduates being retained one year in college (U.S. Dep. of Ed., 2010a).

Therefore, to adequately measure the condition of education, the assessment of our educational system must go beyond scores on state-developed standardized tests and the percentage of students obtaining a high school diploma, and include other reliable indicators, as the ones mentioned before, to indentify how well prepared these students are for college.

Condition of Education in the United States, Texas, and the Rio Grande Valley

Every year, the U.S. Congress requires the National Center for Education Statistics (NCES) to provide a report on the condition of education in the United States (Aud et al., 2010). This report identifies the developments and trends in U.S. education in areas such as student participation and persistence, student performance and achievement, the learning environment, and the resources available. The figures provided by the NCES report supply a helpful reference point to compare the condition of education of specific subgroups such as Hispanics.

Participation in education.

Participation is a key indicator of the condition of education, measured by enrollment and defined as the number of students registered at a designated time and at a designated level of education (NCES, 2010). Each education level has specific characteristics that contribute to the long-term academic success of the learners. Early childhood education prepares children for elementary school by exposing students to an educational experience in a friendly environment. Early childhood education can start closing the educational gaps that exist between learners due to variations in learning experiences at home (Aud et al., 2010; Gándara & Contreras, 2009; Baker, 2006). K-12 education provides the knowledge and skills learners require to support post-secondary instruction and to be productive in society. Because participation is mandatory in most states, K-12 enrollment is almost universal. Post-secondary education provides opportunity to advance knowledge and skills in specific areas of interest, pursue advanced coursework, and specialize in a variety of professional fields (NCES, 2010). However, because post-secondary education enrollment is neither mandatory nor free, it reflects variations in the availability and value given to post-secondary education, as well as variations in socioeconomic conditions and college-age populations (Aud et al., 2010; Gándara & Contreras, 2009).

During the last decades, U.S. enrollment increased at all levels of education. Early childhood education enrollment increased from 20% in 1970 to 53% in 2008. Enrollment at the elementary and secondary school levels for youth ages between seven and fifteen years old remained near 100% due to mandatory school attendance policies. Secondary school enrollment for youth ages sixteen to seventeen years old increased from 90% in 1970 to 95% in 2008 (NCES, 2010). College enrollment for young adults 18 to 19 years old increased from 37% in 1970 to 49% in 2008. College enrollment for young adults 20 to 21 increased from 32% in 1970 to 50% in 2008, and enrollment for ages 22 to 24 increased from 15% in 1970 to 28% in 2008 (Aud et al., 2010). This data is illustrated in Figure 1.

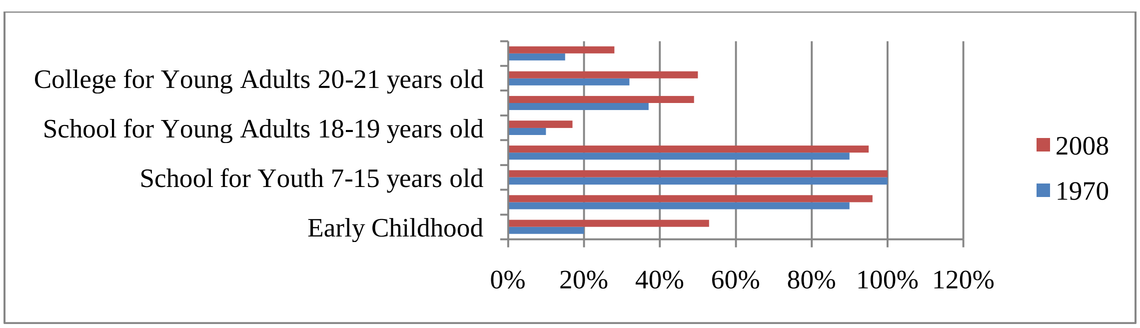

Figure 5: Participation in education

Public school pre-K to 12th enrollment.

As illustrated in figure 2, nationwide public school elementary and secondary enrollment increased 7.4% during the last four decades, moving from about 45.9 million students in 1970-71 to about 49.3 million students in 2008. In 2008, about 34.2 million were enrolled in pre-K to 8th grade and about 15.1 million were enrolled in 9th to 12th grade. During the next decade, enrollment is projected to increase about 6%, reaching 52.3 million students by 2019-2020. Enrollment is projected to increase most at the elementary and middle school levels, while high school enrollment is projected to increase less than 1% (NCES, 2010).

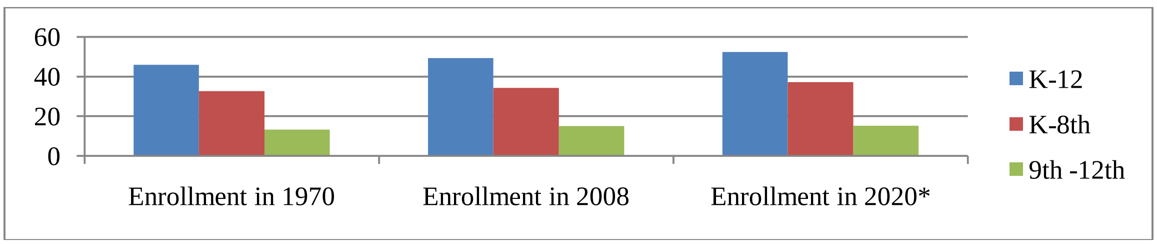

Figure 6: Public school enrollment

The growth in public school enrollment is not distributed evenly across the nation. In fact, school enrollment increased in the South and the West while decreased in the Northeast and the Midwest. As illustrated in figure 3, this asymmetrical trend is expected to continue during the next decade (Aud et al., 2010).

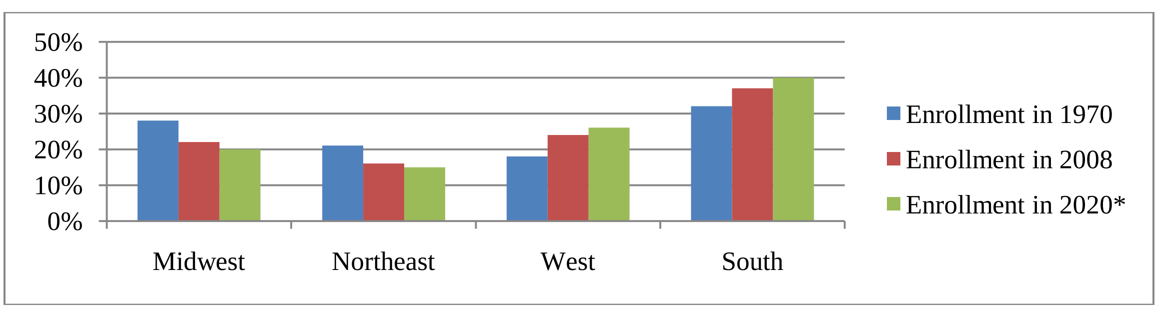

Figure 7: Public school enrollment between Regions

The states with the greatest projected increases for the next decade are Arizona (33.1%); Nevada (34.8%); Utah (34.8%), and Texas (24.9%). If these projections are accurate, Texas can surpass California and become the state with the largest public school enrollment by 2030.

The number of school age children and number of students enrolled in public education are growing at faster rates in Texas than in the United States (Texas Education Agency (TEA), 2010a). While the U.S. population in the United States increased 12.6% between 1999 and 2009, the population in Texas increased 23.6% (U.S. Census Bureau, 2000, 2010a). In a similar fashion, the estimated number of 5- to 17-years-old increased 18.2%; much higher than the 3.9% increase nationwide. Texas had the largest percentage increase in public school enrollment among the four most populated states in the country: California, Texas, New York and Florida. Between 1999 and 2009, public school enrollment grew 6.9% nationwide and 21.1% in Texas.

The Rio Grande Valley's K-12 enrollment increased in larger percentage than Texas. Between 1999 and 2009, Region I was the region with the second largest enrollment increase in Texas, with an increase of 35.7%; slightly behind Region 13 – Austin- that increased 38.7% during the same decade (TEA, 2010a).

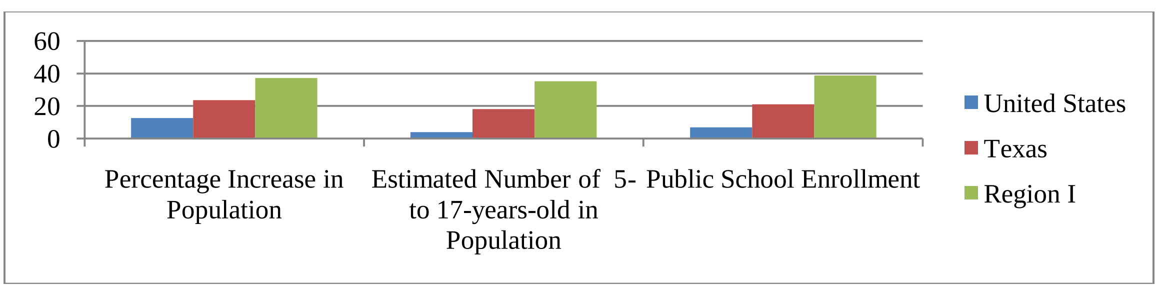

Figure 8: Percentage change between 1999 and 2009

Hispanic pre-K to 12th enrollment.

During the past four decades, enrollment has risen among students from diverse racial and ethnic backgrounds and among students who speak a language other than English at home (NCES, 2010; Gándara & Contreras, 2009; García, 2001; August &

Hakuta, 1997). Many schools across the nation are becoming increasingly diverse in ethnic and racial allotment. The percentage of schools with a White population of 50% or more decreased from 70.9% in 2000 to 61.6% in 2008. Meanwhile, schools with a Black or Hispanic population of 50% or more increased from 19.9% in 2008 to 24.4% in 2008 (Aud et al., 2010). This shift is illustrated in Table 1.

Table 1: Schools with ethnic majority

Schools with Ethnic Majority (50% or more)		
	2000	**2008**
White	70.9	61.6
Black	11.1	11.4
Hispanic	8.8	13.0

Hispanics are the largest and the fastest-growing minority in the nation (U.S. Census Quick Facts webpage, 2010; Fry, 2010; NCES, 2010). During the last five decades, Hispanic numbers grew twelvefold, from 4 million in 1950 to more than 48 million in 2010 (U.S. Census, 2010; Fry, 2010; Gándara & Contreras, 2009). As illustrated in Table 2, in 1970, Hispanics accounted for 4.7% of the national population, in 2009 they accounted for almost 16%, and by 2050 it is projected that Hispanics will be around 132 million and account for 30% of the national population (U.S. Census, 2010). Therefore, because Hispanics are the largest and the fastest growing minority in the nation, their education is crucial (Gándara & Contreras, 2009)

Table 2: Population Distribution

Population Distribution (in Millions) (U.S. Census Bureau)											
	1970	**1980**	**1990**	**1993**	**2000**	**2006**	**2009**	**2020***	**2030***	**2040***	**2050***
Hispanic Population	9.6	14.6	22.4	22.8	35.3	44.3	45.5	59.7	73.0	87.7	132.8
Estimated total Population	204	228	249	256	282	299	301.5	335.4	363.2	393.3	442.7
Percent of total Population	4.7	6.4	9.0	8.9	12.5	14.8	15.1	17.8	20.1	22.3	30.0

Hispanics are a young, growing group. In 2009, the Hispanic population median age was 27.4 years; 9.4 years younger than the national median (36.8 years old). Even though Hispanics represented only 15.8% of the population in the United States, they comprised 26% of children younger than 5 years old and 22% of children younger than 18 years old (U.S. Census Bureau, 2010b). The Hispanic population growth is increasing the Hispanic share in school enrollment. Today, Hispanics make an increasing proportion of the school-age population (Aud et al., 2010). In 1970, about 80% of the K-12 public school population was non-Hispanic White, 15% was African-American, and all other groups together, Hispanics included, represented less than 5% of the schooling population (Census Bureau, 2007). However, by 2008, things have considerably changed. Even though Hispanics accounted for about 14% of the general population, they accounted for 21.7% of the pre-K to 12th public school enrollment nationwide (NCES, 2010).

While White student population decreased 4.6%, from 28 million in 1988 to 26.7 million in 2008, and Black student population increased 10.3%, from 6.8 million in 1988 to 7.5 million in 2008, the Hispanic student population increased 130%, from 4.5 million in 1988 to 10.4 million students in 2008 (Aud et al., 2010). While the share of White students in public education decreased 12.8 points during the last twenty years, from 68.3% in 1988, to 55.5% in 2008, and the share of Black students decreased one point, from 16.5% to 15.5%; the Hispanic share almost doubled, from 11% in 1988 to 21.7% in 2008 (NCES, 2010). By 2020, about 50% of the public school population will be non-White, and by 2030, the majority of students (65%) will be non-White (Thomas & Collier, 1997). As shown in Table 3, the total number of public school students increased 17.3%, from 41 million in 1988 to 48.1 million in 2008; an increase of 7.1 million students in 20 years. With an increase of about 5.9 million students, Hispanics represent 83.2% of the total increase in population (Aud et al., 2010).

Table 3: Participation in Education

Participation in Education (in Thousands)							
Student Population	Enrollment Percentage in 1988	Enrollment Percentage in 2008	Change in 20 years	Enrollment number in 1988	Enrollment number in 2008	Numeric change in 20 Years	Percentage change in 20 years
White	68.3	55.5	-12.8 pts	28,024	26,710	-1,314	-4.6%
Black	16.5	15.5	-1.0 pts	6,776	7,460	684	10.3%
Other Groups	4.2	7.3	3.1 pts	1,712	3,541	1,829	164.7%
Hispanic	11.0	21.7	10.7 pts	4,532	10,426	5,894	130%
Total	100	100		41,044	48,137	7,093	17.3%

In some states, Hispanic participation is significantly higher. In 2008, Hispanic students represented 21.7% of the national K-12 enrollment, 48% in California, and 46% in Texas (Gándara & Contreras, 2009). By 2010, Hispanic enrollment accounted for 50.4% in California (California Dept. of Ed. Webpage, 2010) and 48.6% in Texas (TEA webpage, 2010). Within the states, the Hispanic population is more concentrated in some regions. In Texas for example, Region I has a much higher Hispanic representation. As illustrated in figure 5 in 2010, Hispanics represented 96.7% of the student enrollment in the Rio Grande Valley (TEA, 2010a).

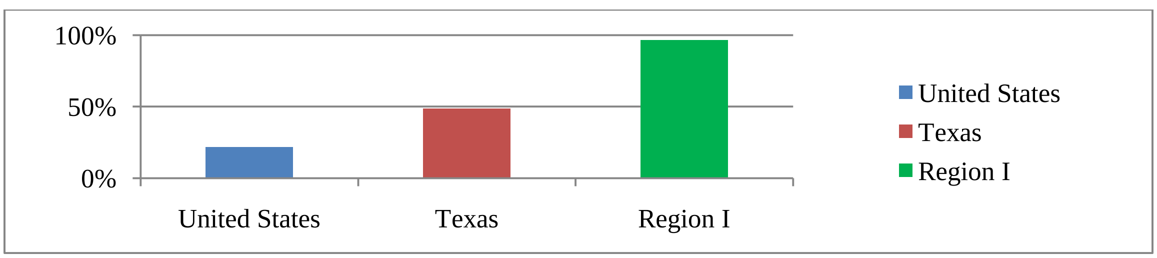

Figure 5: Hispanic enrollment representation

English language learners Pre-K to 12th enrollment

The significant increase in Hispanic population has been accompanied by a significant increase in population with limited English proficiency (LEP) (August & Shanahan, 2006). The percentage of school-age children (5 - 17 years old) who spoke a language other than English (LOTE) at home grew from 8.5% in 1979 (3.4 million) to 20.5% in 2008 (10.9 million) (NCES, 2010). It is important to understand that not all LOTE children are limited in English proficiency. Actually, even though the percentage of LOTE children has increased dramatically, the percentage of LOTE children with limited English proficiency decreased from 34.2% in 1979 to 24.6% in 2008 (Aud et al., 2010). However, the increase in LOTE population is so extensive, that even though a larger proportion of LOTE children are not LEP, the total number of LOTE children who are LEP is increasing.

According to the U.S. Department of Education, English language learners (ELLs) are the fastest-growing student population in the nation (US Dept. of Ed., 2010b). This statement is supported by other authors (Irby et al., 2008; Bearse & De Jong, 2008; Alliance for Excellent Education, 2007; Hoffman & Sable, 2006; August & Shanahan, 2006; Suárez-Orozco & Páez, 2002). Between 1990 and 2005, while the total K-12 enrolment increased by 21%, the amount of English language learners grew 38% (Echevarria et al., 2008; Tong et al., 2008; NCELA, 2006, August & Shanahan, 2006; Batalova, 2006). In 2000, 3.4 million students, representing about 6% of school-age children were ELLs (Capps et al., 2005). By 2008, 4.7 million students were ELL, representing 10.7% of the national K-12 enrollment (US Dept. of Ed., 2010d; Batalova & McHugh, 2010). This data is illustrated in table 4.

Table 4: Language Minorities Representation

Language Minorities Representation in School			
	1979	**2000**	**2008**
Percentage of LOTE school-age children	8.5%		20.5%
Percentage of ELLs in K-12		6%	10.7%

A significant percentage of ELL students are Hispanic (Batalova, 2006). In 2000, 76% of the PK-5th ELL population and 71.6% of the 6-12th ELL population spoke Spanish at home (Batalova & McHugh, 2010; Irby et al., 2008; Tong et al., 2008; NCELA, 2006; Batalova, 2006; Capps et al., 2005; Suárez-Orozco & Páez, 2002).

Even though in 2000 most ELL students were born in the United States and less than 36% were born abroad (Batalova & McHugh, 2010; Batalova, 2006; Capps et al., 2005; Capps 2001), migration has played a key role for the increase in ELL schooling population (Gándara & Contreras, 2009; Capps et al., 2005). The amount of school age children who have at least one immigrant parent has significantly increased during the past decades, moving from 6% in 1970 to 19% in 2000 (Capps et al., 2005) and projected to increase to 33.3% in 2040 (Hernandez, Denton, & McCartney, 2008). About 66% of all Hispanic students in the U.S. have at least one parent born abroad (Census Bureau, 2008; Capps et al., 2005).

This increasing influx of LOTE immigrants presents a challenge for the schooling systems nationwide (Gándara & Contreras, 2009; Tong et al., 2008; Bearse & De Jong, 2008; Capps et al., 2005; Camarota & McArdle, 2003). As illustrated in figure 6, about 67% of all these children were born in the U.S. and have all the rights and privileges of a citizen (Fortuny, Capps, And Passel, 2007). At the same time, and regardless of their nationality or legal resident status, all students are protected by the Constitution in their right to receive a full and equal public school education in the United States (Olsen, 2010; Fortuny et al, 2007).

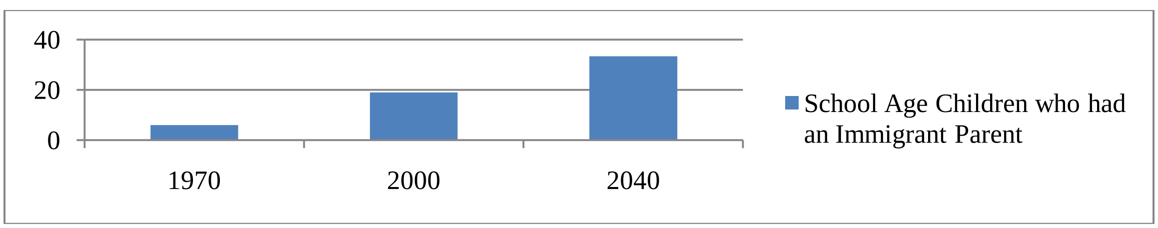

Figure 6: School-Age Children who had an Immigrant Parent

Even though ELLs represent a larger percentage of students at the K-5th level than at the 6th -12th level, the highest growth rates are occurring at the secondary level (Menken, Kleyn, & Chae, 2007, 2010; Bearse & De Jong, 2008; Kindler, 2002).

As illustrated in figure 7, the ELL population is disproportionately distributed across the nation. In 2008, five states accounted for 52% of the total ELL enrollment in the nation. California had the largest ELL enrollment in the nation, with more than 1.5 million students, representing 28.7% of the total, followed by Texas (13.2%), Florida (4.4%), Arizona (3.1%), and Nevada (2.5%) (NCES, 2010). At the same time, 25 school districts account for nearly 25% of the total ELL enrollment in the nation. Los Angeles Unified School District has the largest ELL enrollment with 328,684 ELL students, followed by New York City (122,840), Chicago (82,540), Miami-Dade (62,767), Houston (61,319) and other 12 school districts in California, 3 in Texas, 3 in Florida, one in Nevada and one in Colorado (Aud et al., 2010).

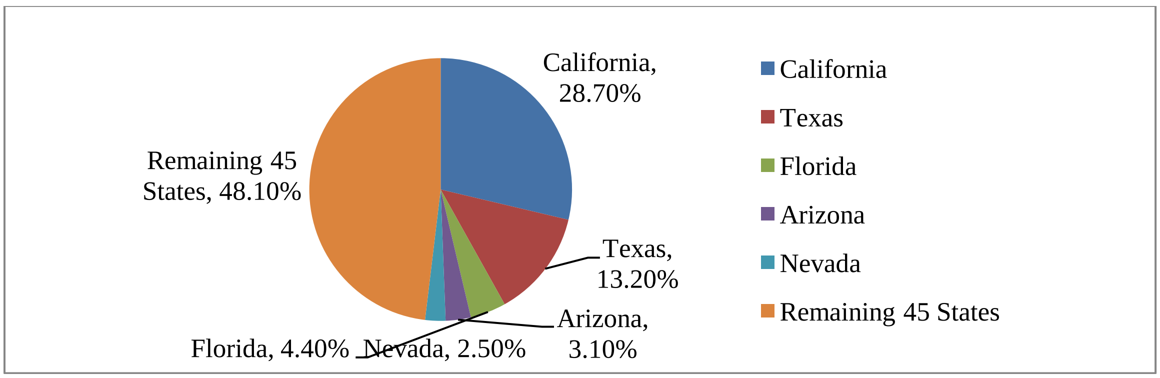

Figure 7: ELL Distribution across States

In several states, ELLs represent a large share of the total public school population. In 2008, 31.4% of the schooling population in Nevada was labeled as ELL, followed by California (24%), Arizona (15.3%), and Texas (15%).That same year, 28 states in the Union (56%) reported an ELL enrollment of 5% or more (Batalova & McHugh, 2010; US Dept. of Ed., 2010d). In some states, the increase has been exponential. For example, between 1996 and 2006, the K-12 ELL population grew 372% in North Carolina and 301% in Nebraska (US Dept. of Ed., 2010d; Batalova & McHugh, 2010; Batalova, 2006).

As illustrated in table 5, Region I has a significantly larger percentage of ELLs than the state and the nation. In 2010, while ELLs represented 11% of the national and 15% of the Texas K-12 enrollment, ELLs represented 36.6% of the K-12 enrollment at Region I (TEA, 2010)

Table 5: ELL Enrollment Representation

ELL Enrollment Representation in 2010			
	United States	Texas	Region I
ELL Public School Enrollment	10.7%	15.1%	36.6%

Due to their swelling numbers, the effective education of ELLs is crucial for the socioeconomic development of the nation. However, they have been traditionally overlooked and underserved (NCES, 2010; U.S. Dept of Ed., 2010d; Gándara & Contreras, 2009; Oseguera et al., 2009; García, 2006; August & Shanahan, 2006; Lindholm-Leary & Borsato, 2005)

Post-secondary education enrollment.

As illustrated in Figure 8, the enrollment increase at the post-secondary education level was significantly larger than at the K-12 level. Such increase exhibits the increasing value society has placed upon post-secondary education during the last four decades.

At the undergraduate level, enrollment increased 121.6%, from 7.4 million students in 1970 to 16.4 million in 2008 (Aud et al., 2010). Enrollment increased unevenly across decades due to different socioeconomic and political conditions. During the 1970´s, undergraduate enrollment increased 42% due to the Civil Rights´ movement and the implementation of Affirmative Action policies. However, the increase was smaller in the 1980's (14%) and the 1990's (9.9%) due to a gradual dismantling of Affirmative Action policies. During the 2000's, undergraduate enrollment gained momentum again due to an increase in demand. The projected increase for undergraduate enrollment for the following decade is estimated at 16%, reaching 19 million students in 2020 (Gándara & Contreras, 2009). Enrollment at a post-baccalaureate level also increased significantly (80%) during the past decades, moving from 1.5 million students in 1970 to 2.7 million in 2008. The projected increase for the next decade is about 43.8%, reaching an estimate of about 3.4 million students (NCES, 2010).

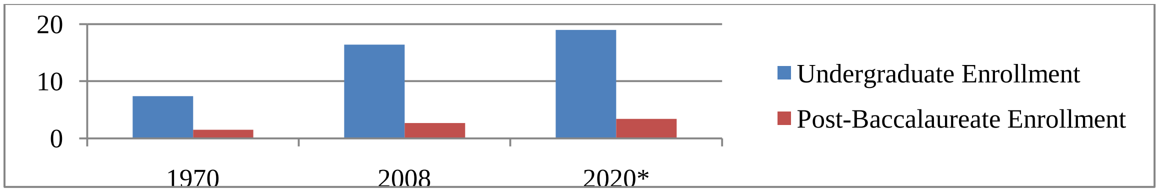

Figure 8: Post-Secondary education enrollment trends

Hispanic post-secondary education enrollment.

Hispanic post-secondary education enrollment has increased during the past three decades, moving from 3.9% in 1980 to 11.9% in 2008 (Aud et al., 2010). Even though this represents an increase above 200% in less than thirty years, the Hispanic participation in higher education remains lower than their share in population (14%). Therefore, Hispanics remain under-represented in higher education (Oseguera et al., 2009; Lindholm-Leary & Borsato, 2005; Smith, 2003; Grogger & Trejo, 2002). This data is illustrated in figure 9.

Hispanics are also highly underrepresented in selective post-secondary institutions. About 80.6% of Hispanic post-secondary students attend public institutions; 7.7 points above their White peers (72.9%). At the same time, only 11.0% of Hispanic higher-education students attend prestigious private non-for profit institutions; almost half the enrollment of their White peers (20.8%). A large percentage of Hispanic undergraduate students (49.4%) attend 2-year public institutions. This is 50% more than their White peers (32.6%) (NCES, 2010).

At the Post-baccalaureate level, Hispanic enrollment increased from 2% in 1976 to 5.1% in 2000 and to 6.2% in 2008 (Aud et al., 2010). Even though there has been a significant increase in representation, Hispanics remain highly underrepresented in baccalaureate and post-baccalaureate education. This data is illustrated in figure 9.

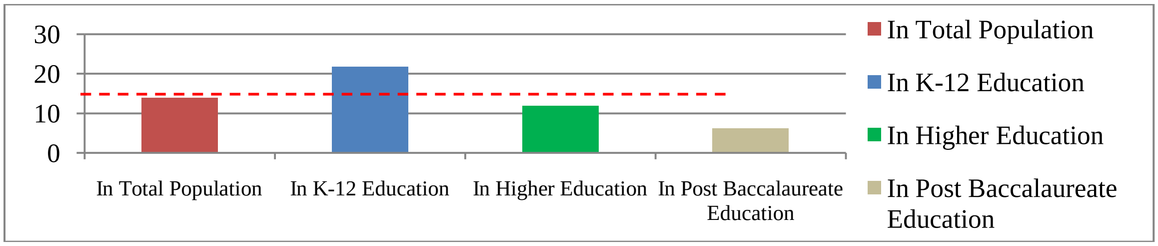

Figure 9: Hispanic Representation in Education

Academic Performance.

Academic Performance is a key indicator of the condition of education that can be established by measuring how students perform in a variety of instruments such as standardized assessments, college level courses, college admission assessments, and grade point average.

Students' academic performance in U.S. and Texas increased during the last four decades. However, even though the academic performance of Hispanics has experienced a significant increase, a significant academic gap remains in place. The academic performance of Hispanic students is considerably below the national average all along the education continuum (Gándara & Contreras, 2009; August & Shanahan, 2006; Lindholm-Leary & Borsato, 2005; Perie, Grigg, & Donahue, 2005; Presidential Advisory Commission on Educational Excellence for Hispanic Americans, 2003; Smith, 2003; Grogger & Trejo, 2002; Kindler, 2002). In 2000, 89% of all Hispanic secondary school students read below grade level (Perie, Grigg, & Donahue, 2005) and their retention level is considered an urgent issue in higher education (Oseguera et al., 2009).

Standardized assessments in core-content areas.

State-developed standardized assessments are the instruments most commonly used to measure academic performance. The 1994 reauthorization of the Elementary and Secondary Education Act (ESEA) required all states to develop standards for core content areas, clearly defining what students should know and be able to do. The No Child Left Behind Act of 2001, made states, school districts, schools and educators accountable for helping students meet the established standards (U.S. Dep. of Ed., 2010a, Gándara & Contreras, 2009). Since 2001, many states have made significant gains in meeting content standards (U.S. Dep. of Ed., 2010a).

In Texas, academic performance in the state-developed Texas Assessment of Knowledge and Skills (TAKS) has improved during the last seven years. In 2010, Texas students met standards at a rate of 90% in reading, 84% in math, 93% in writing, 83% in science, and 95% in social studies. This figure is higher than the 2003 TAKS administration, when Texas students met standards at a rate of 86% in reading, 78% in math, 86% in writing, 71% in science, and 90% in social studies (TEA, 2004; 2010). This data is illustrated in figure 10.

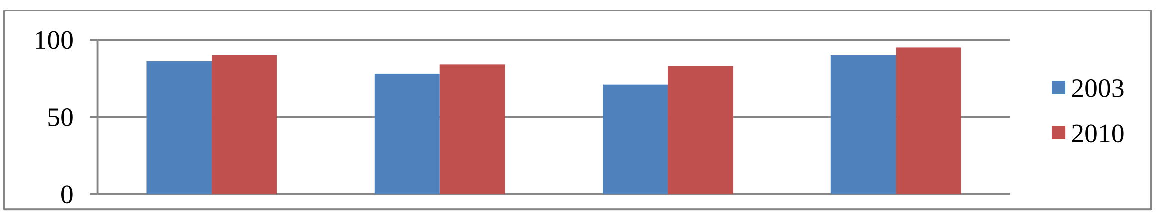

Figure 10: Academic performance in Texas measured by TAKS

However, standardization has exhibited three key problems. First, many state-developed standards and assessments are not designed to meet the knowledge and skills students need to succeed in college. Second, many states have lowered their standards to meet accountability requirements, watering down the curriculum. Third, to meet accountability, many educators and administrators reduce the scope of instruction, teaching exclusively what is being tested and limiting the students´ learning experience (U.S. Dep. of Ed., 2010a; Gándara & Contreras, 2009; Contreras, 2005; Alanís, 2000).

Even though state-developed standardized assessments are the instruments most commonly used to measure academic performance, they are not the most effective to measure the academic performance of Hispanics due to a series of limitations. Beyond the fact that they are not designed to measure college readiness, state-developed assessments have proven ineffective to measure the academic performance of ethno-linguistic minorities due to cultural and linguistic limitations (Gándara & Contreras, 2009, García, 2006). If the cultural and linguistic characteristics of the assessed are not considered by the assessment, any content assessment becomes, to some extent, a language proficiency assessment (August & Shanahan, 2006; Bernardo, 2002; American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999).

Most state-developed standardized assessments were designed to meet the academic needs and measure the academic outcomes of middle class, English-speaking, White learners (U.S. Dep. of Ed., 2010b; Gándara & Contreras, 2009; Cummins 2009; Solano-Flores, 2008; August & Shanahan, 2006; Alanís, 2000). This is especially true for Hispanic ELLs because test results are highly influenced by the language the students use at home (Solano-Flores, 2008; August & Shanahan, 2006, Pennock-Roman, 1988; Duran, Enright, & Rock, 1985). Many Hispanic students, regardless of their status in English proficiency, come from Spanish-speaking homes and therefore, their scores on standardized assessments can be hindered. Also, states vary tremendously in the testing accommodations used for ELLs (Solano-Flores, 2008; Rivera, Collum, Willner, & Sia, 2006) and how these accommodations address the specific needs of the learners (Kopriva, Emick, Hipolito-Delgado, & Cameron, 2007; Abedi, Hofstetter, & Lord, 2004; Abedi & Lord, 2001).

One helpful instrument to measure academic performance is the National Assessment of Educational Progress (NAEP). NAEP is a national assessment conducted in reading, science, mathematics, writing, arts, civics, economics, geography, and U.S. history. Because NAEP assessments are administered uniformly across the nation, their results serve as a common metric for all participants. Also, because NAEP assessments do not change significantly from year to year, they provide a clear picture of average academic progress over time (National Center for Education Statistics, 2010b).

NAEP scores exhibit a positive trend during the past two decades. The average NAEP 4th-grade reading scores increased 4 points, moving from 217 in 1992 to 221 in 2009. Similarly, average NAEP 8th-grade reading scores increased 4 points, moving from 260 in 1992, to 264 in 2009. In Math, average NAEP 4th-grade scores increased significantly (27 points), moving from 213 in 1992 to 240 in 2009. In 8th grade, NAEP math scores increased significantly (20 points) from 263 in 1992 to 283 in 2009 (NCES, 2010). This data is illustrated in table 6.

Table 6: Academic Performance Measured by NAEP

Academic Performance Measured by NAEP Scale Scores Average			
		Average in 1992	Average in 2009
Reading	Average NAEP 4th grade scores	217	221
	Average NAEP 8th grade scores	260	264
Math	Average NAEP 4th grade scores	213	240
	Average NAEP 8th grade scores	263	283

As illustrated in Figure 11, Texas NAEP scores are almost identical to those of the nation. In reading, Texas 4th graders averaged 220 in 2007 and 219 in 2009; similar the national 220 and 220 for each year. Texas 8th graders scored 261 in 2007 and 260 in 2009; almost identical to the 260 and 260 national scores. In math, Texas 4th graders scored 242 in 2007 and 240 in 2009; slightly higher than the 239 and 239 national scores. Texas 8th graders scored 286 in 2007 and 287 in 2009; slightly higher than the 280 and 282 national scores.

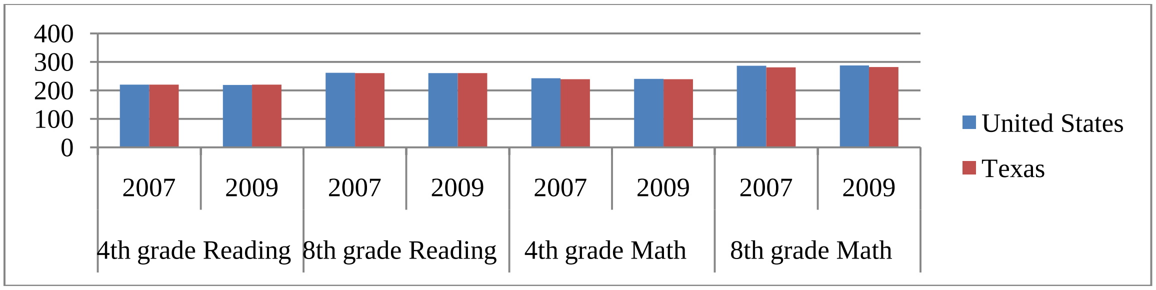

Figure 11: Academic performance in Texas and the U.S. measured by NAEP

NAEP has constantly found a large gap in competency level in reading and math between Hispanics and their White peers. In 2005, only 16% of 4th grade Hispanics reached competency level in the NAEP reading test and 19% in the NAEP math test. This figure is significantly lower than their White peers who achieved 41% in reading and 47% in math (Perie, Grigg, & Donahue, 2005; Perie et al., 2005). As illustrated in Figure 12, in 2009, only 17% of 4th grade Hispanics performed at or above the proficiency level in reading and 22% in math; significantly lower than their 4th grade White peers who achieved 42% in reading and 51% in math (Aud et al., 2010). In 8th grade, only 17% of Hispanics reached competency levels in reading and math; way below their White peers who achieved 41% in reading and 44% in math (NCES, 2010).

In 2009, 6% of 4th grade ELLs scored at or above proficiency in the NAEP reading and 12% in math; way below their non-ELL peers who scored 36% and 41% in reading and math respectively. At secondary level, the gap is wider. Only 4% of 8th grade ELLs met competency level in reading and 10% in math (US Dept. of Ed., 2010d; NCES, 2009a, 2009b). This data is also illustrated in figure 12. The Hispanic proficiency gap in NAEP has been reported by several authors (Perie et al., 2005, NCES, 2004; California Dept. of Education, 2005; Grigg, Daane, Jin, & Campbell, 2003; Kinder, 2002; Strutchens & Silver 2000).).

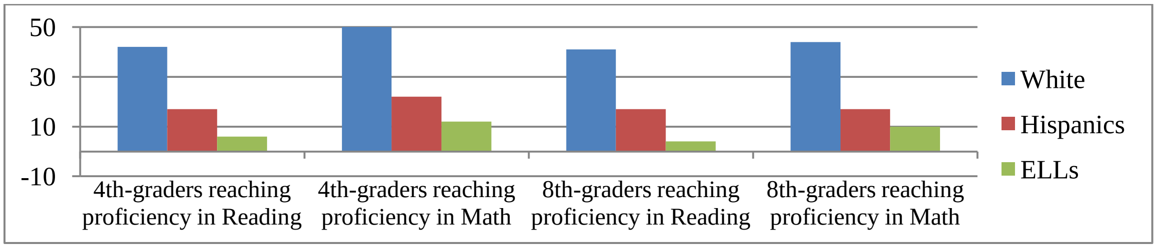

Figure 12: Academic performance by ethnicity and language as measured by NAEP

Standardized college-admission assessments.

Standardized college admission assessments such as SAT are designed to evaluate the students´ academic readiness for college (CollegeBoard, 2010a; Kobrin, Shaw, Mattern & Barbuti, 2008) and are widely accepted by universities as key indicators of academic performance. As other indicators, SAT scores have experienced an upward trend during the past years. In 2010, average SAT scores were 16 points higher in math and 1 point higher in reading than in 1990. However, as illustrated in figure 13, there has been significant fluctuation across the years. For example, scores in 2010 were 4 points lower in math and 7 points lower in reading than in 2005 (CollegeBoard, 2010b).

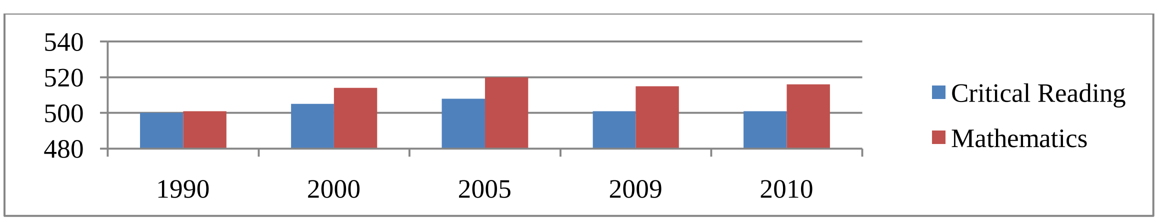

Figure 13: SAT performance

As illustrated in figure 14, Texas SAT scores also experienced an upward trend. In 2010, average Texas scores were 16 points higher in math and one point higher in reading than in 1990. However, there has also been significant fluctuation across the years. Scores in 2010 were four points lower in math and seven points lower in reading than in 2005 (CollegeBoard, 2010).

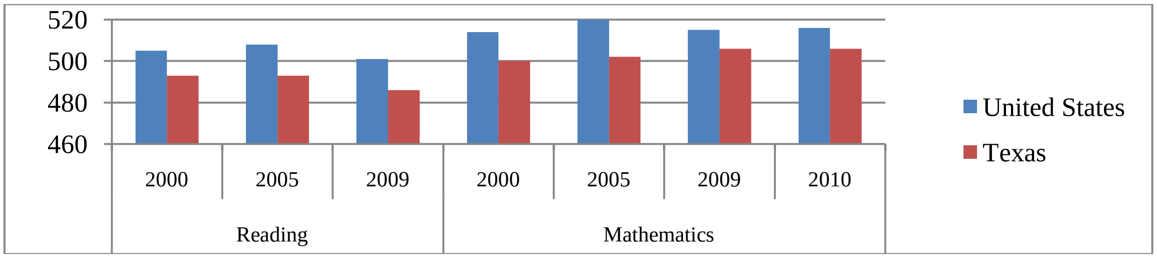

Figure 14: Academic performance in Texas and the U.S. measured by SAT

Students´ performance on standardized assessments such as NAEP, SAT and ACT, provide a clear picture of student academic progress over time (National Center for Education Statistics, 2010b). However, other researchers claim that standardized assessments do not adequately measure the academic growth of all students (U.S. Dep. of Ed., 2010a). Some authors claim that standardized assessments have cultural and linguistic limitations that hinder their effectiveness in measuring the academic growth of ethno-linguistic minorities (U.S. Dep. of Ed., 2010a; Gándara & Contreras, 2009; Solano-Flores, 2008; August & Shanahan, 2006; Alanís, 2000). Therefore, standardized assessments should not be the sole instruments used to measure academic performance.

Standardized college admission tests such as SAT, are gatekeepers for many selective higher education institutions, especially for Hispanics (Gándara & Contreras, 2009). Many Hispanic students do not have opportunity to attend prestigious institutions and therefore are underrepresented in such institutions because they generally perform less well than other groups in standardized college admission assessments (Fry, 2004).

As illustrated in figure 15, the Hispanic achievement gap in college-admission tests is widening. The SAT scores for Hispanics were 56 points lower than their White peers in 1986 and 79 points lower in 2006 (Gándara & Contreras, 2009). This rising gap is reducing the Hispanic representation in selective institutions (Saenz, Oseguera, & Hurtado, 2007).

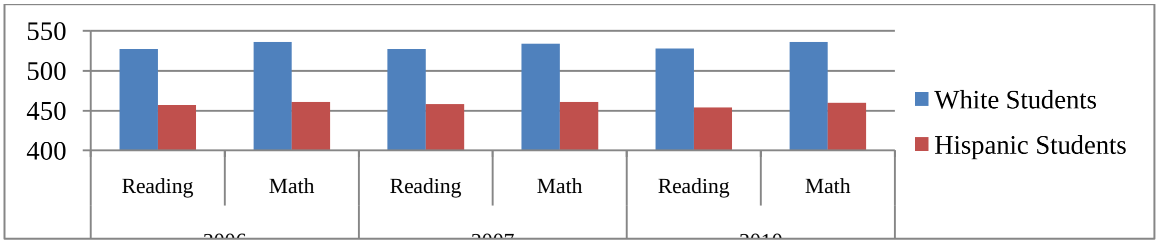

Figure 15: Academic performance by ethnic groups measured by SAT

There are many reasons why Hispanics underperform in standardized college-admission assessments, including English language proficiency. As previously mentioned, Hispanics achieve English language proficiency levels at lower rates than their White peers, and this limited English proficiency can hinder their performance in complex assessments such as SAT (Solano-Flores, 2008; August & Shanahan, 2006; Pennock-Roman, 1988). Hispanics with grade-level English proficiency perform better because they have a better understanding of the test text (Gándara & Contreras, 2009, Alanís, 2000; Duran et al., 1985). However, it is important to understand that Hispanic underperformance is not due to their bilingual condition. In fact, more than one third of SAT high-achieving Hispanics report speaking more than one language (Gándara & Contreras, 2009). There are other factors affecting Hispanic performance on SAT including socio-economic condition, test anxiety, time limitations, and cultural mismatch with the assessment (Solano-Flores, 2008; Alanís, 2000; Steele, 1997).

Participation in college-level courses.

Through participation in college-level courses and assessments such as Dual Credit and Advanced Placement (AP), students not only earn college credit and advanced placement during their secondary education; students can also experience college level education and acquire the skills and habits needed to be successful in college (CollegeBoard, 2010b). The rigorous curriculum provided by college-level courses can lead to higher achievement levels and help students develop a college-going culture (Anastasi, 1996). There is a significant relationship between participating in college-level courses and succeeding at college (CollegeBoard, 2010b; Dougherty, Mellor & Jian, 2005; Gonzalez, O'Connor & Miles, 2001; Lemann, 1999).

AP scores experienced an upward trend during the past years. In 2009 the percentage of students scoring a 3 or higher on an AP exam during high school was higher than in 2004 and 2008 (CollegeBoard, 2010c). This data is illustrated in figure 16.

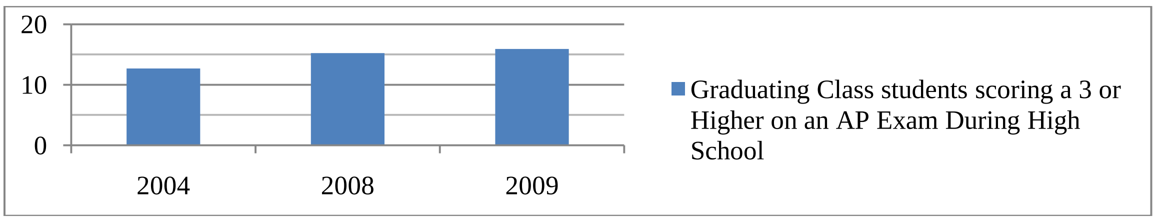

Figure 16: AP participation and performance

Texas AP scores have also experienced an upward trend during the past few years. In 2009, the percentage of graduating class students scoring a 3 or higher on an AP exam during high school was higher than in 2004 and 2008 (CollegeBoard, 2010c). However, the AP performance gap between Texas and the nation widened between 2004 and 2009. While Texas grew 2.4 percentage points between 2004 and 2009, the National average grew 3.2 points (CollegeBoard, 2010c). While 18 states surpassed the national average of 15.9%, Texas lost ground, moving from the 16th place in 2004, to the 20th place in 2009 (CollegeBoard, 2010c)

Participation in college-level courses and assessments is limited by a variety of factors incluiding a students' lack of knowedge about what high school courses are important for college, and schooling tracking practices based on english language proficiency and socio-economic status that limit the opportunity for many students to participate (Gandara & Contreras, 2009). Because many students across the nation do not take part in college-level courses, participation and success in college-level courses cannot be used as sole instrument to measure academic performance.

Hispanics are underrepresented in college-level courses (CollegeBoard, 2010c; 2011) and many Hispanic students are denied the opportunity to participate in challenging college-level courses due to linguistic limitations and tracking practices (CollegeBoard, 2011; Gándara & Contreras, 2009, García, 2006). For example, Hispanic participation in AP courses is way below the average of their White peers. In 2009, 165,151 Hispanic students took an AP test. This represents about 5.5% of the total Hispanic high school enrollment. At the same time, 1,086,254 White students took an AP exam. This represents about 9.1% of the total white high school enrollment.

As illustrated by figure 17, Hispanics are highly underrepresented in challenging and academically valuable AP tests such as Biology, Calculus, Chemistry, English Composition, Government, Psychology, Statistics, and U.S. History. The only AP tests where Hispanics are overrepresented are the Spanish language tests. CollegeBoard recognizes that in several states, Hispanics meet average AP participation due to their Spanish AP enrollment (2010c).

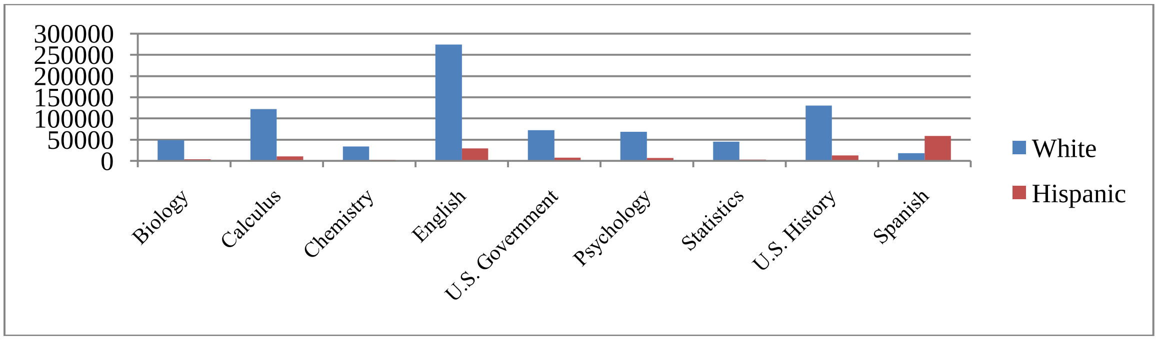

Figure 17: White and Hispanic participation in AP in 2009

This gap in AP participation is highly detrimental, not only because AP scores are a key indicator of the students' likelihood to success in college (CollegeBoard, 2011; U.S. Dept of Ed., 2010a; Geiser & Santelices, 2006), but also because a successful participation in AP courses can increase the student's GPA. Since Hispanics and Hispanic ELLs are underrepresented in these courses, the result is that they cannot compete to earn high GPAs needed for prestigious colleges.

Grade point average (GPA).

GPA is considered by most universities as a useful measure of academic performance (Gándara & Contreras, 2009; Gándara, 2006). Some authors consider GPA as a better predictor of college performance than standardized college admission tests; especially for ethno-linguistic minorities (Geiser & Satileces, 2007). Contrary to what happens with standardized tests, speaking another language can have a positive effect on GPA (Gándara & Contreras, 2009).

However, Hispanics exhibit a wide achievement gap in GPA across grade levels. For example, in 2000 9th grade Hispanics´ average GPA was 2.5 while their White peers´ GPA average was 3.2. A similar pattern was exhibited at the 10th, 11th, and 12th grades (Gándara, 1999; US Dept of Education, 2000). This data is illustrated in table 7.

Table 7: National GPA by Ethnicity

National Average GPA 2000				
	9th Grade	10th Grade	11th Grade	12th Grade
White	3.2	3.2	3.1	2.6
Hispanic	2.2	2.1	2.0	1.9

An important factor hindering the Hispanic GPA is their underrepresentation in college-level courses, such as AP. Due to their challenging curriculum and college credit value, college-level courses are given extra weight in GPA points. GPA fluctuates significantly across schools, districts, and states due to a variety of contextual factors including teacher expectations, courses and standards (Strenta & Elliot, 1987).

Status dropout rate.

Another form of establishing the academic performance of a society or social group is by identifying the percentage of 16- through 24-year-olds who are not enrolled in school and have not earned a high school diploma or equivalency such as a General Educational Development (GED) certificate (Aud et al., 2010; U.S. Dept. of Ed., 2010a; Gándara & Contreras, 2009; Fry, 2003). The Status Dropout Rate is estimated using the American Community Survey (ACS) and the Current Population Survey (CPS). Nationwide, the status dropout rate declined 6.1 percentile points during the last three decades, moving from 14.1% in 1980 to 8.0% in 2008.

There is a discrepancy between the Averaged Freshman graduation Rate (AFGR) and the Status Dropout Rate because they measure different groups under different conditions. AFGR does not account for students who graduate one or more years later than their expected year of graduation or students who accomplished their high school education through a GED certificate. Also, the EFGR loses track of many students due to student transience. Meanwhile, the Status Dropout Rate includes all 16 to 24 year-old dropouts regardless of when and where they attended school. Many individuals may have never attended school in the United States (NCES, 2010).

Both measures indicate that every year, the percentage of students are staying in school and graduating from high school is increasing. During the past four decades, high school attainment increased 11 points; from 77.7% in 1971, to 88.6% in 2009 (Aud et al., 2010).

As illustrated by figure 18, Hispanics exhibit a detrimental overrepresentation in Status Dropout Rate (Gándara & Contreras, 2009. Swanson, 2004). Even though the Hispanic Status Dropout Rate decreased from 35.5% in 1980 to 18.3% in 2008, the White students´ status dropout rate in 2008 was 4.8%; more than 280% lower than Hispanics, leaving a gap of 13.5 points (NCES, 2010).

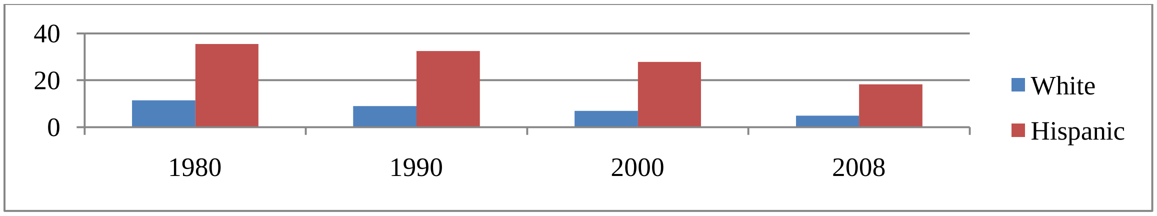

Figure 18: Trends in status dropout rates

Immediate transition to college.

Immediate transition to college is another key indicator of the condition of education. The Immediate College Enrollment Rate (ICER) represents the percentage of high school graduates who were enrolled in college the October immediately following their high school completion (Aud et al., 2010). ICER represents the percentage of students who had the volition, the possibility, and the skills to attend post-secondary education immediately after high school graduation. ICER increased significantly during the last four decades, moving from 49.2% in 1972 to 68.6% in 2008. However, even though a significantly higher percentage of high school completers enrolled in 4-year colleges (41%) than in 2-year colleges (27.7%) in 2008, the percentage of students enrolled in 2-year colleges is increasing at a faster rate.

Hispanics ICER increased 42%, moving from 45% in 1972 to 63.9% in 2008. However, a significant gap remains in comparison with their White peers. In 2008, the White ICER reached 71.7%, leaving a gap of 7.8 points, 12.2% higher than their Hispanic peers (Aud, et al., 2010).   The ICER trends are illustrated in table 8.

Table 8: Immediate College Enrollment Rates

Immediate College Enrollment Rates		
	1972	**2008**
White Non-Hispanic	49.7%	71.7%
Hispanic	45%	63.9%

When reading ICER data is important to understand that ICER considers only high school graduates. Therefore, ICER does not consider the large percentage of students who were not able to attain a high school diploma or equivalent. If such group was considered in the ICER equation, the White/Hispanic gap would be much higher due to the large percentage of Hispanic students who are unable to attain a high school diploma.

Education attainment.

Attainment indicates the progress students make as they move through the schooling system (NCES, 2010). Many public high schools across the nation use the Averaged Freshman Graduation Rate (AFGR) to estimate their graduation rates, measuring the percentage of freshman students who graduate on time 4 years later with a regular diploma. To account for the high rate of retention in the freshman year, AFGR estimates the percentage of an incoming freshman class by averaging the number of 8^{th}-graders 5 years earlier, the number or 9^{th}-graders 4 years earlier, and the number of 10^{th}-graders 3 years earlier.

Nationwide, the AFGR increased 2.2% during the last decade, moving from 71.7% in 2001 to 73.9% in 2007 (Crissey, 2009).. The states with the highest AFGR in 2007 were Vermont (88.6%); Wisconsin (88.5%); and Iowa (86.5), while the states with the lowest AFGR were Nevada (52%); District of Columbia (54.9%); and South Carolina (58.9%). Texas remains slightly under the national average moving from 70.8% in 2001 to 71.9% in 2007 (Aud et al., 2010).

As illustrated in table 9, during the past four decades there has been a significant gain in post-secondary degree attainment for population 25- to 29-year-old. While the national high school attainment rate increased 14%, from 77.7% in 1971 to 88.6% in 2009, the bachelor's degree attainment rate increased 78.9%, moving from 17.1% in 1971 to 30.6% in 2009, and the Master's degree attainment rate increased 64.4%, moving from 4.5% in 1971 to 7.4% in 2009.

Table 9: Educational attainment

Educational Attainment for Population 25- to 29-years Old		
	1971	**2009**
Overall High School Attainment	77.7%	88.6%
Overall Bachelor's Degree Attainment	17.1%	30.6%
Overall Master's Degree Attainment	4.5%	7.4%

According to the American Community Survey (ACS), the educational attainment in Texas for population 25 years and over increased between 2000 and 2009. Texas high school attainment increased 4.8%, moving from 75.7% in 2000 to 79.3% in 2009 and Bachelor's attainment increased 9.5%, moving from 23.2% in 2000 to 25.4% in 2009. However, both figures are below the national increments. National high school attainment increased 5.2%, moving from 80.4% in 2000 to 84.6% in 2009, while Bachelor's attainment increased 11.3%, moving from 24.7% in 2000 to 27.5% in 2009. Therefore, the educational attainment gap between Texas and the National average widened during the last decade. At the local level, educational attainment in the Rio Grande Valley also increased. High school attainment increased 17.8% from 50.5% in 2000 to 59.5% in 2009 and Bachelor's attainment increased 17.8%, moving from 12.9% in 2000 to 15.2% in 2009. Such increases slightly narrowed the wide educational attainment gap traditionally displayed between the Rio Grande Valley and the national average (U.S. Census Bureau, 2010b). This data is illustrated in figure 19.

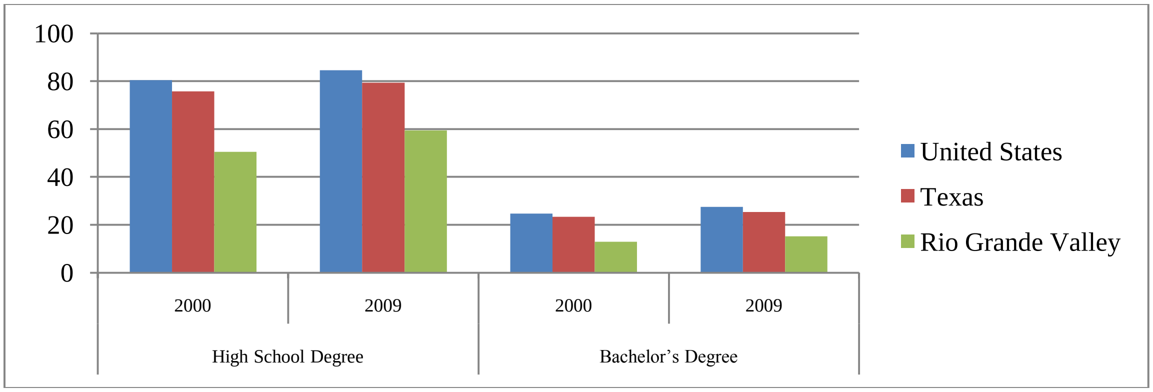

Figure 19: Education Attainment in the U.S., Texas, and the Rio Grande Valley

Hispanic education attainment.

Hispanics display a significant gap in education attainment across the education levels (Lopez, 2009). Even though during the past four decades Hispanics exhibited a 42.6% increase in high school attainment moving from 48.3% in 1971 to 68.9% in 2009; such increase has been insufficient to close the attainment gap. In 2009, White high school attainment reached 94.6%, leaving an achievement gap of 25.7 points, 37.2% higher than Hispanics (NCES, 2010).

Similar to the increase exhibited at the high school level, during the last four decades, Hispanics exhibited a highly significant increase in bachelor's attainment (139.2%), shifting from 5.1% in 1971 to 12.2% in 2009. However, the achievement gap actually widened because by 2009, White bachelor's degree attainment reached 37.2%, leaving a gap of 25 points, 205% higher than Hispanics (Aud et al., 2010).

Hispanics also displayed an increase in Masters´ degree attainment (18.8%) during the last fifteen years, shifting from 1.6% in 1995 to 1.9% in 2009. However, the achievement gap actually widened because by 2009, White's bachelor's degree attainment reached 8.9%, leaving an achievement gap of 7 points, 363% higher than Hispanics (NCES, 2010). These data are illustrated in figure 20.

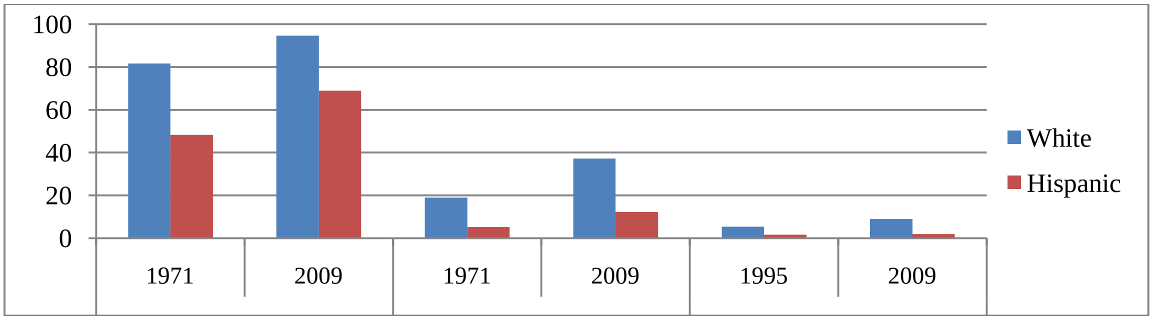

Figure 20: Education attainment trends

Benefits of education.

Identifying the economic benefits generated by educational attainment is another key indicator of the condition of education because it represents the value that the labor market gives to education and how this value impacts the socioeconomic status of the individuals. As illustrated in figure 21, the trends in economic benefits vary according to the educational level. The median annual earnings for full-time, full-year workers ages 25 to 34, estimated in constant 2008 dollars by education attainment changed as follows. The median annual earnings for individuals with less than high school decreased significantly (25%) during the past three decades, moving from $31,400 in 1980 to $23,500 in 2008. The median annual earnings for individuals with high school diploma or equivalence also decreased significantly (18%), moving from $36.600 in 1980 to $30,000 in 2008. Meanwhile, the median annual earnings for individuals with a Bachelor's degree or higher, increased 6%, moving from $47,000 in 1980 to $50,000 in 2008 (Aud et al., 2010).

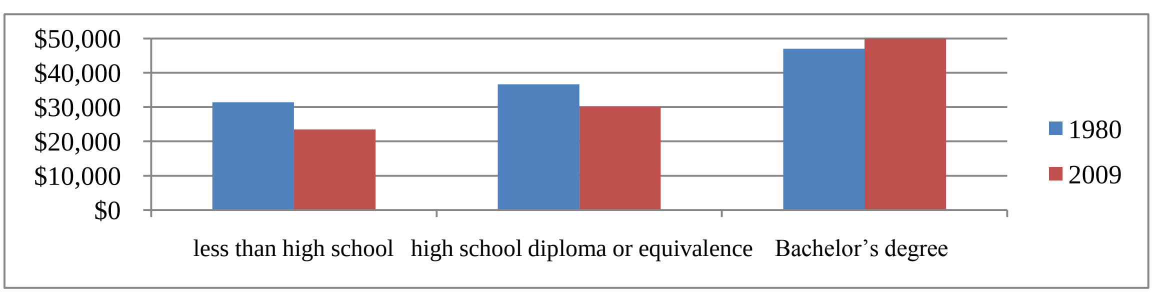

Figure 21: Economic Benefits of Education Attainment

It is evident that the labor market is placing a greater value on individuals with at least a bachelor's degree and placing a lesser value on individuals with less than a bachelor's degree. Today, post-secondary education is considered not only a basic goal in education but a crucial requirement to satisfactorily participate in the labor market and in society (U.S. Department. of Education, 2010a).

However, there seems to be also a difference in education benefits of education attainment based upon ethnicity. The value that the labor market is placing to the education attainment of Hispanics is lower than the value placed for White young adults. Such difference is larger at the lower levels of education. The difference in median annual earnings between Whites and Hispanics is illustrated in table 10.

Table 10: Economic benefits of education attainment by ethnicity

Economic Benefits of Education Attainment by Ethnicity			
Median annual earnings with:	**White**	**Hispanic**	**Difference**
less than high school	$26,000	$22,000	18.2%
a high school diploma or equivalence	$31,000	$27,000	14.8%
an Associate's degree	$40,000	$32,000	25.0%
a Bachelor's degree	$47,000	$42,000	11.9%
a Master's degree	$55,000	$52,000	5.8%

As illustrated by figure 22, such trends in economic benefits impact the socioeconomic wellbeing of states and communities. For example, the socioeconomic gap between Texas and the national average widened during the last decade. While the median household income in Texas increased 20.5%, moving from $39,997 in 2000 to $48,199 in 2009; the national median household income increased 22.5%, moving from $41,994 in 2000 to $51,425 in 2009 (U.S. Census Bureau, 2010b). At local level, the median household income in the Rio Grande Valley increased 21%, moving from 24,863 in 2000 to 30,076 in 2009. Therefore, the socioeconomic gap between the Rio Grande Valley and the national average widened from 68.9% in 2000 to 71.0% in 2009.

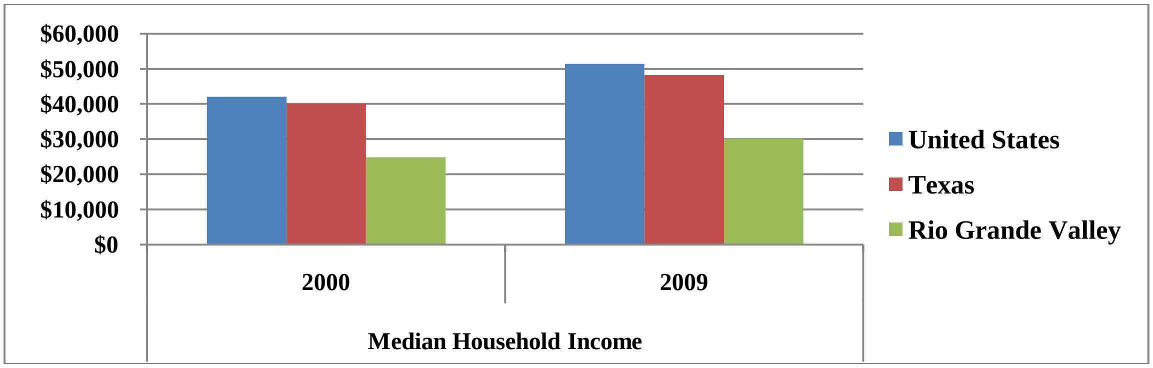

Figure 22: Socioeconomic Benefits of Education in the U.S., Texas, and the Rio Grande Valley

Investing in education.

The amount of money societies invest in education is an important indicator of the condition of education because it represents the value society places in education. In 2006, the United States invested an average of $10,267 per K-12 student (NCES, 2010, Livingston & Wirt, 2005). This amount was 41% higher than the average spent by the member nations of the Organization for Economic Cooperation and Development (OECD). The U.S. was fourth place worldwide in the average amount spent in K-12 education, behind Luxembourg ($15,400), Switzerland ($11,100), and Norway ($10,400) (Aud et al., 2010). At the post-secondary level, the United States led the world with an average spending of $25,109 per student, followed by Canada ($22,800) and Switzerland ($22,200) (NCES, 2010).

Another way to measure and compare the value a country gives to education is by figuring total education expenditures as a percentage of the Gross Domestic Product (GDP) (Aud et al., 2010). From this perspective, the United States ranked in second place with 7.4% of its GPD invested in education; just behind Iceland (8.0%) (NCES, 2010). Therefore, we can conclude that the United States places an important value in education, and therefore assigns significant amounts of money for the education of its people.

However, today's economic recession is challenging the American commitment for education. Nationwide, federal and state governments are reducing their investment in education to help reduce their budget deficits. Therefore, the identification of effective instructional programs is not only relevant from an academic perspective, but also relevant from an economic perspective that would allow governments to spend less in expensive remedial interventions required to fix instructional shortcomings. As in other economic endeavor, the most economically efficient way of doing something is doing it right in the first attempt.

Summary of the condition of education.

The condition of education in the U.S. seems positive in many aspects. Participation increased significantly at the elementary, secondary, and post-secondary education levels during the past decades; and a larger percentage of students are enrolling and remaining in school. This growth is taking place mostly in the South and West.

Academic performance and education attainment also increased. NAEP average scale scores increased during the past two decades, and the percentage of students holding a high school diploma or higher also increased. The increase was highly significant at the bachelor's (78.9%) and the master's (64.4%) levels.

The economy is valuing and rewarding higher education. While the median income dropped significantly for individuals with less than a high school diploma, the median income for individuals with a bachelor's degree or higher increased 6% above inflation during the past three decades. This commitment with higher education is evident in the amount spent by our nation in education. While the United States is ranked fourth place investing in K-12 education, it is ranked first when investing in higher education.

In Texas, the condition of education seems also positive. A larger percentage of students are finishing high school and enrolling in college. Academic performance and attainment also improved. During the last two decades, TAKS, NAEP, SAT, and AP average scores increased and the percentage of students holding a high school diploma and a bachelor's diploma also increased. However, in most indicators, the growth experienced in Texas has been lower than the growth experienced at the national level. Therefore the achievement gap between Texas and the national average has been widening. This gap in education achievement is holding back the economic development of the state.

Even though a general overview of the condition of education in the United States and in Texas provides a positive perspective, if the analyses focus on specific populations such as Hispanics and Hispanic ELLs, the perspective changes drastically. Hispanics and Hispanic ELLs are not only the largest and fastest growing group in the nation, but also a young growing group, making an increasing proportion of the school-age population. Hispanic K-12 enrollment increased 130% during the last two decades, reaching 21.8% in 2008. In California and Texas, Hispanics represent the majority of the school population. Nationwide, ELL enrollment grew from 6% in 2000 to 10.7% in 2008, and about 75% of them are Hispanic. Even though Hispanics and Hispanic ELLs are highly concentrated in a few states and school districts, their participation is rapidly increasing across the nation.

However, Hispanic academic performance exhibits significant gaps across most indicators of academic performance, including national and state-development core-content standardized assessments, college admission tests, college-level courses, GPA, graduation rates, immediate transition to college and education attainment across all levels of education.

These gaps in academic performance impact the socioeconomic benefits Hispanics can obtain from education. Today, Hispanic median earnings are significantly below the national average. Due to its increasing representation, the Hispanic economic gap affects not only the Hispanic population, but impacts the socioeconomic development of the whole nation.

Even though ethno-linguistic minorities have been traditionally overlooked and underserved by our schooling systems; due to their increasing numbers, their education has become crucial for the socioeconomic development of the nation. Genetic and cultural deficit explanations can no longer justify the academic underperformance of Hispanics. It is important to identify the conditions that contribute to the poor academic achievement of Hispanics.

Conditions that Impact the Academic Achievement of Hispanics

Academic achievement is influenced by personal, social, and schooling conditions that can support or hinder the academic development of a learner. Each individual is impacted in a different way according to his/her specific conditions. According to Bronfenbrenner’s (1977) Ecologic Perspective, a set of economic, social, political, and cultural factors affect learners through families, neighborhoods, peers, schools, and mass media (Brisk, 2006). Cortes’ (1986) Contextual Interaction Model exemplifies how internal and external conditions influence the social and educational development of students. Societal and schooling contexts can positively or negatively influence the educational outcome of the learner.

Personal conditions.

Motivation and volition are two critical conditions intrinsic to the learner that highly impact academic achievement (Zull, 2002). Learning cannot take place if there is no motivation to learn (Walberg & Uguroglu, 1980). Motivational factors such as frustration, embarrassment and anxiety impact the learning process (Krashen, 1985; Zedina, 2008; Lightbrown & Spada, 2006). According to Zull (2002), motivation and learning are inseparable. Motivation not only mediates learning but also improves learning and is a consequence of learning (Wlodkowski, 2008). According to Zedina (2008), high stress impairs learning because it is easier for emotions to overcome thinking than for thinking to overcome emotions. However, motivation is not enough. Beyond motivation, there must be a commitment to learn (Schumann, 1978). For learning to take place, learners must be motivated, committed, and personally engaged with the learning process, (Wlodkowski, 2008).

Beyond motivation and volition, there must be background knowledge for new learning to take place. If the learning task is beyond the skills of the learner, no learning will take place, regardless how eager the student is to learn (Wlodkowski, 2008). Learning is intrinsically connected to the background knowledge and experience of the learner (Tate, 2004; Marzano, 2003; Knowles, Holton, & Swanson, 1998; Mitchell, 1998). According to Zedina (2008), learning is based on the ability to connect new information with existing information. Only when such connection is well established, can new learning be incorporated as knowledge (Caine & Caine, 1994).

However, prior knowledge is intrinsically related to culture when culture is defined as ways for perceiving, believing, evaluating, and acting within a social group

(Green & Bloome, 1997). Culture incorporates the meanings members of a social group have for their customary actions, objects, places, interactions, events, institutions and processes. Culture implies also the contextual environment of the learners, including their language, values, customs, traditions, celebrations, music, food, passions, and dreams.

Therefore, education is intrinsically related with the interpretation of reality. As social creatures, human beings interpret the world through sets of socially constructed paradigms, values, and tools, holistically defined as culture (Gee, 1992; Smith, 2003). The interpretation of truth and reality is constructed, labeled, and limited by the socio-cultural background of the individuals. Therefore, culture plays a protagonist role in the learning process (Smith, 2003). Through culture, personal and social conditions intersect. The culture of the individual is intrinsically related to the culture of the community to which the individual is attached, and this culture impacts their schooling experience. As claimed by Freeman and Freeman "the societal context –the world outside school-influences the school context" (2001; p. 186). The students' cultural heritage, their parents' socio-economic condition and educational level, and the students' volition to excel academically, are as crucial for the students' academic success, as their teachers', administrators', and policy makers' attitudes and perceptions about the students' cultural conditions and how they impact their ability to learn. There is a link between community attitudes and school instructional practices (Freeman & Freeman, 2001).

Social conditions.

Social context plays a crucial role in the learning process (Carhill & Páez, 2008). Their ethno-linguistic background, socioeconomic condition, and their community and neighborhood environment impact their academic development of the learners (Gándara

& Contreras, 2009). For example, families with higher levels of education or higher socioeconomic status are more able to draw on resources to pursue better education opportunities (Suarez-Orozco, Suarez-Orozco, & Todorova, 2008).

According to August and Shanahan (2006), socio-cultural factors such as immigration status, parental education, and language status can influence the students' engagement, motivation and participation in the learning process. According to Gándara and Contreras (2009), five social factors increase the risk of school failure. These factors include: poverty, single-parent household, mother with less than high school education, primary language other than English, and unmarried mother at the time of child's birth. According to Zill, Collins, West and Germino-Hausken (1995), Hispanic students have five times more possibilities than White students to have two or more risk factors.

Family background is the most often cited and best researched factor impacting academic achievement (Gándara & Contreras, 2009). There is a strong relationship between academic achievement and the education and socioeconomic status of the parents (Bowles, Gintis, & Groves, 2005; Hakuta, Butler & Witt, 2000). More educated and more affluent parents can provide home learning environments and experiences aligned to the learning environments and experiences of school (Suarez-Orozco et al., 2008; Goldenberg, Rueda & August, 2006; Dickinson & Tabors, 2001). However, Hispanic parents have on average, less education and lower socioeconomic status than other groups (Aud, et al., 2010; West, Denton, and Germino-Hausken, 2000).

Parent education.

Education attainment provides the cultural and social capitals required to adequately guide and support the education of children (Lareau, 2003, 1989; Coleman, 1987a, 1987b, 1988). Hispanic families have high academic goals for their children (Steinberg, 1996; Haro, Rodriguez, & Gonzales, 1994; Delgado-Gaitan, 1990); however, due to a gap in education attainment, many Hispanic parents do not know how things work in education –cultural capital- and do not have access to the social networks –social capital- that can facilitate their children's path through education (Lareau, 1989; Steinberg, 1996).

For Hispanics, as parent education and family income increases, so do their academic outcomes. However, even middle class Hispanics experience a lack of cultural and social capital because Hispanics are much more likely than other groups to be first generation middle class (Isaacs, 2008; Krueger, 2005; Patillo-McCoy, 1999).

Poverty.

There is an intrinsic correlation between poverty and academic underperformance (Glick & White, 2004). The Luxembourg Income Study, defines poverty as having an income "below one-half of the median income…so low that children and family are not able to participate enough in community activities to be perceived, by both, themselves and others, as regular members of society" (Rainwater & Smeeding, 2003). According to the Luxembourg Study, in 1997, almost 37% of all Hispanic children lived in poverty (Rainwater & Smeeding, 2003). According to the U.S. Census Bureau (2010a), 28% of all Hispanics lived in poverty in 2005 and 22% of all Hispanics lived below the poverty level in 2009. For young Hispanics the situation is even worse. In 2005, 31% of all Hispanic children under six years old lived in poverty (Institute of Education Sciences, 2006). In 2004, 56% of all young children of immigrants lived in poverty (Capps, Fix, Murray, Osr, Passel, & Herwantoro, 2004). In general, low income Hispanics have less per-capita incomes than low-income Whites (Martin, Hamilton, Sutton, Ventura, Menacker, & Munson, 2005). In education, poverty is measured by the percentage of students eligible for free or reduced-price lunch (FRPL) through the National School Lunch Program (NSLP) (Aud et al., 2010). In 2005, 73% of all 4th grade Hispanic students were eligible for NSLP; three times the percentage of White students eligible (Gándara & Contreras, 2009).

Single-parent families.

In 2004, while 78% of all non-Hispanic White children lived in a two-parent family and 75% lived with both biological parents, this was true for only 65% of all Hispanic children (Gándara, 2006). Single-parenthood increases the likeliness of living in poverty and experiencing psychological stress and depression (Jencks, 1993; Wilson, 1996). Single-parenthood and poverty decreases the likelihood of children having books at home and being read by parents or observing adults read (Heath, 1983).

Neighborhood characteristics.

Neighborhood characteristics play a critical role in education (Leventhal & Brooks-Gunn, 2004; Jarret, 1997; Brooks-Gunn, Denner, & Klebanov, 1995). The availability of local resources such as parks and libraries and the availability of successful role models of behavior are strongly correlated with school success. More affluent neighborhoods are more likely to provide both, local resources and role models of behavior (Jarret, 1997; Brooks-Gunn et al., 1995). Low-income neighborhoods are less equipped and more associated with negative social role models such as juvenile delinquency (Ong & Terriquez, 2008).

Due to their socio-economic status, Hispanics tend to live in segregated, less affluent neighborhoods (Iceland & Weinberg, 2002). Such segregation limits the social context of their youngsters and their vision of the world. Segregation is more strongly related to student learning outcomes than individual SES variables (Sirin, 2005).

Immigrant status and mobility.

Due to their socioeconomic condition and migratory status, many Hispanic students experience constant residential mobility through their childhood and adolescence (Ream, 2004; Rumberger, 2003; Crowley, 2003). Such mobility impacts their educational achievement. According to Glick and White (2004), students who experience residential mobility are twice as likely not to complete high school. Residential mobility disrupts the students' learning process, increases their likelihood to have behavioral problems, to be held back a grade, and to dropout of school (Ream & Stanton-Salazar, 2006; Rumberger, 2003; Rumberger and Larson, 1998; Entwisle, Alexander & Olson, 1997).

Home language.

The difference between the language used in school and the language used at home is strongly related to academic achievement (Bailey & Butler, 2003; Cazden, 2001; Cummins, 2000a). By the time learners reach school, they have acquired an eclectic collection of concepts and their related vocabulary (Smith, 2003). For many ethno-linguistic minorities, home language is a crucial element of their cultural values, practices, and identity (Delgado-Gaitan, 1990).

Schooling conditions.

Many education stakeholders interpret educational equality as providing equal education opportunities for all. However, in a society where cultural groups hold unequal levels of socioeconomic and political power, providing equal conditions does not create equal outcomes (Freire, 1985; Ferreiro, 1999). Schools play a critical role in the academic development of Hispanics, because Hispanic students are more likely to have less educational resources outside of school (Gándara, 2006; Jia & Aaronson, 2003; Valdes, 2001; Olsen, 1997). If the objective is equal outcomes, it is necessary to provide additional support to account for such unequal conditions. An equal education based exclusively on providing equal books, equal treatment, equal language, and equal curriculum does not grant in equal outcomes because there is not the same stating point (Crawford, 2004). High quality schools can help close the Hispanic achievement gap by providing the resources unavailable at home (Gándara and Contreras, 2009). Hispanic students who attend high-quality schools are more likely to perform at higher levels of academic achievement (Carhill & Páez, 2008; Orfield & Lee, 2005, 2006; Stiefel, Schwartz & Ellen, 2006; Fry, 2010).

However, the quality of education provided is not equal across the nation. School quality variables include size, resources, staff, and ethnic enrollment (Carhill & Páez, 2008). Due to a variety of reasons, many Hispanic students in the U.S. attend highly overcrowded schools, with fewer resources, and less skilled teachers (UCLA, 2007; Oakes, Mendoza, & Silver, 2004; Betts, Reuben, and Dannenberg, 2000).

Segregation.

Ethno-linguistic and socioeconomic segregation impacts the education of many Hispanic youngsters because it increases their possibility to be enrolled in segregated, less-quality, high-poverty schools than their peers from other ethnic groups. Hispanics experience schooling segregation more than any other group (Orfield & Yun, 1999) and such segregation pattern is increasing. In 1997, about 35% of all Hispanic students attended minority schools, by 2006 the rate increased to 39% (Orfield and Lee, 2006). In states with larger Hispanic representation, schooling segregation is higher. In Texas and California, more than 50% of all Hispanic students attend highly segregated (90-100% minority) schools and nearly 75% of these schools are high-poverty schools (Orfield & Lee, 2006).

Hispanic ELLs are heavy concentrated in just a few schools and experience segregation by language. In 2000, only 10% of all schools in the country enrolled over 70% of all the ELLs in the nation (De-Cohen, Deterding & Chu-Clewel, 2005; Zehler, Fleischman, Hopstock, Stephenson, Pendizick, & Sapru, 2003). In 2006, half of all Hispanic ELLs were enrolled in schools where more than 30% of their peers were also ELLs (Linquanti, 2006).

Segregated schools tend to offer inferior courses and provide lower levels of competition, limiting students' preparation for college (Orfield & Eaton, 1996). Segregation restricts students' exposure to other cultures, limiting their view of the world, and negatively influencing their perceptions of themselves and their abilities (Gándara & Contreras, 2009). Schooling segregation also limits students' access to the kind of social capital required for social mobility and academic success (Gándara, 1995).

High-poverty schools.

Due to ethno-linguistic and socioeconomic segregation, Hispanics are more likely to attend high-poverty schools than any other group. High-poverty schools (HPSs) are defined as those where 75% or more of the student enrollment is eligible for free or reduced-price lunch (NCES, 2010).

In 2008, a greater percentage of Hispanic students (42%) attended HPSs than their White peers (5%) (Aud et al., 2010). Hispanics are highly over-represented and make the largest group in HPSs. Approximately, 46% of all students attending elementary HPSs and 44% of all students attending secondary HPSs were Hispanic (NCES, 2010). These figures are much higher than those of White peers who attend at high-poverty schools a rate of 14% and 11% respectively to elementary and secondary schools. The Hispanic HPSs participation rate is more than double the Hispanic total enrollment percentage of 22% at the elementary level and 28% at the secondary level (Aud et al., 2010).

At the same time, Hispanics are underrepresented in low-poverty schools, where less than 25% of all students are eligible for free/reduced-price lunch. In 2008, less than 10% of Hispanics attended low-poverty schools. This figure is much lower than their White peers' rate of 75% (NCES, 2010).

Limited English proficient students are also heavily overrepresented in high-poverty schools. In 2008, 25% of all students attending elementary HPSs and 16% of all students attending secondary HPSs were identified as limited in English proficiency (LEP). These figures are much higher than in low-poverty schools, where LEPs represent less than 5% in elementary and 2% in secondary low-poverty schools (Aud et al., 2010).

Attendance in high-poverty schools limits the educational experience and outcomes of Hispanics (Orfield & Lee, 2005; Hakuta et al., 2000). Traditionally, students from HPSs do not perform as well on national standardized assessments such as NAEP. In 2009, only 14% of 4th graders and 12% of 8th graders at HPSs performed at or above proficient on the NAEP reading assessment; much lower than their peers from low-poverty schools who reached 50% in 4th grade and 47% in 8th grade (NCES, 2010).

Similar gaps in scores were exhibit in the NAEP Math assessment. Graduation rates are also impacted by the kind of school students attend. In 2008, graduation was met by 91% of all students in low poverty schools, but only by 68% of all high-poverty schools. Similarly, while 52% of low-poverty school graduates enrolled in a 4-year college institution, only 28% of HPSs graduate students enrolled in college the fall right after high school graduation (Aud et al., 2010).

Paralleling Hispanic enrollment trends, the number of high poverty schools increased during the last decade, from 12% in 2000 to 17% in 2008; and the increase has been more evident in the South and in the West (NCES, 2010). The percentage of high-poverty schools with a Hispanic majority of 50% or more, increased from 32.8% in 2000 to 40.6% in 2008 (Aud et al., 2010).

Less-skilled and non-supportive teachers.

Hispanics are also educated by less prepared teachers. Teachers at high-poverty schools are less educated and less experienced than at low-poverty schools (U.S. Dep. of Ed., 2010a). In 2008, Teachers at low-poverty elementary schools had in average 13.7 years of experience and 49% have a master's degree. Meanwhile, teachers at high-poverty schools had an average of 12.8 years of experience and only 40.2% of them had a master's degree. At the secondary level, the breach is wider, low-poverty school teachers having 14 years of experience and 52.3% of them having a master's degree, while HPSs teachers had only 12.4 years of experience and only 38.3% of them had a master's degree (NCES, 2010).

A similar trend in evident in high-LEP schools, where more than 75% of students are members of a language minority (De-Cohen et al., 2005). Teachers and administrators in high-LEP schools have less academic preparation and less teaching experience (De-Cohen et al., 2005). Also, states with a high concentration of ELLs, like California and Texas, are facing a shortage of well-trained, experienced, bilingual teachers (Gándara % Contreras, 2009).

Worse than a lack of experienced teachers, is a lack of teachers committed to teaching Hispanic learners and who hold high academic expectations for them. The teachers' attitude towards students can be more important than the credentials of the educator. As Crosnoe claims:

> "*Worrisome is the potential for U.S. educators to shape the instruction and placement of children in self-fulfilling ways. When a teacher views a child as unintelligent because of her difficulty speaking English, and recommends her to be placed in remedial coursework that provides no intellectual stimulation or challenge, it eventually causes her to disengage from school and do poorly. The low level of English proficiency and early math skills of some children, can trump their actual aptitudes and abilities*" (Crosnoe, 2006b, pp. 38-39).

Inadequate school facilities and funding.

There is a strong correlation between the quality of school facilities and the wealth of its communities. School districts tend to spend less on their high-poverty schools than on their low poverty schools (U.S. Dep. of Ed., 2010a; Roza & Hill, 2004). At the same time, high quality facilities are more likely to be attended by White and Asian middle and upper class students, while low-quality facilities are overwhelmingly attended by Hispanic and African-American students (Oakes et al., 2004; Rumberger &

Gándara, 2004; Gándara, Rumberger, Maxwell-Jolly & Callahan et al., 2003). The California school system educates almost one third of all Hispanic students in the nation (Aud et al., 2010) and is ranked last in several school quality indicators including teacher/student ratio, class size, and academic proficiency scores (Gándara & Contreras, 2009). Texas, with the second largest Hispanic school enrollment in the nation, is among the states with lowest K-12 investment (National Education Association, 2007).

Inadequate access to technology.

Today's world is becoming more and more technologically dependant. Beyond content knowledge in specific areas of interaction, the labor market is requiring background knowledge in popular computer applications and the Internet. Therefore, exposure to, and a basic knowledge of computers and the Internet is a requirement in today's professional world. Beyond its practical application in the labor market, computer education and exposure benefits the education of those students with access to computers and the Internet at home. According to research, students with home access to computers are more likely to be enrolled in school (Fairlie, London, Rosner & Pastor, 2006) and more likely to graduate from high school (Beltran, Das, & Fairlie, 2006). However, due to their socioeconomic status, many Hispanic children do not have access to computers and the Internet at home (Wilhelm, Carmen & Reynolds, 2002). At the same time, due to overcrowding and limited funds, many Hispanic schools do not provide adequate access to computers and the Internet (Fairlie et al., 2006; U.S. Dept. of Ed., 2005; Sweet, Raher, Abromitis & Johnson, 2004; Wilhelm et al., 2002). By failing to provide such technological exposure, schools are not only failing to close the technological gap, but actually they are expanding it. According to Fairlie and associates (2006), only 37% of Hispanic students used the Internet at school; 15 points less than their White peers.

Non-supportive learning environments.

Many Hispanic students attend schools that do not provide adequate environments for learning to take place. The incidence of violence in high-poverty schools is twice as large as at low-poverty schools, and the incidence of violence in schools with a Hispanic population of 50% or more is twice the incidence of violence in schools with a White majority enrollment (NCES, 2010). A sense of insecurity hinders the ability to learn (Elliot, Murphy, Goldring & Porter, 2006; Scheckner, Rollin, Kaiuser-Ulery & Wagner, 2002), and Hispanic students are more likely to report a sense of insecurity at school. In 2005, almost 10% of all Hispanic students reported being afraid of an attack. This figure is 2.5 times higher than their White peers' rate of 4% (US D. of Ed. NCES, 2005). A sense of insecurity can force students to join gangs, skip school, or drop out of school altogether (Ringwalt, Ennett, & Johnson, 2003; Scheckner et al., 2002).

Cultural and linguistic prejudice.

Prejudice is another important factor that hinders the learning experience of Hispanics. Identity and culture has a strong influence upon the learning process (Oseguera et al., 2009). Many Hispanic students attend institutions that do not reflect their own traditions and assumptions, forcing them to navigate between the values and expectations of their school communities and the values and expectations of their cultural communities (Torres, 2006). Many Hispanic students report feelings of isolation and culture shock during their education (Torres, 2006).

Even if the curriculum is designed to close the academic achievement gap, it can still reflect a supremacist perspective of assimilation that is harmful to minority group students (Delpit, 2006). In many cases, in the attempt to help learners to be successful in the dominant society, the curriculum not only provides the knowledge and skills required, but also forces the learners to relinquish their cultural and linguistic background in order to succeed (García, 2005).

According to Schumann (1978), the students' belief about the presence or absence of prejudice shapes their attitude towards school. According to Schumann's Acculturation model (Schumann, 1978), the interaction, similarity and animosity between the school culture and the home culture can hinder or support the learning process. According to Zedina (2008), school lessons should be related to the students' real life as much as possible.

Hispanic students are highly vulnerable to culture shock that hinders their ability to succeed in education (Castellanos & Gloria, 2007; Castellanos, & Orozco, 2005; Gloria, Castellanos & Orozco, 2005; Jalomo & Rendón, 2004; Gloria & Castellanos, 2003; Castellanos & Jones, 2003). When students perceive cultural or ethnic bias, they can have trouble adjusting cognitively and emotionally to school, and may develop unconscious resistance to school (Hurtado & Ponjuan, 2005).

According to Torres Bicultural Orientation Model (2006), four possible orientations are possible when students are confronted by cultural shock at school. One possible outcome is for students to become bicultural oriented, exhibiting at the same time high levels of acculturation and ethnic identity. A second possible outcome is for students to exhibit high levels of Hispanic identity but low levels of acculturation. A third possible outcome would be for students to assimilate to the host culture, exhibiting high levels of acculturation and low Hispanic identity. The fourth possible outcome is when students become marginalized, exhibiting low levels of both, ethnic identity and acculturation. When students encounter culturally-exclusive institutions, the possibility of marginalization increases (Torres, 2006).

According to Freire and Shor (1987), individuals voluntarily leave behind their cultural and linguistic background and acquire a different one because they perceive that their home culture is defective, and that the dominant culture is better. When individuals accept cultural detachment and replacement, they are not only devaluing their cultural heritage; they are devaluing themselves.

The effects of cultural subordination are evident among immigrant minorities and their descendants. Immigrant minorities maintain a cultural identification with their home country, maintaining pride in their cultural heritage, and confidence in themselves (Ogbu, 1991). They interpret social barriers as temporary problems, and perceive education as a way to succeed. They incorporate elements of the dominant culture, and alternate behaviors between home and dominant society.

However, for their descendants, conditions may be different. Ogbu (1991) defines them as involuntary immigrants because they did not choose to be a minority. They were either born in the United States or arrived too young to identify with their ethnic culture. For them, America is their home. However, the socio-cultural differences between home and society challenge their cultural identity and membership. Many involuntary minority members blame their culture for their socio-economic condition, perceiving assimilation as a way to leave behind their present situation. Some achieve better levels of academic success and social mobility at the cost of loosing physical and psychological contact with their cultural heritage (Ogbu, 1991).

Another segment of involuntary minorities also reject their parents' culture; at the same time, reject the dominant group for the discriminatory treatment. They become alienated and affiliate themselves with outcast groups or gangs, rejecting the value that both home and dominant cultures place on education, and developing alternative theories of socioeconomic success (Ogbu, 1991). According to Kohl (1994) and Valdes (2001), many involuntary immigrants intentionally decide not-to-learn, in an attempt to "build a small, safe world in which their feelings of being rejected by family and society could be softened" (Kohl, 1994, 16).

A culturally sensitive education can be used to eliminate any existing social and cultural inequalities. Through education, socio-economically disadvantaged members of a community can upgrade their condition (Freire, 1970, 1973; Freire & Shor, 1987). Besides providing them with knowledge and skills needed for social mobility, a multicultural education that promotes cultural diversity can be seen as an asset rather than as a detriment, and the cultural heritage of minority groups can be validated, understood, and celebrated (Freeman & Freeman, 2001, Cummins, 1988). Multicultural education is an alternative to the assimilationist perspective, designed to close the socioeconomic gap without demanding cultural assimilation. Multicultural education can bring not only true educational equity, but improve cross-cultural interactions, democracy, and social justice (Banks & Banks, 2004).

Many authors agree with a multicultural perspective. Cortes (1994) defines the process as *acculturation,* describing it as a learning process where the learners incorporate some tenets of mainstream culture without surrendering their heritage cultures and languages. Ferreiro calls for a unified system of public education with differentiated strategies and modalities that will grant equitable access and outcomes for marginalized groups; "a school that adapts to them instead of asking them to adapt to the school" (Ferreiro 1999, p. 165, free translation). Freire (1970; 1973; 1985), advocates for an educational system that empowers minority students without requiring them to surrender their cultural identity. García (2005), calls for implementation of educational programs that accept and respect students, families, and communities; granting educational value to their cultural and linguistic backgrounds through thoroughly incorporating them into curriculum and instruction.

The decision between assimilation and multicultural education is made at local and state levels. The U.S. Constitution places education not in the hands of the federal government but in the hands of the people, via state and local administrations. This allows for the implementation of different schooling policies designed upon the different goals of education.

School orientations.

According to Cummins (1986, 1996), schools apply different perspectives through two contrasting school orientations: Intercultural and assimilationist. An assimilationist orientation considers diversity as a problem and promotes a rapid assimilation to the dominant culture as the solution. Minority languages and cultures are discriminated against and even prohibited, "disempowering and marginalizing" students (Freeman & Freeman, 2001, p. 212). When schools adopt an assimilationist orientation, minority students can be academically disabled or can become defiant (Cummins, 1996).

Conversely, if the school's goal is to provide all their students with equal opportunities to succeed, the orientation is intercultural. This approach supports and encourages the social and academic use of the learners' home languages and cultures. It not only validates the cultural backgrounds of the students, but thoroughly incorporates them into the curriculum. According to Cummins (1996), when schools adopt an intercultural orientation, students are academically and personally empowered.

The main difference between the two orientations is the role minority cultures and languages play in the socialization, instruction, and assessment of learners within the school curriculum and environment (Cummins, 1996). However, it is important to understand this educational dichotomy not as two distant exemplars but as the extreme sides of a continuum. Schools, programs, and curriculums, move along the continuum according to the amount of students' culture and language they include. School orientations are crucial for the education of emergent bilinguals due to the crucial role language plays in the development of cognition.

Summary of Conditions that Impact the Academic achievement of Hispanics.

Personal, social, and schooling conditions impact the academic achievement of Hispanics. Beyond their volition to learn, Hispanics are highly influenced by their social environment. Their socio-economic status and the level of education of their parents are key predictors of their academic development. Other social indicators include neighborhood characteristics, legal status, mobility and home language. At the same time, Hispanic education is also influenced by specific schooling conditions including segregation, high-poverty schools, inadequate schooling facilities, non-supportive learning environments, cultural and linguistic prejudice and school orientations.

Instruction of Emergent Bilinguals

Language instruction.

Language is one of the most important issues in education. The whole learning process can be divided between learning concepts and acquiring the vocabulary related to such concepts. However, language learning does not start in school. It starts at birth or even before birth and it starts in the home language. By the time learners reach school, they have acquired a collection of concepts and their related vocabulary (Smith, 2003). As previously mentioned, this learning has a direct correlation with the socioeconomic conditions and life experiences of the learner.

First language acquisition and development.

For socio-psycholinguists, language is a social phenomenon that develops naturally through social interaction. According to sociolinguistic researchers like Gee (1992) and Smith (2003), language is acquired rather than learned, and by the time students reach school they have already developed certain levels of conversational proficiency in their home language. At school, they mostly develop academic language and meta-cognition about language. It is important to keep in mind the intrinsic relationship between language and learning. For learning to take place, a certain level of language proficiency must be in place. At the same time, as cognition is developed, so is the language proficiency of the learner. The relationship becomes critical at secondary levels where content is more challenging and context is reduced, increasing the cognitive lexical demand (Cummins, 1981). It is also important to recognize that language serves other functions beyond the exchange of information. Gee (1992) recognizes two additional functions of language: to express attitude and to mark social identity.

First language development has proven beneficial for the education of language minorities. Language minority students are more likely to perform better academically when their first language is academically developed (Thomas & Collier, 2002; Greene, 1998; Willig, 1985). Psychology, linguistic, and sociology research concur that L1 proficiency development is important because prior knowledge is encoded in L1, because through cognates and linguistic transfer, L1 vocabulary development supports vocabulary development in L2, and because L1 development affirms students' identity (August & Shanahan, 2006). According to Thomas and Collier (2004), the extent and quality of schooling in L1 is the number one predictor for long term achievement in English.

Second language acquisition and development.

During the past few decades, sociolinguistic researchers and theorists have analyzed the influence culture and society has upon the acquisition and development of a second language. One of the most comprehensive theories is Krashen's Social Theory for Second Language Acquisition (1981). For Krashen, people naturally acquire a second language through social interaction, and language competence develops naturally when people are placed in social settings where they can be exposed to language used by native language speakers, they participate in a meaningful exchange of information, in a low anxiety environment, through comprehensible input, have extensive opportunities to practice language output, and receive continuous and supportive feedback. For Gee (1992), second language acquisition occurs by exposure to social models, without formal teaching and in meaningful and natural settings.

Krashen's Theory of Second Language Acquisition is made up of five interrelated hypotheses. Krashen's Acquisition-Learning Hypothesis (1981) identifies two complementary ways of getting a second language (Krashen, 1985). Acquisition takes place subconsciously, when the learners internalize the language by trying to use it and understand it for real and meaningful purposes. During acquisition, the learner does not focus on the language but on the message. According to Krashen, acquisition takes place in natural settings. The second way of getting a language is through learning; when the learner consciously focuses on the language itself. Through learning, the student learns specific aspects of the language including, for example, grammatical and syntactical rules. Krashen's Acquisition-Learning Hypothesis holds acquisition responsible for almost all language development and gives learning a minimal role.

Krashen's Natural Order hypothesis claims a natural order for the specific aspects of language to be acquired (Krashen, 1985). According to Krashen, this order is the same regardless of the learners' first language. If the order is altered, certain levels of test performance might be attained through rote memorization, but acquisition for practical use in natural settings will not be obtained (Freeman & Freeman, 2001).

The third premise is Krashen's Input Hypothesis (Krashen, 1985) that recognizes the key role language input has upon language acquisition. According to Krashen, people can acquire language only when they receive a message –oral or written- that they can slightly struggle to understand. If the message is too complex for the learner to understand, acquisition will not take place. At the same time, if the message is too simple to challenge the student, there would be no new knowledge to acquire. Input must be provided slightly above the ability of the learner. Therefore, the teachers' job is to make academic content challenging but comprehensible. Through the use of simplified language input (Hatch, 1983), teachers can facilitate language development.

The fourth premise is the Affective Filter Hypothesis (Krashen, 1985). As previously mentioned, certain affective factors like anxiety, boredom, and lack of desire can block input, while others, like self-confidence and motivation can keep the filter down. For acquisition to take place, language input and monitoring must happen in a safe non-judgmental environment, where the learner can focus on the message rather than on the language. Many language learners struggle to produce language afraid of criticism and ridicule. This is especially true when placed in classrooms with strong language speakers. Therefore, the learning context is crucial for the successful acquisition of a second language. This premise is closely related to some aspects of Schumann's Acculturation Model (1978).

Krashen's fifth premise is the Monitor's Hypothesis, which explains the role learning plays in the acquisition of a second language (Krashen, 1985). Through learning, students can gain certain aspects of language that allow them to monitor their output. By learning language rules, learners can focus on the grammatical form of the language to monitor their language production.

The Monitor Hypothesis is helpful in writing production, allowing students to use their knowledge during the editing stage. Even though language fluency is a key evidence of acquisition, monitoring oral production can be challenging. Limited monitoring would provide no useful feedback, while excessive monitoring can delay and even impede oral production (Freeman & Freeman, 2001). When teachers focus on rules, rather than on comprehension, they increase the learners' anxiety and block input. According to Krashen (1985), oral error correction has almost no effect upon language acquisition.

However, L2 acquisition success cannot be explained by a single factor. A variety of individual and social factors can influence L2 acquisition and development (Goldenberg, Rueda, & August, 2006; Lightbown & Spada, 2006; August & Hakuta, 2005; Gass & Selinker, 2001). According to Schumann's Acculturation Model (1978), the acquisition of a second language is part of a process of acculturation influenced by several factors within and beyond the learner. Within the learner, three main factors affect acquisition: the motivation to learn the language, the attitude the learner has towards the language and towards the learning process, and the cultural shock experienced by the learner when immersed in the learning process. At the same time, several factors beyond the learner can also affect language acquisition. According to Schumann, the relationship and differences between the learners' culture and the culture of the language to be acquired, can severely affect the acquisition process. The larger the social distance between cultures, the harder the acquisition. Issues such as cultural enclosure, social dominance, group size, and length of residence can influence the learning process.

Cortés' Contextual Interaction Model (1986) also supports the claim that contextual factors can influence the acquisition of a second language. Different cultural, socio-economic, and educational backgrounds can bring forward different educational outcomes from a same instructional program. Therefore, these differences should be considered when designing and implementing an instructional program. As previously mentioned, an assimilationist orientation can disable students academically, increasing the social distance described by Schumann, or blocking input, as claimed by Krashen's Affective Filter Hypothesis.

Being bilingual and biliterate at grade-level goes beyond the ability to speak, listen, read and write in two languages. It involves the capability to think in both languages and to be academically successful in grade-level core content courses, with challenging curriculums and delivered in more than one language. Cummins' BICS-CALP Language Proficiency Distinction (1984a, 1984b, 2000b) explains the differences between the language proficiency needed to engage in a conversation and the language proficiency required to succeed in cognitively demanding activities. Basic Interpersonal Communication Skills (BICS) is the language competence required to effectively maintain a conversation. It is highly contextual, dependant on context clues such as gestures, intonation, and visuals, and therefore cognitively undemanding. BICS can be acquired within two to three years of constant exposure. However, the acquisition of BICS is not enough to be successful in school, especially, in secondary school.

Cognitive Academic Language Proficiency (CALP) is the language competence needed to succeed in secondary school classrooms. CALP is cognitively demanding and context reduced. One crucial characteristic of CALP is the time required for its development. It can take from 5 to 7 years of exposure to develop CALP competence (Cummins, 1984a, 1984b, 2000b).

One important aspect of CALP development is the level of CALP developed in the first language. Cummins' Developmental Interdependence Hypothesis (1978, 2000b) explains that the more the learners develop their first language CALP, the greater their possibilities to develop their second language CALP because knowledge acquired through the first language transfer can easily transfer to a second language. Therefore, it makes sense to expose learners to challenging secondary school level core content courses in their first language because they will develop first language CALP that will then support the development of CALP in English.

Therefore, second-language-acquisition short-term programs are ineffective in closing the language acquisition and academic achievement gaps (Thomas & Collier, 2002) because L2 acquisition implies a long-term process. Conversational fluency (BICS) attainment can take between one to three years, while academic language proficiency (CALP) attainment can take up to 7 years of schooling exposure (Thomas & Collier, 2002; Hakuta, Buttler, & Witt, 2000; Wong-Fillmore, 1991; Collier, 1987).

Role of L1 development in the acquisition of a second language.

Several theorists and researchers have claimed a reciprocal language learning process where L1 development assists L2 acquisition (Olsen, 2010; Echevarria et al., 2008; Vaugh et al., 2006; August & Shanahan, 2006; Cummins, 1989, Collier, 1987, McLaughlin, 1985). There is strong evidence of interdependence across languages in areas of phonological awareness, reading comprehension, reading strategies and cognate-vocabulary knowledge (August & Shanahan, 2006). Such findings are explained through some form of common underlying proficiency (Cummins, 2000) that reflects an interdependence of knowledge, skills, and abilities that underlie the academic performance in both languages (Riches & Genesee, 2006). Emergent bilinguals' prior knowledge and deep cognitive processing are encoded in L1; therefore, L1 development plays a key role in the learning process (Bransford, Brown, & Cocking, 2002).

English language proficiency development.

Many educational stake-holders consider English-language proficiency (ELP) as the single key for improving the educational achievement of LEP students (McDonnell &

Hill, 1993; Gándara, 1997), “rather than considering or exploring more complex alternatives including discriminatory institutional practices” (Macias, 1993, p. 236). In most cases, the goal is for ELLs to learn English as rapidly as possible and leave behind their home languages (Portes & Rumbaut, 1990; Crawford, 1992; McDonnell & Hill, 1993). This issue is especially relevant to Hispanics because 96% of the foreign-born and 64% of the native-born Hispanics reported speaking a language other than English at home (Macias, 1993).

Some researchers claim that ELP improves school performance of language minority students, especially if school performance is solely measured in English (Vernez & Abrahamse, 1996; Rumbaut, 1995; Fernandez & Nielsen, 1986). Others suggest a correlation between ELP and years of school completed because both tend to increase from generation to generation (Buriel and Cardoza, 1988). However, in the case of Hispanics, the relationship between ELP and school performance is much more complicated. Although ELP and years of school tend to increase across generations, test scores, grades, and other forms of educational achievement do not increase (Buriel, & Cardoza, 1988; Ogbu, 1992; Portes & Rumbaut, 1990).

Rumberger and Larson (1998) analyzed the relationship between immigration, English language proficiency, and school performance through evaluating the linguistic and academic differences within a relatively homogeneous group of low socio-economic first-and second-generation Hispanic students. By focusing in a single school and community, researchers attempted to control the influence of schools and locations upon academic achievement.

According to Rumberger and Larson (1998) two perspectives explain English-language acquisition. A Socioeconomic perspective views ELP as a skill required to function in society. A socio-cultural perspective views English-language acquisition as a symbol of identity and assimilation into the mainstream. However, both perspectives do not explain why the educational achievement of Hispanics is higher among second-generation than among either first- or third-generation students. Although English proficiency and socioeconomic levels tend to improve across generations, their educational aspirations and motivation tend to diminish (Rumberger & Larson, 1998).

The conceptual framework of Rumberger and Larson (1998) considers three dimensions of educational achievement: (1) Academic Achievement as reflected by grades and test scores, (2) Educational Commitment, reflected by remaining in school, and (3) Educational Attainment, reflected by years of schooling completed and the completion of requirements for degrees or diplomas. Their research methodology divided the student sample in three subgroups: English Only (EO), Limited English Proficient (LEP), and Fluent English Proficient (FEP) students. This last group included students originally labeled as LEP, but who were eventually reclassified.

The analysis of educational achievement proved that FEP students had lower transience rates, higher grades, and were more likely to be on track for academic success than their EO and LEP Hispanic peers (Rumberger & Larson, 1998). Results are consistent with previous research (Rumbaut, 1995; Stanton-Salazar & Dornbush, 1995).

In the analysis of educational commitment, FEP students exhibited greater educational commitment than EO or LEP students, being less likely to enroll late and less likely to be transient. EO Latino students displayed the lowest educational commitment, being more likely to enroll late and more likely to be transient. Beyond having higher grades, lower transience rates, and more academic commitment, FEP students displayed higher levels of educational attainment, being more likely on track for graduation than EO and LEP students (Rumberger & Larson, 1998). These results contradict theories of socio-economic status and language proficiency.

An analysis of background characteristics showed that even though EO students had higher levels of socioeconomic status and English language proficiency than FEP students, FEP students displayed higher levels of academic achievement, educational commitment, and educational attainment (Rumberger & Larson, 1998). The bilingual status of the FEP students appears to be an indicator of cultural, rather than social-class advantage. Stanton-Salazar and Dornbusch (1995) reached a similar conclusion, claiming that "to predict academic performance and high school completion…cultural and sociolinguistic variable usually become key" (p. 130). Other studies have found higher achievement among bilingual than among monolingual Hispanics (Stanton-Salazar & Dornbusch, 1995; Buriel, 1994; Portes & Rumbaut, 1990).

The bilingual education debate.

For many educators and policymakers, school success depends upon English academic literacy (Echevarria et al., 2008; García, 2006; Lemke, 1988). English language acquisition and development was seen as crucial for the education of linguistic minorities and a debate developed over whether school instruction should be delivered through the home language of the learners or exclusively in English (Tong et al., 2008). Educational philosophies and political considerations contributed to the debate. A lack of English proficiency hinders the academic development of linguistic minorities both in terms of social relations (Cummins, 1989) and in terms of academic achievement (Tong et al., 2008). Oral English proficiency is highly correlated with English literacy and subsequent academic success (August & Shanahan, 2006). English language proficiency is an important predictor of academic achievement (Suarez-Orozco et al., 2008). Inadequate English language development has been associated with indicators of academic failure including repeating grades and school dropout (National Center for Educational Statistics, 2004; Ruiz-de-Velazco & Fix, 2000). Low academic English proficiency is also associated with low performance on national and state-developed standardized assessments (August & Shanahan, 2006; August & Hakuta, 2005; Black & Valenzuela, 2004; MacSwain & Rolstad, 2003; Abedi & Lord, 2001; Butler & Castellon, 2000).

In the U.S., bilingual education and bilingualism have been controversial (Tong et al., 2008; Crawford, 2000; Bernal, 1994, Krashen, 1996, 1999a, 1999b)**.** During the first decades of the 20th century, bilingualism was identified as a disadvantage (Saer, 1923). Bilinguals were perceived as mentally baffled and impaired in their thinking ability compared with English-speaking monolinguals. This detrimental perspective started to fade when Jones (1959) found no correlation between IQ and bilingualism and found no real IQ difference between monolinguals and bilinguals. Peal and Lambert (1962) challenged the detrimental perspective even more when they claimed that bilingualism could actually lead to cognitive advantages over monolinguals. Since then, the education of linguistic minorities has been challenged by two conflicting perspectives.

The English-only perspective.

Some educators and policy makers believe that sacrificing English-instruction time is detrimental in the education of linguistic minorities (Rossell & Baker, 1996;

Porter, 1990, Baker & de Kanter, 1981). Maximum exposure to English is important through instruction and language input (Gass & Selinker, 2001). The Time-on-Task or Maximum Exposure hypothesis claims that any form of education that reduces the amount of instructional time of exposure to the English language can generate harmful learning effects upon the student (Porter, 1990). English-only advocates recommend for linguistic minorities to focus on learning English as fast as possible and to leave the learning of other content areas until their English proficiency is sufficiently developed.

The bilingual instruction perspective.

Bilingual education makes use of the students' native language (L1) for instruction (Irby et al., 2008). The basic argument in support of bilingual education is that through cross-linguistic transfer, bilingual education can facilitate the acquisition of content knowledge and English language (August & Shanahan, 2006; Reese et al., 2000; Thomas & Collier, 1997). The advantage of bilingual education is that learners do not have to wait until developing enough English proficiency to start developing their content knowledge. Through instruction in their home language, emergent bilinguals can continue their content education while developing enough English language proficiency to be successful in an English-only classroom.

According to bilingual education advocates, the Time-on-Task hypothesis that supports English-only instruction has been proven meritless by a myriad of successful bilingual programs where emergent bilinguals exhibit no detrimental effects in their mastery of the English language as a consequence of spending significant amounts of instructional time in their home language (Cummins, 1996; Corson, 1993). Research has consistently failed to exhibit a significant relationship between the amount of English instruction and the development of grade-level English proficiency (Cummins, 1999). If some bilingual education programs have been unsuccessful, it is not due to the instructional time spent in the home language, but due to poor implementation; mainly a lack of consistency in L1 cognitive development (Thomas & Collier, 2002). According to August and Shanahan (2006), instruction through a minority language does not generate adverse effects on children's proficiency in the majority language.

Within the debate surrounding bilingual education, the only issue that supporters and detractors of bilingual education agree upon is in the fact that Hispanic ELLs have historically exhibited an achievement gap when compared with grade-level peers from different racial, ethnic, and linguistic backgrounds (Callahan, et al., 2009; Cerna, et al, 2009; Coulter & Smith, 2006; Hasson, 2006; Callahan, 2005; Combs, Evans, Fletcher, Parra & Jimenez, 2005; Skrla & Scheurich, 2004b; Valencia et al., 2004).

Federal policy related with bilingual education.

Eventually, the debate surrounding bilingual education reached the political arena and was transformed into policy. In 1965, President Lyndon B. Johnson signed the Elementary and Secondary Education Act (ESEA), that recognized the need to educate language-minority children and legitimized the use of home language instruction to facilitate the development of academic proficiency. In 1968, the Bilingual Education Act, or Title VII of ESEA recognized the need of students with Limited English Speaking Ability (LESA) and for the first time, appropriated funds for bilingual education. The federal support to bilingual education influenced decisions at the state level. In 1969, Texas legalized bilingual education by removing the penalties that outlawed the use of any home language other than English for instruction.

Through the 1970’s, federal support to bilingual education continued. The Bilingual Education Act reauthorization of 1974 created a network of support centers and provided funds for teacher training and higher education. The Reauthorization of 1978 adopted the term Limited English Proficient and defined bilingual education as an approach that provides instruction in English and in L1, to facilitate student academic success.

However, during the 1980’s the political winds started to change in favor of a rapid acquisition of English fluency. The Bilingual Education Act reauthorization of 1984 expanded the options by identifying and providing funds for three types of bilingual education: transitional, developmental, and special alternative programs. The Reauthorization of 1988 increased the support for transitional bilingual education and imposed an arbitrary three year limit for emergent bilinguals to be enrolled in bilingual education.

By the 1990’s, political winds changed again, in favor of bilingual education. The 1994 reauthorization of the Bilingual Education Act is considered the most comprehensive bilingual education legislation. Even though it did not remove the three year limitation, it authorized and supported bilingual enrichment programs such as Dual Language Instruction, designed to maintain and develop home language. Also, it made bilingual education accessible for native English speakers interested in developing bilingualism and biliteracy.

In 2001, the political winds changed against bilingual education. The reauthorization of the Elementary and Secondary Act of 2001, better known as No Child Left Behind (NCLB), repealed the Bilingual Education Act and practically eliminated the term bilingual from the legislation. The Bilingual Education Act (Title VII of ESEA) became the English Language Acquisition, Language Enhancement and Academic Achievement Act (Title III of NCLB). The federal structures supporting bilingual education were also restructured. Through accountability, NCLB increased the pressure for students to rapidly acquire English fluency (Olsen, 2010).

However, NCLB did not repeal the legal requirements for bilingual education. Supreme Court rulings such as Lau v. Nichols (1974) recognized that "there is no equality of treatment merely by providing students with the same facilities, textbooks, teachers and curriculum… for students who do not understand English are effectively foreclosed from any meaningful education" (Lau v. Nichols, 1974). Castaneda v. Pickard (1981) recognized that during their initial learning stages, English language learners may develop academic deficits; therefore, school districts are required to address those deficits through language support programs such as Bilingual education and ESL (Olsen, 2010). According to Castaneda v. Pickard (1981), such programs (1) must be informed by sound educational theory recognized by experts in the field, (2) must be implemented in a reasonably effective manner through the provision of adequate resources including trained personnel, materials and relevant support, and (3) must be evaluated to determine if they are overcoming the language barriers in a reasonable time.

Today, school districts with an enrollment of 20 or more English language learners of the same language and in the same grade level are obligated to offer a bilingual education program in grades PK to 5th. The bilingual program must be full time and home language instruction must be provided according to the student's English language proficiency: 75% of L1 instruction for beginners, 50% for intermediate and

25% for advanced and advanced high. All schools not required to provide a bilingual program are obligated to offer an English-as-a-Second-Language (ESL) program to their English language learners.

Searching for effective models for the education of emergent bilinguals.

Even though the education of linguistic minorities is not a recent phenomenon, the search for effective methods of educating these population subgroups has gained interest in the last 20 years, fueled by a rapid increase in LEP population. In 2004, 11% of the student population was designed LEP, an increase of more than 60% since 1994 (NCELA, 2006).

Several instructional programs have been developed (August & Hakuta, 1998). Programs vary widely in terms of curriculum design, instructional practices, and resources (Alanís, 2000). Also, programs vary in their approach to helping learners increase their academic achievement while learning English (Freeman, Freeman, & Mercuri, 2003, 2005; Lara-Alecio, Galloway, Irby, Rodriguez, & Gomez, 2004). However, the most important difference is the treatment programs provide to L1. While some programs focus on transitioning ELLs to English, other programs aim on developing their learners' L1 proficiency (Cox, 2008). Enrichment programs aim to enrich the linguistic repertoire of the learner without detriment to the first language, while subtractive programs aim to subtract the first language and replace it with a second language.

There is a lack of congruency between program designation and program implementation (Torres-Guzmán, Morales, Rodriguez & Han, 2005). As previously mentioned, the lack of standard definitions complicates the identification and classification of programs. While some authors identify six educational programs for educating ELLs (García, et al., 2008; Freeman, 2007; Crawford, 2004), other authors identify up to ten different categories (Baker, 2006). According to Olsen (2010), there are four basic models for the education of emergent bilinguals. According to Thomas and Collier (1997), five program characteristics can define basic program differences including: amount of L1 support, type of L2 support, Type of teaching style, socio-cultural support, and integration with the curricular mainstream. To simplify the analysis, this study classified programs within three categories based upon their goals, orientation, and use of home language.

Bilingual education goals and orientations.

According to Alanís (2000), bilingual Education programs should aim for four specific goals: (1) full proficiency and literacy in native language and English, (2) the acquisition of basic and high order thinking skills for academic achievement, (3) the development of a strong self-concept, and (4), a successful transition to higher education. However, due to the variety of perspectives related with bilingual education, other goals are also associated with bilingual education, including: mainstream assimilation, the unification of a multilingual, multiethnic society, the development of marketable language skills, the preservation of ethnic and religious identity, the strengthening of elite groups, and the equalization of language status (Alanís, 2000).

As previously mentioned, schools can adopt one of two different orientations – assimilationist and intercultural- towards their emergent bilinguals (Cummins, 1996). The assimilationist orientation perceives cultural and linguistic diversity as a problem, requiring learners to abandon their cultural milieu and assimilate to the dominant culture and language. The intercultural orientation perceives diversity as an asset, allowing students to incorporate elements of the dominant culture into their home culture, without cultural detriment and loss of cultural identity.

Long-term LEPs: outcomes of a faulty education.

The rapid increase of LEP students is a reality in the US public schools, especially in large urban areas. For example, in Dallas, the LEP population increased 35% over the past five years and the High school LEP population increased 71% in the last six years. Public opinion places responsibility upon immigration. However, Yang, Urrambazo & Murray (2003), made a significant contribution to research when they claimed that the massive influx of new immigrants is not the only cause for this increase.

There is an increasing population of students who have been in TBE/ESL programs for more than seven years, unable to attain enough English proficiency to meet the exit criteria (Olsen, 2010). Long-term LEP students (Olsen & Jaramillo, 1999a, 1999b) largely contribute to the secondary LEP population. Even though there is a continuing growth of English proficiency level when LEP students stay longer in a TBE/ESL program, only a small proportion of students reach adequate levels of English language proficiency. An overwhelming majority of long-term LEPs reach a ceiling of limited proficiency that does not allow them to leave the program. Almost 75% of the secondary students identified as LEP had been enrolled in the BE/ESL program since kindergarten, and a vast majority of high school dropouts were long-term LEP (Yang et al., 2003).

More than 50% of the adolescent ELLs in the American schooling systems were born in the U.S. (Batalova, Fix, & Murray, 2005) and have not been able to develop grade-level English proficiency even after many years in school (Echevarria et al., 2008). The majority of secondary school ELLs in Texas and California are long-term LEP (Olsen, 2010). More than 70% of Dallas secondary-school ELLs are U.S. natives (Olsen, 2010), and 35% of all ELLs in New York are long term LEP (Menken, et al., 2010).

The length of time needed for LEP students to become proficient in English is considered a key issue. Several authors agree that it takes between five to seven years for LEP students to acquire the English language proficiency required to be successful in standardized assessments (Collier, 1995). However, this time frame was calculated based on well implemented, quality bilingual programs. Poor program implementation can hinder the possibility for emergent bilinguals to meet the exit criteria, and there is widespread poor program implementation nationwide (Olsen, 2010). A lack of program consistency is a major contributing factor for the development of long-term LEPs because learners have fewer opportunities for academic language development in both languages and an accumulation of academic deficits over time (Olsen, 2010). According to Olsen (2010), poor program implementation can hinder the development of English proficiency, leaving the student struggling to understand what is being taught in a non-mastered language.

Long-term LEPs are more likely to experience academic failure than their peers (Menken, 2005). This process not only hinders their academic and linguistic development, but also erodes their home language (Olsen, 2010). Long-Term LEPs are orally fluent in English, but their English reading and writing skills are below grade level and they have very low literacy skills in their home language (Menken et al., 2007; Freeman, Freeman, & Mercuri, 2002; Olsen & Jaramillo, 1999b). When they reach high school, long-term LEPs are in the process of losing their home language (Menken & Kleyn, 2009; Wong-Fillmore, 1991). Long-term LEPs' academic achievement does not show consistent patterns of growth. Most students stagnate during their extended permanence in TBE/ESL programs. The lack of academic/cognitive ability and higher-order thinking skills hinders their academic progress, and their lack of broad English vocabulary limits their reading comprehension (Menken & Kleyn, 2010; Olsen, 2010; Yang et al., 2003). The academic stagnation of LEP students can be due to inappropriate course assignment and the lack of rigorous content coverage in ESL courses. For example, many LEP students are permanently assigned to beginning or remedial classes (Menken & Kleyn, 2010; Olsen, 2010).

The No Child Left Behind Act of 2001 increased the pressure by requiring LEP students to take state-mandated standardized assessments within three years after entering the school system; these requirements ignore the variation in speed with which some students learn English (Zehr, 2007). In fact, NCLB was implemented despite a surpassing shortage of research on how long it takes for young LEP students to become proficient in English. Congress recognized that they had "no clear consensus on the length of time LEP children need to become proficient in English" (U.S. General Accounting Office, 2001, p. 7).

Conger (2008) analyzed large samples of LEP students to evaluate how long it takes the average LEP student to become minimally-proficient in English. Between 25% and 30% of the students reached minimal proficiency in the first year after entry, and more than 50% reached proficiency within three years. Conger's findings support the claim that most LEP students, who enter the US as children, eventually become proficient in English (Carlinger, 2000; Portes & Schauffler, 1994). According to Collier (1989), much of the difference in acquisition time depends on the learner's previous schooling in L1. The more schooled in L1, the faster the acquisition takes place.

However, Conger's study also indicates that the probability of becoming proficient and the speed with which proficiency is acquired are reduced by the age at which students enter school (Conger, 2008). This claim is congruent with the Critical Period Hypothesis (CPH) that establishes a negative correlation between the age at which learning begins and the ability to become a native-like English speaker (Singleton & Ryan, 2004). Students, who take longer to become proficient, tend to be students who entered into the U.S. schooling systems at an older age (Conger, 2008). However, CHP is controversial because it seems to have some validity in pronunciation. Learners that start their second language acquisition process after puberty are more likely to retain a foreign accent than learners who start the learning process at a younger age. However, older students, especially those schooled in L1, acquire English vocabulary faster due to their access to a larger L1 vocabulary and background knowledge.

Conger (2008) claims that the NCLB three-year time-limits penalize older-entering LEP students and places school districts with a large number of older LEP students at a disadvantage. Further research is necessary to support policy reforms that consider more adequate age-specific time limits on exemptions for standardized test-taking for LEP students.

The reclassification of LEP students: a measuring dilemma

Dawton, Borman, Stringfield, Overan and Castellano, (2003) unintentionally identified one major problem in bilingual education; the fact that LEP accountability practices do not provide a complete picture of the educational outcomes of bilingual education, because LEP students are reclassified when they reach certain levels of English proficiency. When reclassified, former LEPs vanish from accountability. How can a program demonstrate acceptable levels of academic success if participants are reclassified and removed from the program when they get close to academic proficiency?

Even though the academic proficiency of LEP students is constantly monitored, assessed, and reported, less is known about the long-term performance of LEP students once they are reclassified. To expand knowledge, the Texas Education Agency (TEA) conducted a longitudinal study to examine the academic progress of actual and former LEP students (TEA, 2002).

The TEA study evidenced an unequal distribution of Hispanic and LEP students in the state. El Paso and the Rio Grande Valley have the largest concentrations of both subgroups. Hispanic students made up more than 90% of the student populations in the two regions; more than 50% of the students were LEP, and more than 90% of the LEP students spoke Spanish at home (TEA, 2010a). No other region in the nation has similar concentrations of Hispanic and Hispanic LEP students.

TEA (2010a) claims that 92% of the LEP students received some type of language service immediately upon being identified as LEP. For young students, the most common pattern of language service is TBE; and for older students, the most common pattern is ESL. Some students received a mix of services and 7% of the LEP population received no service at all (TEA, 2002).

TEA recognizes an academic gap between LEP and non-LEP students toward meeting the exit-level testing requirements. For example, in 1999-2000, much less LEP students passed the 8th grade reading TAAS compared to their non-LEP peers, and 8th grade reading assessments are the best predictors of student performance on the exit-level tests (TEA, 2000).

Summary of the instruction of emergent bilinguals

The effective instruction of emergent bilinguals is impacted by a variety of factors. For obvious reasons, language instruction and the acquisition and development of their first and second languages are key elements of their instruction. Research has exhibited the crucial role that L1 development plays in the acquisition and development of a second language.

However, cultural paradigms and political ideologies have generated a debate around bilingual education. The English-only perspective, based on a Time-on-Task hypothesis claims that any instructional time wasted in L1 instruction and development hinders the education of language minorities. Meanwhile, the Bilingual Education perspective claims that by supporting the development of the first language, academic achievement and English language proficiency development are enhanced. At the same time, by making use of the first language as medium of instruction, content instruction is expedited and enhanced. The bilingual education debate has reached the Federal courts and Federal policy. However, according to the political mood of the times, Federal policy has drifted constantly in favor and against bilingual education.

In search for effective models for the education of emergent bilinguals, a variety of programs has been developed based upon different goals and orientations. Due to a lack of standard definitions, program designation and implementation hardly coincide. Comprehensive school reform models have been tried unsuccessfully for the education of emergent bilinguals, and English language proficiency development remains as the crucial challenge for their education. Even though being born in the U.S. and being enrolled in the American schooling systems for many years, many long-term LEP students struggle with English language development and complex secondary school content instruction provided in academic English. At least half of all the LEP students in secondary U.S. schools are long-term LEP. In some areas this percentage increases significantly. For many school districts in the nation, long-term LEPs represent the most important challenge in their instructional agenda.

Prevalent Models of Instruction for Emergent Bilinguals

As previously mentioned, a lack of standard program definitions has generated a lack of congruency between program designation and program implementation (Torres-Guzmán, et al., 2005). To simplify the analysis, this study classified programs within three approaches based upon their goals, orientation, and home language use.

The English-only approach.

All programs included in this category share three main characteristics: (1) Instruction is solely provided in English; (2) programs have an assimilationist orientation, and (3) programs have a subtractive approach (García, et al., 2008). The ultimate goal is English monolingualism and cultural assimilation (Baker, 2006). The English-only category includes programs such as Submersion, Pullout ESL, and Structured Immersion and Content-Based ESL. Even though many English language learners are placed directly into mainstream classrooms, mainstream is not considered a model for the instruction of English learners because it was not specifically designed for the instruction of ELLs (Olsen, 2010). The difference between the programs is the amount and type of support provided to the students (Baker, 2006). The English-only approach is the most common category available for the education of emergent bilinguals at the secondary level of instruction (Crawford, 2004).

English submersion.

English submersion is, in fact, a program designed for native English speakers and not for English language learners; therefore, no special services are provided. However, many ELLs are placed in English submersion by two main reasons. The first reason is pragmatic: the limited number of ELLs in the school district does not justify the implementation of a bilingual or ESL program. The second reason is based on the Time-on-Task hypothesis that claims that for learners to acquire the dominant language as soon as possible, they must be instructed in the dominant language all day, in conjunction with native English speakers. The ultimate goal in English submersion is for the first language to replace the second language (Olson, 2010, Freeman et al., 2005; Cox, 2008).

Structured English immersion.

Structured immersion was originally developed in Canada for English speakers learning French (Lindholm, 1990a, 1990b; Taylor, 1992). Based on Krashen’s Input hypothesis, instruction is provided through simplified, comprehensible language with no L1 assistance and teachers are trained to teach ELLs using specific strategies (Cox, 2008; Tong et al., 2008).

In the American version of structured immersion, LOTE students are immersed in English and expected to attain grade-level academic English skills within two or three years (Ovando, Combs, & Collier, 2006; Ramirez, Yuen, & Ramey, 1991). Because instruction is provided exclusively in English, learners do not have to share the same linguistic background.

A critical difference between the two programs is the pursued goal. In the Canadian version, the objective is for the learners to become bilingual and bicultural without detriment to their academic achievement, while in the American version, the objective is for the learners to develop English language proficiency.

Structured Immersion in Canada was effective partially because the home language (L1) of the immersed students (English) is considered important; therefore, the acquisition of a second language (French) did not challenge the maintenance of the first language. At the same time, the socioeconomic status and educational background of the learners' families allow them to provide the additional support required for the maintenance and development of the first language. In the American version, L1 is viewed as a problem in need of remediation. Therefore, the acquisition of a second language (English) does challenge L1 maintenance. Even though structured immersion proved successful in promoting additive bilingualism when used by speakers of a powerful language to acquire a second language; when language minorities are placed in Structured English immersion, the program can become assimilationist and subtractive (Cox, 2008; Roberts, 1995).

Structured immersion is recommended only when (1) there are not enough students with the same native language for first language instruction to be provided, (2) ELLs display higher levels of English proficiency, (3) state policies or parental denial of bilingual instruction mandate English-only approaches (Tong et al., 2008; Lara-Alecio et al., 2004; Ovando, 2003).

***English as a Second Language* (ESL).**

In traditional ESL programs, students were –pulled out- from other content classes to attend ESL classes where they would learn basic communication skills (Cox, 2008; Freeman et al., 2005). Pullout ESL instruction focus exclusively in developing English language proficiency (US Dept. of Ed., 2010d) and instructional time can vary from 20 minutes to several hours a day, depending upon resources available and students' needs. Depending upon the length of participation, pullout ESL may not be enough to develop grade- level English language proficiency (Collier, 1989). Pullout ESL students are more likely to fall behind in content areas and struggle to learn English then their ELL peers in other programs (Genesee et al., 2006; August & Shanahan, 2006; Baker, 2006; Thomas and Collier, 1996). Many school districts across the nation are moving away from pullout ESL (US Dept. of Ed., 2010d).

During the last four decades, ESL methodologies evolved leading to a content-based ESL instruction, where the goal is not only English language acquisition, but preparing students to be successful in a mainstream, English-only classroom (US Dept. of Ed., 2010d; Echevarria et al., 2008; Short, 1994; Crandall, 1993; Mohan, 1986). Content instruction from the different subject areas is delivered through thematic or interdisciplinary units, modeling academic language and providing practice in mainstream academic skills and tasks (Short, 2002; Mohan, Leung, & Davison 2001; Thomas & Collier, 1997; Chamot & O'Malley, 1994). Through the integration of content objectives and language objectives, Content-based ESL programs can promote students' content mastery while developing English proficiency (US Dept. of Ed., 2010d).

Sheltered English instruction.

Content ESL is also known as Sheltered English Instruction. As in all other English-only approaches, the objective is to learn English as soon as possible; therefore, students are taught in English all day. However, sheltered English instruction requires a context-embedded setting equipped supported by visual aids, repetitions, slower speech, and gestures to make input comprehensible and where the curriculum is reduced to fit the English proficiency of the learners (Echevarria et al., 2008). Grade-level content instruction is provided through modified instruction and a developmental language approach. Techniques include cooperative learning, tapping students' prior knowledge and targeted vocabulary development (Echevarria & Short, 2004). Language acquisition is enhanced through meaningful use and interactions relevant to the curriculum (Genesee, Lindholm-Leary, Saunders & Christian, 2005; August & Shanahan, 2006). Sheltered instruction provides greater flexibility in design and lesson delivery and can be used in conjunction with other instructional programs such as ESL, TBE and Dual Language Instruction.

The transitional bilingual education (TBE) approach.

This educational approach makes limited and temporary use of the primary language of the learners (L1) until they develop enough English language proficiency to be immersed in mainstream classes (García et al, 2008; Freeman, 2007; Baker, 2006; Crawford, 2004). In transitional programs, all students are from the same minority linguistic background (Irby et al., 2008), and the length of time students participate in TBE programs varies among and within states from one to five years (Freeman, 2007).

The different models of transitional education share two main characteristics: (1) an assimilationist orientation and (2) a subtractive approach (García, et al., 2008). Similar to the English-only approach, the ultimate goals in TBE are cultural assimilation and English monolingualism (Baker, 2006). Even though it makes use of the students' first language, there is no attempt to maintain or develop L1 proficiency (Crawford, 2004), resulting in subtractive bilingualism (Baker, 2006; Cummins, 1996).

During the first stages, students are provided with core content instruction in their home language while exposing them to English through other areas such as physical education and arts. The program bridges the transition from one language to the other. As the student develops English proficiency, instruction in English is phased-in and instruction in L1 is phased-out. Eventually, students are mainstreamed into all English classrooms and L1 instruction is discontinued (Cox, et al., 2008; Irby et al., 2008; Tong et al., 2008; Lara-Alecio et al., 2001).

Transitional bilingual education is based on three critical assumptions about the learner: (1) the student is expected to rapidly develop enough English skills to participate successfully in an English-only classroom; (2) students are expected to have access to similar knowledge bases as mainstream students, including prior content knowledge, social and cultural knowledge; (3) learners are expected to suffer no significant stress when moving from a language-supported program to a non-supported program.

Early-exit transitional bilingual education.

In Early Exit TBE, students receive first language instruction for one to three years before being mainstreamed into all-English instruction (Cox, 2008; Ovando et al., 2006; Freeman et al., 2005; Lara-Alecio, Irby, & Meyer, 2001; Genesee, 1999). Early

Exit TBE is the most common type of bilingual education in the United States, despite the fact that many studies show that ELLs need from five to seven years to reach the grade-level English language proficiency required to be successful in an English-only classroom (Cox, 2008; Tong et al., 2008; Collier, 1989; Cummins, 1996; Krashen, Dulay, & Burt, 1982). Early-exit TBE is a subtractive, remedial instructional model that encourages English acquisition without providing long-term support for L1 development (Irby et al., 2008; Ovando et al., 2006; Lara-Alecio et al., 2001; Genesee, 1999; Ramirez, Yuen, Ramey, & Pasta, 1991).

Late-exit transitional bilingual education.

In Late Exit TBE, students maintain L1 instruction for up to six years (Cos, et al., 2008; Genesee, 1999), allowing students to build a stronger foundation in their native language that can improve their academic achievement (Thomas & Collier, 2002). Late-exit TBE students are more likely to maintain L1 proficiency than similar peers in early-exit TBE or English-only programs. However, late-exit TBE is not as commonly implemented as early exit TBE (Irby et al., 2008).

In all cases, TBE programs do not aim to develop bilingualism and biliteracy but to develop English language proficiency (Cox, et al., 2008; Irby et al., 2008; Tong et al., 2008). TBE programs fail to develop the students' Li cognitive academic language (Alanís, 2000). In many TBE programs, teachers use L1 less than expected due to a variety of factors, including accountability pressure and language bias (Saunders, Foorman, & Carlson, 2006; Dolson & Mayer, 1992)

English-only and Transitional bilingual approaches have been consistently rejected by academic advocates of bilingual education because they fail to meet the academic, linguistic and psychological needs of ELLs (Irby et al., 2008; Alanís, 2000; Valdés, 1997; Wong Fillmore, 1992a; Hernández-Chávez, 1984). Instead, researchers argue for enrichment programs that can truly promote bilingualism and biliteracy (US Dept. of Ed., 2010d; Cox, 2008; Irby et al., 2008; Tong et al., 2008; Thomas & Collier, 2004; Cummins, 1996; Collier, 1989).

The enrichment bilingual development approach.

This educational approach makes extensive and prolonged use of the primary language of minority students and continues to provide instruction in the first language even when the students have reached acceptable levels of proficiency in both languages (García et al., 2008; Freeman, 2007; Baker, 2006; Crawford, 2004). This category includes programs such as Bilingual Maintenance, One-Way developmental Bilingual Education, and Dual Language Immersion programs (Freeman, 2007). In contrast with the English-Only approach and Transitional Bilingual education, EBD is not developed exclusively for English language learners. Programs such as Dual Language Instruction can include speakers of the majority group. Also, the EBD approach has an Intercultural Orientation (Cummins, 1996) and an additive approach (Crawford, 2004).

Second, in contrast with the English-only approach and the TBE approach, the ultimate goal of the EBD approach is for all students to be academically successful, become bilingual and biliterate, and to develop positive intercultural understandings (García et al., 2008; Freeman, 2007; Baker, 2006; Crawford, 2004; Lindholm-Leary, 2001; Cloud et al., 2000; Christian, 1994).

The theoretical framework that supports the EBD approach has three main components: (1) bilingualism theories that emphasize the importance of strong native language literacy skills for learning a second language, and high levels of proficiency in two languages in additive bilingual settings (Cummins, 1981a; Thomas & Collier, 1997); (2) linguistic theories that regard language-learning as a socio-cultural phenomenon in which meaningful interactions between native and non-native speakers are emphasized as central to the learning process (Ellis, 2000; Pica, 1994; Wong-Fillmore, 1989, 1891a; Long, 1983), and important for developing positive cross-cultural relationships (Cohen, 1994; Slavin, 1985); (3) identification of successful instructional practices for language development and academic achievement (Genesse, 1986).

Because the ultimate goal is not English monolingualism but bilingualism and biliteracy, EBD students should not be referred as ELLs but as emergent bilinguals, eliminating the tacit hierarchy that emerges among English-only and transitional bilingual approaches between native English speakers (NES) and English language learners. In an EBD approach, all participating students are perceived as emergent bilinguals from different linguistic backgrounds. The EBD approach aims to create balanced additive bilingual environments where native speakers of a target language are used as models for second language learners and programs are designed to promote interactions among students from different cultural and linguistic backgrounds.

Research suggests that successful programs for emergent bilinguals should: (1) allow for the development of their native language and literacy (Cummins, 1989; Tharp, 1997), (2) employ challenging curriculums that incorporate the experiences of the students and their communities (Banks, 1995; Sleeter & Grant, 1994; Tharp, 1997), (3) engage students in cooperative learning (Tharp, 1997), and (4) maintain high expectations for all students (Banks, 1995; Cummins, 1989). According to Thomas &

Collier, Dual Language Instruction programs “are the only programs… that can assist students to fully reach the 50th percentile in both L1 and L2 in all subjects and… reach higher levels through the end of schooling…with the fewest dropouts” (2002, p. 7).

Dual Language Instruction (DLI)

According to Howard and Sugarman (2001), Dual Language instruction is a generic term that identifies any program that (1) provides literacy and content instruction through two languages, (2) promotes bilingualism and biliteracy (3) promotes grade level academic achievement in both languages, and (4) promotes multicultural competence and positive cross-cultural attitudes for all students. This definition is shared and complemented by other authors (Howard, Sugarman, Christian, Lindholm-Leary, & Rogers, 2007; García & Bartlet, 2007; Torres-Guzman et al., 2005; Torres-Guzman, 2002; Mora, Wink, & Wink, 2001; Montone & Loeb, 2000; Calderon & Carreon, 2000; Cloud, et al., 2000; Valverde & Armendáriz, 1999; Christian, 1996; Torrez-Guzman & Perez, 1996; Wong-Fillmore, 1992a; Lindholm, 1990a; Lindholm & Fairchild, 1990). Dual language instruction is also identified as bilingual immersion or multilingual instruction.

According to the U.S. Department of Education (2010d), DLI is successful in producing bilingual, bicultural students because the development of L1 literacy promotes L2 literacy development. According to Thomas and Collier (1997), DLI is the only program successful in closing the English language proficiency gap in three to five years. This claim seems to be especially true for Hispanics (Lutz, 2004).

During the past few decades, DLI has gained popularity across the nation due to a variety of reasons including: federal funding programs in the 1990’s, parental support, and publicized success of some programs (García & Bartlet, 2007; García, 2004; Torres-Guzman, 2002; Lindholm-Leary, 2001; Cloud et al., 2000; Montone & Loeb, 2000; Valdez, 1997).

Characteristics of dual language instruction programs.

Dual Language Instruction shares some common characteristics that differentiate it from other instructional programs including: population, language of instruction, length of the program, curriculum, and program goals.

Population.

One major characteristic of DLI is that is not designed exclusively for the instruction of language minorities. In Dual Language Instruction, students from two different language backgrounds can be grouped together for content and language instruction delivered through two different languages of instruction (Freeman & Freeman, 2005**;** Lindholm-Leary & Borsato, 2006). In DLI, native language speakers of one group can model the language for native language speakers of the other group, and both groups acquire a second language simultaneously by negotiating communication among them (Montone & Loeb, 2000; Wong-Fillmore, 1992b).

DLI is not a remedial program for students having a -language problem- (Ruiz, 1994). DLI should be perceived as an enrichment program open for all students willing to develop proficiency in a second language **(**Collier & Thomas, 2005). In many DLI schools, DLI students are perceived as a selected group of students.

DLI programs take advantage of three factors commonly ignored by traditional models: (1) the role played by communities of practice in the acquisition of a second language; (2) the complex ways in which social identity is negotiated during the acquisition of a second language (Norton, 2000; Norton-Pierce, 1995); (3) the way second language interactions are influenced by power relations among languages (Bordieu, 1991). In a properly implemented DLI program, both languages share equal status, curtailing the influence of language power relations. Because one language is not substituting the other but complementing the linguistic repertoire of the individual, social identity is not eroded and participants are constantly engaged in communities of practice that facilitate the acquisition of a second language (García & Bartlet, 2007).

However, participation of two different language groups is not a requirement for a program to be considered as dual language instruction. The population of a DLI program can range from all participants sharing one linguistic background, to a balanced participation of students from different linguistic groups (Torres-Guzman et al., 2005).

DLI programs are labeled differently according to their population distribution. In One-Way DLI programs, all or most of the participating students share the same language background (Cox et al., 2008; Irby et al., 2008; Howard et al., 2007; Gomez, Freeman & Freeman, 2005; Mora, Wink, & Wink, 2001; Genesee & Gándara, 1999). Some authors also include ethno-linguistic background as key for program identification. According to Perez (2004) and Torres-Guzman (2002), a program should be labeled One-Way DLI if a majority of participants come from the same ethnic background, regardless that their linguistic proficiencies in each language vary significantly. For Rosado (2005) the term "language-minority" includes native Spanish speakers, native English speakers of Hispanic ancestry, as well as bilingual Spanish-speaking students, and the term "language majority" applies exclusively to White, middle-class children from European descent who speak –Standard- English.

One-way DLI makes use of the students' L1 for content instruction for as long as possible. One-Way DLI is considered most promising in maintaining students' L1 while developing grade-level English proficiency (Irby et al., 2008). One-Way DLI is also considered effective in providing high-quality educational experience and promoting high levels of academic achievement for linguistic minority students (Irby et al., 2008; Lindholm-Leary & Borsato, 2006; Lindholm-Leary, 2001). One-Way DLI is also known as Developmental Bilingual Education, One-Way Developmental, and Maintenance Bilingual (Thomas & Collier, 2002; Lindholm-Leary, 2001; Genesee, 1999; Ramirez, Pasta, Ramey & Yuen, 1992).

In Two-Way DLI programs, native English speakers (NES) and native speakers of a language other than English (LOTE) are mixed so both groups can learn from one another (Howard, Sugarman, & Christian, 2003; Stern, 1963). A distribution of 50/50 is ideal (Collier & Thomas, 2004; Lindholm-Leary, 2001; Valverde & Armendariz, 1999), but even a ratio of 2:1is acceptable for programs to be identified as Two-Way (Lindholm-Leary, 2001; Lindholm-Leary & Borsato, 2001; Lindholm-Leary & Ferrante, 2003). Two-Way DLI programs are also indentified as Two-Way immersion Programs (Howard, & Sugarman, 2001; Thomas & Collier, 2002; Lara-Alecio et al., 2004), Two-Way Bilingual Education programs (Christian, 1994; Ovando, Collier, & Combs, 2003; Crawford, 2004; CAL, 2008), and Dual Language education programs (DLENM, 2005).

Languages of instruction.

Dual Language Instruction programs are characterized by the use of two languages as mediums of instruction. In 2008, 93% of all DLI programs used Spanish and English as the languages of instruction (Bearse & De Jong, 2008). Ideally, a 50-50 division between the time used for instruction in English and the time used for instruction in LOTE is recommended to provide the learners with extensive opportunities to learn and develop both languages simultaneously (Torres-Guzman et al., 2005; Lara-Alecio et al., 2004; Howard & Christian, 2002). A 50-50 language allocation is ideal to maintain an equal treatment for both languages (Howard et al., 2007; Thomas & Collier, 2004).

However, the initial allocation of languages can vary according to the model of instruction. In a 50/50 DLI, language allocation is evenly split since the early grades; students receiving 50% of their daily instruction in one language and 50% in the other language (Cox, 2008; Thomas & Collier, 2004; Howard & Christian, 2002).

Meanwhile, in a 90/10 model, 90% of the instruction during the early grades (PK-1) is delivered through the students' first language and the remaining 10% of the instructional time is used to expose children to English (Cox, 2008; Howard & Christian, 2002). English instruction is phased in gradually across grade levels to eventually reach a 50/50 parity by fifth grade (Howard & Christian, 2002).

The reasons to choose one model over the other vary. Some educators prefer to begin with a 90/10 program to enhance academic achievement in L1. Others prefer the 50/50 model to speed up English acquisition (Cox, 2008). Some researchers claim that the 90/10 model is somewhat more effective than the 50/50 model because it facilitates content learning (Lindholm-Leary & Ferrante, 2003; Lindholm-Leary, 2001; Lindholm-Leary & Borsato, 2001).

Several authors claim that it is important to maintain a language separation to avoid a confusing mixture of languages (Torres-Guzman et al., 2005; Calderon & Minaya-Rowe, 2003; Kirk-Senesac, 2002; Torrez-Guzman, 2002). Teachers must maintain the use of one language at a time, avoiding simultaneous translation, and making use of sheltered-instruction techniques to make language comprehensible for second-language learners. Other authors claim that there are times the languages must be kept separate but also times where both languages can be used simultaneously (Cummins, 2007, García, 2006). Teachers can temporarily allow children to respond through their first language while motivating them to practice L2 production. During class, students are allowed to assist each other and exchange information through both languages (Thomas & Collier, 2004). For example, during collaborative learning activities, discussions between students can take place in the language of preference of the participants. This allows for greater opportunities for language modeling and also risk-free opportunities to engage in L2 output practices.

Curriculum.

Because DLI is a mainstream/enrichment program, not a remedial one, it must focus on a challenging, core academic curriculum (Thomas & Collier, 2004). No watered-down instruction is allowed. The curriculum must constantly promote critical thinking, viewing all participating students as capable. Through collaborative learning settings, students can assist each other and promote meaningful second language development (Thomas & Collier, 2004).

Structure.

For DLI programs to be successful, implementation must go beyond the classroom walls. The program requires strong structural characteristics and specific instructional settings including a strong and supporting administration, a bilingual staff, and an additive bilingual and multicultural print-rich environment where both languages are used equally in announcements, signs, bulletins, cultural events and home communications (Thomas & Collier, 2004).

Length of implementation

Dual language instruction requires a minimum of six years of implementation, to fully close the English proficiency gap. This is especially crucial in one-way programs where there are no English-speaking peers to provide modeling and peer tutoring for English language learners **(**Thomas & Collier, 2004). Initial implementation can start at the PK-K levels and grow along with the students (Torres-Guzman et al., 2005). Also, DLI programs can be established as DLI schools or as strands within mainstream schools. However, the six-year timeframe must not be perceived as a limit. Ideally, DLI instruction should become a PK-12 program **(**Collier & Thomas, 2005, Freeman, 2000). However, DLI predominates at the elementary level (García & Bartlet, 2007). In 2008, most programs were implemented at the elementary level. Only 13 programs across the nation were implemented at the secondary level (Bearse & De Jong, 2008).

Authors claim a variety of reasons that limit a successful DLI implementation at the secondary level. According to García and Bartlet (2007), the specialized academic register required for secondary level instruction is difficult for ELLs to achieve in the four years of high school. According to Montone and Loeb (2000), the complexity of middle and high school organization makes DLI implementation, challenging.

However, research confirms the importance of additive school environments at the secondary level that can build on the linguistic and cultural resources ELLs bring to school (Bearse & De Jong, 2008; Faltis & Coulter, 2008; Valdes, 2001; Faltis &Wolfe, 1999; Lucas, Henze, & Donato, 1990; Olsen, 1997). The relationship between language proficiency and academic achievement is higher in secondary school, where academic language becomes more complex and more content-specific (Echevarria et al., 2008; Biancarosa & Snow, 2004).

Schools can support emergent bilinguals' content knowledge acquisition by delivering complex secondary-school content instruction in L1, without watering down curriculum and instructional rigor (Bearse & De Jong, 2008). Students literate in their native language and with strong academic background only need English language development to transfer content knowledge to their second languages, increasing their likelihood to achieve higher levels of academic success (Echevarria et al., 2008). At the same time, DLI students keep developing their English language proficiency through content courses delivered in English and English language development courses.

The implementation of DLI at the secondary school level can bring forward a set of potential benefits including: lower likelihood of detrimental tracking practices, participation in advanced content courses, participation in international Baccalaureate programs, and participation in college-level courses and assessments such as Advanced Placement (AP) that can provide emergent bilinguals with challenging educational experiences and the opportunity to earn college credits (Montone & Loeb, 2000).

The implementation of DLI at the secondary level is highly recommended both, as a continuation of an existing DLI elementary program to keep developing L1 and L2 academic proficiency; and as an independent program to help emergent bilinguals develop their content knowledge in L1 while developing English language proficiency. According to DLI theoretical framework, content instruction in L1 not only facilitates content knowledge and promotes the academic development of L1 but also facilitates

English language development. As previously mentioned, the extent and quality of schooling in L1 is the best predictor for long term academic achievement in English (Thomas & Collier, 2004).

Dual language instruction and Federal policy.

Dual Language instruction is supported by federal policy and Supreme Court rulings such as Castaneda v. Pickard (1981). As required by the Castaneda provisions, (1) Dual Language Instruction is thoroughly informed by sound educational theory recognized by experts in the field; (2) several DLI programs have been implemented in an effective manner and provided with adequate resources including trained personnel, materials and relevant support, and (3) during the last two decades, DLI programs have been thoroughly evaluated by research to determine if they are overcoming the language barriers in a reasonable time. DLI has proven successful in meeting the provisions of No Child Left Behind (Howard et al., 2007). Therefore, DLI is not only theoretical sound, but also politically attractive. Even stringent opponents to bilingual education support Dual Language Instruction (Collier & Thomas, 2005).

Benefits of Dual Language Instruction.

The amount of DLI programs available nationwide is minimal in comparison to the amount of emergent bilinguals enrolled in the American schooling systems (Howard & Sugarman, 2007). Educators and policy-makers should be informed about the benefits of implementing Dual Language Instruction.

Academic achievement.

Research has consistently demonstrated the academic advantages of DLI for both, language minority and language majority students (Cox et al., 2008; Tong et al., 2008;

Howard et al., 2007; *Lindholm-Leary & Borsato, 2006; Howard, Sugarman, & Christian, 2003; Howard, Christian, & Genesee, 2003; De Jong, 2002, 2006; Kirk-Senesac, 2002; Thomas & Collier, 2002;Christian & Genesee, 2001; Lindholm-Leary, 2001; August & Hakuta, 1997; Christian, Montone, Lindholm, & Carranza, 1997; Lambert & Cazabon, 1994; Cazabon, Lambert, & Hall, 1993; Ramirez, 1992; Ramirez et al., 1991; Willig, 1985*). DLI students generally outperform non-DLI students on standardized academic achievement tests in reading and math (Bearse & De Jong, 2008; Quintanar-Sarallana; 2004). These long-term academic effects are measurable way into high school, where DLI students perform comparable to or higher than their native English speaking peers who did not participate in bilingual education (Howard et al., 2007; Lindholm & Molina, 2000, Lindholm-Leary 2004).

According to research, when instructional programs provide opportunities for students to develop L1 proficiency, they become more academically effective, both at the elementary and secondary school levels **(**Genesee et al., 2006; Lindholm-Leary & Borsato, 2006). "students instructed in their native language…and English, perform on average, better on English measures than language-minority students instructed only in English" (August & Shanahan, 2006, p. 11).

Only quality DLI programs can provide ELLs with the grade-level cognitive and academic development they need to be successful in English (Lindholm-Leary, 2005b; Thomas & Collier, 1996). Only DLI students can reach the 50th percentile or higher in both L1 and L2 in all content subjects after four to seven years of schooling (Thomas & Collier, 2002). "Dual language [instruction] programs ... provide the greatest academic gains for language minority students when compared to...other types of bilingual or English-as-a-second language programs" (Shannon & Milian, 2002, p 683).

At the same time, DLI instruction allows language majority students to acquire oral and written proficiency in a second language and to maintain grade-level academic achievement and higher levels of English literacy skills despite receiving most of their instruction in a second language (Howard & Christian, 2002; Genesee, 1987; Snow, 1986; Lambert & Tucker, 1972).

Second Language Acquisition and Development.

According to research, the more linguistic support a student receives in their first language, the more likely the student is to attain higher levels of linguistic and academic achievement in the second language (Collier, 1992). DLI programs are highly effective in teaching a second language both to native English speakers and to speakers of other languages (Thomas & Collier, 1996). DLI programs are especially effective helping ELLs to develop English language proficiency (Medina & Escamilla, 1992). When students receive dual language instruction their likelihood to succeed in standardized assessments increase in comparison with students in other bilingual or ESL programs (Collier &Thomas, 2004).

Bilingualism, Biliteracy, and Cultural Awareness

DLI is the only instructional approach that takes explicit steps toward language status equalization and promotes a long-term view of literacy in two languages (Bearse & De Jong, 2008; Freeman, Freeman, & Mercuri, 2005; Cloud, Genesee, & Hamayan, 2000). DLI provides constant social interaction that leads to improve social relationships and collaboration between ethnic and socioeconomic groups (Collier & Thomas, 2005).

DLI students from both language groups recognize and exhibit an edge on bilingualism, biliteracy and cultural awareness (Bearse & De Jong, 2008; Krashen, 2004; Howard, Sugarman , Christian, 2003).

First language maintenance and development.

The motivation to learn and develop a language is influenced by the sociopolitical context of identity and the benefits associated with the language (Norton, 2000; Norton-Pierce, 1995). Many school settings send a message that learning English is more important than learning Spanish and students become aware and reactive to these status differences, affecting students' linguistic choices and identities over time (Potowski, 2004, 2007; McCollum, 1999). The diminishing role of Spanish can result in more unequal leaning opportunities and detrimental socioeconomic conditions for Hispanics. DLI has the potential to provide access to additive bilingual and multicultural environments that support the academic achievement of linguistic minorities (Potowski, 2007; Nieto, 2000; Lucas et al., 1990).

Summary of prevalent models of instruction for emergent bilinguals

Prevalent models of instruction can be classified in three main categories or approaches based upon their goals, orientation, and instructional usage of L1. The English-only approach promotes English monolingualism and an assimilationist orientation. Based upon the Time-on-task hypothesis, the English-only approach rejects the use of home language for instruction. Within this approach are located instructional programs such as English Submersion, Structured English immersion, Sheltered English Instruction and English as a Second Language. Programs vary depending of the support provided to the students.

The Bilingual Transition Approach also promotes English monolingualism and an assimilationist orientation. However, it makes limited use of the home language for instruction to bridge the students' linguistic transition from their first language to English. The Bilingual transition approach makes no attempt to maintain or develop the students' first language, and L1 instruction is abandoned as soon as the learner acquires enough English language proficiency to be mainstreamed. The most popular program included in this approach is Early-Exit TBE.

The Enrichment Bilingual Development Approach promotes bilingualism and a multicultural orientation. Not only makes use of the home language for instruction, but promotes a grade-level proficiency development of L1. Dual Language Instruction, as an umbrella term, represents a variety of programs that share similar characteristics unique of the Enrichment Bilingual Development approach. One thing that makes DLI unique is its population, because contrary to other bilingual programs, DLI is not geared exclusively for English language learners. DLI is a comprehensive enrichment program available for all students, regardless of their linguistic background. Another unique characteristic is that it makes use equal use of both languages for content and language instruction. Both languages are equally valued eliminating linguistic hierarchies. Another unique characteristic is its enrichment curriculum. Contrary to the transitional-bilingual and English –only approaches that manage a remedial curriculum geared to fix a –language problem-; DLI manages an enrichment curriculum that perceives the students' languages as curricular assets, promotes critical thinking, and cooperative learning geared towards academic excellence. Contrary to transitional-bilingual and English –only approaches, DLI does not attempt to provide short-term results. DLI implementation demands a long-term commitment to implement the program for at least 6 years before exiting. Even though most DLI school districts are implementing DLI at the elementary level only, secondary implementation is highly recommended due to the academic, linguistic and social benefits that research has evidenced from DLI implementation.

DLI appears to be the most effective program for the instruction of emergent bilinguals and its implementation at the middle and high school levels seems highly recommended, especially in communities with high percentages of language-minority students, or receiving large numbers of ELLs into their secondary schools. However, most school districts implementing DLI instruction end their programs at 5th grade, even though DLI facilitates content knowledge acquisition and L1 and L2 academic language proficiency development; critical at secondary grades, when instruction becomes more challenging and less supported by context (Thomas & Collier, 2002).

The lack of implementation of DLI programs at the secondary level can be partially attributed to the fact that there is no research evidence about the academic outcomes of implementing a Dual Language Instruction program from kindergarten to 12th grade, and there is a lack of research evidence because there are few DLI programs being implemented at the secondary and high school levels (Bearse & De Jong, 2008; Howard et al., 2007). The goal of this study is to identify how does the long-term academic achievement of students schooled in the Dual Language Instruction program of a selected school district compare with the academic achievement of students schooled in the Transitional Bilingual Education program and students schooled in the English as a Second Language program within the same district. The methodology for carrying out this study will be found in the next chapter.

Chapter 3

METHODOLOGY

Introduction.

For the United States to maintain its leadership role in the global market and to retain its democratic principles, it is important to ensure that all students attain their highest-possible level of educational achievement. Thus, the ultimate goal for all schooling systems in the nation is for all their students to achieve academic success (U.S. Dept. of Ed., 2010a). However, the educational achievement of Hispanics has lagged behind, in comparison with the achievement of their peers from other races and ethnicities (Gándara & Contreras, 2009; García, 2006; Grigg et al., 2003; Kinder, 2002; Siegel, 2002). Therefore, it is critical to identify instructional programs effective in closing the educational achievement gap that exists between Hispanics and their peers.

To analyze the effectiveness of additive bilingual education models, such as Dual Language Instruction, against traditional models such as TBE and ESL in terms of long-term academic development for Hispanics, this study addressed the following question: How does the long-term academic achievement of Hispanic students schooled in a DLI program compare with the academic achievement of comparable students schooled in a Transitional Bilingual Education (TBE) program and students enrolled in the English as a Second Language (ESL) program; all within the same school district?

The task is challenged by two fundamental questions: "How to measure educational achievement?" And, given the diversity in our student population, "How to measure educational achievement for members of ethno-linguistic minorities, such as Hispanics and Hispanic ELLs?"

Measuring educational achievement.

Since the publication of *A Nation at Risk* (1983), the efficacy of our educational systems has been questioned. The standardization reform of the 1980's and 1990's pushed forward the development of specific standards designed to provide a framework for educational achievement (Echevarria et al., 2008; García & Bartlet, 2007). *America 2000* and *Goals 2000* were written to identify educational standards and measures of performance (Eisner, 2000).

Identifying educational standards and measures of performance depends upon a clear specification of intended outcomes, the use of quantitative measurement to represent and assess performance, and the ability to predict, control, and identify the specific effects of instructional interventions (Eisner, 2000). Standardization however, also downplays the idiosyncrasy of the participants and their environments (Leithwood & Riehl, 2003; Pellegrino, Chudowsky, & Glaser, 2001). Therefore, standardization facilitates implementation, assessment, and evaluation, but limits the validity and reliability of findings (Solano-Flores, 2008).

The 2001 re-authorization of the Elementary and Secondary Education Act (ESEA), also known as the No Child Left Behind Act transformed the standardization reform into national, state, and local policies, making states, districts, schools, and educators accountable to meet the standards (Nesselrodt, 2007; Capps et al., 2005). Schools became accountable for the successful education of all their students, including racial and ethnic groups, low-income students, LEP students (Capps et al., 2005). However, performance and achievement is measured solely upon the students' ability to meet state standards through state-developed assessments.

Education practitioners and researchers have questioned the effectiveness of the criteria currently used for accountability, claiming that it is inadequate to effectively measure the educational achievement of all students (Gándara & Contreras, 2009, Gándara, 2006; Guerrero, 2004; Orfield, Losen, Wald & Swanson, 2004; Coltrane, 2002; Eisner, 2000). The Federal government recently questioned the effectiveness of an accountability system solely based upon standardized tests. In May of 2010, the Obama administration recognized that many state-created standards-based assessments "do not adequately measure student growth or the knowledge and skills student need" (U.S. Dep. of Ed., 2010a, p. 1).

Claiming that the goal for America's educational system should be that all students finish high school ready for college, the U.S. Department of Education recognized that the standards required by ESEA are not necessarily "based on evidence of what students need to be successful in college," (2010a, p. 1) and therefore, are insufficient as the sole measure of academic achievement. The Obama administration provided a set of indicators useful in measuring academic achievement from a college-readiness perspective. Such indicators include: college-level courses such as Advanced Placement (AP); Standardized college admission tests such as SAT and ACT; percentage of high school graduates enrolled in college the fall after graduation; percentage of high school graduates taking remediation courses in college; college GPA, college-credit attainment, and college retention. Together, these indicators provide a clear picture about how students, teachers, schools, school districts, and states are doing in their commitment to develop college-ready students.

Measuring the educational achievement of Hispanics.

The American schooling systems have been traditionally based upon the educational needs of White, middle-class, and English-speaking students, leaving many non-Euro-American-background students underserved (Gándara & Contreras 2009; Nesselrodt, 2007; García, 2006; Grigg et al., 2003; Freeman & Freeman, 2002; Kinder, 2002; Siegel, 2002; August & Hakuta, 1997).

NCLB brought into the spotlight the educational needs of ethno-linguistic and socio-economic minorities (Nesselrodt, 2007). Since then, the educational achievement of most minority groups has increased, measured by the NCLB accountability criteria. However, when measured by the college-readiness indicators recommended by the Federal Administration, the outcomes are different; especially for Hispanics.

Even though Hispanics increased their high school completion rate by more than 20 points between 1970 and 2009, the high school completion gap between Hispanic and White students remains significantly wide. In 2009, the gap surpassed the 24 percentage points (Aud et al., 2010). In 2009, the high school dropout rate for Hispanics was almost four times higher than for Whites. The Immediate College Enrollment Rate (ICER); the percentage of high school completers enrolled in college the fall immediately following their high school graduation, is not only lower for Hispanics than for Whites, but the gap is widening. The ICER gap between Whites and Hispanics increased from 4.7% in 1972 to 7.8% in 2008 (NCES, 2010).

All these figures indicate that even though Hispanics are graduating from high school at higher rates than before, they are not enrolling in college at a similar rate (NCES, 2009a). In other words, Hispanics, while being more able to meet the standard-based expectations of NCLB, seem to be less prepared to meet the expectations set by college-readiness indicators. Focusing exclusively in standards, many schooling systems are failing in their responsibility for “meeting the educational needs of an increasingly diverse student population,” and in ensuring that all students “have the opportunity to succeed in college” (US Dept. of Ed., 2010b, p. 1).

To define functional working criteria to measure and compare the effectiveness of different instructional programs in promoting long-term academic achievement, this study incorporated both sets of measuring criteria. Educational achievement was measured based upon individual results in state-developed standardized assessments (TAKS); participation in AP courses; individual results in SAT and ACT tests; percentage of students graduating from high school; and percentage of high school graduates enrolled in college the fall after graduation.

Research Design

The objective of the study is to compare the academic achievement of Hispanic students enrolled in Dual Language Instruction, with similar students enrolled in Transitional Bilingual Education and/or English as a Second Language programs. As recommended by Thomas and Collier (1997), the goal is to identify which program is most effective in assisting Hispanics and Hispanic ELLs to reach “full educational parity with native English speakers (NES) in all school content subjects (not just in English proficiency) after a period of at least five to six years” (p. **7**).

To achieve this goal, the researcher implemented a quantitative, retrospective research, comparing the educational path of students with similar ethnic, cultural, and socioeconomic backgrounds; studying in the same schools, and in many cases, instructed by the same teachers. The only differential variables between groups were the program and language of instruction.

The review of literature made evident the need for a quantitative approach, that can provide measurable data of the long-term academic outcomes generated by different instructional programs in similar student populations (Cerna et al., 2009; Callahan et al., 2009; Brown, 2008; García, et al, 2008; Batalova et al., 2007; Coulter & Smith, 2006; NCELA, 2006).

Creswell (2009) defines quantitative research as a means for testing theories by examining the relationship among measurable variables through statistical procedures. This approach holds a post-positivist worldview in which particular causes influence probable effects or outcomes. The research problem reflects a need to identify the causes that influence the observed outcomes (Creswell, 2009).

The nature of the study is retrospective or ex-post facto because the study was designed and implemented after the analyzed intervention had taken place and the outcomes had been measured (Cox, 2008). This retrospective research used a non-experimental strategy of inquiry because the participants were not randomly assigned and because the dependent and independent variables have already occurred (Creswell, 2009; Cox, 2008). A non-experimental strategy of inquiry may be considered a critical limitation of the study because it may not meet the criteria used to designate methodologically acceptable studies by some researchers. According to Thompson (2008) for example, only experimental designs can make definitive causality claims.

However, as claimed by Thomas and Collier (1997), such criteria limit education research. Several factors can hinder the possibility of implementing random assignment in a real educational environment, especially for a long-term research. Many experiments use convenience samples to measure effects in natural settings and naturally formed groups (Creswell, 2009). As Thomas and Collier (1997) note, the most important argument against random assignment is ethical. If research has thoroughly proven that one instructional process is less effective than other, a researcher would face an ethical dilemma by intentionally placing a group of students in a less-effective instructional program for a long period of time, cognizant of the detrimental effects that such placement can have upon the students' academic development.

Research in bilingual education also faces legal limitations. In Castañeda v. Pickard (1981), the Supreme Court required schools to select instructional practices with high theoretical effectiveness. Assigning students to less effective instructional programs not only would be unethical, it will also be unlawful. In Lau v. Nichols, the Supreme Court required schools to provide language minority students with some form of instructional assistance (Lau v. Nichols, 1974). Therefore, it would be almost impossible to find a comparable group of students receiving no instructional support that was large enough to participate as control group.

As Thomas and Collier (1997) point out, random assignment is useful only for short-term phenomena and small groups. Laboratory-style experimental research reduces the external validity and generalization of results beyond the sample, limiting the applicability of findings in the real world. As Cummins (1999) observes:

> "knowledge is generated not by evaluating the effects of particular treatments under strictly controlled conditions, but by observing phenomena, forming hypothesis to account for the observed phenomena,

testing the hypothesis against additional data, and gradually refining the hypotheses into more comprehensive theories that have broader explanatory and predictive power "(p, 30)

The present research is based upon what Cummins (1999) identifies as a Research-Theory-Policy Paradigm, where the accumulation of consistent findings become relevant in the context of a coherent theory. The research is also based on what Thomas and Collier (2004) call gap-closure research, where cohorts of students are followed over a long period of time rather than through short-term, and where cross-sectional comparisons are established to identify program effectiveness on achievement gap closure.

Because the academic development of a second language can take between six to eight years, the assessment and comparison of students over a period of one to four years is too short to accurately predict long-term program effectiveness (Thomas & Collier, 1997). According to Thomas and Collier, “significant differences in program effects become cumulatively larger and thus more apparent, as students continue their schooling in the English-speaking grade-level classes” (1997, p. 14). This is also more evident at the secondary school level where instruction becomes more cognitively challenging (Echevarria et al., 2008; Biancarosa & Snow, 2004).

Setting

The study took place in a public school district located along the Texas/Mexico border. The school district was selected for two reasons: its demographics and its instructional programs. The school district’s demographic data is relatively similar to the demographics of many school districts attended by Hispanics and Hispanic ELLs across the region, the state, and the nation. The selected school district has an overwhelmingly-high percentage of Hispanics among its population. In 2008, 98.6% of students in the district were Hispanic, and 42.1% were identified as LEP (TEA, 2008a).

Even though the Hispanic and Hispanic ELL concentration in the school district is significantly higher than the national and state averages, it is representative of many school districts attended by Hispanics and Hispanic LEPs nationwide. For example, even though Hispanics represented 21.7% of the nation's total pre-K-12 enrollment in 2008 (Aud et al., 2010; Batalova, & McHugh, 2010); Hispanics represented 47.2% the total pre-K-12 enrollment in Texas (TEA, 2008b).

Something similar happens with the ELL population. Batalova and McHugh (2010b) claim that ELLs are concentrated in just a few schools across the nation. Almost 75% of all the LEP population in the U.S. is enrolled in only 10% of the schools in the country, and 25 school districts account for almost 25% of the total ELL enrolment nationwide. For example, Los Angeles Unified School District had 240,389 ELLs enrolled in 2007-08, representing 34.7% of their total enrollment (California Dept. of Ed. webpage, 2010). In 2008, ELLs represented 16.7% of the Texas school population while the national ELL enrolment was 10.7%. In Houston, ELL students represented 29.7% of the population (Batalova & McHugh, 2010b). The Rio Grande Valley, with only 8.2% of the state enrolment, accounted for almost 20% of the ELL enrolment. ELLs represented almost 40% of Region 1's enrollment. This data is illustrated in figure 23.

As showed in figure 23, poverty is another important factor in the selected school district. Almost 89% of the students in the district are labeled as economically disadvantaged; more than double the national average of 42.9% (TEA, 2010A). This is highly representative of the schools serving Hispanic and Hispanic ELLs. Hispanics and

ELLs are twice as likely to live in poor families and to attend schools with a high concentration of poor students, than any other minority group (Aud et al; 2010; Batalova & McHug, 2010; Batalova, 2006).

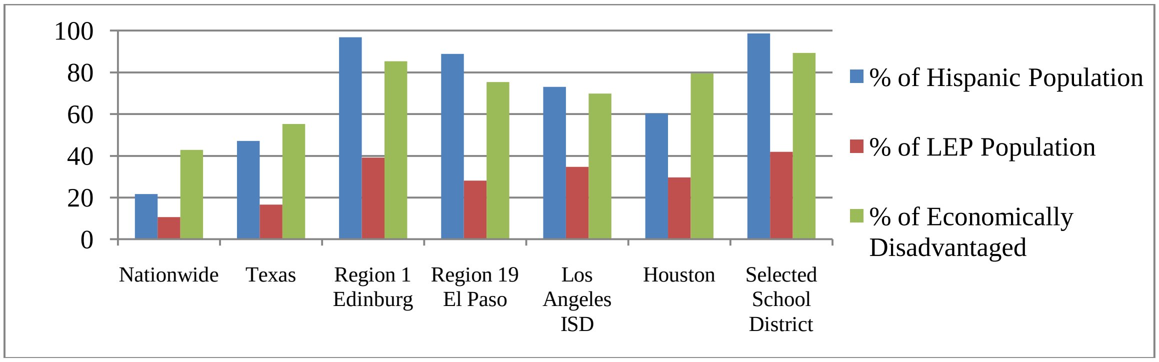

Figure 23: ELL population distribution by Regions

The educational attainment of the population in the school district area is very low. In 2008, only 56.5% of the population 25 years and over had a high school diploma or higher, and less than 12.8% held a bachelor's degree. These percentages are much lower than the national averages or 84.5% and 27.4% respectively for high school and bachelor's degrees (U.S. Census Bureau, 2008). Figure 24 shows the gap between the educational attainment for the area and the national average.

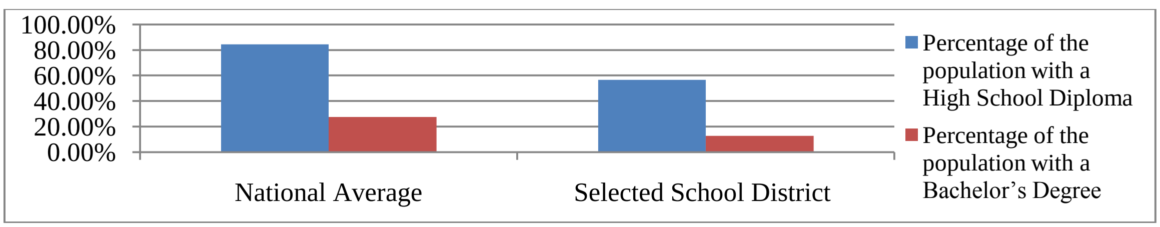

Figure 24: Educational attainment gap

These figures are representative of the schooling experience of many Hispanics and Hispanic ELLs nationwide. Even though Hispanic high school attainment increased by more than 20 percentage points in the past twenty years, the high school attainment gap between White and Hispanic students remains extremely wide. As illustrated in figure 25, while 94.6% of the White, non-Hispanic population 25- to 29 years-old had a high school diploma in 2009, less than 69% of their Hispanic peers achieved the same goal. The gap is larger at the bachelor's level. Thirty-seven percent of White 25- to 29-years old had a bachelor's degree, while only 12.2% of Hispanics had one. The bachelor's attainment gap between Whites and Hispanics increased from 11.2 points in 1971 to 24.8 points in 2009 (Aud et al, 2010). This is especially problematic in today's economy, where post-secondary education is regarded as crucial for individual and national advancement (National Academy of Sciences, 2010; Fry, 2002).

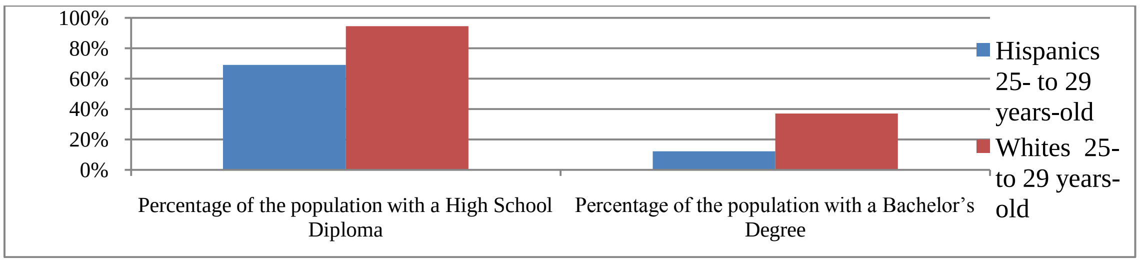

Figure 25: National Education Attainment Gap between Ethnic Groups in 2009

A second reason for selecting this school district was the uniqueness of its instructional programs. Like many other school districts with high concentrations of Hispanics and Hispanic ELLs, most of the Hispanic ELLs in the school district are placed in subtractive programs that provide them with limited or no instructional support in their home language. Even though 84.2% of the population in the community speaks a language other than English at home (U.S. Census, 2008), only 41.5% of the students in the district are enrolled in bilingual/ESL education (TEA, 2010b).

What makes this school district unique is the fact that it has been implementing strands of Transitional Bilingual Education, English as a Second Language, English Mainstream, and Dual Language Instruction within the same campuses over an extended period of time. In 1995, the school district started providing Dual Language Instruction in three elementary schools within the district. The program was based upon Gomez and

Gomez 50/50 Dual Language Instruction model (Gomez, Freeman, & Freeman, 2005), where the students receive 50% of their instruction in English and 50% in Spanish. Initially, the program started as a Two-Way program, where a relatively even number of native English speakers and native speakers of another language are integrated for content and literacy instruction in both languages (Howard & Christian, 2002). The program was developed as a strand within the schools, starting with two cohorts at the Pre-kinder and kindergarten level, and moving up with the students all the way up to 5th grade. All information pertaining the school district's Dual Language Instruction Program implementation was obtained from the archives of the school district's Bilingual Education department.

The first DLI group of students started at the kindergarten level in 1995 with 184 participants, including: 94 male and 90 female students; 176 Hispanic and 8 White; 109 native Spanish speakers and 75 native English speakers. The second DLP group started that same year, but at the pre-kinder level, with 166 students including: 87 male and 79 female; 155 Hispanic and 11 White; 91 native Spanish speakers and 75 native English speakers. Table 11 shows the demographic data for the first two DLI groups.

Table 11: Demographic Characteristics of the First Two DLI Groups

Demographic Characteristics of the First Two DLP Groups							
	Participants	Gender		Ethnicity		Native Language	
		Male	Female	Hispanic	White	Spanish	English
First DLI Group Starting in Kinder	184	94	90	176	8	109	75
Second DLI Group Starting in Pre-K	166	87	79	155	11	91	75

The number of participating students in the first two DLP groups varied through the years. By 1998-1999, when the first DLP group reached second grade, it had 182 participants, two less than at the beginning; including 105 native Spanish speakers and 77 native English speakers. When the second DLP group reached first grade, it had 377 participants, 211 more students than at the beginning; including 219 native Spanish speakers and 158 native English speakers. These changes are shown in Table 12.

Table 12: Variation in the number of participating students through the years

Variation in the number of Participating Students through the years						
	1995-1996			1998-1999		
	Participants	Native Language		Participants	Native Language	
		English	Spanish		English	Spanish
First DLI Group	184	75	109	182	77	105
Second DLI Group	166	75	91	377	158	219

As the program grew, more native Spanish speakers were incorporated into the program. However, native English speakers were only allowed to enter the program at the early grades and not beyond second grade. This decision resulted in a radical change in the program, allowing for the simultaneous implementation of One-way and Two-way dual language instruction programs, depending on the language dominance of students in each campus and grade level. Regardless of the student composition, all schools implemented similar instructional characteristics. As previously mentioned, in a Two-Way model, there is a relative balance between native English speakers and native Spanish speakers, while in a One-Way model, the majority or even the total of the participants can be from one single language background (Thomas & Collier, 2004). In both models, instruction is delivered in two languages.

When the first DLP group reached 5th grade, the school district decided to expand the program into secondary school. Only one of the five middle schools in the district was selected to participate because the two elementary schools that had been participating in the program since the beginning, fed into this school. In 2002-03, the first DLP group reached the middle school with 60 students including: 22 males and 38 females; 58 Hispanics and 2 Whites; 35 native Spanish speakers and 25 native English speakers.

When the second cohort reached eighth grade, the program experienced a change in participation criteria. A group of recent-immigrant students with strong Spanish proficiency were placed in the program, so they could keep developing their home language proficiency and content knowledge while developing English proficiency in the ESL classrooms. This change generated a new sub-category of DLI participants; long-term DLI students who had been in the program since elementary, and short-term dual language students, who incorporated to the program at the secondary school level.

By 2005, the program reached the high school level. Forty six DLI students enrolled in two of the three district high schools. The district's plan was to continue offering strands in Spanish language arts and social studies in Spanish; similar to what was being done in middle school. However, due to the lack of Spanish-proficient teachers capable of delivering challenging social studies courses in academic Spanish at the high school level, each high school was granted the flexibility to decide which courses would be provided in Spanish, according to the teachers available. One campus was able to keep up with the Spanish language arts/social studies strand, but the other campus started a Spanish language arts/mathematics strand. Eventually, each high school campus offered a variety of content courses in Spanish including geometry, algebra, biology, world history, U. S. history and Spanish I to IV. All DLI students had to take at least 6 DLI courses during their four years of high school instruction.

In 2008-09, the first cohort of DLI students reached their commencement ceremony. 46 DLI students graduated from high school in May, and by August, all of them were enrolled in college. The following year, all the 45 DLI students of the second cohort graduated from high school, and all of them were enrolled in college by fall.

Participants

The Texas Education Agency (TEA) uses student cohorts and classes to calculate longitudinal rates and analyze student progress through high school. According to TEA, a cohort is a group of students tracked over a number of years, from the time they enter a specific grade level until the fall following their anticipated graduation date. A cohort is therefore identified by the starting grade and the anticipated year of graduation. The difference between a cohort and a class is that a class consists of students who graduate on a specific year, regardless of the cohort they originally belong to (TEA, 2010a).

For the present study, the researcher collected data of students enrolled in two high school cohorts within the selected school district. Student cohort 2005-2009 included all students enrolled in 9th grade in 2005, and expected to graduate from high school in 2009. Student cohort 2005-2009 also included students who registered for the first time in the district between 2005 and 2009 and were in the same grade level as the other participants in cohort 2005. The initial number of cohort 2005-2009 participants included 525 female and 535 male; 16 White (1.5%), 1 Asian (.09%), 5 African-American (.47%), and 1039 Hispanic (97.93%); 852 economically disadvantaged (ED) (80.68%), 93 special education (SE) (9.77%), 144 Gifted and Talented (G&T) (13.57%), 212 Limited English Proficient (LEP) (19.98%), 166 ESL (15.64%), and 657 At-risk students (61.92%). In Cohort 2005-2009, 219 participants (20.64%) were born outside the United States; 1 in Germany, 1 in Honduras, 1 in Saudi Arabia, and 216 in Mexico. In total, Cohort 2005 included 1061 initial members.

Student cohort 2006-2010 included all students enrolled in 9th grade in any of the school district high schools in 2006, and expected to graduate from high school in 2010.

Cohort 2006-2010 also included students who registered for the first time in the district between 2006 and 2010 who were in the same grade level. Cohort 2006-2010 enrolled 1045 initial participants, including 511 female (48.90%) and 534 male (51.10%); 26 White (2.49%), two Asian-American (0.19%), six African-American (0.57%), and 1011 Hispanic (96.75%); 881 economically disadvantaged (84.31%), 83 Special Education (7.94%); 139 Gifted and Talented (13.30%), 187 Limited English Proficient (17.89%), 131 ESL (12.54%), and 611 At-risk students (58.47%). In Cohort 2006-2010, 182 participants (20.64%) were foreign born; one in Brazil, one in Cuba, one in Colombia, one in Germany, one in the Republic of Georgia, one in the Philippines, and 176 in Mexico. The cohorts' data is illustrated in table 13.

Table 13: Demographic Characteristics of students enrolled in 9th grade

Demographic Characteristics of students enrolled in 9th grade															
	Students	Gender		Ethnicity				Sub-groups						Nationality	
		Female	Male	White	Asian	Afro	Hisp.	Ec-Dis	Sp-Ed	G&T	LEP	ESL	At-R	US-Born	Foreign Born
2005	1061	525	535	16	1	5	1039	852	93	144	212	166	657	842	219
2006	1045	511	534	26	2	6	1011	881	83	139	187	131	611	863	182

To meet the goals of the study, some student records were not included. (1) The data of students identified as Special Education was discarded due to a wide disparity of SE participants. (2) Because the goal of the study was to identify the long-term effects of implementing a K-12 program, only students who had been in the U.S. schooling system for 12 years were included. (3) All student who were not identified as Hispanic were also discarded because, as recommended by Thomas and Collier, the goal of this study was to identify which program was more effective in assisting Hispanics and Hispanic ELLs to reach "full educational parity with native English speakers (NES) in all school content subjects (not just in English proficiency) (1997).

The ultimate goal of the study was to identify the long-term academic effects of implementing a K-12 DLI program by comparing the academic achievement of DLI students against the academic achievement of students enrolled in other instructional programs available in the selected school district. Therefore, once the discarded records were removed, the cohorts were divided into two groups: DLI and non-DLI students. The non-DLI group included students enrolled in the mainstream, TBE and ESL programs. Even though the groups had significantly different number of participants, the participants in both groups shared similar conditions.

As exhibited in figure 26, cohort 2005-2009 had 684 participants including 39 DLI and 645 non-DLI students. The gender distribution within the cohort was balanced with 49.9% (341) female and 50.1% (343) male students. However, this gender distribution was slightly uneven between groups. The DLI group had 61.5% (24) females and 38.5% (15) males. The non-DLI group had 49.1% (317) females and 50.9% (328) males. Cohort 2006-2010 had 667 participants including 37 DLI and 630 non-DLI students. The gender distribution among the cohort was relatively balanced with 54.1% (361) female and 45.9% (306) male students. Once again, the gender balance was not maintained by the groups. The DLI group had 62.2% (23) females and 37.8% (14) males. The non-DLI group had 53.7% (338) females and 46.3% (292) males.

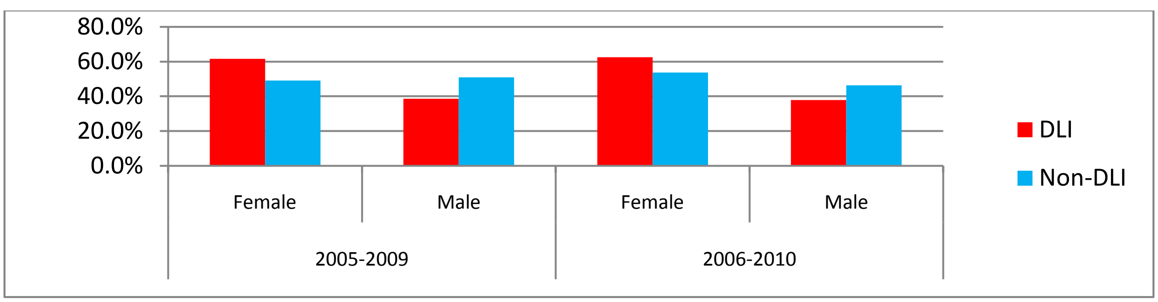

Figure 26: Gender distribution across cohorts

The students' socioeconomic condition is an important predictor of educational success. The socioeconomic distribution across the cohorts exhibited an extremely high level of poverty among the students. In cohort 2005-2009, 84.5% (578) of the participants were labeled as economically disadvantaged. The DLI group showed a marginal advantage in socioeconomic status in comparison with the non-dual group. As illustrated in figure 27, 82.1% (32) of the DLI students were labeled as economically disadvantaged; 2.6 points lower than the non-DLI group where 84.7% (546) were identified as economically disadvantaged. In cohort 2006-2010, 87.7% (585) of the participants were labeled as economically disadvantaged; including 86.5% (32) of the DLI students and 87.8% (553) of the non-DLI students.

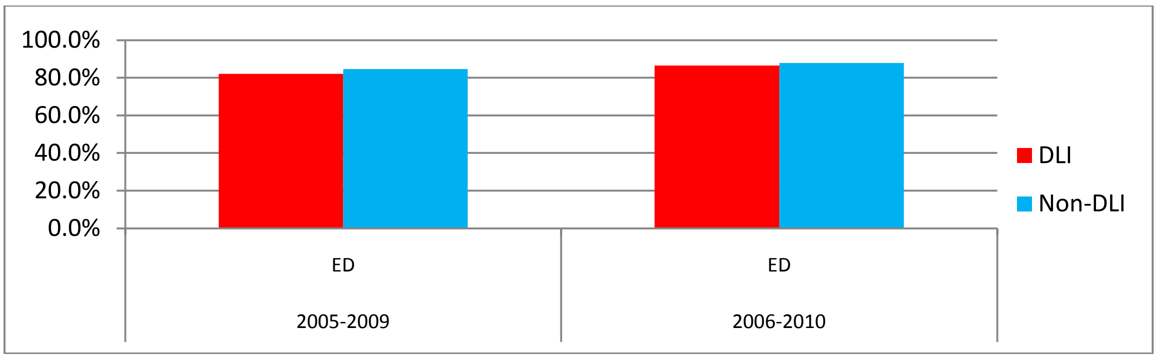

Figure 27: Percentage of students by cohort labeled as economically disadvantaged

The language background of the students is also a very important predictor of educational success. The linguistic background across the cohorts exhibited a high percentage of students with a language background other than English. In cohort 2005-2009, 55.3% (378) of the participants were identified as speaking a language other than English (LOTE) at home. This language background distribution was relatively similar between groups. As illustrated in figure 28, 61.5% (24) of the DLI students were labeled as native Spanish speakers (NSS); while 54.9% (354) of the non-DLI students spoke Spanish at home. In cohort 2006-2010, 51.7% (345) of the students were labeled as LOTE. However, the second cohort exhibited a wider difference of linguistic background between groups. Almost 65% (24) of the DLI students were labeled as NSS, while only 51.0% (321) of the non-DLI students spoke Spanish at home.

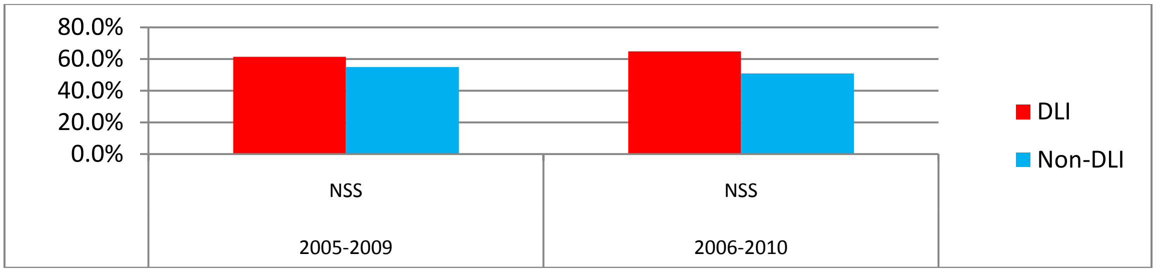

Figure 28: Percentage of students speaking a language other than English at home

The place of birth of the learner has been traditionally considered an important predictor of educational success; specifically if the place of birth is outside the United States. Both cohorts exhibit high percentages of students born outside the U.S. In cohort 2005-2009, 6.6% (45) of the participants were foreign-born. This birthplace distribution was significantly different between groups. As illustrated in figure 6, 23.1% (9) of the DLI students were born outside the U.S. while only 5.6% (36) of the non-DLI students were foreign-born. In cohort 2006-2010, 7.2% (48) of the students were not born in the U.S. Once again, there is a significant difference between groups. As illustrated in figure 29, 18.9% (7) of the DLI students were foreign-born, while only 6.5% (41) of the non-DLI students were not born in the U.S.

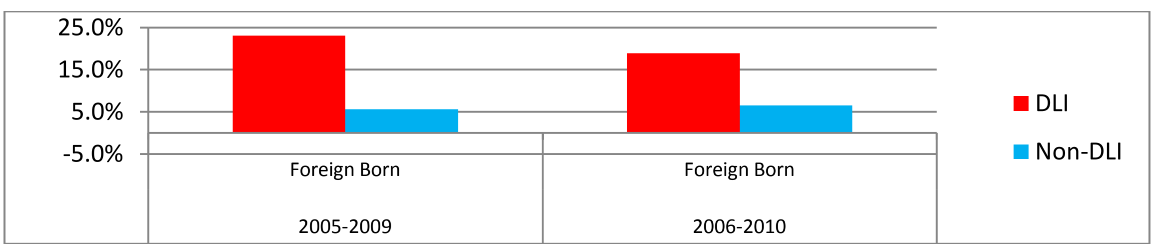

Figure 29: Percentage of cohort students born outside the U.S.

Because home language has been closely linked to academic success (Bailey & Butler, 2003; Cazden, 2001; Cummins, 1991, 2000b), each group was subdivided according to their home language (native English speaker or native Spanish speaker). The home language subdivision in the non-DLI group was aligned to their program of instruction. Due to the intrinsic design of the programs, the students' home language matched their program of instruction. All NES students were enrolled in Mainstream, while all the NSS were enrolled in TBE and ESL programs. Figure 30 illustrates how the program was subdivided:

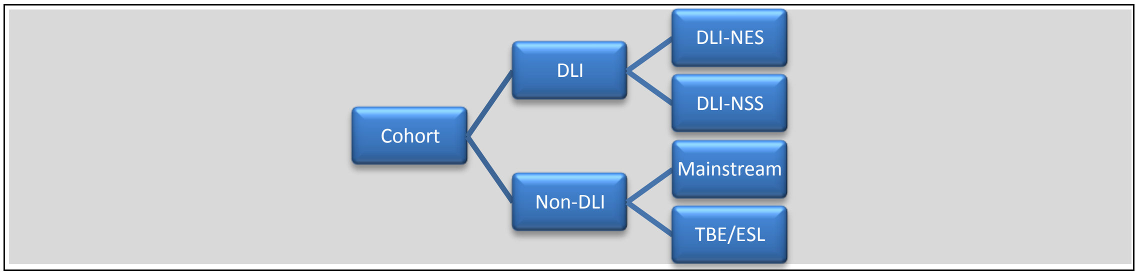

Figure 30: Grouping and Sub-grouping Pattern

The 2005-2009 cohort groups.

The 2005-2009 cohort was divided in two groups: DLI and non-DLI. However, to compare students with similar socioeconomic and linguistic backgrounds, each group was divided into two sub groups based upon the home language of the participants. Two groups only included Native English speakers (NES): DLI-NES and Mainstream. Two groups only included Native Spanish Speakers (NSS): DLI-NSS and TBE/ESL. This data is exhibited in table 14.

Table 14: Cohort subgroups by language background

2005-2009 Cohort Subgroups by language Background				
Language Backgrounds	NES		NSS	
Sub-groups	DLI-NES	Mainstream (NES)	DLI-NSS	TBE/ESL (NSS)
Total participants	16	291	27	354
Females	62.5% (10)	48.8% (142)	59.3% (16)	49.4% (175)
Males	37.5% (6)	51.2% (147)	40.7% (11)	50.6% (179)
Hispanic	100% (16)	100% (291)	100% (27)	100% (354)
Economically Disadvantaged	75.0% (12)	75.3% (219)	88.9% (24)	92.4% (327)
Foreign Born	0% (0)	1.7% (5)	33.3% (9)	8.8% (31)

Native English Speakers (NES).

The 2005-2009 DLI-NES subgroup included 16 native English speaking (NES) students; 62.5% (10) female and 37.5% (6) male. All 16 participants (100%) were

Hispanic, and 75.0% (12) were economically disadvantaged. From the 16 participants, 100% (16) had been in the DLI program for 12 years or more, and none of the participants (0%) were foreign born.

The 2005-2009 mainstream sub-group included 291 NES participants; 48.8% (142) female and 51.2% (147) male. All 291 participants (100%) were Hispanic; all (100%) had been in the mainstream program for 12 years or more, 75.3% (219) were economically disadvantaged and 1.7% (5) was foreign born. As illustrated in figure 30, the DLI-NES subgroup had a higher percentage of females, a lesser percentage of economically disadvantaged and a higher percentage of foreign born students, in comparison with mainstream.

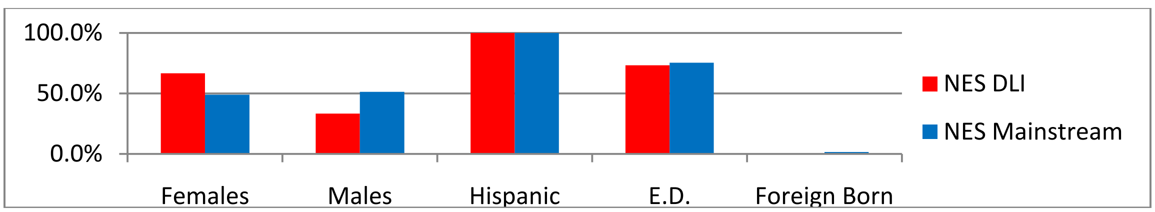

Figure 31: Background Characteristics of Native English Speakers in DLI and Mainstream subgroups for 2005-2009

Native Spanish Speakers (NSS).

The 2005-2009 DLI-NSS group included 27 native Spanish speaking (NSS) students; 59.3% (16) female and 40.7% (11) male. All 27 participants (100%) were Hispanic, and 89.3% (25) were economically disadvantaged. From the 27 participants, 100% (27) had been in the DLI program for 12 years and 33.3% (9) were foreign born.

The 2005-2009 TBE/ESL subgroup included 354 NSS participants; 49.4% (175) female and 50.6% (179) male. All 354 participants (100%) were Hispanic and 92.4% (327 were economically disadvantaged. From the 354 participants, 100% (354) were in the TBE/ESL program for several years and later transitioned into the mainstream program. All the TBE/ESL participants have been in U.S. school for 12 years or more.

From the 354 TBE/ESL participants, 8.8% (31) were foreign born. As illustrated by figure 32, the NSS subgroup had a higher percentage of females, a lesser percentage of economically disadvantaged, and a higher percentage of foreign born students; in comparison with TBE/ESL.

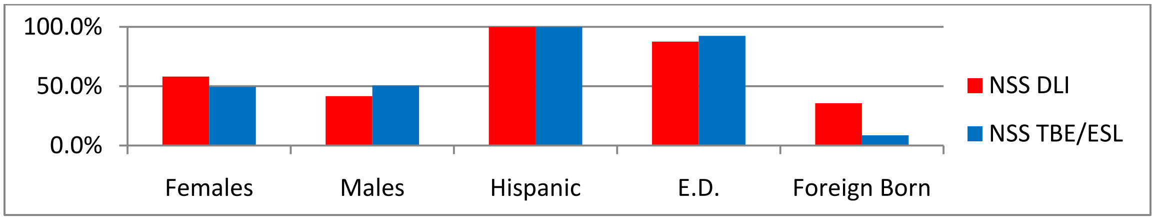

Figure 32: Background Characteristics of Native Spanish Speakers in DLI and TBE/ESL groups for 2005-2009

The 2006-2010 cohort groups.

As displayed in table 15, the 2006-2010 cohort, was divided in two groups: DLI and non-DLI. However, to compare students with similar socioeconomic and linguistic backgrounds, each group was divided into two sub groups based upon the home language of the participants.

Table 12: Cohort Subgroups by Language Background

2006-2010 Cohort Subgroups by Language Background				
Language Backgrounds	NES		NSS	
Sub-groups	DLI-NES	Mainstream (NES)	DLI-NSS	TBE/ESL (NSS)
Total participants	13	309	26	321
Females	61.5% (8)	53.4% (165)	65.4% (17)	53.9% (173)
Males	38.5% (5)	46.6% (144)	37.6% (9)	46.1% (148)
Hispanic	100% (13)	100% (309)	100% (24)	100% (321)
Economically Disadvantaged	76.9% (10)	78.6% (243)	92.3% (24)	96.6% (310)
Foreign Born	0% (0)	0% (0)	30.8% (8)	12.8% (41)

Native English Speakers (NES).

The 2006-2010 DLI-NES group included 13 native English speaking (NES) students 61.5% (8) female and 38.5% (5) male. All 13 participants (100%) were Hispanic and 76.9% (10) were economically disadvantaged. All 13 participants, (100%) had been in the program for 12 years or more, and none of the participants were foreign born.

The 2006-2010 mainstream subgroup included 309 NES students; 53.4% (165) female and 46.6% (144) male. All 309 participants (100%) were Hispanic; all (100%) had been in the mainstream program for 12 years or more, 78.6% (243) were economically disadvantaged and none was foreign born. As illustrated in figure 33, the DLI-NES subgroup had a higher percentage of females, a lesser percentage of economically disadvantaged students, and a higher percentage of foreign born students, in comparison with mainstream.

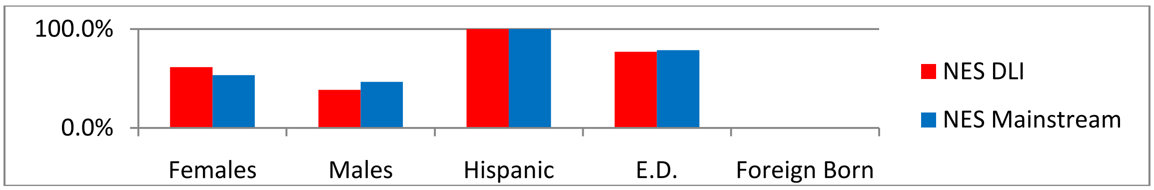

Figure 33: Background Characteristics of NES in DLI and Mainstream groups for 2006-2010

Native Spanish Speakers (NSS).

The 2006-2010 DLI-NSS sub-group included 26 native Spanish speaking (NSS) students; 65.4% (17) female and 37.6% (9) male. All 26 participants (100%) were Hispanic, 92.3% (24) were economically disadvantaged, and 30.8% (7) were foreign born. The 2006-2010 TBE/ESL subgroup included 321 NSS participants; 53.9% (173) female and 46.1% (148) male. All 321 participants (100%) were Hispanic, 93.1% (391) were economically disadvantaged and 12.8% (41) were foreign born. As illustrated in figure 34, the DLI-NSS subgroup had a higher percentage of females, a lesser percentage of economically disadvantaged students, and a higher percentage of foreign born students, in comparison with TBE/ESL.

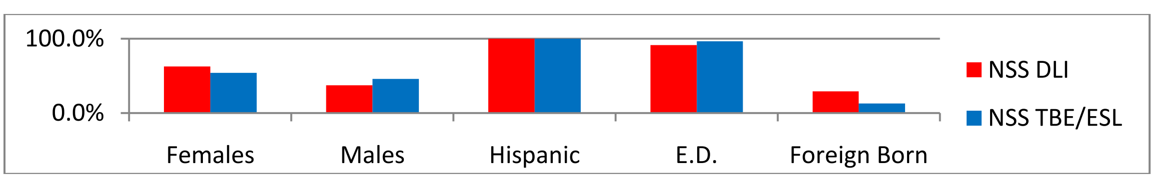

Figure 34: Background Characteristics of NSS in DLI and TBE/ESL groups for 2006-2010

Data Collection

Once the school district provided written authorization for the study and granted access to the student cumulative folders and electronic archives, the researcher systematically reviewed the archives. Each individual form had a pre-assigned identification number with no correlation with the student's school identification number. Each student's data was recorded in a de-identified matrix of variables using windows Excel. Once the folder was thoroughly reviewed, it was marked as reviewed to avoid repetition. Once the folder was returned to its file, there was no way to relate it to the data collection form. The school district administration also supported the data collection process by providing de-identified batches of specific information about the specific cohorts. The information was provided in electronic format compatible with the de-identified matrix of variables being used.

Confidentiality risks were addressed to ensure that confidentiality was not breached. Individual identifiers were removed, and individual data was recorded under identification numbers generated by the researcher for the purposes of this study. The study never revealed the school district's identity at any time. Data was recorded in the form of unidentified individual hard-copy records and encrypted computer files. All hard-copy data collected was stored in a locked file in the researcher's office. All encrypted files were collected on a hard-drive disk on a computer with no access to the Internet. In addition, the computer was kept in a secure locked room. Data analysis and presentations of the data never revealed the identity of the participants or the school district. Study records will be retained for three years for further analysis and afterwards will be properly destroyed. Hard copy documents will be shredded, and the hard disk drive will be erased and re-formatted to avoid any possible misuse of data.

The researcher reviewed the cumulative folders and electronic data of the 2,106 students in both cohorts, looking for three specific sets of variables. The first set of variables constitutes the independent variables of the study and includes data related to program participation such as: program of instruction (mainstream, Transitional Bilingual Education (TBE), English as a Second Language (ESL), and Dual Language Instruction (DLI)), initial language status (Limited English Proficient LEP, non-LEP) and date of entry into the U.S. schooling system. These variables provide the framework to establish the comparison groups and subgroups.

The second set of variables includes individual demographic information including: home language (English/Spanish/both/other), ethnicity (White/Asian/Hispanic/African-American), gender, economic disadvantage, birth year, and birthplace (USA/Mexico/other). These variables were used by the researcher to establish the demographic similarity between groups.

The third set of variables represents the dependent variables of the study and includes measurable academic outcomes of program participation such as: overall TAKS scores across content areas; English language proficiency status, grade retention; high school GPA; high school ranking; College-level courses participation; College-level credits obtained in advance; graduation and dropout rates, and the Immediate College Enrollment Rate (ICER) per subgroup. Through an analysis of variables the researcher could identify the program of instruction that was most helpful in promoting academic achievement for each specific subgroup for each specific outcome variable.

Data Analysis

Descriptive statistics were calculated for each one of the variables, for each one of the subgroups. Location or central tendency was calculated to represent the data, including mode, median and mean. Central tendency is helpful to identify outlying scores that can significantly distort the characterization of data (Thompson, 2008). Dispersion was calculated to identify similarity between scores. According to Thompson (2008), researchers should never report central tendency without reporting dispersion. Dispersion descriptors included sum of squares (SOS), to identify score variance from the mean within a group. To compare score variance between groups, variance was calculating dividing the SOS by the number of participants. Calculating the square root of the variance, we obtain the standard deviation.

The next step included calculating the statistical significance of the data. The *p* value represents the likelihood that a particular outcome occurs by chance. Therefore, the smaller the p value, the greater the possibility of a causal relationship between variables. A *p* value of less than 0.05 is considered statistically significant because it implies that there is less than a 5% probability that the relationship occurred by chance; a value between 0.05 and 0.10 is considered as marginally significant (George & Mallery, 2009). By calculating the standard deviation of the sampling distribution the standard error (SE) can be identified to quantify the precision of the statistic. To obtain more precise estimates and smaller standard errors, it is recommended to increase the sample size (Thompson, 2008). This is why the study included the records of all the students in the cohort who shared similar background conditions.

Through the use of *p* value and r^2, effect size was identified to statistically quantify the extent to which statistics differ from the null hypothesis. Effect sizes can be computed as an analogy of r^2. Through the use of effect sizes a researcher can identify "the strength of the conclusions about group differences or the relationships among variables in quantitative studies" (Creswell, 2009, p. 167). Through effect sizes, results can be more accurately compared across studies (Thompson, 2008). However, effect sizes must be interpreted in the context of the study. Through the use of SPSS statistical software, version 19, effect sizes were computed to identify a variance in academic impact. Through the analysis of different variables, the academic outcomes of the different subgroups were examined. Different statistical processes were utilized according to the specific needs.

Analysis of variance (ANOVA) was conducted to identify differences on a single variable across groups. Each one of the independent variables was analyzed through ANOVA. Through the use of ANOVA we could estimate the effect sizes associated with subgroup differences in score means. Also, the use of ANOVA avoided the performance of several t tests to compare the different groups independently. This was useful because the use of several t tests in the same analysis increases the experimental-wise error (Creswell, 2009; Thompson, 2008). ANOVA assumes that there is no significant variance in distribution among groups. Such assumption can be tested through a Levene's Test of Homogeneity of Variance and if significant variance is found, an alternative procedure can be used (George & Mallery, 2009). Contrast tests also quantify the significance of the difference between groups. However, the test provides two different outputs depending in the homogeneity of variances. When the Levene's test identifies a statistically significant variance between groups ($p \leq .050$) the *–does not assume equal variances-* outcome is considered as valid (George & Mallery, 2009).

Summary of Chapter 3

The objective of the study was to measure and compare the effectiveness of different instructional programs -Dual Language Instruction (DLI), Transitional Bilingual Education (TBE), and English as a Second Language (ESL) - in promoting the academic achievement of Hispanic and Hispanic ELLs with similar demographic characteristics. To achieve the goal, a retrospective research study was conducted, in which educational achievement was measured based upon results in state-developed standardized assessments, College-level courses, college-admission tests, AP scores; percentage of cohort students graduating, and percentage of cohort graduates enrolled in college the fall after graduation. The only differential variables between groups were the program and language of instruction. A review of the literature made evident the need for a quantitative analysis that can provide measurable data of the long-term academic outcomes generated by the different instructional programs. The school district was selected due to its extensive Hispanic population and its implementation of a DLI program from K to 12th. The study collected and analyzed data on the academic performance of students enrolled in two high school cohorts within the district, including 1351 participants. Three specific sets of variables were collected, including individual demographic information, program participation and measurable outcomes of program participation. Significant variances in their specific outcomes were identified through the use of Analysis of variance (ANOVA).

Chapter 4

ANALYSIS OF DATA FOR THE 2005-2009 COHORT

Introduction

The goal of this study was to identify how the long-term academic achievement of Hispanic students schooled in the Dual Language Instruction (DLI) program of a selected school district compares with the academic achievement of Hispanic students schooled in the Transitional Bilingual Education program and students schooled in the mainstream program within the same district. As recommended by Thomas and Collier (1997), the goal of any research study comparing programs for English learners is to identify which program is most effective in assisting students to reach "full educational parity with native English speakers (NES) in all school content subjects" (p. **7**).

As mentioned in the previous chapter, there were three sets of variables. The first set constituted the independent variables of the study and included data related to program participation such as: program of instruction, initial language status, and date of entry into the U.S. schooling system. These variables provided the framework to establish the comparison groups and subgroups.

The second set of variables included individual student's demographic information such as home language, ethnicity, gender, socio-economic status, birth year, and birthplace. These variables were used to establish the demographic similarity between groups.

The third set of variables represented the dependent variables of the study and included measurable academic outcomes of program participation. Educational achievement was measured based upon average scores in state-developed standardized assessments (TAKS), English language proficiency status, high school GPA, high school ranking, College-level courses participation, graduation rates, and Immediate College Enrollment Rates (ICER).

Through contrast analysis, the dependent variables were analyzed to identify the program of instruction that was most likely to result in higher academic achievement. First, the data of each cohort was analyzed separately and second, the outcome data of both cohorts was analyzed to identify similarities and differences between cohort outcomes.

Explanation of procedures used.

All variables were analyzed following the same process. The first step was to make the differences between groups visible by using Microsoft EXCEL. Means were calculated for each group and the groups were contrasted by expressing the differences in percentage points (Δ = mean of group A – mean of group B) and as a proportion of the lesser mean (proportional Δ = Δ/mean of lesser group). A difference expressed in percentage points can be meaningless; however, by expressing the difference as a proportion of the mean, it becomes meaningful.

For example, on page 178, the differences between groups in science TAKS average scores were analyzed. DLI-NES had an average score of 2242, while Mainstream had an average score of 2142. There is a difference of 100 TAKS percentage points between DLI-NES and Mainstream. Expressing the difference exclusively in percentage points is meaningless. However, by expressing the difference as a proportion of the mean, the difference becomes meaningful. In this case, by dividing the difference (100) by the lesser number (2142) we express the difference as a proportion of the lesser number (4.7%). DLI-NES had an average score that is 4.7% higher than the average score of Mainstream. Once the group means were calculated and differences were made visible, these differences were statistically analyzed to determine if such differences were statistically significant.

Through statistical inference, conclusions can be drawn about the difference between populations, with regard to a specific variable. Through hypothesis testing, research questions are translated into hypotheses that can be tested. According to Occam's razor, if there are two or more possible explanations, the simplest explanation should be always accepted. In a comparison test, the simpler explanation is that there is no difference between sets. Therefore, the tested hypothesis should be the null hypothesis (H_0) that claims that there is no significant difference between groups.

To test the null hypothesis, a critical level of significance (*p)* is established to identify whether or not there is a statistically significant difference between groups. The symbol *p* represents the probability that the difference between means occurred by chance; the lesser the *p* value, the lesser the probability of committing a type I error - falsely rejecting a true H_0-. By establishing a stringent level of significance ($p \leq .050$) the possibility of committing a type I error is reduced. However, the possibility of committing a type II error –failing to reject a false H_0- is increased. The power of a statistical test depends upon the probability of claiming a statistically significant difference when this difference does exist. The outcome of a hypothesis test is always divalent: either reject the H_0 or do not reject H_0. However, the –do not reject H_0- outcome does not prove that the null hypothesis is true; it only proves that there is insufficient evidence against it.

The most common parametric test to compare two groups is the t-test, where the means of two groups are contrasted. However, because the objective of this study is to compare four different groups of students (DLI-NES, Mainstream, DLI-NSS and TBE), a sequence of t-tests is not recommended because it increases the possibility of committing a type I error. In this case, a recommended procedure is analysis of variance (ANOVA), because it allows for the simultaneous comparison of three or more groups. An unpaired test such as ANOVA does not require groups to be paired in any way or to be of equal sizes. This is crucial for this study because the four groups analyzed differ significantly in size.

One assumption in statistical tests such as ANOVA is that there is no significant variance in normal distribution between groups. ANOVA assumes that both groups have a normal distribution. Through a Levene's test, the homogeneity of variance between groups can be established. Therefore, a Levene's test is recommended before any comparison of means. An advantage of the Levene's statistic is that it does not require a normality of data, and if the variance is significant, alternative procedures can be used that do not assume an equality of variance (George & Mallery, 2009).

If the ANOVA test identifies the difference as significant ($p \leq .050$), additional analysis is required to identify between which groups such differences are taking place. The additional analysis required depends upon the results of the Levene's test. For example, to identify and quantify the statistical significance of the difference between each possible pair of groups a post-hoc analysis such as Least Significant Difference (LSD) can be used. However, if the Levene's test finds a statistically significant variance between groups ($p \leq .050$) the LSD results would be wrong. In such case, a Contrast-

Tests analysis seems more adequate. The Contrast tests output also quantifies the significance of the difference between groups. However, it provides two different outputs depending in the equality of variances identified by the Levene's test. The Contrast Tests' -*assume equal variances*- output follows the same procedure as an LSD test and its output mirrors LSD. The Contrast Tests' –*does not assume equal variances*- outcome takes into consideration the variance and provides an adjusted outcome. When the Levene's statistic identifies a statistically significant variance between groups ($p \leq .050$), the –*does not assume equal variances*- outcome should be considered as valid (George & Mallery, 2009).

Using SPSS 19 software, each dependent variable was analyzed through one-way ANOVA, using ***student groups*** as a factor, to identify the statistical significance of differences between groups. The one-way ANOVA command in SPSS-19 allows for additional procedures to be executed simultaneously. In the one-way ANOVA command, optional statistics were requested including descriptive statistics, Levene's Homogeneity of Variance test, and Contrast tests between groups. These one-way ANOVA settings were used for all the data analyses of the study. To exemplify the outcomes of the ANOVA test, all tables provided by the ANOVA procedure were included in the demographic analysis of Cohort 2005-2009. However, due to space limitations only the most significant tables were included in the additional analyses.

The 2005-2009 cohort

This cohort included 688 participants distributed in 4 groups. The DLI-NES group had 16 native English speaking (NES) students enrolled in the Dual language instruction (DLI) program. The Mainstream group had 291 NES students enrolled in mainstream, English-only instruction. The DLI-NSS group had 27 native Spanish speaking (NSS) students enrolled in DLI. The TBE/Mainstream group had 354 NSS students who were initially enrolled in a transitional bilingual education program for the first years of elementary instruction and who were later transitioned into the mainstream English-only instruction program.

Demographics.

The demographic data of the 4 groups was compared to establish a similarity between groups or to identify significant differences between groups that could influence the study outcomes. The demographic data initially recollected included: ethnicity, home language, birthplace, birth date, gender, and economic disadvantage. However, due to program design, not all the demographic variables required to be independently analyzed.

First, the study included only Hispanic students; therefore, ethnicity was excluded from the contrast analysis because there would be no difference between groups (all p = 1.000). Second, as previously stated, the study groups were categorized not only by program of instruction but also by home language. Each group had exclusively members from one specific language group. Two groups (DLI-NES and Mainstream) had only native English speakers (NES), while the other two groups (DLI-NSS and TBE) had only native Spanish speakers (NSS). Therefore, a contrast analysis between groups would always find either no difference between groups (p = 1.000) or a highly significant difference between groups (p =.000). Home language was not analyzed independently as a variable, but implicitly analyzed in the groups' analyses. Third, the study focused exclusively on students who were enrolled in U.S. schools for 12 years or more. The students' place of birth was not considered as influential to the study and therefore was not analyzed. At the end, only three demographic variables were analyzed to establish a similarity between groups or to identify significant differences between groups that could influence study outcomes. These variables were age, gender, and economic disadvantage.

Age.

Through Microsoft Excel, the groups' average age was calculated to look for differences between groups. Table 16 and Figure 35 exhibit the initial data, which shows that the four groups exhibited differences in students' average age.

Table 16: Students' average age per group

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Student's average age per group	17.88	17.81	17.96	17.86

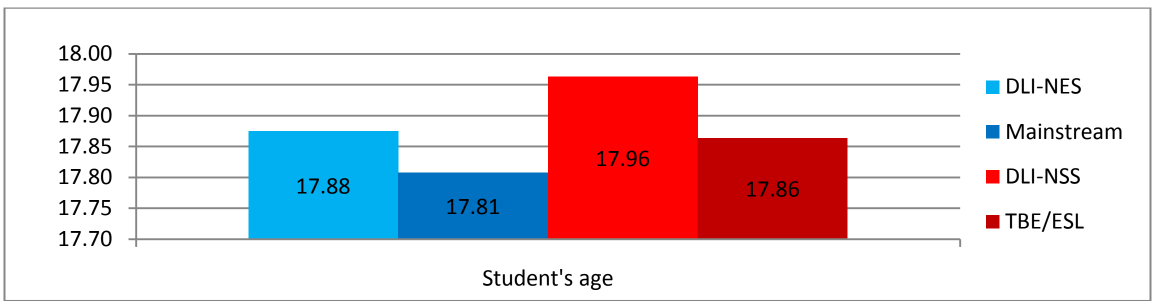

Figure 35: Students' average age per group

DLI-NSS had the highest age average, surpassing DLI-NES by 0.08 percentage points (0. 4%), TBE/ESL by 0.10 percentage points (0. 6%) and Mainstream by 0.15 percentage points (0.8%). DLI-NES placed second, surpassing TBE/ESL by 0.02 percentage points (0.1%) and Mainstream by 0.07 percentage points (0.4%). TBE/ESL placed third, surpassing Mainstream by 0.05 percentage points (0.3%).

Through SPSS 19, a one-way ANOVA test was executed, and additional procedures were requested including descriptive statistics, Levene's homogeneity of variance test, and Contrast tests between groups. Tables 17 to 21 exhibit the outputs provided by the one-way ANOVA.

Table 17: Descriptive Statistics for Students' average age per group

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
DLI NES	16	17.875	.3416	.0854	17.693	18.057	17.0	18.0
Mainstream	291	17.808	.5093	.0299	17.749	17.866	17.0	19.0
DLI NSS	27	17.963	.4369	.0841	17.790	18.136	17.0	19.0
TBE ESL	354	17.864	.5255	.0279	17.809	17.919	17.0	20.0
Total	688	17.844	.5124	.0195	17.806	17.883	17.0	20.0

Beyond identifying the groups analyzed, the number of participants, and the mean of each group, the descriptive statistics describes the value distribution of each group by providing the standard deviation and the standard error for each group. The standard deviation measures the variability around the mean, while the standard error establishes a relationship between the standard deviation and the number of participants by dividing the standard deviation by the square root of N. The 95% confidence interval identifies the upper and lower values of the range where 95% of the means of the samples will fall, while minimum and maximum describe the extreme values observed for each group. Values located outside of the 95% confidence interval could be analyzed for outliers.

Table 18: Levene's Test of Homogeneity of Variances for Students' average age per group

Levene Statistic	df1	df2	Sig.
3.216	3	684	.022

The Levene's test for homogeneity of variance examines if the variance is the same for all the dependent variables, providing information about the suitability of the variables for analysis. The significance value signals the existence or not of a statistically significant variance in distribution. If the Levene's test finds significant variance, ANOVA results can be questioned, and further analysis is required, including checking the symmetry (skewness) and peakedness (kurtosis) deviation from normality. Another option is by executing additional processes such as Contrast tests, which analyze data without assuming an equal variance. In this study, additional Contrast tests were required in case of evidence of statistically significant variance in distribution. In the case of average age, for example, the Levene's test found statistically significant variance between groups (p = .022).

Table 19: ANOVA table for students' average age per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.931	3	.310	1.183	.315
Within Groups	179.428	684	.262		
Total	180.359	687			

The ANOVA table provides the sum of squared deviations; both, between the mean for each group, and within each group, by multiplying the sum of squared deviations by the number of subjects. The ANOVA table also provides the degrees of freedom (df), both, between groups, calculating the number of groups minus one; and within groups, calculating the number of subjects, minus the number of groups minus one. A mean square value is established by dividing the sum of squares by the degrees of freedom, and an F-ratio is established by dividing the mean square between groups by the mean square within groups. The F-ratio compares the variations between and within groups to look for significant differences between groups. The significance value indicates the probability that the observed value occurred by chance. In this case, the ANOVA found no significant difference between groups in student's age (p = .315).

Table 20: Contrast Coefficients

	Groups of students			
Contrast	**DLI NES**	**Mainstream**	**DLI NSS**	**TBE ESL**
1	1	-1	0	0
2	1	0	-1	0
3	1	0	0	-1
4	0	1	-1	0
5	0	1	0	-1
6	0	0	1	-1

The contrast coefficients' table indicates that six individual contrasts between groups took place: In Contrast 1, DLI-NES and Mainstream are contrasted to identify statistically significant differences. In Contrast 2, DLI-NES and DLI-NSS are contrasted. Contrast 3 takes place between DLI-NES and TBE/ESL, Contrast 4 between Mainstream and DLI-NSS, Contrast 5 between Mainstream and TBE/ESL, and Contrast 6 between DLI-NSS and TBE/ESL.

Table 21: Contrast tests for Students' average age per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Student's age	Assume equal variances	1	.067	.1315	.513	684	.608
		2	-.088	.1616	-.544	684	.586
		3	.011	.1309	.081	684	.936
		4	-.155	.1030	-1.508	684	.132
		5	-.057	.0405	-1.403	684	.161
		6	.099	.1023	.964	684	.335
	Does not assume equal variances	1	.067	.0905	.746	18.877	.465
		2	-.088	.1198	-.734	37.727	.467
		3	.011	.0898	.118	18.373	.907
		4	-.155	.0892	-1.742	32.923	.091
		5	-.057	.0409	-1.390	625.897	.165
		6	.099	.0886	1.112	32.026	.274

The Contrast Tests' table identifies each contrast being considered; the value of contrast or weighted value used for each computation; the standard error; the t-value obtained by dividing the value of contrast by the standard error; the degrees of freedom (df) obtained by subtracting the number of groups from the number of subjects; and the 2-tailed significance or likelihood that the values would happen by chance. As previously mentioned, the Contrast tests provide two different outputs, depending in the equality of variances. As evident in the table, the two outputs contrast the same groups and use the same values of contrast; however, they compute different standard errors, different t-values, and different degrees of freedom. The difference occurs because, assuming a statistically significant variance between groups, each calculation is done using the number of participants of the groups contrasted, instead of the number of participants in the whole test. This allows contrasting groups with a significant variance in distribution, but also allows for contrasting groups that have significantly different number of participants. This last issue is key for this study, where the groups analyzed have a significant difference in the number of participants per group.

Due to these differences in the procedure, the two outcomes provide different values of significance. When the Levene's statistic identifies a statistically significant variance between groups ($p \leq .050$), the –*does not assume equal variances*- outcome should be considered as valid. In the case of student's age, the Levene's statistic found significant variance between groups ($p = .022$). Therefore, the –*does not assume equal variances*- outcome was validated. Table 6 shows the results for both cases – *assumes equal variance* and *does not assume equal variance*- for illustrative purposes. From this point on, only the validated outcome is provided.

The Contrast tests found a marginally significant difference in Contrast 4 between Mainstream and DLI-NSS ($p = .091$) and found no significant differences in Contrast 1 between DLI-NES and Mainstream ($p = .465$), in Contrast 2 between DLI-NES and DLI-NSS ($p = .467$), in Contrast 3 between DLI-NES and TBE/ESL ($p = .907$), in Contrast 5 between Mainstream and TBE/ESL ($p = .165$), and in Contrast 6 between DLI-NSS and TBE/ESL ($p = .274$).

Analysis discussion

The ANOVA table and the Contrast tests found no statistically significant differences between groups. Because the Levene's statistic did identify significant variances between groups, the –*does not assume equal variances*- output was accepted as valid.

The groups exhibited differences in average age. DLI-NSS had the highest average age, surpassing DLI-NES by 0. 4% (*p* =. 467), TBE/ESL by 0. 6% (*p* =. 274) and Mainstream by 0. 8% (*p* =. 091). DLI-NES placed second, surpassing TBE/ESL by 0. 1% (*p* =. 907) and Mainstream by 0. 4% (*p* =. 465). TBE/ESL placed third, surpassing Mainstream by 0. 3% (*p* =. 165). In all cases the differences were not statistically significant, supporting the claim that the differences between groups would not impact the study outcomes in a significant way.

Gender.

The percentage of males included in each group was analyzed to look for significant differences between groups. Table 22 and Figure 36 exhibit the initial data, which shows that the four groups exhibited differences in gender.

Table 22: Percentage of male students per group

Cohort 2005-2009	**DLI-NES**	**Mainstream**	**DLI-NSS**	**TBE/ESL**
Percentage of male students per group	37.5%	51.2%	40.7%	50.6%

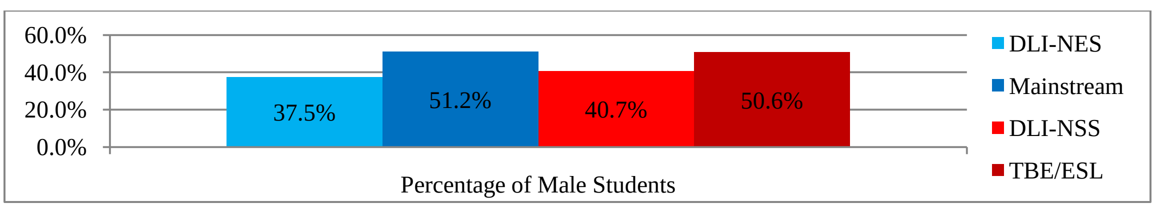

Figure 36: Percentage of male students per group

Mainstream had the highest percentage of male students, surpassing TBE/ESL by 0.6 percentage points (1.2%), surpassing DLI-NSS by 10.5 percentage points (25.8%) and surpassing DLI-NES by 13.7 percentage points (36.5%). TBE/ESL placed second, surpassing DLI-NSS by 9.9 percentage points (24.3%) and DLI-NES by 13.1 percentage points (34.9%). DLI-NSS placed third, surpassing DLI-NES by 3.2 percentage points (8.5%). Table 23 shows the results of the Levene’s test of homogeneity of variance for gender. The Levene’s statistic found significant variances between groups (p = .000).

Table 23: Levene's test of Homogeneity of Variances for Percentage of male students per group

Levene Statistic	df1	df2	Sig.
9.777	3	684	.000

Table 24 presents the ANOVA results for gender for each group. The ANOVA table found no significant difference between groups (p = .547).

Table 24: ANOVA table for Percentage of male students per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.533	3	.178	.709	.547
Within Groups	171.465	684	.251		
Total	171.999	687			

Table 25 shows the Contrast tests for gender per group. Because the Levene's test found significant variances between groups (p = .000), the –*does not assume equal variances*- output was validated; however, none of the Contrast tests was identified as significant (all $p \geq .301$).

Table 25: Contrast tests for Percentage of male students per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Student's gender	Does not assume equal variances	1	-.137	.1284	-1.067	16.697	.301
		2	-.032	.1578	-.205	31.673	.839
		3	-.131	.1278	-1.022	16.389	.321
		4	.105	.1007	1.039	31.025	.307
		5	.006	.0396	.161	619.053	.872
		6	-.098	.1000	-.983	30.104	.334

Analysis Discussion

The ANOVA table and the Contrast tests found no statistically significant differences between groups. Because the Levene's test identified significant variances between groups, the –*does not assume equal variances*- output was accepted as valid.

Mainstream had the highest percentage of male students, surpassing TBE/ESL by 1.2% (p = .872), surpassing DLI-NSS by 25.8% (p = .307) and surpassing DLI-NES by 36.5% (p = .301). TBE/ESL placed second, surpassing DLI-NSS by 24.3% (p = .334) and DLI-NES by 34.9% (p = .321). DLI-NSS placed in third place, surpassing DLI-NES by 8.5% (p = .839).

In the case of gender, even though differences exist between groups, these differences were not identified as statistically significant; supporting the claim that the existing differences between groups do not impact the study outcomes in a statistically significant way.

Economic disadvantage.

The percentage of students identified as economically disadvantaged was analyzed to look for significant differences between groups. . Table 26 and figure 37 exhibit the initial data, which shows that the four groups exhibited differences in their percentage of economically disadvantaged students.

Table 26: Percentage of economically disadvantaged students per group

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of Economically disadvantaged students per group	75.0%	75.3%	88.9%	92.4%

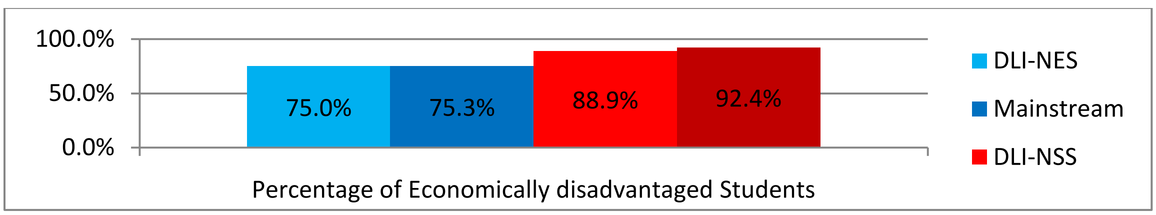

Figure 37: Percentage of economically disadvantaged students per group

TBE/ESL had the highest percentage of students identified as economically disadvantaged, surpassing DLI-NSS by 3.5 percentage points (3.9%), Mainstream by 17.1 percentage points (22.7%) and DLI-NES by 17.4 percentage points (23.2%). DLI-NSS placed second, surpassing Mainstream by 13.6 percentage points (18.1%) and DLI-NES by 13.9 percentage points (18.5%). Mainstream placed third, surpassing DLI-NES by 0.3 percentage points (0.4%).

Table 27 shows the results of the Levene's test for percentage of students economically disadvantaged. The Levene's test found significant variances between groups in the percentage of economically disadvantaged students (p = .000).

Table 27: Levene's Test of Homogeneity of Variances for Percentage of economically disadvantaged students

Levene Statistic	df1	df2	Sig.
59.431	3	684	.000

Table 28 presents the ANOVA table for percentage of students economically disadvantaged. The ANOVA analysis found significant differences between groups (p = .000).

Table 28: ANOVA table for Percentage of economically disadvantaged students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.876	3	1.625	13.110	.000
Within Groups	84.793	684	.124		
Total	89.669	687			

Table 29 presents the Contrast tests for percentage of economically disadvantaged students. Based on the results of the Levene's test, the analysis does not assume equal variances.

Table 29: Contrast tests for Percentage of economically disadvantaged students

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Economically Disadvantaged	Does not assume equal variances	1	-.003	.1146	-.022	16.578	.982
		2	-.139	.1277	-1.088	24.212	.287
		3	-.174	.1127	-1.542	15.483	.143
		4	-.136	.0666	-2.046	35.442	.048
		5	-.171	.0290	-5.899	461.662	.000
		6	-.035	.0632	-.551	28.798	.586

The Contrast tests found significance differences in Contrast 4, between Mainstream and DLI-NSS (p = .048) and in Contrast 5, between Mainstream and TBE/ESL (.000). No significant differences were found in the other contrasts (p ≥ .143).

Analysis discussion

The four groups exhibited differences in the percentage of economically disadvantaged students. Because the Levene's test identified significant variances between groups (p = .000), the –*does not assume equal variances*- output was validated.

TBE/ESL had the highest percentage of students identified as economically disadvantaged, surpassing DLI-NSS by 3.9% ($p = .586$), Mainstream by 22.7% ($p = .000$) and DLI-NES by 23.2% ($p = .143$). DLI-NSS placed second, surpassing Mainstream by 18.1% ($p = .048$) and DLI-NES by 18.5% ($p = .287$). Mainstream placed third, surpassing DLI-NES by 0.4% ($p = .982$).

Even though evident differences exist between groups, most of these differences were not statistically significant. The only differences in economic disadvantage identified as statistically significant that can impact the study outcomes were between Mainstream and DLI-NSS ($p = .048$) and between Mainstream and TBE/ESL ($p = .000$). Differences in socio-economic status have been proven highly influential in the academic performance of students. However, as previously stated, the differences between groups were relatively small and in most cases not statistically significant.

Summary for Demographics

No statistically significant differences were identified for age average and for gender between any of the groups, and significant differences in economic disadvantage were identified only for two of the six possible contrast pairs. Statistically significant differences in economic disadvantage were identified between mainstream and DLI-NSS and between mainstream and TBE. Because economic disadvantage has proven detrimental for academic performance, these two groups -DLI-NSS and TBE- could be predicted to exhibit academic underperformance in comparison with mainstream due to higher levels of economic disadvantage. However, considering all the demographic variables as a whole, the groups do not exhibit statistically significant differences that can impact the study outcomes in a significant way.

Academic Outcomes of Program Participation

The next step following the analysis of demographic data was to analyze the groups' dependent variables to identify significant differences between groups that could represent the differentiated outcomes of program participation. As previously mentioned, educational achievement was measured based upon results in state-developed standardized assessments (TAKS), English language proficiency status, high school GPA, high school ranking, College-level courses participation, graduation rates, and Immediate College Enrollment Rates (ICER).

As presented in the review of literature, there are two ways to measure academic achievement: standardized tests and college readiness. During the past two decades, the standardization reform provided a framework for educational achievement through the development of specific content-area standards written to define and measure educational performance (Echevarria et al., 2008; García & Bartlet, 2007; Eisner, 2000). Academic performance is measured, then, through state-developed standardized tests and the percentage of students obtaining a high school diploma. Because states, school districts, schools, and educators are accountable for their ability to meet the standards (Nesselrodt, 2007; Capps et al., 2005), public education has strongly followed the standardization approach to measure achievement .

However, the U.S. Department of Education (2010a) states that the goal for public education should be for all students not only to graduate from high school, but to be ready for college. From a college-readiness perspective, there are other reliable indicators to identify how well prepared are students for college. College-readiness indicators include participation in college-level courses such as Advanced Placement (AP), scores on standardized college admission assessments such as ACT, percentage of high school graduates attending college immediately after high school graduation,; the percentage of high school graduates taking remedial courses in college, and the percentage of high school graduates being retained after one year in college (U.S. Dep. of Ed., 2010a).

This study included most of the variables included in both ways to measure achievement. However, not all the college-readiness indicators were included because they were beyond the scope of the research. The excluded variables include: percentage of high school graduates taking remedial courses in college and percentage of high school graduates being retained after one year in college because the data required for analysis was not available within the district records.

Results on standardized assessments

In this step, the analysis focused on academic outcomes as traditionally measured by accountability and the standardization reform. Because the study took place in Texas, the results of the Texas Assessment of Knowledge and Skills (TAKS) became the focus of analysis. An advantage of working with standardized assessments is that they provide scaled scores that allow for comparisons within and between test administrations and within and between groups.

Because the objective of the study was to identify the long-term academic effects of implementing specific instructional programs, the analysis focused on high school TAKS scores to find statistically significant differences between groups. During high school, students have to take several TAKS tests in four core content areas. In 9th grade, students take two TAKS tests in reading and math. In 10th grade, students have to take four TAKS tests in math, English Language Arts (ELA), science and social studies.

In 11th grade, students also take four TAKS tests in the same core content areas. However, these tests are identified as Exit-TAKS because passing these tests is a prerequisite for graduation. Students have several opportunities to re-take an Exit-TAKS test if they are unable to pass it. They can take the same content area test up to 3 times every school year. If they do not pass one or more Exit-TAKS in 11th grade, they can take them again in 12th grade, and will remain in 12th grade until passing all four Exit-TAKS tests.

High school TAKS scores were analyzed in four different ways, including differences in score averages in all content areas, additional opportunities taken to pass the tests, percentage of students failing to pass the tests even after several attempts, and percentage of students who met the commended criteria. As mentioned before, due to space limitations, each description will only include the tables identified as highly significant for the analysis.

High school TAKS score averages.

Content area average scores were calculated for each group by adding the students' scores and dividing the sum by the number of opportunities taken. Because a demographic similarity between groups has been established, differences in high school TAKS scores can be partially attributed to program of instruction. Table 30 and figure 38 exhibit the initial data, which shows that the four groups had differences in TAKS average scores in all content areas.

Table 30: TAKS average scores on each content area per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
TAKS average scores on each content area	ELA	2379	2254	2256	2219
	Math	2209	2147	2209	2135
	Science	2242	2142	2182	2120
	Social Studies	2333	2253	2259	2223

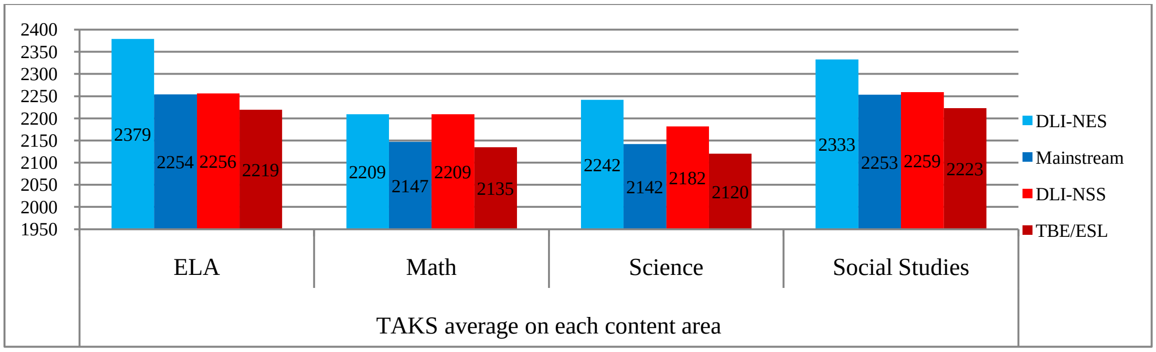

Figure 38: TAKS average scores on each content area per group

In ELA, DLI-NES had the highest score average, surpassing DLI-NSS by 123 percentage points (5.5%), Mainstream by 125 percentage points (5.5%), and TBE/ESL by 160 percentage points (7.2%). DLI-NSS placed second, surpassing Mainstream by 2 percentage points (0.1%) and TBE/ESL by 37 percentage points (1.7%). Mainstream placed third, surpassing TBE/ESL by 35 percentage points (1.6%).

In math, DLI-NES and DLI-NSS tied in first place, surpassing Mainstream by 62 percentage points (2.9%) and TBE/ESL by 74 percentage points (3.5%). Mainstream placed second, surpassing TBE/ESL by 12 percentage points (0.6%).

In science, DLI-NES had the highest score average, surpassing DLI-NSS by 60 percentage points (2.7%), Mainstream by 100 percentage points (4.7%) and TBE/ESL by 122 percentage points (5.8%). DLI-NSS placed second, surpassing Mainstream by 40 percentage points (1.9%) and TBE/ESL by 62 percentage points (2.9%). Mainstream placed third, surpassing TBE/ESL by 22 percentage points (1.0%).

In social studies, DLI-NES had the highest score average, surpassing DLI-NSS 74 percentage points (3.3%), Mainstream by 80 percentage points (3.6%), and TBE/ESL by 110 percentage points (4.9%). DLI-NSS placed second, surpassing Mainstream by 6 percentage points (0.3%) and TBE/ESL by 36 percentage points (1.6%). Mainstream placed third, surpassing TBE/ESL by 30 percentage points (1.3%).

Table 31 shows the results of the Levene's test of homogeneity of variance for TAKS scores. The test found no statistically significant variance between groups in all content areas (all $p \geq .487$). Because the Levene's test found no significant variance between groups, the –assume equal variance- output was validated.

Table 31: Levene's Test of Homogeneity of Variances for TAKS average scores on each content area per group

	Levene Statistic	df1	df2	Sig.
ELA TAKS Average in High School	.112	3	684	.953
MATH TAKS Average in High School	.290	3	684	.833
Science TAKS Average in High school	.813	3	684	.487
Social Studies TAKS average in High School	.226	3	684	.879

Table 32 presents the ANOVA results for average TAKS scores for each group. The ANOVA table found significant differences between groups, in all content areas (all $p \leq .013$).

Table 32: ANOVA table for TAKS average scores on each content area per group

		Sum of Squares	df	Mean Square	F	Sig.
ELA TAKS Average in High School	Between Groups	527286.432	3	175762.144	11.085	.000
	Within Groups	10845148.671	684	15855.481		
	Total	11372435.103	687			
MATH TAKS Average in High School	Between Groups	215509.050	3	71836.350	3.641	.013
	Within Groups	13494926.060	684	19729.424		
	Total	13710435.110	687			
Science TAKS Average in High school	Between Groups	336991.177	3	112330.392	9.827	.000
	Within Groups	7818931.601	684	11431.187		
	Total	8155922.778	687			
Social Studies TAKS average in High School	Between Groups	305698.097	3	101899.366	6.234	.000
	Within Groups	11180763.902	684	16346.146		
	Total	11486461.999	687			

Table 33: Contrast tests for TAKS average scores on each content area per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
ELA TAKS Average in High School	Assume equal variances	1	125.33	32.333	3.876	684	.000
		2	123.12	39.727	3.099	684	.002
		3	160.13	32.183	4.975	684	.000
		4	-2.21	25.332	-.087	684	.931
		5	34.80	9.964	3.492	684	.001
		6	37.00	25.140	1.472	684	.142
MATH TAKS Average in High School	Assume equal variances	1	62.12	36.068	1.722	684	.085
		2	.03	44.315	.001	684	1.000
		3	74.45	35.900	2.074	684	.038
		4	-62.09	28.258	-2.197	684	.028
		5	12.33	11.114	1.110	684	.268
		6	74.43	28.044	2.654	684	.008

Science TAKS Average in High school	Assume equal variances	1	100.17	27.454	3.649	684	.000
		2	59.80	33.732	1.773	684	.077
		3	122.06	27.327	4.467	684	.000
		4	-40.37	21.510	-1.877	684	.061
		5	21.89	8.460	2.587	684	.010
		6	62.26	21.346	2.916	684	.004
Social Studies TAKS average in High School	Assume equal variances	1	80.15	32.830	2.441	684	.015
		2	74.29	40.337	1.842	684	.066
		3	110.65	32.677	3.386	684	.001
		4	-5.87	25.721	-.228	684	.820
		5	30.49	10.117	3.014	684	.003
		6	36.36	25.526	1.424	684	.155

Table 33 presents the Contrast tests for the average TAKS scores for each content area per group. Based on the results of the Levene test, the analysis assumes equal variances. In ELA there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .002), in Contrast 3 between DLI-NES and TBE (*p* = .000), and in Contrast 5 between Mainstream and TBE (*p* = .001). At the same time, no significant difference was identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .931), or in Contrast 6 between DLI-NSS and TBE (p = .142).

In math there are significant differences in Contrast 3 between DLI-NES and TBE/ESL (*p* = .038), in contrast 4 between Mainstream and DLI-NSS (*p* = .028) and Contrast 6 between DLI-NSS and TBE/ESL (*p* = .008). There is also a marginal difference in Contrast 1 between DLI-NES and Mainstream (*p* = .085) and no significant difference in Contrast 2 between DLI-NES and DLI-NSS (*p* = 1.000) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .268).

In science, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .010), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .004). There are also marginal differences in

Contrast 2 between DLI-NES and DLI-NSS (p = .077) and in Contrast 4 between Mainstream and DLI-NSS (p = .061).

In social studies, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .015); in Contrast 3 between DLI-NES and TBE/ESL (p = .001); and in Contrast 5 between Mainstream and TBE/ESL (p = .003) There is also a marginally significant difference in Contrast 2 between DLI-NES and DLI-NSS (p = .066), and there are no statistically significant differences in Contrast 4 between Mainstream and DLI-NSS (p = .820) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .155).

Analysis discussion.

The four groups exhibited differences on average scores in each of the content areas. This suggests that program type is a contributing factor to academic achievement for students.

Overall, DLI-NES had the highest score averages in all content areas; and in most cases, the differences were identified as statistically significant. In ELA, DLI-NES had the highest score average, surpassing DLI-NSS by 5.5% (p = .002), surpassing Mainstream by 5.6% (p = .000), and surpassing TBE/ESL by 7.2% (p = .000). DLI-NSS placed second, surpassing Mainstream by 0.1% (p = .931) and surpassing TBE/ESL by 1.7% (p = .142). Mainstream placed third, surpassing TBE/ESL by 1.6% (p = .001).

In math, DLI-NES and DLI-NSS tied in first place (p = 1.000). DLI-NES surpassed Mainstream by 2.9% (p = .085) and surpassed TBE/ESL by 3.5% (p = .038). DLI-NSS surpassed Mainstream by 2.9% (p = .028) and surpassed TBE/ESL by 3.5% (p = .008). Mainstream place second, surpassing TBE/ESL by 0.6% (p = .268).

In science, DLI-NES had the highest score average, surpassing DLI-NSS by 2.7% (p = .077), surpassing Mainstream by 4.7% (p = .000) and surpassing TBE/ESL by 5.8% (p = .000). DLI-NSS placed second, surpassing Mainstream by 1.9% (p = .061) and surpassing TBE/ESL by 2.9% (p = .004). Mainstream placed third, surpassing TBE/ESL by 1.0% (p = .010).

In social studies, DLI-NES had the highest score average, surpassing DLI-NSS 3.3% (p = .066), surpassing Mainstream by 3.6% (p = .015), and surpassing TBE/ESL by 4.9% (p = .001). DLI-NSS placed second, surpassing Mainstream by 0.3% (p = .820) and surpassing TBE/ESL by 1.6% (p = .155). Mainstream placed third, surpassing TBE/ESL by 1.3% (p = .003).

DLI-NES had the best results in all content areas, and many of these differences were identified as statistically significant. DLI-NES had higher scores than Mainstream in all content areas, and these differences were almost always statistically significant. The differences between DLI-NES and Mainstream were: ELA, 5.6% (p = .000); math, 2.9% (p = .085); science, 4.7% (p = .015); and social studies, 3.6% (p = .015).

DLI-NES had higher scores than DLI-NSS in all content areas. However, the differences were not always statistically significant. The differences between DLI-NES and DLI-NSS were: ELA, 5.5% (p = .002); math, 0.0% (p = 1.000); science, 2.7% (p = .077); and social studies 3.3% (p = .066).

DLI-NES had higher scores than TBE/ESL in all content areas and such differences were always statistically significant. The differences between DLI-NES and TBE/ESL were: ELA, 7.2% (p = .000); math, 3.5% (p = .038); science, 5.8% (p = .000); and social studies, 4.9% (p = .001).

DLI-NSS placed second in average TAKS scores. DLI-NSS had higher scores than Mainstream in all content areas. However, the differences were not always statistically significant. DLI-NSS had better results than Mainstream in: ELA 0.1% (p = .931), math 2.9% (p = .028) science 1.9% (p = .061), and social studies 0.3% (p = .820).

DLI-NSS had higher scores than TBE/ESL in all content areas. However, differences were not always statistically significant. The differences between DLI-NSS and TBE/ESL were: ELA, 1.7% (p = .142); math, 3.5% (p = .008); science, 2.9% (p = .004); and social studies, 1.6% (p = .155).

Mainstream placed third in regards of average TAKS scores. Mainstream had higher scores than TBE/ESL in all content areas. However, the differences were not always statistically significant. The differences between mainstream and TBE/ESL were: ELA, 1.6% (p = .001); math, 0.6% (p = .268); science, 1.0% (p = .010) and social studies by 1.3% (p = .003).

Additional TAKS tests taken.

Due to the high stakes decisions made based on the TAKS, students are granted the opportunity to take the tests several times in order to pass them. This is especially true in high school where student graduation depends upon passing the Exit-TAKS. The percentage of additional tests that each group took in their attempt to pass the high school TAKS tests was analyzed to look for statistically significant differences between groups. Table 34 and Figure 39 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of additional tests taken, in all content areas.

Table 34: Percentage of additional tests taken per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of additional test taken per group	ELA	0.0%	13.7%	3.7%	16.7%
	Math	25.0%	50.9%	51.9%	66.9%
	Science	18.8%	45.7%	37.0%	71.2%
	Social Studies	0.0%	15.1%	3.7%	13.8%

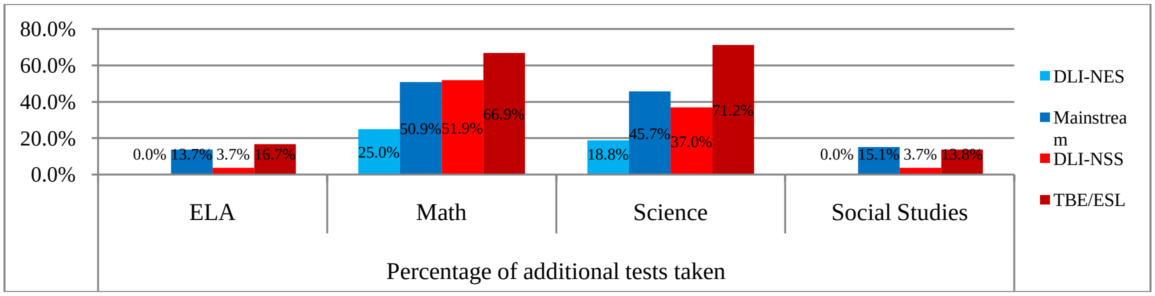

Figure 39: Percentage of additional tests taken per group

In ELA, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 3.7% additional tests taken, 100% more than DLI-NES. Mainstream placed third with 13.7% additional tests taken, 10.0 percentage points (270.3%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 16.7% additional tests taken, 3.0 percentage points (18.0%) more than Mainstream, 13.0 points (351.4%) more than DLI-NSS, and 100% more than DLI-NES.

In math, DLI-NES had the best performance, with 25.0% additional tests taken. Mainstream placed second with 50.9% additional tests taken; 25.9 percentage points (103.6%) more than DLI-NES. DLI-NSS placed third with 51.9% additional tests taken; 1.0 percentage points (2.0%) more than Mainstream and 26.9 percentage points (107.6%) more than DLI-NES. TBE/ESL had the worst performance with 66.9% additional tests taken; 15.0 percentage points (28.9%) more than DLI-NSS, 16.0 points (31.4%) more than Mainstream, and 41.9 points (167.6%) more than DLI-NES.

In science, DLI-NES had the best performance, with 18.8% additional tests taken. DLI-NSS placed second with 37.0% additional tests taken; 18.2 percentage points (96.8%) more than DLI-NES. Mainstream placed third with 45.7% additional tests taken; 8.7 percentage points (23.5%) more than DLI-NSS and 26.9 percentage points (143.1%) more than DLI-NES. TBE/ESL had the worst performance with 71.2% additional tests taken; 25.2 percentage points (55.8%) more than Mainstream, 34.2 percentage points (92.4%) more than DLI-NSS, and 52.4 percentage points (278.7%) more than DLI-NES.

In social studies, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 3.7% additional tests taken; 100% more than DLI-NES. TBE/ESL placed third with 13.8% additional tests taken; 10.1 percentage points (273.0%) more than DLI-NSS and 100% more than DLI-NES. Mainstream had the worst performance with 15.1% additional tests taken; 1.3 percentage points (9.4%) more than TBE/ESL, 11.4 percentage points (308.1%) more than DLI-NSS, and 100% more than DLI-NES.

Table 35 shows the results of the Levene's test for the percentage of additional tests taken in each area. The test found significant variance between groups in all content areas (all p ≤ .016). Therefore, the –*not assume equal variance*- output was validated.

Table 35: Levene's Test of Homogeneity of Variances for percentage of additional tests taken per group

	Levene Statistic	df1	df2	Sig.
additional tests taken for ELA TAKS	3.816	3	684	.010
additional tests taken for Math TAKS	5.251	3	684	.001
additional tests taken for Science TAKS	14.091	3	684	.000
additional tests taken for Social Studies TAKS	3.471	3	684	.016

Table 36 presents the ANOVA results for the percentage of additional tests taken. The test found no significant differences between groups in three of the four content areas (all p ≥ .152). The only area that exhibited a statistically significant difference was science (p = .006).

Table 36: ANOVA table for Percentage of additional tests taken per group

		Sum of Squares	df	Mean Square	F	Sig.
Additional tests taken for ELA TAKS	Between Groups	.834	3	.278	.938	.422
	Within Groups	202.631	684	.296		
Additional tests taken for Math TAKS	Between Groups	6.141	3	2.047	1.766	.152
	Within Groups	792.800	684	1.159		
Additional tests taken for Science TAKS	Between Groups	14.205	3	4.735	4.187	.006
	Within Groups	773.557	684	1.131		
Additional tests taken for Social Studies TAKS	Between Groups	.629	3	.210	.795	.497
	Within Groups	180.528	684	.264		

Table 37: Contrast tests for Percentage of additional tests taken per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Additional tests taken for ELA TAKS	Does not assume equal variances	1	-.14	.032	-4.245	290.000	.000
		2	-.04	.037	-1.000	26.000	.327
		3	-.17	.030	-5.538	353.000	.000
		4	.10	.049	2.041	76.921	.045
		5	-.03	.044	-.661	624.517	.509
		6	-.13	.048	-2.716	69.433	.008
Additional tests taken for Math TAKS	Does not assume equal variances	1	-.26	.181	-1.429	18.875	.169
		2	-.27	.259	-1.035	40.204	.307
		3	-.42	.181	-2.315	18.997	.032
		4	-.01	.204	-.049	31.068	.962
		5	-.16	.085	-1.892	638.498	.059
		6	-.15	.204	-.739	31.227	.466
Additional tests taken for Science TAKS	Does not assume equal variances	1	-.27	.195	-1.384	17.478	.184
		2	-.18	.264	-.692	37.887	.493
		3	-.52	.198	-2.649	18.633	.016
		4	.09	.193	.448	30.358	.657
		5	-.25	.083	-3.082	638.532	.002
		6	-.34	.197	-1.737	32.389	.092
Additional tests taken for Social Studies TAKS	Does not assume equal variances	1	-.15	.033	-4.546	290.000	.000
		2	-.04	.037	-1.000	26.000	.327
		3	-.14	.026	-5.270	353.000	.000
		4	.11	.050	2.293	80.164	.024
		5	.01	.042	.302	579.408	.763
		6	-.10	.045	-2.233	57.658	.029

Table 37 presents the Contrast tests for the percentage of additional tests taken for each content area. In ELA, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .045), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .008). The analysis found no significant differences in Contrast 2 between DLI-NES and DLI-NSS (p = .327) and Contrast 5 between Mainstream and TBE/ESL (p = .509).

In math, there is a statistically significant difference in Contrast 3 between DLI-NES and TBE/ESL (p = .032). There is also a marginally significant difference in Contrast 5 between Mainstream and TBE/ESL (p = .059). No significant differences were indentified in Contrast 1 between DLI-NES and Mainstream (p = .169), in Contrast 2 between DLI-NES and DLI-NSS (p = .307), in Contrast 4 between Mainstream and DLI-NSS (p = .962), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .466).

In science, there are statistically significant differences in Contrast 3 between DLI-NES and TBE/ESL (p = .016) and in Contrast 5 between Mainstream and TBE/ESL (p = .002). There is also a marginally significant difference in Contrast 6 between DLI-NSS and TBE/ESL (p = .092) and no significant differences were identified in Contrast 1 between DLI-NES and Mainstream (p = .184), in Contrast 2 between DLI-NES and DLI-NSS (p = .493) and in Contrast 4 between Mainstream and DLI-NSS (p = .657).

In social studies, significant differences were identified in Contrast 1 between DLI-NES and Mainstream (p = .000); Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .024), and Contrast 6 between DLI-NSS and TBE/ESL (p = .029). No statistically significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (p = .327), and in Contrast 5 between Mainstream and TBE/ESL (p = .763)

Analysis discussion.

The four groups exhibit differences in the percentage of additional tests taken. This suggests that program type is a contributing factor to academic achievement for students.

In ELA, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 100% more additional tests than DLI-NES (p = .327). Mainstream placed third with 270.3% more additional tests than DLI-NSS (p = .045) and 100% more than DLI-NES (p = .000). TBE/ESL had the worst performance with 18.0%

more additional tests than Mainstream (*p* = .509), 351.4% more than DLI-NSS (*p* = .008), and 100% more than DLI-NES (*p* = .000).

In math, DLI-NES had the best performance, with 25.0% additional tests. Mainstream placed second with 103.6% additional tests more than DLI-NES (*p* = .169). DLI-NSS placed third; with 2.0% more tests than Mainstream (*p* = .962) and 107.6% more than DLI-NES (*p* = .307). TBE/ESL had the worst performance with 28.9% more additional tests than DLI-NSS (*p* = .466), 31.4% more than Mainstream (*p* = .059), and 167.6% more than DLI-NES (*p* = .032).

In science, DLI-NES had the best performance, with 18.8% additional tests. DLI-NSS placed second with 96.8% more additional tests than DLI-NES (*p* = .493). Mainstream placed third with 23.5% more additional tests than DLI-NSS (*p* = .184) and 143.1% more than DLI-NES (*p* = .184). TBE/ESL placed last with 55.8% more additional tests than Mainstream (*p* = .002), 92.4% more than DLI-NSS (*p* = .092), and 278.7% more than DLI-NES (*p* = .016).

In social studies, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 100% more than DLI-NES (*p* = .327). TBE/ESL placed third with 273.0% more additional tests than DLI-NSS (*p* = .029) and 100% more than DLI-NES (*p* = .000). Mainstream had the worst performance with 9.4% more additional tests than TBE/ESL (*p* = .763), 308.1% more than DLI-NSS (*p* = .024), and 100% more than DLI-NES (*p* = .000).

Overall, DLI-NES had the best results, requiring the lowest percentage of additional tests in all content areas, and many of these differences were identified as statistically significant.

DLI-NES required fewer additional TAKS tests than Mainstream in all content areas. However, differences were not always statistically significant. The differences between DLI-NES and Mainstream were: ELA, 100% (p = .000); math, 103.6% (p = .169); science, 143.1% (p = .184); and social studies, 100% (p = .000).

DLI-NES required fewer additional TAKS tests than DLI-NSS in all content areas. However, differences were not statistically significant. The differences between DLI-NES and DLI-NSS were: ELA, 100% (p = .357); math, 107.6% (p = .307); science, 96.8% (p = .493); and social studies 100% (p = .327).

DLI-NES required fewer additional TAKS tests than TBE/ESL in all content areas and such differences were always statistically significant. The differences between DLI-NES and TBE/ESL were: ELA, 103.6% (p = .000); math, 167.6% (p = .032); science, 278.7% (p = .016); and social studies, 100% (p = .000).

DLI-NSS placed second in regards of requiring fewer additional TAKS tests. DLI-NSS required less additional TAKS tests than Mainstream in all content areas except in math. The differences were not always statistically significant. DLI-NSS had better results than Mainstream in: ELA, 73.0% (p = .045); science, 23.5% (p = .657); and social studies 308.1% (p = .024). DLI-NSS was surpassed by Mainstream only in math, by 2.0% (p = .962).

DLI-NSS required fewer additional TAKS tests than TBE/ESL in all content areas. However, differences were not always statistically significant. The differences between DLI-NSS and TBE/ESL were: ELA, 28.9% (p = .008); math, 28.9% (p = .466); science, 92.4% (p = .092); and social studies, 273.0% (p = .029).

Mainstream placed third in regards of requiring fewer additional TAKS tests. Mainstream required less additional TAKS tests than TBE/ESL in all content areas except in social studies. The differences were not always statistically significant. The differences between mainstream and TBE/ESL were: ELA, 31.4% (p = .509); math, 31.4% (p = .059); and science, 55.8% (p = .002). Mainstream was outscored by TBE/ESLL in social studies by 8.6% (p = .763).

Percentage of students failing an Exit-TAKS even after several attempts.

Despite the high stakes associated with the Exit TAKS, a significant percentage of students fail to pass the exit TAKS even after several attempts. Because passing all the Exit-TAKS is a requirement for high school graduation, failing the Exit-TAKS even after several attempts is a key indicator of academic failure (Perna & Thomas, 2009). Therefore, the percentage of students that failed the Exit-TAKS tests even after several attempts was compared, to find statistically significant differences between groups. Table 38 and Figure 40 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students failing the Exit TAKS even after several attempts, in all content areas.

Table 38: Percentage of students failing to pass the Exit-TAKS even after several attempts per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of Students failing after several attempts per group	ELA	0.0%	5.2%	0.0%	4.8%
	Math	0.0%	7.2%	0.0%	10.2%
	Science	0.0%	6.2%	0.0%	8.5%
	Social Studies	0.0%	5.5%	0.0%	3.7%

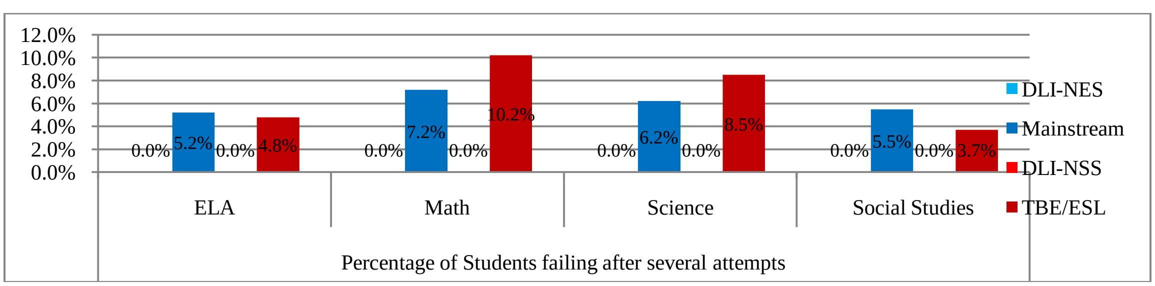

Figure 40: Percentage of students failing to pass the Exit-TAKS even after several attempts per group

In ELA, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 4.8% students failing; 100% more than both DLI groups. Mainstream had the worst performance with 5.2% students failing; 0.4 percentage points (8.3%) more than TBE/ESL and 100% more than both DLI groups.

In math, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 7.2% students failing; 100% more than both DLI groups. TBE/ESL had the worst performance with 10.2% students failing; 3.0 percentage points (41.7%) more than Mainstream and 100% more than both DLI groups.

In science, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 6.2% students failing; 100% more than both DLI groups. TBE/ESL had the worst performance with 8.5% students failing; 2.3 percentage points (37.1%) more than Mainstream and 100% more than both DLI groups.

In social studies, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 3.7% students failing; 100% more than both DLI groups. Mainstream had the worst performance with 5.5% failing; 1.8 percentage points (48.6%) more than TBE/ESL and 100% more than both DLI groups.

Table 39 shows the results of the Levene's test for the percentage of failing students in each content area. The Levene's test found significant variance between groups in the percentage of students failing even after several attempts in all content areas (all $p \leq .018$).

Table 39: Levene's Statistic for Percentage of students failing to pass the Exit-TAKS even after several attempts

	Levene Statistic	df1	df2	Sig.
Failing ELA TAKS after several opportunities	3.372	3	684	.018
Failing MATH TAKS after several opportunities	9.314	3	684	.000
Failing Science TAKS after several opportunities	7.189	3	684	.000
Failing Social Studies TAKS after several opportunities	4.734	3	684	.003

Table 40 presents the ANOVA results for the percentage of students failing. The ANOVA table found no significant differences between groups (all $p \geq .113$).

Table 40: ANOVA table for Percentage of students failing to pass the Exit-TAKS even after several attempts per group

		Sum of Squares	df	Mean Square	F	Sig.
Failing ELA TAKS after several opportunities	Between Groups	.101	3	.034	.759	.517
	Within Groups	30.410	684	.044		
	Total	30.512	687			
Failing MATH TAKS after several opportunities	Between Groups	.454	3	.151	1.998	.113
	Within Groups	51.824	684	.076		
	Total	52.278	687			
Failing Science TAKS after several opportunities	Between Groups	.307	3	.102	1.578	.193
	Within Groups	44.344	684	.065		
	Total	44.651	687			
Failing Social Studies TAKS after several opportunities	Between Groups	.135	3	.045	1.111	.344
	Within Groups	27.643	684	.040		
	Total	27.778	687			

Table 41: Contrast tests for Percentage of students failing to pass the Exit-TAKS even after several attempts per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Failing ELA TAKS after several opportunities	Does not assume equal variances	1	-.05	.013	-3.970	290.000	.000
		3	-.05	.011	-4.220	353.000	.000
		4	.05	.013	3.970	290.000	.000
		5	.00	.017	.204	610.648	.838
		6	-.05	.011	-4.220	353.000	.000
Failing MATH TAKS after several opportunities	Does not assume equal variances	1	-.07	.015	-4.749	290.000	.000
		3	-.10	.016	-6.322	353.000	.000
		4	.07	.015	4.749	290.000	.000
		5	-.03	.022	-1.334	641.911	.183
		6	-.10	.016	-6.322	353.000	.000
Failing Science TAKS after	Does not assume equal	1	-.06	.014	-4.373	290.000	.000
		3	-.08	.015	-5.717	353.000	.000
		4	.06	.014	4.373	290.000	.000

several opportunities	variances	5	-.02	.020	-1.117	641.301	.264
		6	-.08	.015	-5.717	353.000	.000
Failing Social Studies TAKS after several opportunities	Does not assume equal variances	1	-.05	.013	-4.108	290.000	.000
		3	-.04	.010	-3.668	353.000	.000
		4	.05	.013	4.108	290.000	.000
		5	.02	.017	1.092	560.954	.275
		6	-.04	.010	-3.668	353.000	.000

Table 41 presents the Contrast tests for the percentage of students failing, for each content area per group. Based on the results of the Levene's test, the analysis does not assume equal variances. Because both, DLI-NES and DLI-NES had 0% students failing TAKS in all content areas, contrast 2 could not be performed. In ELA, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .838).

In math, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .183).

In science, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .0), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .254).

In social studies, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .0), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .275).

Analysis discussion.

The four groups exhibit differences in the percentage of students who failed to pass the Exit-TAKS tests even after several attempts. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES and DLI-NSS had 0% students failing the test in all content areas, outscoring the other groups by a wide margin. Mainstream placed third in ELA and social studies while TBE/ESL placed third in math and science.

In ELA, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 100% more students failing than both DLI groups (p = .000). Mainstream had the worst performance with 8.3% more students failing than TBE/ESL (p = .838) and 100% more than both DLI groups (p = .000).

In math, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 100% more students failing than both DLI groups (p = .000). TBE/ESL had the worst performance with 41.7% more students failing than Mainstream (p = .183) and 100% more than both DLI groups (p = .000).

In science, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 100% more students failing than both DLI groups (p = .000). TBE/ESL had the worst performance with 37.1% more than Mainstream (p = .264) and 100% more than both DLI groups (p = .000).

In social studies, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 100% more than both DLI groups (p = .000). Mainstream had the worst performance with 48.6% more than TBE/ESL (p = .275) and 100% more than both DLI groups (p = .000).

Overall, both DLI groups exhibited the best results having the lowest percentage of students failing an Exit-TAKS test even after several attempts in all content areas, and all the differences were identified as statistically significant. Both DLI groups had a lower percentage of students failing than Mainstream in all content areas and the differences were always statistically significant. The differences between DLI groups and Mainstream were: ELA 100% (p = .000), math 100% (p = .000), science 100% (p = .000), and social studies 100% (p = .000).

Both DLI groups had a lower percentage of students failing than TBE/ESL in all content areas and the differences were always statistically significant. The differences between DLI groups and TBE/ESL were: ELA 100% (p = .000), math 100% (p = .000), science 100% (p = .000), and social studies 100% (p = .000). Meanwhile, the results between Mainstream and TBE/ESL were divided. Mainstream had less students failing than TBE/ESL in math by 37.7% (p = .183) and in science by 37.1% (p = .264).

TBE/ESL had less students failing the Exit-TAKS than Mainstream by 8.3% (p = .838) in ELA, and by 37.2% (p = .264) in social studies.

Percentage of students meeting commended criteria in Exit TAKS.

When students met the Exit -TAKS commended criteria with a scaled score of 2400 percentage points or higher, they demonstrate an elevated level of knowledge that goes beyond rote memorization. At the same time, their self-confidence and their volition to go to college are increased. Meeting commended criteria is therefore a key indicator of academic performance. For this reason, the percentage of students who met commented in Exit-TAKS tests was analyzed to look for statistically significant differences between groups. Table 42 and Figure 41 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students meeting commended criteria in Exit-TAKS.

Table 42: Percentage of students who met commended in Exit-TAKS per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students who met commended in an Exit-TAKS per group	ELA	56.3	15.1	29.6	9.6
	Math	12.5	13.7	29.6	12.7
	Science	18.8	3.8	11.1	3.7
	Social Studies	43.8	17.9	14.8	13.0

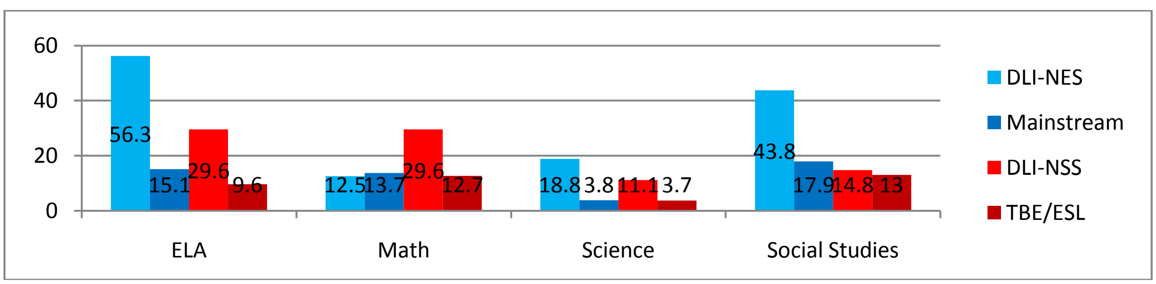

Figure 41: Percentage of students who met commended in Exit-TAKS per group

In ELA, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 26.7 percentage points (90.2%), surpassing Mainstream by 41.2 percentage points (272.8%), and surpassing TBE/ESL by 46.7percentage points (486.5%). DLI-NSS placed second, surpassing Mainstream by 14.5 percentage points (96.0%) and surpassing

TBE/ESL by 20.0percentage points (208.3%). Mainstream placed third, surpassing TBE/ESL by 5.5 percentage points (57.3%).

In math, DLI-NSS had the highest percentage of commended students, surpassing Mainstream by 19.9 percentage points (116.1%), surpassing TBE/ESL by 16.9 percentage points (133.1%), and surpassing DLI-NES by 17.1percentage points (136.8%). Mainstream placed second, surpassing TBE/ESL by 1.0 percentage points (7.9%) and surpassing DLI-NES by 1.2percentage points (9.6%). TBE/ESL placed third, surpassing DLI-NES by 0.2 percentage points (1.6%).

In science, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 7.7 percentage points (69.4%), surpassing Mainstream by 15.0 percentage points (394.7%), and surpassing TBE/ESL by 15.1percentage points (408.1%). DLI-NSS placed second, surpassing Mainstream by 7.3 percentage points (192.1%) and surpassing TBE/ESL by 7.4 percentage points (200.0%). Mainstream placed third, surpassing TBE/ESL by 0.1 percentage points (2.6%).

In social studies, DLI-NES had the highest percentage of commended students, surpassing Mainstream by 25.9 percentage points (144.7%), DLI-NSS by 29.0 percentage points (195.9%), and TBE/ESL by 30.8 percentage points (236.9%). Mainstream placed second, surpassing DLI-NSS by 3.1 percentage points (17.3%) and TBE/ESL by 4.9 percentage points (27.4%). DLI-NSS placed third, surpassing TBE/ESL by 1.8 percentage points (13.8%).

Table 43 shows the results of the Levene’s test for the percentage of students who met commended in Exit-TAKS tests, in all content areas. The Levene’s statistic found significant variances in the percentage of students who met commended in Exit-TAKS tests, in all content areas (all p ≤ .001). Therefore, the –*not assume equal variance*- output was validated.

Table 43: Levene's statistic for Percentage of students who met commended in an Exit-TAKS per group

	Levene Statistic	df1	df2	Sig.
Met Commended in ELA Exit TAKS	14.380	3	684	.000
Met Commended in Math Exit TAKS	5.223	3	684	.001
Met Commended in Science Exit TAKS	12.476	3	684	.000
Met Commended in Social Studies in	8.805	3	684	.000

Table 44 presents the ANOVA results for the percentage of students who met commended in Exit-TAKS tests, in all content areas. The ANOVA table found significant differences in ELA (p = .000), science (p = .009), and social studies (p = .006), and no significant difference in math (p = .109).

Table 44: ANOVA table for Percentage of students who met commended in an Exit-TAKS per group

		Sum of Squares	df	Mean Square	F	Sig.
Met Commended in ELA Exit TAKS	Between Groups	3.605	3	1.202	10.800	.000
	Within Groups	76.093	684	.111		
	Total	79.698	687			
Met Commended in Math Exit TAKS	Between Groups	.721	3	.240	2.026	.109
	Within Groups	81.161	684	.119		
	Total	81.882	687			
Met Commended in Science Exit TAKS	Between Groups	.481	3	.160	3.887	.009
	Within Groups	28.211	684	.041		
	Total	28.692	687			
Met Commended in Social Studies Exit TAKS	Between Groups	1.656	3	.552	4.191	.006
	Within Groups	90.075	684	.132		
	Total	91.731	687			

Table 45 presents the Contrast tests for the percentage of students who met commended in Exit-TAKS tests, in all content areas. Based on the results of the Levene's test, the analysis does not assume equal variances.

Table 45: Contrast tests for Percentage of students who met commended in an Exit-TAKS per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Met Commended in ELA Exit TAKS	Does not assume equal variances	1	.41	.130	3.169	15.820	.006
		2	.38	.149	2.532	25.638	.018
		3	.47	.129	3.615	15.453	.002
		4	-.03	.079	-.430	30.101	.670
		5	.06	.026	2.102	559.851	.036

		6	.09	.078	1.146	28.247	.261
Met Commended in Math Exit TAKS	Does not assume equal variances	1	-.01	.088	-.142	16.727	.889
		2	-.17	.124	-1.384	38.954	.174
		3	.00	.087	-.024	16.320	.981
		4	-.16	.092	-1.730	28.712	.094
		5	.01	.027	.384	610.757	.701
		6	.17	.091	1.853	28.075	.074
Met Commended in Science Exit TAKS	Does not assume equal variances	1	.15	.101	1.476	15.373	.160
		2	.08	.118	.647	26.204	.523
		3	.15	.101	1.489	15.297	.157
		4	-.07	.063	-1.170	27.743	.252
		5	.00	.015	.072	615.663	.943
		6	.07	.062	1.191	27.388	.244
Met Commended in Social Studies Exit TAKS	Does not assume equal variances	1	.26	.130	1.990	15.939	.064
		2	.29	.146	1.984	23.978	.059
		3	.31	.129	2.378	15.591	.031
		4	.03	.073	.417	31.673	.679
		5	.05	.029	1.696	581.783	.090
		6	.02	.072	.253	29.535	.802

In ELA, the Contrast tests found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .006), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .018), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .002), and in Contrast 5 between Mainstream and TBE/ESL (*p* = .036). At the same time, no significant differences were identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .670) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .261).

In math, marginal differences were identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .094) and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .074). No significant differences were found in Contrast 1 between DLI-NES and Mainstream (*p* = .889), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .174), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .981), and in Contrast 5 between Mainstream and TBE/ESL (*p* = .701).

In Science, no significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .160), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .523), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .157), in Contrast 4 between

Mainstream and DLI-NSS (p = .252), in Contrast 5 between Mainstream and TBE/ESL (p = .943), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .244).

In Social Studies, a statistically significant difference was identified in Contrast 3 between DLI-NES and TBE/ESL (p = .031). Marginally significant differences were indentified in Contrast 1 between DLI-NES and Mainstream (p = .064), in Contrast 2 between DLI-NES and DLI-NSS (p = .059), and in Contrast 5 between Mainstream and TBE/ESL (p = .090). No statistically significant differences were identified in Contrast 4 between Mainstream and DLI-NSS (p = .679), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .802).

Analysis discussion.

The four groups exhibited large differences in their percentages of students who met the commended criteria in Exit-TAKS tests. DLI-NES outscored the other three groups by a wide margin in ELA, science and social studies. However, the DLI-NES group was outscored by all the other groups in math. DLI-NSS outscored all other groups in math, placed second in ELA and science, and placed third in social studies. Mainstream placed second in social studies and math, and third place in ELA and science. TBE placed last in all content areas except math where it placed in third.

DLI-NES significantly outperformed Mainstream by 272.8% in ELA (p = .000), 394.7% in science (p = .004), and 144.7% in social studies (p = .004). Mainstream only outperformed DLI-NES in math by 8.8% (p = .169). DLI-NES outperformed DLI-NSS by 90.2% in ELA (p = .000), 69.4% in science (p = .234), and 195.9% in social studies (p = .012). DLI-NSS outperformed DLI-NES in math by 136.8% (p = .115). DLI-NES outperformed TBE/ESL by 485.5% in ELA (p = .000), 408.1% in science (p = .004), and

236.9% in social studies (p = .001). TBE/ESL only outperformed DLI-NES in math by 1.6% (p = .981).

DLI-NSS outperformed Mainstream by 96.0% in ELA (p = .613), 192.1% in Math (p = .022), and 192.1% in science (p = .073). Mainstream outperformed DLI-NSS in social studies by 17.3% (p = .676). Mainstream outperformed TBE/ESL by 57.3% in ELA (p = .037), 7.9% in Math (p = .705), 2.7% in science (p = .947), and 37.7% in social studies (p = .090). DLI-NSS outperformed TBE/ESL by 208.3% in ELA (p = .181), 133.1% in Math (p = .014), 200.0% in science (p = .067), and 13.8% in social studies (p = .802).

Overall, DLI-NES had the highest percentage of commended students in all content areas except math, where it placed last. DLI-NES had a higher percentage of commended students than Mainstream in all content areas except math. Differences were statistically significant in math, and marginally significant in social studies. The differences were: ELA, 272.8% (p = .006); science, 394.7% (p = .160); and social studies, 100% (p = .064). Mainstream surpassed DLI-NES in math, by 9.6% (p = .169).

DLI-NES had a higher percentage of commended students than DLI-NSS in all content areas except math. However, differences were statistically significant only in ELA and marginally significant in social studies. The differences between DLI-NES and DLI-NSS were: ELA, 90.2% (p = .018); science, 69.4% (p = .523); and social studies 100% (p = .059). DLI-NES was surpassed by DLI-NSS in math, by 136.8% (p = .174).

DLI-NES had a higher percentage of commended students than TBE/ESL in all content areas except math. Differences were statistically significant in ELA and social studies. The differences between DLI-NES and TBE/ESL were: ELA, 485.5 (p = .002);

science, 408.1% (*p* = .157); and social studies, 236.9% (*p* = .031). DLI-NES was surpassed by TBE/ESL only in math, by 1.6% (*p* = .981).

DLI-NSS placed first in the percentage of commended students in Math, placed second in ELA and science, and placed third in social studies. DLI-NSS had a higher percentage of commended students than Mainstream in all content areas except in social studies. The difference was marginally significant only in math. DLI-NSS had better results than Mainstream in: ELA, 96.0% (*p* = .670); math, 115.1% (*p* = .094); and science, 192.1% (*p* = .252). DLI-NSS was surpassed by Mainstream only in social studies, by 3.1% (*p* = .679).

DLI-NSS had a higher percentage of commended students than TBE/ESL in all content areas. The difference was marginally significant in math. The differences between DLI-NSS and TBE/ESL were: ELA, 208.3% (*p* = .261); math, 133.1% (*p* = .074); science, 200.0% (*p* = .244); and social studies, 13.8% (*p* = .802).

Mainstream placed third in the percentage of commended students. Mainstream had a higher percentage than TBE/ESL in all content areas. Differences were statistically significant in math and marginally significant in social studies. The differences between mainstream and TBE/ESL were: ELA, 57.3% (*p* = .036); math, 7.9% (*p* = .701); science, 2.6% (*p* = .943) and social studies by 4.9% (*p* = .090).

Summary of Results on Standardized Assessments

The four groups exhibited differences in all analyses based on standardized assessments. In score average, DLI-NES surpassed all other groups in all content areas, except in math, where DLI-NES tied DLI-NSS. DLI-NSS always placed second except in math, where it tied DLI-NES in first place. Mainstream always placed third place and

TBE/ESL always placed last. The significance of the differences varied depending of the comparison group.

DLI-NES tied DLI-NSS in math (p = 1.000) and surpassed DLI-NSS by marginally significant differences in science (p = .077) and social studies (p = .066). ELA was the only core content area where DLI-NES surpassed DLI-NSS by a statistically significant margin (p = .002). DLI-NES surpassed Mainstream by statistically significant differences (all $p \leq .015$) in all core content areas except math, were the difference was marginally significant (p = .085). DLI-NES surpassed TBE/ESL by statistically significant differences in all core content areas (all $p \leq .015$).

DLI-NSS surpassed mainstream in all content areas; however, the difference was only found statistically significant in math (p = .028) and marginally significant in science (p = .061).

DLI-NSS surpassed TBE/ESL in all content areas; however, the difference was only found statistically significant in math (p = .008) and in science (p = .004).

Mainstream surpassed TBE/ESL in all content areas by a statistically significant difference (all $p \leq .010$) except in math where the difference was not statistically significant. TBE/ESL placed last in all content areas and in most cases, by significant differences.

In the percentage of additional TAKS tests taken, DLI-NES had the best results in all content areas. DLI-NSS placed second in all content areas except math, where placed third. Mainstream placed third in all content areas except math, where it placed second. TBE/ESL placed last in all content areas. The significance of the differences varied depending of the comparison group.

DLI-NES took less additional TAKS tests than DLI-NSS in all content areas; however, the differences were not statistically significant (all $p \geq .307$). DLI-NES took less additional TAKS tests than Mainstream in all content areas; however, the differences were statistically significant in ELA ($p = .000$) and in social studies ($p = .000$). DLI-NES took less additional TAKS tests than TBE/ESL in all content areas and the difference was always statistically significant (all $p \leq .032$). DLI-NSS took less additional tests than Mainstream in all content areas except math. The diiference was statistically significant in ELA ($p = .045$) and social studies ($p = .024$) but not in science ($p = .657$). DLI-NSS took less additional tests than TBE/ESL in all content areas. The difference was statistically significant in ELA ($p = .008$) and social studies ($p = .029$), marginally significant in science ($p = .092$) and not significant in math ($p = .466$). Mainstream only took less additional tests than DLI-NSS in math, and the difference was found as not statistically significant ($p = .962$). Mainstream took less additional tests than TBE/ESL in all content areas except social studies. The Mainstream edge was found statistically significant in science ($p = .002$), marginally significant in math ($p = .059$) and not significant in ELA ($p = .509$). TBE/ESL took the largest amount of additional tests in all content areas and in many cases by statistically significant differences. The only exception was in social studies where TBE/ESL took less additional tests than Mainstream. However, the difference was found as not statistically significant.

In the percentage of students failing an Exit-TAKS test after several attempts, both DLI groups had the best results in all content areas. Both groups had no students failing an Exit TAKS after several attempts. Both groups outperformed Mainstream and TBE/ESL in all content areas by statistically significant differences (all $p = .000$).

Mainstream had less failing students than TBE/ESL in Math and in science, while TBE had less failing students than Mainstream in ELA and social studies. In all four comparisons, the differences were found as not statistically significant (all $p \geq .183$).

In the percentage of students excelling an Exit-TAKS test and meeting the commended criteria, DLI-NES surpassed all other groups in all content areas, except math, where DLI-NES was outscored by all the other groups. DLI-NSS surpassed all other groups in math, placed second in ELA and science, and place third in social studies. Mainstream placed second in social studies and third in all other content areas. TBE/ESL placed last in all content areas except math where it placed third. The statistical significance of the differences varied depending of the comparison group.

DLI-NES surpassed DLI-NSS by a statistically significant difference in ELA (p =.000) and social studies (p = .012) but not in science (p = .234). DLI-NES surpassed Mainstream by statistically significant differences in ELA (p =.000), science (p = .004), and social studies (p = .004). DLI-NES surpassed TBE/ESL by statistically significant differences in all core content areas (all $p \leq .015$) except math.

DLI-NSS only surpassed DLI-NES in math, and the difference was not statistically significant (p =.115). DLI-NSS surpassed mainstream by a statistically significant difference in math (p =.022), a marginally significant difference in science (p =.073), and by a not statistically significant difference in ELA (p =.613). DLI-NSS surpassed TBE/ESL in all content areas; however, the difference was only found statistically significant in math (p = .014), marginally significant in science (p =.067), and not statistically significant in ELA (p =.181), and social studies (p = .802).

Mainstream surpassed DLI-NES in math, but the difference was not statistically significant (*p* =.169). Mainstream surpassed DLI-NSS in social studies, but the difference was not statistically significant (*p* =.676). Mainstream surpassed in TBE/ESL in all content areas, but the differences was statistically significant only in ELA (*p* =.037), marginally significant in social studies (*p* = .090), and not statistically significant in math (*p* =.705) and science (*p* = .947).

In general, DLI-NES exhibited the best results in almost all measures of academic achievement related with TAKS. DLI-NES surpassed all other groups in score averages, had the lowest percentage of additional tests taken, the lowest percentage of students failing even after several attempts, and the highest percentage of students excelling the Exit TAKS and meeting the commended criteria. For the sixteen measures (four indicators by four content areas) DLI-NES placed fifteen times on first place and one in last place. DLI-NSS was second best on almost all indicators. For the sixteen measures, DLI-NSS placed six times on first place, eight times on second and two times on third. Mainstream placed third in academic achievement as measured by TAKS. For the sixteen indicators, Mainstream placed three times on second place, ten times on third place, and three times on last place. TBE/ESL exhibited the worst results, placing last on almost all indicators of academic achievement related with TAKS. For the 16 measures, TBE/ESL placed four times on third and 12 times on last.

It can be concluded that, from the perspective of TAKS, dual language instruction proved much more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Overall high school Performance.

The academic performance of students, based upon quantitative measures such as high school graduation, grade point average, and class ranking are an important indicator of academic achievement. These variables are commonly used by many universities across the nation as key indicators of academic performance.

Class ranking also provides a differentiated treatment for college admission. Colleges seek for top high school performers and deter the access of underperformers. From a college-readiness perspective, high school is not only about passing courses and passing grades; it is also about setting the basis for higher education. Overall high school performance is a clear indicator of instructional-program effectiveness. Therefore, a variety of measures of high school performance were analyzed to look for significant differences between groups including high school graduation, graduation plan, grade point average and school ranking.

*High School Graduation***.**

From the accountability perspective, the ultimate goal of public education is for students to graduate from high school. Therefore, the percentage of students graduating is a key indicator of academic achievement. Table 46 and Figure 42 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating on time.

Table 46: Percentage of students who met graduation requirements on time

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students who met graduation requirements	100%	92.4%	100%	89.8%

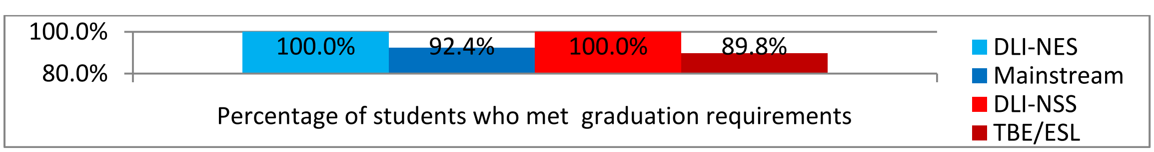

Figure 42: percentage of students who met graduation requirements on time

DLI-NES and DLI-NSS tied in first place, with all students graduating on time. Both DLI groups surpassed Mainstream by 7.6 percentage points (8.2%) and surpassed TBE/ESL by 10.2 percentage points (11.4%). Mainstream placed second, surpassing TBE/ESL by 2.6 percentage points (2.9%).

Table 47 shows the results of the Levene's test for the percentage of students graduating on time. The Levene's statistic found significant variance between groups (p = .000). Table 48 presents the ANOVA results for the percentage of students graduating on time. The ANOVA table identified no significant differences between groups (p = .131).

Table 47: Levene's statistic for percentage of students who met graduation requirements on time

Levene Statistic	df1	df2	Sig.
8.880	3	684	.000

Table 48: ANOVA table for percentage of students who met graduation requirements on time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.435	3	.145	1.882	.131
Within Groups	52.676	684	.077		
Total	53.110	687			

Table 49 presents the Contrast tests for the percentage of students graduating on time. Because the Levene's statistic found significant variances between groups (p = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 49: Contrast tests for percentage of students who met graduation requirements on time

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduating on time	Does not assume equal variances	1	.076	.0155	4.870	290.000	.000
		3	.102	.0161	6.322	353.000	.000
		4	-.076	.0155	-4.870	290.000	.000
		5	.026	.0224	1.167	640.486	.244
		6	.102	.0161	6.322	353.000	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and

TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .244). Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had 0% of students not graduating on time (p = 1.000).

Analysis discussion.

The four groups exhibited differences in the percentage of students who met graduation requirements and therefore were able to graduate on time. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES and DLI-NSS tied with a graduation rate of 100% (p = 1.000). DLI-NES surpassed Mainstream by 8.2% (p = .000) and TBE/ESL by 11.4% (p = .000). DLI-NSS surpassed Mainstream by 8.2% (p = .000) and surpassed TBE/ESL by 11.4% (p = .000). Mainstream surpassed TBE/ESL by 2.9% (p = .244).

Percentage of students who met Distinguished Achievement graduation plan

Even though graduating from high school is important, from a college –readiness perspective, it is also important how this graduation is achieved. The state of Texas has three different high school graduation plans for students to choose from, depending on their individual needs. The easiest graduation route is the Minimum Requirements plan that requires only 22 high school credits for graduation. This plan is designed for students who want to finish high school as soon as possible, allowing students to take a smaller number of courses per school year or to graduate from high school in three years. However, the minimum requirements plan is the least valued by colleges nationwide because it is the least challenging. The second choice is the Recommended Graduation plan, which requires student to complete 26 high school credits for graduation. This is the graduation plan followed by most high school students in Texas. The third and most challenging route is the Distinguished Achievement plan because it requires students to take at least four challenging college-level courses such as College Board Advanced Placement, within the 26 credits required for graduation. Because Distinguished Achievement students take college courses in high school, when they graduate, they have proven themselves capable of meeting the academic challenge of college. This is why most universities across the state and across the nation, seek for students graduating under the Distinguished Achievement plan.

Because graduating under the Distinguished Achievement (DA) plan is an asset from the college-readiness perspective, the percentage of students graduating under the DA plan was analyzed to look for statistically significant differences between groups. Table 50 and Figure 43 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating under the DA plan.

Table 50: Percentage of students graduating under the Distinguished Achievement Plan per group

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students graduating as Distinguished	56.3%	15.8%	44.4%	13.0%

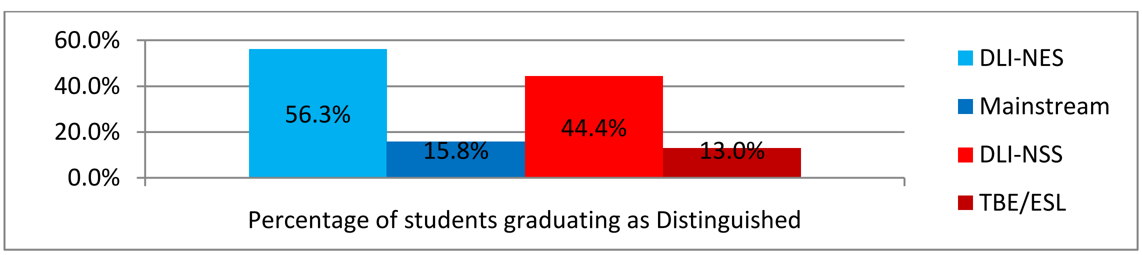

Figure 43: Percentage of students graduating under the Distinguished Achievement Plan per group

Both DLI programs had a significantly higher percentage of students graduating as DA. DLI-NES surpassed DLI-NSS by 26.8% (11.9 percentage points), Mainstream by 247.5% (40.1 percentage points), and TBE/ESL by 333.1% (43.3 percentage points). DLI-NSS surpassed Mainstream by 174.1% (28.2 percentage points) and TBE/ESL by

241.5% (31.4 percentage points). Mainstream surpassed TBE/ESL by 24.6% (3.2 percentage points).

Table 51 shows the results of the Levene's test for the percentage of students graduating as DA. The Levene's statistic found significant variance between groups (p = .000).

Table 51: Levene's test for percentage of students graduating under the Distinguished Achievement Plan

Levene Statistic	df1	df2	Sig.
15.641	3	684	.000

Table 52 shows the ANOVA results for the percentage of students graduating as DA. The ANOVA table found significant differences between groups (p = .000).

Table 52: ANOVA table for percentage of students graduating under the Distinguished Achievement Plan

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.085	3	1.695	12.975	.000
Within Groups	89.355	684	.131		
Total	94.440	687			

Table 53 presents the Contrast tests for the average TAKS scores for each content area per group. Because the Levene's test found significant variances between groups (*p* = .000), the –not assume equal variances- outcome was accepted as valid.

Table 53: Contrast tests for Percentage of students graduating under the Distinguished Achievement Plan

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduating as Distinguished	Does not assume equal variances	1	.40	.130	3.114	15.850	.007
		2	.12	.161	.734	31.334	.469
		3	.43	.129	3.345	15.591	.004
		4	-.29	.100	-2.870	28.568	.008
		5	.03	.028	1.008	597.104	.314
		6	.31	.099	3.174	27.781	.004

The Contrast tests identified statistically significant differences between groups in Contrast 1 between DLI-NES and Mainstream (*p* = .007), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .004), in Contrast 4 between Mainstream and DLI-NSS (*p* = .008), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .004). No statistically significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .469) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .314).

Analysis discussion.

The four groups exhibit differences in the percentage of students who met the distinguished graduation plan. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES had the highest percentage of students graduating under the Distinguished Achievement plan. DLI-NES surpassed DLI-NSS by 26.8% (*p* = .469), surpassed Mainstream by 247.5% (*p* = .007), and surpassed TBE/ESL by 333.1% (*p* = .004). DLI-NSS surpassed Mainstream by 174.1% (*p* = .008) and surpassed TBE/ESL by 241.5% (p = .004). Mainstream surpassed TBE/ESL by 24.6% (*p* = .314).

Percentage of students who met the Minimum Requirements' graduation plan

Graduating with minimum requirements can be a detrimental condition for students hoping to go to college. Therefore the percentage of students graduating with minimum requirements was analyzed to look for statistically significant differences between groups. Table 54 and Figure 44 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating under the minimum requirements plan.

Table 54: Percentage of students graduating with Minimum requirements

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
% of students graduating with minimum requirements	0.0%	2.7%	0.0%	0.6%

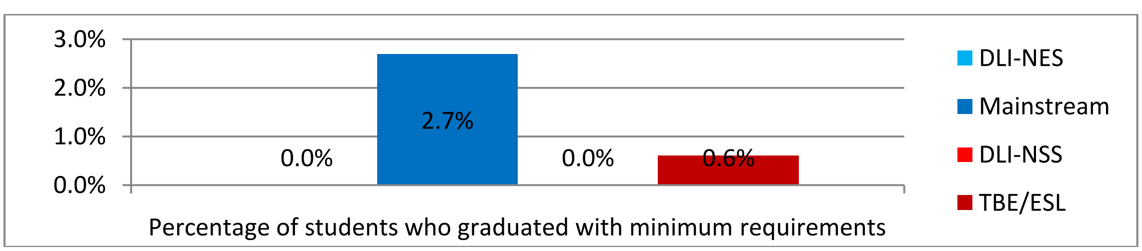

Figure 44: Percentage of students graduating with Minimum requirements

Both DLI groups exhibited the best academic performance with 0.0% students graduating under the minimum requirements plan. TBE/ESL placed third with 0.6% students graduating with minimum requirements; 100% more than both DLI groups. Mainstream had the worst performance with 2.7% students graduating with minimum requirements; 2.1 percentage points (77.8%) more than TBE/ESL and 100% more than both DLI groups. Table 55 shows the results of the Levene's test for the percentage of students graduating under the minimum requirements plan. The Levene's statistic found significant variance between groups (p = .000).

Table 55: Levene's Test for Percentage of students graduating with Minimum requirements

Levene Statistic	df1	df2	Sig.
8.254	3	684	.000

Table 56 presents the ANOVA results for the percentage of students graduating under the minimum requirements plan. The ANOVA table identified no significant differences between groups (p = .131).

Table 56: ANOVA table for Percentage of students graduating with Minimum requirements

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.086	3	.029	2.004	.112
Within Groups	9.769	684	.014		
Total	9.855	687			

Table 57 presents the Contrast tests for the percentage of students graduating under the minimum requirements plan. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was validated.

Table 57: Contrast tests for Percentage of students graduating with Minimum requirements

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduation with Minimum Requirements	Does not assume equal variances	1	-.03	.010	-2.863	290.000	.004
		3	-.01	.004	-1.416	353.000	.158
		4	.03	.010	2.863	290.000	.004
		5	.02	.010	2.101	389.234	.036
		6	-.01	.004	-1.416	353.000	.158

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .004), in Contrast 4 between Mainstream and DLI-NSS (p = .004), and in Contrast 5 between Mainstream and TBE/ESL (p = .036). No significant differences were identified in Contrast 3 between DLI-NES and TBE/ESL (p = .158) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .158). Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had 0% of students graduating with minimum requirements.

Analysis discussion.

The four groups exhibit differences in the percentage of students graduating with minimum requirements. This suggests that program type is a contributing factor to academic achievement for students. Both DLI groups exhibited the best performance with 0.0% students graduating under the minimum requirements plan (p = 1.000). TBE/ESL placed third with 100% more students graduating with minimum requirements than both DLI groups (p = .158). Mainstream had the worst performance with 77.8% more than TBE/ESL (p = .036) and 100% more than both DLI groups (p = .004).

Weighted grade point average.

Every year, schools across the nation rank their students according to their individual academic achievement. Percentage points are assigned for every course taken and for the final grades achieved in those courses. During their high school years, the students' grade point average (GPA) is monitored as a way to evaluate academic achievement. Even though course grades can be highly subjective and reliant to individual teacher and school criteria, GPA is considered an important indicator of academic achievement.

Even more helpful is the weighted grade point average (W-GPA), where grades are weighted according to the difficulty level and academic relevance of the course. For example, a Biology AP course gets more weight than a Biology Pre-AP course and even more than a regular Biology class. Due to its standardized nature, WGPA facilitates comparisons between schools.

Due to its academic relevance, the students' WGPA was analyzed to look for statistically significant differences between groups. Table 58 and Figure 45 exhibit the initial data, which shows that the four groups exhibited differences in mean weighted grade point average

Table 58: Mean weighted grade point average per group

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Mean Weighted Grade point Average	92.4	84.4	89.8	83.2

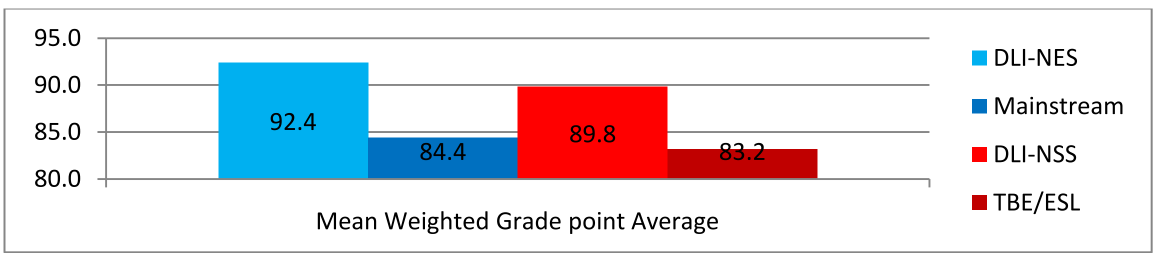

Figure 45: Mean weighted grade point average per group

The four groups exhibited differences in their students' mean weighted grade point average. DLI-NES had the best WGPA, and surpassed the other three groups by a wide margin. DLI-NES surpassed DLI-NSS by 2.6 percentage points (2.9%), surpassed Mainstream by 8.0 percentage points (9.5%), and surpassed TBE/ESL by 9.2 percentage points (11.1%). DLI-NSS placed second, surpassing Mainstream by 5.4 percentage points (6.4%) and surpassing TBE/ESL by 6.6 percentage points (7.9%). Mainstream placed third by surpassing TBE/ESL by 1.2 percentage points (1.4%). Table 59 shows the results of the Levene's test for mean WGPA. The Levene's statistic found no significant variance between groups (p = .757).

Table 59: Levene's Test for Mean weighted grade point average

Levene Statistic	df1	df2	Sig.
.395	3	684	.757

Table 60 presents the ANOVA results for mean weighted grade point average. The ANOVA table identified significant differences between groups (p = .000).

Table 60: ANOVA table for Mean weighted grade point average

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2297.870	3	765.957	8.829	.000
Within Groups	59341.985	684	86.757		
Total	61639.856	687			

Table 61 presents the Contrast tests for mean weighted grade point average. Because the Levene's statistic found no significant variances between groups (*p* = .757), the Contrast tests' –*assume equal variance*- outcome was considered as valid.

Table 61: Contrast tests for Mean weighted grade point average

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Weighted Grade Point Average	Assume equal variances	1	7.9248764	2.39174947	3.313	684	.001
		2	2.5322859	2.93863292	.862	684	.389
		3	9.1703388	2.38063177	3.852	684	.000
		4	-5.3925905	1.87386443	-2.878	684	.004
		5	1.2454623	.73702924	1.690	684	.092
		6	6.6380529	1.85965319	3.570	684	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .001), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .004), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .002). The Contrast test salso identified a marginally significant difference in Contrast 5 between Mainstream and TBE/ESL (*p* = .092), and found no statistically significant difference in Contrast 2 between DLI-NES and DLI-NSS (*p* = .315).

Analysis discussion.

The four groups exhibited differences in their students' GPA. This suggests that program type is a causal factor to academic achievement for students.

DLI-NES students achieved the highest mean in WGPA, surpassing DLI-NSS by 2.9% (*p* = .389), surpassing Mainstream by 9.5% (*p* = .001), and surpassing TBE/ESL by 11.1% (*p* = .000). In second place, DLI-NSS surpassed Mainstream by 6.4% (*p* = .004) and TBE/ESL by 7.9% (p = .000). Mainstream placed third, surpassing TBE/ESL by 1.4% (*p* = .092).

Student's ranking

Through WGPA, schools can rank their students based on academic achievement. Class ranking is helpful to compare individual students' achievement in comparison with the academic achievement of their peers. Because ranking is considered a key indicator of academic achievement by most colleges across the nation, the groups' average student ranking was analyzed to look for statistically significant differences between groups. Table 62 and Figure 46 exhibit the initial data, which shows that the four groups exhibited differences in students' average ranking.

Table 62: Students' average ranking per group

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Students Average Ranking	105.4	229.7	164.7	260.9

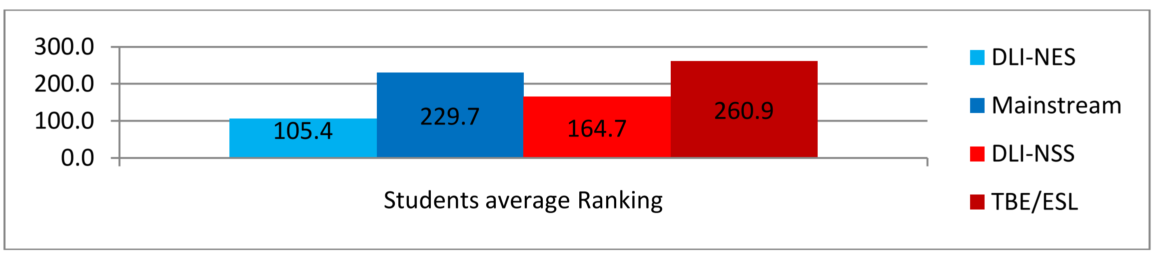

Figure 46 Students' average ranking per group

It is important to remember that in ranking, the lower the number, the better. Ranking is measured from 1 to *n*, 1 being the best possible ranking position available and N the last and worst-possible ranking position available.

DLI had the best academic performance with a ranking average of 105.5. DLI-NSS placed second with a ranking average of 164.7 percentage points; 59.3 percentage points (56.3%) more than DLI-NES. Mainstream placed third with 229.7 percentage points; 65.0 percentage points (39.5%) more than DLI-NSS and 124.3 percentage points (117.9%) more than DLI-NES. TBE/ESL had the worst performance with an average ranking of 260.9 percentage points; 31.2 percentage points (13.6%) more than Mainstream, 96.2 percentage points (58.4%) more than DLI-NSS, and 155.5 percentage points (147.5%) more than DLI-NES.

Table 63 shows the results of the Levene's test for students' average ranking. The Levene's statistic found significant variance between groups (p = .040).

Table 63: Levene's Test for Students' average ranking per group

Levene Statistic	df1	df2	Sig.
2.789	3	684	.040

Table 64 presents the ANOVA results for students' average ranking. The ANOVA table identified significant differences between groups (p = .000).

Table 64: ANOVA table for Students' average ranking per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	628195.929	3	209398.643	9.708	.000
Within Groups	14753491.141	684	21569.431		
Total	15381687.070	687			

Table 65 presents the Contrast tests for students' average ranking. Because the Levene's statistic found significant variances between groups (p = .040), the Contrast tests' –*not assume equal variance*- outcome was considered as valid.

Table 65: Contrast tests for students' average ranking per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
place achieved in the school overall ranking	Does not assume equal variances	1	-124.37	24.567	-5.063	19.266	.000
		2	-59.29	35.224	-1.683	40.306	.100
		3	-155.51	24.439	-6.363	18.872	.000
		4	65.08	27.922	2.331	31.464	.026
		5	-31.14	11.670	-2.668	629.788	.008
		6	-96.22	27.809	-3.460	30.967	.002

The Contrast tests found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .026), in Contrast 5 between Mainstream and TBE/ESL (p = .008), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .002). The test found no significant difference in Contrast 2 between DLI-NES and DLI-NSS (p = .100).

Analysis discussion.

The four groups exhibit differences in the mean ranking of their students. This suggests that program type is a contributing factor to academic achievement for students. DLI had the best academic performance with a ranking average of 105.5. DLI-NSS placed second with a ranking 56.3% higher than DLI-NES (p = .201). Mainstream placed third with a ranking 39.5% higher than DLI-NSS (p = .028) and 117.9% higher than DLI-NES (p = .001). TBE/ESL had the worst performance with a ranking 13.6% higher than Mainstream (p = .008), 58.4% higher than DLI-NSS (p = .001), and 147.5% higher than DLI-NES (p = .000).

Percentage of students in the Top 10%

High schools use WGPA to categorize their class students in predetermined brackets, percentiles or quartiles. The most common bracket used in high school is Top 10%, which, as the name indicates, includes the top 10% of the students with the highest WGPA in the school. Highly selective universities across the nation look to incorporate into their ranks the most successful students available. By identifying their top 10% students, schools facilitate college entrance selection.

It is expected that 10% of the students of an instructional program are included in the Top 10% list. The representation of instructional programs in the Top 10% list is a clear indicator of the effectiveness of an instructional program. For this reason, the groups' representation in the Top 10% was analyzed to look for statistically significant differences between groups. Table 66 and Figure 50 exhibit the initial data, which shows that the groups exhibited differences in the percentage of students ranked in Top 10%.

Table 66: Percentage of students per group ranked in the Top 10%

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 10%	37.5%	10.0%	18.5%	8.2%

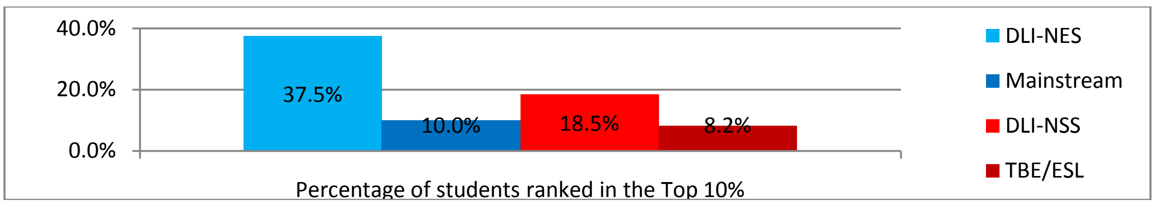

Figure 47: Percentage of students per group ranked in the Top 10%

DLI had the highest percentage of students ranked in the Top 10%, surpassing DLI-NSS by 19.0 percentage points (102.7%), Mainstream by 27.5 percentage points (275.0%), and TBE/ESL by 29.3 percentage points (357.3%). DLI-NSS placed second, surpassing Mainstream by 8.5 percentage points (85.0%) and TBE/ESL by 10.3 percentage points (125.6%). Mainstream placed third, surpassing TBE/ESL by 1.8 percentage points (22.0%). Table 67 shows the results of the Levene's test for the percentage of students ranked in the Top 10%. The Levene's statistic found significant variance between groups (p = .000).

Table 67: Levene's test for Percentage of students per group ranked in the Top 10%

Levene Statistic	df1	df2	Sig.
12.462	3	684	.000

Table 68 presents the ANOVA results for the percentage of students ranked in the Top 10%. The ANOVA table found significant differences between groups (p = .001).

Table 68: ANOVA table for Percentage of students per group ranked in the Top 10%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.522	3	.507	5.729	.001
Within Groups	60.558	684	.089		
Total	62.080	687			

Table 69 presents the Contrast tests for the percentage of students ranked in the Top 10%. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 69: Contrast tests for Percentage of students per group ranked in the Top 10%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Met top ten percent	Does not assume equal variances	1	.28	.126	2.181	15.600	.045
		2	.19	.146	1.297	26.132	.206
		3	.29	.126	2.329	15.412	.034
		4	-.09	.078	-1.094	28.839	.283
		5	.02	.023	.776	595.091	.438
		6	.10	.078	1.331	27.941	.194

The Contrast tests identified significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .045) and in Contrast 3 between DLI-NES and TBE/ESL (*p* = .034). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .206), in Contrast 4 between Mainstream and DLI-NSS (*p* = .283), in Contrast 5 between Mainstream and TBE/ESL (*p* = .438), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .194).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the top 10%. This suggests that program type is a contributing factor to academic achievement for students. The results of the analysis show that higher percentages of students in the DLI programs ranked in the top 10% of students in their classes. DLI-NES surpassed DLI-NSS by 102.7% (*p* = .206), surpassed Mainstream by 275.0% (*p* = .045) and surpassed TBE/ESL by 357.3% (*p* = .034). DLI-NSS surpassed Mainstream by 85.0% (*p*

= .283) and surpassed TBE/ESL by 125.6% (p = .194). Mainstream surpassed TBE/ESL by 22.0% (p = .438).

Percentage of students in top 25%

Another practical way of using WGPA is by identifying the students ranked in the top 25% or first quartile. Even though they are not considered the school's most academically outstanding students, their academic ranking identifies them as academically successful and with high possibilities to be successful in college. Therefore, most selective universities welcome this kind of student into their ranks.

By definition, it is expected that 25% of the students in an instructional program should be included in the top 25% rank. Therefore the instructional programs' representation in the top25% list is a clear indicator of program effectiveness. For this reason, the groups' percentage of students in the Top 25% was analyzed to look for statistically significant differences between groups. Table 70 and Figure 48 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in the top 25%.

Table 70: Percentage of students per group, ranked in the Top 25%

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 25%	56.3%	25.8%	48.1%	21.2%

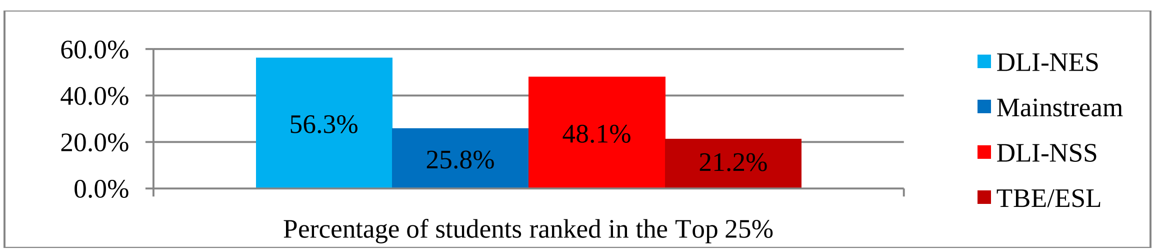

Figure 48: Percentage of students per group, ranked in the Top 25%

DLI-NES surpassed DLI-NSS by 8.2 percentage points (17.0%), Mainstream by 30.5 percentage points (118.2%), and TBE/ESL by 35.1 percentage points (165.6%). DLI-NSS surpassed Mainstream by 22.3 percentage points (86.4%) and TBE/ESL by

26.9 percentage points (126.9%). Mainstream surpassed TBE/ESL by 4.6 percentage points (21.7%).

Table 71 shows the results of the Levene's test for percentage of students ranked in the top 25%. The Levene's test found significant variance between groups (p = .000).

Table 71: Levene's test for Percentage of students per group, ranked in the Top 25%

Levene Statistic	df1	df2	Sig.
8.191	3	684	.000

Table 72 presents the ANOVA results for the percentage of students ranked in the top 25%. The ANOVA table identified significant differences between groups (p = .000).

Table 72: ANOVA table for Percentage of students per group, ranked in the Top 25%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.541	3	1.180	6.436	.000
Within Groups	125.459	684	.183		
Total	129.000	687			

Table 73 presents the Contrast tests for the percentage of students ranked in the top 25%. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 73: Contrast tests for Percentage of students per group, ranked in the Top 25%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the top 25%	Does not assume equal variances	1	.30	.131	2.333	16.229	.033
		2	.08	.161	.502	31.476	.619
		3	.35	.130	2.699	15.877	.016
		4	-.22	.101	-2.209	29.683	.035
		5	.05	.034	1.363	601.096	.173
		6	.27	.100	2.686	28.620	.012

The Contrast tests identified significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .033), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .016), in Contrast 4 between Mainstream and DLI-NSS (*p* = .035), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .012). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .619) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .173).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in top 25%. This suggests that program type is a contributing factor to academic achievement for students. As with the results for the top 10%, the analysis of the top 25% shows that students in the DLI programs succeed at higher rates than students in the other types of programs. DLI-NES surpassed all other groups in the percentage of students included in Top 25%. DLI-NES surpassed DLI-NSS by 17.0% (p = .619), Mainstream by 118.2% (p = .033) and TBE/ESL by 165.6% (p = .016). DLI-NSS placed second by surpassing Mainstream by 86.4% (p = .035) and TBE/ESL by 126.9% (p = .012). Mainstream placed third by surpassing TBE/ESL by 21.7% (p = .173).

Percentage of Students in top 50%.

The weighted Grade Point Average (WGPA) can also be used to identify which students are above the mean. Because it is a more inclusive bracket than the top 10% or the top 25% brackets, it becomes a more reliable measure of the effectiveness of an instructional program. Therefore, the percentage of students ranked in the top 50% was analyzed to looks for statistically significant differences between groups. Table 74 and Figure 49 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in the top 50%.

Table 74: Percentage of students per group ranked in the top 50%

Cohort 2005=2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 50%	81.3%	50.5%	74.1%	46.3%

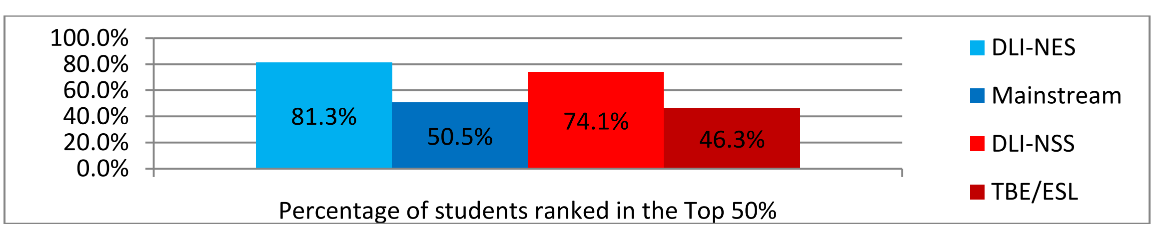

Figure 49: Percentage of students per group ranked in the top 50%

DLI-NES had the best results, followed by DLI-NSS in second place, Mainstream in third place, and TBE/ESL in last place. DLI-NES surpassed DLI-NSS by 7.2 percentage points (9.7%), Mainstream by 30.8 percentage points (61.0%), and TBE/ESL by 35.0 percentage points (75.6%). DLI-NSS surpassed Mainstream by 23.6 percentage points (46.7%) and TBE/ESL by 27.8 percentage points (60.0%). Mainstream surpassed TBE/ESL by 4.2 percentage points (9.1%).

Table **75** shows the results of the Levene's test for the percentage of students ranked in top 50%. The test found significant variance between groups (p = .000)**.**

Table 75: Levene's test for Percentage of Students by group ranked in the Top 50%

Levene Statistic	df1	df2	Sig.
77.807	3	684	.000

Table 76 presents the ANOVA results for the percentage of students ranked in the top 50%. The ANOVA table identified significant differences between groups (p = .002).

Table 76: ANOVA table for Percentage of students per group ranked in the top 50%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.612	3	1.204	4.891	.002
Within Groups	168.388	684	.246		
Total	172.000	687			

Table 77 presents the Contrast tests for the percentage of students ranked in the top 50%. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 77: Contrast Test for Percentage of students per group ranked in the top 50%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the top 50%	Does not assume equal variances	1	.31	.105	2.928	17.648	.009
		2	.07	.132	.542	34.289	.591
		3	.35	.104	3.351	17.149	.004
		4	-.24	.091	-2.594	32.383	.014
		5	.04	.040	1.058	618.378	.290
		6	.28	.090	3.085	31.175	.004

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .009), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .004), in Contrast 4 between Mainstream and DLI-NSS (*p* = .014), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .004). No statistically significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .591) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .290).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the top 50%. This suggests that program type is a contributing factor to academic achievement for students. Once again, students in the DLI programs exhibit greater success than students in the other groups. A greater percentage of students in the DLI program rank in the top 50% of all students using WGPA as a measure.

DLI-NES surpassed DLI-NSS by 9.7% (*p* = .591), surpassed Mainstream by 61.0% (*p* = .009) and surpassed TBE/ESL by 75.6% (*p* = .004). DLI-NSS surpassed Mainstream by 46.7% (*p* = .014) and surpassed TBE/ESL by 60.0% (p = .004). Mainstream surpassed TBE/ESL by 9.1% (*p* = .290).

Percentage of students in last 25%.

The identification of low performing students is a practical way to measure the effectiveness of an instructional program. Therefore, the percentage of students ranked in the last 25% was measured to look for statistically significant differences between groups. Table 78 and Figure 50 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in the last 25%.

Table 78: Percentage of students per group ranked in the last 25%

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the last 25%	0.0%	22.7%	3.7%	29.7%

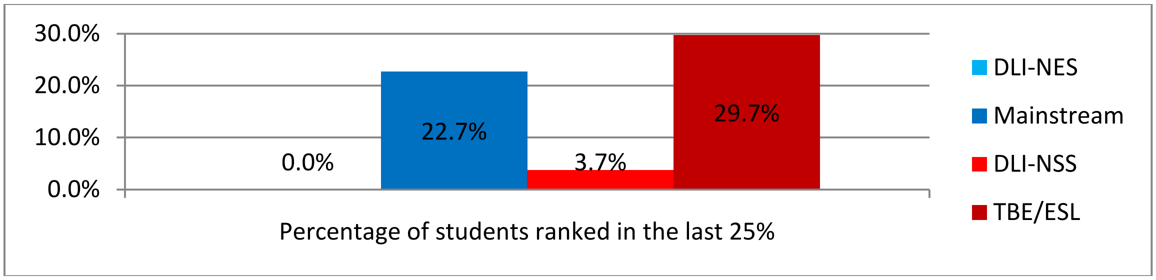

Figure 50: Percentage of students per group ranked in the last 25%

Participation in the last 25% is detrimental because this quartile represents the lowest performers in the class. Therefore, the group with best academic performance is the one with the lowest percentage of students ranked in the last 25%. DLI-NES had the best performance, with 0.0% students in the last 25%. DLI-NSS placed second with 3.7% of its students in the last quartile, 100% more than DLI-NES. Mainstream placed third with 22.7% students in the last 25%, 19.0 percentage points (513.5%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 29.7% of it students in the last quartile, 7.0 percentage points (30.8%) more than Mainstream, 26.0 percentage points (702.7%) more than DLI-NSS, and 100% more than DLI-NES.

Table 79 shows the results of the Levene's test for the percentage of students ranked in the last 25%. The Levene's statistic found significant variance between groups ($p = .000$).

Table 79: Levene's test for Percentage of students per group ranked in the last 25%

Levene Statistic	df1	df2	Sig.
44.226	3	684	.000

Table 80 presents the ANOVA results for the percentage of students ranked in the last 25%. The ANOVA table identified significant differences between groups ($p = .001$).

Table 80: ANOVA test for Percentage of students per group ranked in the last 25%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.150	3	1.050	5.707	.001
Within Groups	125.850	684	.184		
Total	129.000	687			

Table 81 presents the Contrast tests for the percentage of students ranked in the last 25%. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 81: Contrast tests for Percentage of students per group ranked in the last 25%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the last 25%	Does not assume equal variances	1	-.23	.025	-9.223	290.000	.000
		2	-.04	.037	-1.000	26.000	.327
		3	-.30	.024	-12.201	353.000	.000
		4	.19	.044	4.269	53.051	.000
		5	-.07	.035	-2.019	635.320	.044
		6	-.26	.044	-5.859	52.513	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .044), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .327).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the last 25%. This suggests that program type is a contributing factor to academic achievement for students. As with previous measures, students in the DLI groups had more success than students in either the mainstream or the ESL/TBE groups. DLI-NES had the best performance, with 0.0% students in the last 25%. DLI-NSS placed second with 100% more students in the last quartile than DLI-NES (*p* = .327). Mainstream placed third with 513.57% more students in the last 25% than DLI-NSS (*p* = .000) and 100% more than DLI-NES (*p* = .000). TBE/ESL had the worst performance with 30.8% more students in the last quartile than Mainstream (p = .044), 702.7% more than DLI-NSS (p = .000), and 100% more than DLI-NES (p = .000).

Summary of results on overall high school performance.

The four groups exhibited differences in all indicators of high school performance. In high school graduation rate, both DLI groups surpassed the other groups. DLI-NES and DLI-NSS tied with a graduation rate of 100% (p = 1.000), surpassing Mainstream by 8.2% and TBE/ESL by 11.4%. The differences were statistically significant (all p = .000). Mainstream surpassed TBE/ESL by 2.9%; however, the difference was not statistically significant (p = .244).

In the percentage of students who met the -Distinguished Achievement- graduation plan, DLI-NES outscored all the other groups. DLI-NES surpassed TBE/ESL by 333.1% and Mainstream by 247.5%. In both cases, the difference was statistically significant ($p \leq .007$). DLI-NES surpassed DLI-NSS by 26.8%; however, the difference was not statistically significant (p = .469). DLI-NSS placed second, surpassing Mainstream by 174.1% and TBE/ESL by 241.5%. In both cases, the difference was statistically significant ($p \leq .008$). Mainstream placed third, surpassing TBE/ESL by 24.6%. However, the difference was not identified as statistically significant (p = .314).

In the percentage of students graduating with the minimum requirement, both DLI groups had the best results. Both DLI groups had no students graduating with minimum requirements, outperforming Mainstream by a statistically significant difference (p = .004) and surpassing TBE/ESL by a not statistically significant difference (p = 158). TBE/ESL placed second, outperforming Mainstream by a statistically significant difference (p = .036).

In weighted grade point average, DLI-NES achieved the highest average, surpassing TBE/ESL and Mainstream by a statistically significant difference ($p \leq .001$); and surpassing DLI-NSS by a difference not statistically significant ($p = .389$). DLI-NSS placed second, by surpassing Mainstream and TBE/ESL by statistically significant differences ($p \leq .004$). Mainstream placed third, surpassing TBE/ESL by a marginally significant difference ($p = .092$).

In student ranking, DLI-NES outperformed all the other groups. DLI-NES surpassed Mainstream and TBE/ESL by statistically significant differences ($p \leq .001$), and surpassed DLI-NSS by difference not identified as statistically significant ($p = .201$). DLI-NSS placed second by outperforming Mainstream and TBE/ESL by statistically significant differences ($p \leq .028$). And outperformed TBE/ESL by 58.4% ($p = .001$). Mainstream place third, outperforming TBE/ESL by a statistically significant difference ($p = .008$).

In the percentage of students ranked in the top 10%, DLI-NES surpassed all the other groups. DLI-NES placed first by surpassing Mainstream and TBE/ESL by statistically significant differences ($p \leq .045$), and by surpassing DLI-NSS by a difference not identified as statistically significant ($p = .206$). DLI-NSS placed second by surpassing Mainstream and TBE/ESL. However, in both cases the differences were not statistically significant ($p \geq .194$). Mainstream placed third by surpassing TBE/ESL. The difference was not statistically ($p = .438$).

In the percentage of students ranked in the top 25%, DLI-NES exhibited the best results by surpassing Mainstream and TBE/ESL by statistically significant differences ($p \leq .033$), and surpassed DLI-NSS by a difference not statistically significant ($p = .619$).

DLI-NSS placed second by surpassing Mainstream and TBE/ESL by statistically significant differences ($p \leq .035$) Mainstream placed third by surpassing TBE/ESL; however, the difference was not identified as statistically significant ($p = .173$).

In the percentage of students ranked in the top 50%, DLI-NES placed first by surpassing Mainstream and TBE/ESL by statistically significant differences($p \leq .009$), and by surpassing DLI-NSS by a difference not identified as statistically significant ($p = .591$). DLI-NSS placed second, surpassing Mainstream and TBE/ESL by statistically significant differences ($p \leq .014$). Mainstream placed third by surpassing TBE/ESL by a difference not found statistically significant ($p = .290$).

In the percentage of students ranked in the last 25%, DLI-NES had the best results by having no representation in the last quartile. DLI-NES outperform Mainstream and TBE/ESL by statistically significant differences ($p = .000$) and outperformed DLI-NSS by a not statistically significant difference ($p = .327$). DLI-NSS placed second best by surpassing Mainstream and TBE/ESL by statistically significant differences (p = .000). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference ($p = .044$).

DLI-NES exhibited the best results in all measures of academic achievement related to high school performance. For the nine measures of high school performance, DLI-NES consistently placed first. DLI-NSS tied for first place in two indicators – graduation rate and percentage of students graduating with minimum requirements- and placed second on the other seven measures. Mainstream always placed third except in the percentage of students graduating with minimum requirements, where Mainstream placed last. TBE/ESL exhibited the worst results, placing last in eight of the nine indicators of academic achievement related with high school performance. TBE/ESL only placed third in the percentage of students graduating with minimum requirements.

It can be concluded that from the perspective of high school performance, dual language instruction proved much more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Performance on College-Readiness Indicators.

Performance on standardized assessments such as TAKS, high school graduation, grade point average, and class ranking are important indicators of academic achievement. However, all these indicators are based upon academic performance during high school. The fact that a student is successful at the high school level does not imply that he/she would be successful in college, because the challenges and expectations are different.

For most colleges across the nation, the most reliable predictors of academic performance are those designed with a college-level challenge in mind. The students' performance in college-level courses such as AP is a very reliable predictor of how these students will perform in college because the students are following a college-level curriculum and expected to meet expectations at a college-level assessment.

Standardized college-admission tests such as SAT or ACT are also very reliable predictors of college-readiness. Designed with the purpose in mind, college admission tests measure the knowledge and skills students need in order to be academically successful in college, freshmen-level courses. For example, the ACT benchmark scores reflect the level of knowledge and skills required for students to have a 75% chance of achieving a grade of C or higher in freshmen, credit-bearing courses such as English composition, algebra, social science and biology (ACT-2010).

Therefore, a variety of measures of performance in college-readiness were analyzed to look for significant differences between groups. The variables analyzed include overall performance in AP tests and overall performance in ACT tests. Each indicator was analyzed from different perspectives to provide a more comprehensive analysis.

Students' participation and performance in Advanced Placement (AP) tests.

Participation in AP courses and assessments is a highly reliable indicator of how well prepared students are for college. Many high schools across the nation recognize the additional challenge of these courses by granting additional GPA weight to AP courses. Many colleges across the nation recognize the validity and reliability of AP courses by granting students college credits when they meet expectations in the AP assessment. Because AP course participation and AP test passing are key indicators of college readiness, both measures were analyzed to look for differences between groups.

Participation in Advanced Placement (AP) tests.

Participation in AP courses is a reliable predictor of college readiness. When students participate in challenging courses such as AP courses, they demonstrate a higher commitment to academic success. Course participation was measured by the percentage of students who took at least one AP test. The percentage of students taking at least one AP test was analyzed to look for differences between groups. Table 82 and Figure 51 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students that took an AP test.

Table 82: Percentage of students that took an AP test, by groups

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
% of students who took an AP test by groups	100.0%	11.7%	100.0%	14.7%

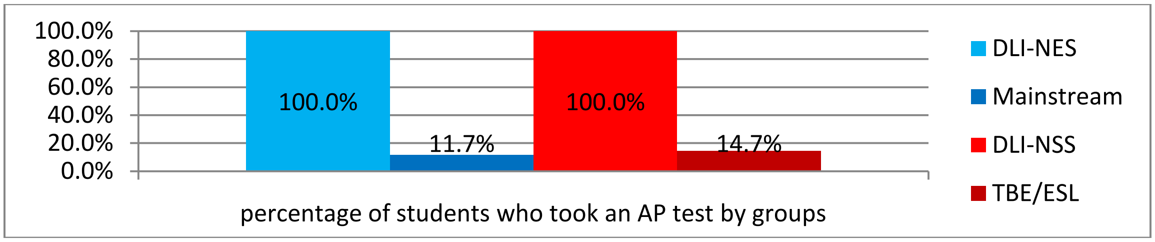

Figure 51: percentage of students who took an AP test, by groups

DLI-NES and DLI-NSS tied in first place, with all students taking at least one AP test during their 4 years of high school education. Both DLI groups surpassed Mainstream by 88.3 percentage points (754.7%) and surpassed TBE/ESL by 85.3 percentage points (580.3%). TBE/ESL placed third, surpassing Mainstream by 3.0 percentage points (2.9%). Table 83 shows the results of the Levene's test for the percentage of students taking an AP test. The Levene's statistic found significant variance between groups (p = .000)**.**

Table 83: Levene's test for Percentage of Students per group taking an AP test

Levene Statistic	df1	df2	Sig.
14.094	3	684	.000

Table 84 presents the ANOVA results for the percentage of students taking an AP test. The ANOVA table identified significant differences between groups (p = .000).

Table 84: ANOVA table for Percentage of students per group taking an AP test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	30.423	3	10.141	93.247	.000
Within Groups	74.389	684	.109		
Total	104.813	687			

Table 84 presents the Contrast tests for the percentage of students taking at least one AP test during their high school education. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 85: Contrast Test for Percentage of students per group taking an AP test

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an AP test	Does not assume equal variances	1	.883	.0189	46.819	290.000	.000
		3	.853	.0188	45.278	353.000	.000
		4	-.883	.0189	-46.819	290.000	.000
		5	-.030	.0267	-1.127	636.683	.260
		6	.853	.0188	45.278	353.000	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No statistically significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .260). Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had 100% students taking the test (p = 1.000).

Analysis discussion.

The four groups exhibited large differences in the percentage of students taking at least one AP test. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES and DLI-NSS tied in first place, with all their students taking at least one AP test during their 4 years of high school education. Both DLI groups surpassed Mainstream by 754.7% (p = .000) and surpassed TBE/ESL by 580.3% (p = .000). TBE/ESL placed third, surpassing Mainstream by 2.9% (p = .260).

Percentage of students succeeding in Advanced Placement (AP) tests

Active participation in AP courses has proven a reliable predictor of college readiness. However, a clear indicator of college readiness is when students not only actively participate in a college-level course and take the final exam, but when students are academically capable of meeting the expectations of the test. From the AP perspective, students meet the criteria and are therefore meritorious to receive college credit for that course, when they achieve a score of 3 or more in the AP test. The maximum grade in AP rest is 5 and the minimum grade is 1. When students succeed in challenging courses such as AP, not only demonstrate a higher commitment for academic success; they demonstrate college-level readiness.

The percentage of students passing at least one AP test with a grade of 3 or more was analyzed to look for differences between groups. Table 86 and Figure 52 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students passing an AP test with a score of 3 or higher.

Table 86: Percentage of students who passed an AP test with a score of 3 or higher

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
percentage of students who passed an AP test	68.8%	3.8%	88.9%	10.0%

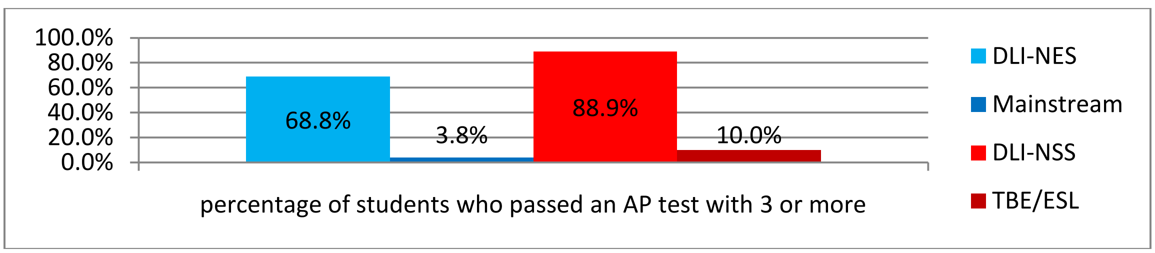

Figure 52: percentage of students that passed an AP test with a score of 3 or higher

DLI-NSS had the largest percentage of students passing at least one AP test with a score of 3 or higher during their 4 years of high school education. DLI-NSS surpassed DLI-NES by 20.1 percentage points (29.2%), surpassed TBE/ESL by 78.9 percentage points (789.0%) and surpassed mainstream by 85.1 percentage points (2239.5%). DLI-NES placed second, surpassing TBE/ESL by 58.8 percentage points (588.0%) and surpassing Mainstream by 65.0 percentage points (1710.5%). TBE/ESL placed third, surpassing Mainstream by 6.2 percentage points (163.2%).

Table 87 shows the results of the Levene's test for the percentage of students passing an AP test. The test found significant variance between groups (p = .000).

Table 87: Levene's test for Percentage of Students passing an AP test

Levene Statistic	df1	df2	Sig.
23.493	3	675	.000

Table 88 presents the ANOVA results for the percentage of students passing an AP test. The ANOVA table identified significant differences between groups (p = .000).

Table 88: ANOVA table for Percentage of students passing an AP test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.165	3	7.722	108.196	.000
Within Groups	48.173	675	.071		
Total	71.337	678			

Table 89 presents the Contrast tests for the percentage of students passing an AP test. Because the Levene's test found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 89: Contrast Test for Percentage of students per group passing an AP test

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who passed an AP test with 3 or more	Does not assume equal variances	1	.649	.1202	5.400	15.271	.000
		2	-.201	.1346	-1.496	23.075	.148
		3	.587	.1208	4.863	15.548	.000
		4	-.851	.0627	-13.572	27.791	.000
		5	-.062	.0197	-3.145	599.658	.002
		6	.789	.0637	12.380	29.660	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .002), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .000). No significant difference was identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .148). .

Analysis discussion.

The four groups exhibited large differences in the percentage of students passing at least one AP test with a score of 3 or higher. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NSS had the highest percentage of students passing an AP test with a score of 3 or higher. DLI-NSS surpassed DLI-NES by 29.2%, (p = .148), surpassed TBE/ESL by 785.0% (p = .000) and surpassed mainstream by 2239.5% (p = .000). DLI-NES placed second, surpassing TBE/ESL by 588.0% (p = .000) and surpassing Mainstream by 1710.5% (p = .000). TBE/ESL surpassed Mainstream by 163.2% (p = .002).

Participation in AP tests other than Spanish.

According to College Board (2010b), Hispanic participation in AP tests is similar to the national average. However, this participation is centered on Spanish language tests. When Spanish tests are not considered, the level of participation significantly decreases (College Board, 2010b). For this reason, the students' participation in AP tests other than Spanish was analyzed to look for differences between groups. Table 90 and Figure 53 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students that took an AP test other than Spanish.

Table 90: Percentage of students that took an AP test other than Spanish, by groups

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
% of students who took an AP test other than Spanish	37.5%	10.0%	44.4%	12.1%

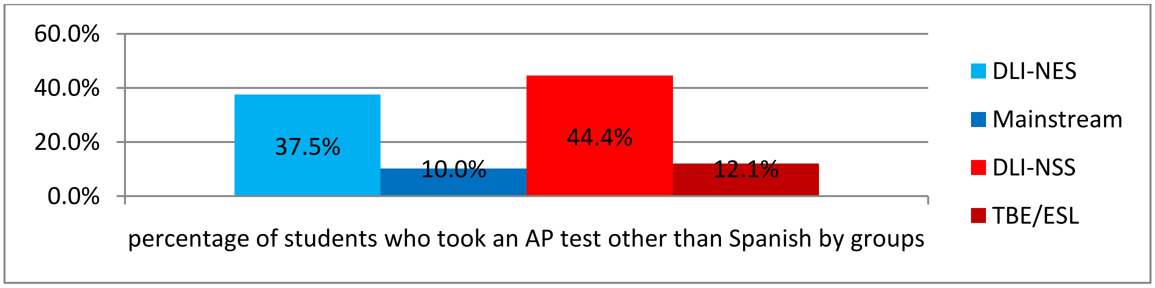

Figure 53: percentage of students that took an AP test other than Spanish, by groups

DLI-NSS had the largest percentage of students taking an AP test other than Spanish. DLI-NSS surpassed DLI-NES by 6.9 percentage points (18.4%), surpassed TBE/ESL by 32.3 percentage points (266.9%) and surpassed mainstream by 34.4 percentage points (344.0%). DLI-NES placed second, surpassing TBE/ESL by 25.4 percentage points (209.9%) and surpassing Mainstream by 27.5 percentage points (275.0%). TBE/ESL placed third, surpassing Mainstream by 2.1 percentage points (21.0%). Table 91 shows the results of the Levene's test for the percentage of students taking an AP test other than Spanish. The test found significant variance between groups (p = .000).

Table 91: Levene's test for Percentage of Students that took an AP test other than Spanish, by groups

Levene Statistic	df1	df2	Sig.
20.600	3	684	.000

Table 92 presents the ANOVA results for the percentage of students taking an AP test. The ANOVA table identified significant differences between groups (p = .000).

Table 92: ANOVA table for Percentage of students that took an AP test other than Spanish, by groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.923	3	1.308	12.039	.000
Within Groups	74.303	684	.109		
Total	78.227	687			

Table 93 presents the Contrast tests for the percentage of students taking an AP test other than Spanish. Because the Levene's test found significant variances between groups (*p* = .000), the –not assume equal variance- outcome was considered as valid.

Table 93: Contrast Test for Percentage of students that took an AP test other than Spanish, by groups

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an AP test other than Spanish	Does not assume equal variances	1	.275	.1262	2.181	15.600	.045
		2	-.069	.1585	-.438	31.963	.664
		3	.254	.1262	2.009	15.586	.062
		4	-.345	.0990	-3.482	27.719	.002
		5	-.022	.0247	-.882	635.299	.378
		6	.323	.0990	3.263	27.680	.003

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .045), in Contrast 4 between Mainstream and DLI-NSS (*p* = .002), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .003). A marginally significant difference was found in Contrast 3 between DLI-NES and TBE/ESL (*p* = .062), and no statistically significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .664) and in contrast 5 between Mainstream and TBE/ESL (*p* = .378).

Analysis discussion.

The four groups exhibited differences in the percentage of students taking at least one AP test other than Spanish. This suggests that program type is a contributing factor to academic achievement for students. DLI-NSS had the largest percentage of students taking an AP test other than Spanish. DLI-NSS surpassed DLI-NES by 18.4%, (*p* = .664), TBE/ESL by 266.9% (*p* = .003) and mainstream by 344.0% (*p* = .002). DLI-NES placed second, surpassing TBE/ESL by 209.9% (*p* = .062) and Mainstream by 275.0% (*p* = .045). TBE/ESL placed third, surpassing Mainstream by 21.0% (*p* = .378).

Percentage of students succeeding in AP tests other than Spanish.

The percentage of students passing at least one AP tests other than Spanish with a grade of 3 or more was analyzed to look for differences between groups. Table 94 and Figure 54 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students passing an AP test other than Spanish.

Table 94: Percentage of students who passed an AP test other than Spanish with a score of 3 or higher

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
percentage of students who passed an AP test other than Spanish with a score of 3 or higher	23.1%	3.0%	11.5%	4.0%

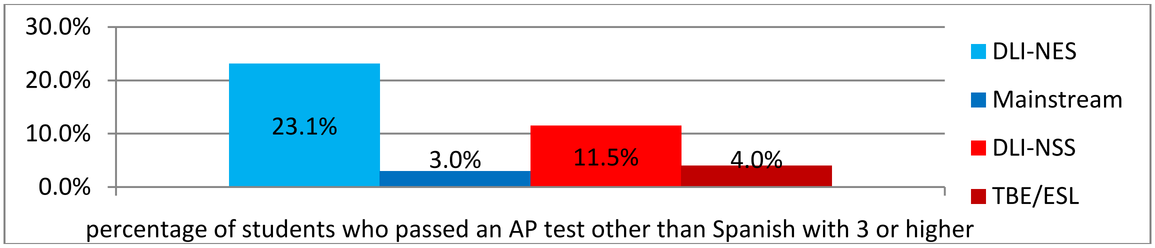

Figure 54: percentage of students that passed an AP test other than Spanish with a score of 3 or higher

DLI-NES had the largest percentage of students passing at least one AP test other than Spanish, with a score of 3 or higher during their high school education. DLI-NES surpassed DLI-NSS by 11.6 percentage points (100.9%), surpassed TBE/ESL by 19.1 percentage points (477.5%) and surpassed mainstream by 20.1 percentage points (670.0%). DLI-NSS placed second, surpassing TBE/ESL by 7.5 percentage points (187.5%) and surpassing Mainstream by 8.5 percentage points (283.3%). TBE/ESL placed third, surpassing Mainstream by 1.0 percentage points (33.3%). Table 95 shows the results of the Levene's test for the percentage of students passing an AP test other than Spanish with a score of 3 or higher. The Levene's test found significant variance between groups (p = .000).

Table 95: Levene's test for Percentage of Students passing an AP test other than spanish

Levene Statistic	df1	df2	Sig.
16,154	3	630	.000

Table 96 presents the ANOVA results for the percentage of students passing an AP test. The ANOVA table identified significant differences between groups (p = .001).

Table 96: ANOVA table for Percentage of students passing an AP test other than Spanish

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.643	3	.214	5.356	.001
Within Groups	25.207	630	.040		
Total	25.850	633			

Table 97 presents the results of the Contrast tests for the percentage of students passing an AP test other than Spanish. Because the test found significant variances between groups (*p* = .000), the–not assume equal variance- outcome was validated.

Table 97: Contrast Test for Percentage of students per group passing an AP test other than Spanish

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who passed an AP test other than Spanish	Does not assume equal variances	1	.201	.1221	1.644	12.179	.126
		2	.115	.1374	.840	18.849	.412
		3	.191	.1221	1.566	12.188	.143
		4	-.085	.0648	-1.317	26.364	.199
		5	-.009	.0150	-.628	589.062	.530
		6	.076	.0648	1.171	26.435	.252

The Contrast tests identified no statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .126), in Contrast 2 between DLI-NES and DLI-NSS (p = .412), in Contrast 3 between DLI-NES and TBE/ESL (p = .143), in Contrast 4 between Mainstream and DLI-NSS (p = .199), in Contrast 5 between Mainstream and TBE/ESL (p = .530), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .252).

Analysis discussion.

The four groups exhibited large differences in the percentage of students passing at least one AP test other than Spanish with a score of 3 or higher. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES had the largest percentage of students passing an AP test other than Spanish with a score of 3 or higher. DLI-NES surpassed DLI-NSS by 100.9%, (p = .412), surpassed TBE/ESL by 477.5% (p = .143) and surpassed mainstream by 670.0% (p = .126). DLI-NSS placed second, surpassing TBE/ESL by 187.5% (p = .252) and surpassing Mainstream by 283.3% (p = .199). TBE/ESL surpassed Mainstream by 33.3% (p = .530).

Students' participation and performance on college-admission tests.

Even though colleges value the college-readiness indicators generated by high schools such as WGPA, Class ranking and Participation in AP courses; they also rely on standardized, college-generated admission tests such as ACT. Regardless of their GPA, class ranking, or amount of AP tests passed, all college applicants must take an admission test before being accepted into college. Most colleges across the nation require new students to meet certain admission-test benchmarks. Other colleges place students in non-college-credit, remedial courses when the students are unable to meet the benchmark criteria.

One way or the other, performance on standardized college-admission tests such as SAT or ACT is a key indicator of college readiness. For this reason, the students' performance on college-admission tests was analyzed to look for significant differences between groups. Several indicators of college-admission-test performance were analyzed including percentage of students taking a college-admission test, mean averages on college admission tests, and percentage of students reaching the national benchmark in college-admission tests. Because ACT is the test of choice of the selected school district, the analysis was made using the results of ACT tests.

Percentage of students taking an ACT Test.

Not all students in the study took an ACT test even though it was offered and paid for by the school district. All students had the opportunity to take an ACT test during their junior and senior years and they could take the test both times free of charge. Many students took the test twice, others took the test only once, but a large percentage of students never took an ACT test during their high school years. These results are congruent with the state average (ACT, 2011).

Because college-admission tests are a requirement for college enrollment, the percentage of students participating in an ACT test was analyzed to look for differences between groups. Table 98 and Figure 55 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students participating in ACT.

Table 98: Percentage of students that took an ACT test, per group

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students that took an ACT test	100%	46.7%	100%	47.2%

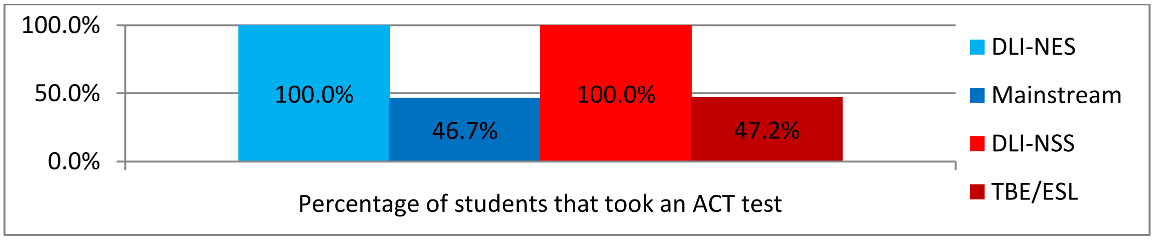

Figure 55: percentage of students that took an ACT test, per group

Both DLI groups tied in first place in percentage of students that took an ACT test, with 100% participation. All DLI students took at least one ACT tests during their high school years. Both DLI groups surpassed TBE/ESL by 52.8 percentage points (111.9%) and surpassed mainstream by 53.3 percentage points (114.1%). TBE/ESL placed second, surpassing Mainstream by 0.5 percentage points (1.1%).

Table 99 shows the results of the Levene's test for the percentage of students that took an ACT test. The test found significant variance between groups (p = .000)**.**

Table 99: Levene's test for Percentage of Students that took an ACT test, per group

Levene Statistic	df1	df2	Sig.
3863.425	3	684	.000

Table 100 presents the ANOVA results for the percentage of students that took an ACT test. The ANOVA table found significant differences between groups (p = .000).

Table 100: ANOVA table for Percentage of students that took an ACT test, per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.337	3	3.779	16.089	.000
Within Groups	160.657	684	.235		
Total	171.994	687			

Table 101 presents the results of the Contrast tests for percentage of students that took an ACT test. Because the Levene's test found significant variances between groups (*p* = .000), the–not assume equal variance- outcome was validated.

Table 101: Contrast Test for Percentage of students that took an ACT test, per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an ACT test	Does not assume equal variances	1	.533	.0293	18.180	290.000	.000
		3	.528	.0266	19.882	353.000	.000
		4	-.533	.0293	-18.180	290.000	.000
		5	-.004	.0396	-.111	619.126	.912
		6	.528	.0266	19.882	353.000	.000

The Contrast tests found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .000). No significant difference was find in Contrast 5 between Mainstream and TBE/ESL (*p* = .912). Contrast 2 between DLI-NES and DLI-NSS was not evaluated because both groups had equal values (*p* = 1.000).

Analysis discussion.

The four groups exhibited differences in the percentage of students that took an ACT test. This suggests that program type is a contributing factor to academic achievement for students. Both DLI groups tied in first place in the percentage of students that took an ACT test, with 100% participation. All DLI students took at least one ACT tests during their high school years. Both DLI groups surpassed TBE/ESL by 111.9% (*p* = .000) and surpassed mainstream by 114.1% (*p* = .000). TBE/ESL placed second, surpassing Mainstream by 1.1% (*p* = .912).

Students' performance in ACT.

Even though students' participation in college-admission test such as the ACT is key for college enrollment, a successful participation is also crucial, not only for college enrollment, but also for college placement. Many colleges across the nation deny enrollment to students who do not meet a pre-established score criteria. Other institutions allow enrollment of underperforming students, but condition acceptance on successful participation in remedial courses.

Because successful participation in college-admission tests is key for college enrollment, the percentage of students participating successfully in the ACT was analyzed through a variety of indicators including average scores and meeting benchmark scores per content area.

When interpreting this analysis is important to consider that the analysis focused in those students participating in ACT tests. All students (100%) from both DSLI groups were included but only 46.7% or Mainstream students and 47.2% or TBE/ESL students were analyzed. The remaining students were not included in the analysis because they never took an ACT test. Since less than half the Mainstream and TBE/ESL students took the test, one might conclude that fewer of the students in those groups planned to enter college. At the same time, one could also predict higher scores for these groups since a more selective sample from each group took the test. However, as the results show, students in the DLI programs succeeded at higher rates.

Students' average scores in ACT per content area per group

Table 102 and Figure 56 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students participating in ACT.

Table 102: ACT average scores per content area per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
ACT average scores per content area per group	Reading	20.9	16.9	18.6	15.3
	Math	18.8	17.6	19.0	17.2
	Science	18.7	17.8	18.9	16.8
	English	19.8	17.3	18.7	16.3
	Composite	19.6	17.3	18.7	16.3

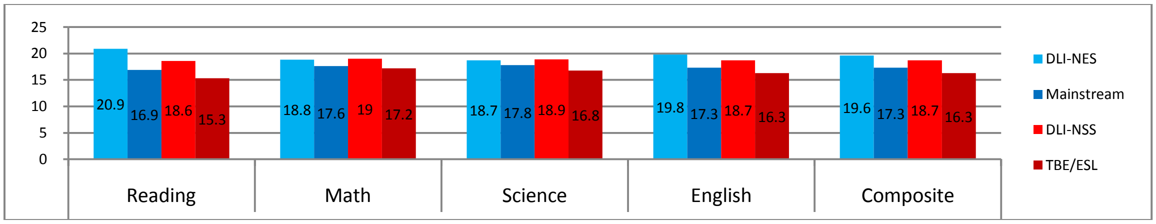

Figure 56: ACT average scores per content area per group

In reading, DLI-NES had the highest score average, surpassing DLI-NSS by 2.3 percentage points (12.4%), Mainstream by 4.0 percentage points (23.7%), and TBE/ESL by 5.6 percentage points (36.6%). DLI-NSS placed second, surpassing Mainstream by 1.7 percentage points (10.1%) and TBE/ESL by 3.3 percentage points (21.6%). Mainstream placed third, surpassing TBE/ESL by 1.6 percentage points (10.5%).

In math, DLI-NSS had the highest score average, surpassing DLI-NES by 0.2 percentage points (1.1%), Mainstream by 1.4 percentage points (8.0%), and TBE/ESL by 1.8 percentage points (10.5%). DLI-NES placed second, surpassing Mainstream by 1.2 percentage points (6.8%) and TBE/ESL by 1.6 percentage points (9.3%). Mainstream placed third, surpassing TBE/ESL by 0.4 percentage points (2.3%).

In science, DLI-NSS had the highest score average, surpassing DLI-NES by 0.2 percentage points (1.1%), Mainstream by 1.1 percentage points (6.2%), and TBE/ESL by 2.1 percentage points (12.5%). DLI-NES placed second, surpassing Mainstream by 0.9 percentage points (5.1%) and TBE/ESL by 1.9 percentage points (11.3%). Mainstream placed third, surpassing TBE/ESL by 1.0 percentage points (6.0%).

In English, DLI-NES had the highest score average, surpassing DLI-NSS by 1.1 percentage points (5.9%), Mainstream by 2.5 percentage points (14.5%), and TBE/ESL by 3.5 percentage points (21.5%). DLI-NSS placed second, surpassing Mainstream by 1.4 percentage points (8.1%) and TBE/ESL by 2.4 percentage points (14.7%). Mainstream placed third, surpassing TBE/ESL by 1.0 percentage points (6.1%).

In a composite score, DLI-NES had the highest average, surpassing DLI-NSS by 0.9 percentage points (4.8%), Mainstream by 2.3 percentage points (13.3%), and TBE/ESL by 3.3 percentage points (20.2%). DLI-NSS placed second, surpassing Mainstream by 1.4 percentage points (8.1%) and TBE/ESL by 2.4 percentage points (14.7%). Mainstream placed third, surpassing TBE/ESL by 1.0 percentage points (6.1%).

Table 103 shows the results of the Levene's test for ACT average scores. The test found significant variances between groups in reading (p = .024) and English (p = .051); a marginally significant variance in composite (p = .100) and no statistically significant variances for math (p = .051) and science (p = .649).

Table 103: Levene's Test for ACT average scores per content area per group

	Levene Statistic	df1	df2	Sig.
ACT score Reading	3.184	3	342	.024
ACT score Math	1.425	3	342	.235
ACT score Science	.550	3	342	.649
ACT score English	2.623	3	342	.051
ACT score Summarized	2.099	3	342	.100

Table 104 presents the ANOVA results for the ACT average scores. The ANOVA table found significant differences between groups (all $p \leq .035$).

Table 104: ANOVA table for Percentage of students that took an ACT test, per group

		Sum of Squares	df	Mean Square	F	Sig.
ACT score Reading	Between Groups	683.503	3	227.834	10.502	.000
	Within Groups	7419.598	342	21.695		
	Total	8103.101	345			
ACT score Math	Between Groups	94.289	3	31.430	2.905	.035
	Within Groups	3700.257	342	10.819		
	Total	3794.546	345			
ACT score Science	Between Groups	182.625	3	60.875	3.741	.011
	Within Groups	5564.939	342	16.272		
	Total	5747.564	345			
ACT score English	Between Groups	295.149	3	98.383	7.233	.000
	Within Groups	4652.111	342	13.603		
	Total	4947.260	345			
ACT score Summarized	Between Groups	288.411	3	96.137	7.545	.000
	Within Groups	4357.485	342	12.741		
	Total	4645.896	345			

Table 105 presents the results of the Contrast tests for ACT average scores. Because the test found significant variances between groups for reading and English, the–not assume equal variance- outcome was validated for these two areas, while the –assume equal variance-outcome was validated for the other three areas.

Table 105: Contrast Test for Percentage of students that took an ACT test, per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
ACT score Reading	Does not assume equal variances	1	3.978	1.6811	2.366	16.646	.030
		2	2.319	1.8772	1.236	24.496	.228
		3	5.582	1.6764	3.330	16.461	.004
		4	-1.658	.9926	-1.671	35.449	.104
		5	1.604	.5212	3.077	293.248	.002
		6	3.262	.9845	3.313	34.378	.002
ACT score Math	Assume equal variances	1	1.162	.8694	1.336	342	.182
		2	-.213	1.0378	-.205	342	.838
		3	1.522	.8608	1.769	342	.078
		4	-1.375	.6930	-1.984	342	.048
		5	.361	.3799	.949	342	.343
		6	1.735	.6823	2.544	342	.011
ACT score Science	Assume equal variances	1	.842	1.0661	.790	342	.430
		2	-.238	1.2727	-.187	342	.852
		3	1.921	1.0557	1.820	342	.070
		4	-1.080	.8499	-1.271	342	.205
		5	1.079	.4659	2.316	342	.021
		6	2.159	.8367	2.581	342	.010
ACT score English	Does not assume equal variances	1	2.518	1.1984	2.101	16.922	.051
		2	1.109	1.4064	.788	28.579	.437
		3	3.501	1.1984	2.921	16.926	.010
		4	-1.410	.8430	-1.672	33.357	.104
		5	.983	.4108	2.392	297.835	.017
		6	2.392	.8430	2.838	33.386	.008
ACT score Summarized	Assume equal variances	1	2.232	.9434	2.365	342	.019
		2	.896	1.1262	.795	342	.427
		3	3.311	.9341	3.544	342	.000
		4	-1.336	.7521	-1.776	342	.077
		5	1.079	.4123	2.618	342	.009
		6	2.415	.7404	3.262	342	.001

In reading, there are statistically significant differences in Contrast 1, between DLI-NES and Mainstream (p = .030); in Contrast 3, between DLI-NES and TBE (p = .004); in Contrast 5, between Mainstream and TBE (p = .002) and in Contrast 6, between DLI-NSS and TBE (p = .002). At the same time, a marginally significant difference was identified in Contrast 4, between Mainstream and DLI-NSS (p = .104), and no significant difference was found in Contrast 2, between DLI-NES and DLI-NSS (p = .228).

In math, there are statistically significant differences in Contrast 4 between Mainstream and DLI-NSS (p = .048) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .002). There is also a marginally significant difference in Contrast 3 between DLI-NES and TBE/ESL (p = .078); and there are no significant differences in Contrast 1 between DLI-NES and Mainstream (p = .182), in Contrast 2 between DLI-NES and DLI-NSS (p = .838) and in Contrast 5 between Mainstream and TBE/ESL (p = .343).

In science, there are statistically significant differences in Contrast 5 between Mainstream and TBE/ESL (p = .021) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .010). There is also a marginal difference in Contrast 3 between DLI-NES and TBE/ESL (p = .070) and no significant differences in Contrast 1 between DLI-NES and Mainstream (p = .430), in Contrast 2 between DLI-NES and DLI-NSS (p = .852) and in Contrast 4 between Mainstream and DLI-NSS (p = .205).

In English, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .051); in Contrast 3 between DLI-NES and TBE/ESL (p = .010); in Contrast 5 between Mainstream and TBE/ESL (p = .017), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .008). There is also a marginal difference in Contrast 4 between Mainstream and DLI-NSS (p = .104); and no significant difference in Contrast 2 between DLI-NES and DLI-NSS (p = .437).

In the composite score, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .019); in Contrast 3 between DLI-NES and TBE/ESL (p = .000); in Contrast 5 between Mainstream and TBE/ESL (p = .009), and in

Contrast 6 between DLI-NSS and TBE/ESL (p = .001). There is also a marginal difference in Contrast 4 between Mainstream and DLI-NSS (p = .077); and no significant difference in Contrast 2 between DLI-NES and DLI-NSS (p = .427).

Analysis discussion

The four groups exhibited large differences on average scores in each of the content areas. This suggests that program type is a contributing factor to academic achievement for students. As with other factors discussed, students in DLI programs succeeded at higher rates than students in other programs.

In reading, DLI-NES had the highest score average, surpassing DLI-NSS by 12.4% (p = .228), Mainstream by 23.7% (p = .030), and TBE/ESL by 36.6% (p = .004). DLI-NSS placed second, surpassing Mainstream by 10.1% (p = .104) and TBE/ESL by 21.6% (p = .002). Mainstream placed third, surpassing TBE/ESL by 10.5% (p = .002).

In math, DLI-NSS had the highest score average, surpassing DLI-NES by 1.1% (p = .838), Mainstream by 8.0% (p = .048), and TBE/ESL by 10.5% (p = .011). DLI-NES placed second, surpassing Mainstream by 6.8% (p = .182) and TBE/ESL by 9.3% (p = .078). Mainstream placed third, surpassing TBE/ESL by 2.3% (p = 343).

In science, DLI-NSS had the highest score average, surpassing DLI-NES by 1.1% (p = .852), Mainstream by 6.2% (p = .205), and TBE/ESL by 12.5% (p = .010). DLI-NES placed second, surpassing Mainstream by 5.1% (p = .430) and TBE/ESL by 11.3% (p = .070). Mainstream placed third, surpassing TBE/ESL by 6.0% (p = .021).

In English, DLI-NES had the highest score average, surpassing DLI-NSS by 5.9% (p = .437), Mainstream by 14.5% (p = .051), and TBE/ESL by 21.5% (p = .010). DLI-

NSS placed second, surpassing Mainstream by 8.1% (p = .104) and TBE/ESL by 14.7% (p = .008). Mainstream placed third, surpassing TBE/ESL by 6.1% (p = .017).

In the composite score, DLI-NES had the highest average, surpassing DLI-NSS by 4.8% (p = .427), Mainstream by 13.3% (p = .019), and TBE/ESL by 20.2% (p = .000). DLI-NSS placed second, surpassing Mainstream by 8.1% (p = .077) and TBE/ESL by 14.7% (p = .001). Mainstream placed third, surpassing TBE/ESL by 6.1% (p = .009).

The DLI groups had the best ACT score averages, and many of these differences were identified as statistically significant. DLI-NES had higher scores than Mainstream in all content areas, and these differences were in most cases statistically significant. DLI-NES surpassed Mainstream in reading 23.7% (p = .030), math 6.8% (p = .182), science 5.1% (p = .430), English 14.5% (p = .051), and composite 13.3% (p = .019).

DLI-NES had higher scores than DLI-NSS in three content areas and these differences were not statistically significant. DLI-NES surpassed DLI-NSS in reading, 12.4% (p = .228), English 5.9% (p = .437), and composite 4.8% (p = .427). DLI-NES had higher scores than TBE/ESL in all content areas and such differences were in most cases statistically significant. DLI-NES surpassed TBE/ESL in reading, 536.6% (p = .004); math, 9.3% (p = .078), science, 11.3% (p = .070); English, 21.5% (p = .010) and composite 20.2% (p = .000).

DLI-NSS placed second in regards of average ACT scores. DLI-NSS had higher scores than DLI-NES in two areas. However, the differences were not statistically significant. DLI-NSS surpassed DLI-NES in math 1.1% (p = .838) and in science 1.1% (p = .852). DLI-NSS had higher scores than Mainstream in all content areas. However, the differences were not always statistically significant. DLI-NSS surpassed Mainstream in reading 10.1% (p = .104), math 8.0% (p = .048), science 6.2% (p = .205), English 8.1% (p = .104), and composite by 8.1% (p = .077). DLI-NSS had higher scores than TBE/ESL in all content areas and the differences were statistically significant. DLI-NSS surpassed TBE/ESL in reading 21.6% (p = .002), math 10.5% (p = .011), science 12.5% (p = .010), English 14.7% (p = .008), and composite 14.7% (p = .001). Mainstream placed third in regards of average ACT scores. Mainstream had higher scores than TBE/ESL in all content areas and the differences were almost always statistically significant. Mainstream surpassed TBE/ESL in reading 10.5% (p = .002), math 2.3% (p = 343), science 6.0% (p = .021), English 6.1% (p = .017), and composite 6.1% (p = .009).

Percentage of Students performing successfully in ACT tests

ACT provides a set of benchmarks identified as college-readiness indicators. According to the ACT, such benchmarks “reflect the level of preparation needed for students to have at least a …75% chance of achieving a grade of C or higher, in entry-level credit-bearing college courses” (ACT, 2011, p. 3). According to the ACT, the minimum acceptable test scores are: English, 18; mathematics 22; reading, 21; and science 24. ACT benchmarks are, however, relatively difficult to achieve. In Texas for example, only 41% of the Hispanic population met the ACT benchmark in English, 29% in math, 30% in reading, and 13% in science (ACT, 2011). A margin of 2 percentage points within the benchmark is considered acceptable by many colleges across the nation.

To measure students’ successful performance on the ACT, the percentage of students scoring within one point of the ACT benchmark for all content areas (except English, where the benchmark is already low), was analyzed to look for differences across groups. Table 106 and Figure 57 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students meeting the ACT benchmarks.

Table 106: percentage of students meeting ACT benchmarks per area per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students meeting ACT benchmarks per group	Reading	43.8	25.0	37.0	18.6
	Math	25.0	16.9	33.3	11.4
	Science	12.5	10.3	14.8	6.0
	English	43.8	40.4	51.9	30.5
	Composite	43.8	22.8	37.0	19.8

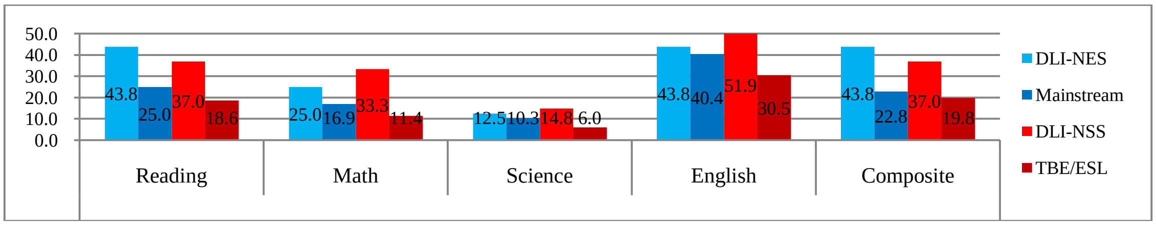

Figure 57: percentage of students meeting ACT benchmarks per area per group

In reading DLI-NES had the highest percentage of students meeting the ACT benchmark within one point; surpassing DLI-NSS by 6.8 percentage points (18.4%), Mainstream by 18.8 percentage points (75.2%), and TBE/ESL by 25.2 percentage points (135.5%). DLI-NSS placed second, surpassing Mainstream by 12.0 percentage points (48.0%) and TBE/ESL by 18.4 percentage points (98.9%). Mainstream placed third, surpassing TBE/ESL by 6.4 percentage points (34.4%).

In math, DLI-NSS had the highest percentage of students meeting the ACT benchmark within one point; surpassing DLI-NES by 8.3 percentage points (33.2%), Mainstream by 16.4 percentage points (97.0%), and TBE/ESL by 21.9 percentage points (192.1%). DLI-NES placed second, surpassing Mainstream by 8.1 percentage points (47.9%) and TBE/ESL by 13.6 percentage points (119.3%). Mainstream placed third, surpassing TBE/ESL by 5.5 percentage points (48.2%).

In science, DLI-NSS had the highest percentage of students meeting the ACT benchmark within one point; surpassing DLI-NES by 2.3 percentage points (18.4%), Mainstream by 4.5 percentage points (43.7%), and TBE/ESL by 8.8 percentage points (146.7%). DLI-NES placed second, surpassing Mainstream by 2.2 percentage points (21.4%) and TBE/ESL by 6.5 percentage points (108.3%). Mainstream placed third, surpassing TBE/ESL by 4.3 percentage points (71.7%).

In English, DLI-NSS had the highest percentage of students meeting the ACT benchmark; surpassing DLI-NES by 8.1 percentage points (18.5%), Mainstream by 11.5 percentage points (28.5%), and TBE/ESL by 21.4 percentage points (70.2%). DLI-NES placed second, surpassing Mainstream by 3.4 percentage points (8.4%) and TBE/ESL by 13.3 percentage points (43.6%). Mainstream placed third, surpassing TBE/ESL by 9.9 percentage points (32.5%).

In the composite score, DLI-NES had the highest percentage of students meeting the ACT benchmark within one point; surpassing DLI-NSS by 6.8 percentage points (18.4%), Mainstream by 21.0 percentage points (92.1%), and TBE/ESL by 24.0 percentage points (121.2%). DLI-NSS placed second, surpassing Mainstream by 14.2 percentage points (62.3%) and TBE/ESL by 17.2 percentage points (86.9%). Mainstream placed third, surpassing TBE/ESL by 3.0 percentage points (15.2%). Table 107 shows the results of the Levene's test for percentage of students meeting the ACT benchmark. The test found significant variances between groups in all content areas and in the composite score (all $p \leq .003$).

Table 107: percentage of students meeting ACT benchmarks per area per group

	Levene Statistic	df1	df2	Sig.
Percentage of students who met the ACT reading benchmarks within one point	7.795	3	342	.000
Percentage of students who met the ACT math benchmarks within one point	10.109	3	342	.000
Percentage of students who met the ACT science benchmarks within one point	4.722	3	342	.003
Percentage of students who met the ACT English benchmarks	5.669	3	342	.001
Percentage of students who met the ACT composite benchmarks within one point	5.749	3	342	.001

Table 108: ANOVA table for percentage of students meeting ACT benchmarks per area per group

		Sum of Squares	df	Mean Square	F	Sig.
Percentage of students who met the ACT reading benchmarks within one point	Between Groups	1.587	3	.529	2.967	.032
	Within Groups	60.979	342	.178		
	Total	62.566	345			
Percentage of students who met the ACT math benchmarks within one point	Between Groups	1.309	3	.436	3.319	.020
	Within Groups	44.949	342	.131		
	Total	46.257	345			
Percentage of students who met the ACT science benchmarks within one point	Between Groups	.281	3	.094	1.183	.316
	Within Groups	27.117	342	.079		
	Total	27.399	345			
Percentage of students who met the ACT English benchmarks	Between Groups	1.524	3	.508	2.203	.088
	Within Groups	78.861	342	.231		
	Total	80.384	345			
Percentage of students who met the ACT composite benchmarks within one point	Between Groups	1.391	3	.464	2.615	.051
	Within Groups	60.647	342	.177		
	Total	62.038	345			

Table 108 presents the ANOVA results for the percentage of students meeting ACT benchmarks. The ANOVA table found statistically significant differences between groups in reading (p = .032), math (p = .020), and in the composite score (p = .032). A marginally significant difference was identified in English (p = .088), and no statistically significant difference was found in science (p = .316).

Table 109 presents the results of the Contrast tests for percentage of students meeting ACT benchmarks. Because the Levene’s test found significant variances between groups (all $p \leq .003$); the–not assume equal variance- outcomes were validated.

Table 109: Contrast Test for percentage of students meeting ACT benchmarks per area per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who met the ACT reading benchmarks within one point	Does not assume equal variances	1	.188	.1334	1.406	17.633	.177
		2	.067	.1593	.421	30.606	.676
		3	.252	.1316	1.914	16.707	.073
		4	-.120	.1018	-1.183	34.516	.245
		5	.064	.0480	1.342	274.203	.181
		6	.185	.0994	1.859	31.497	.072
Percentage of students who met the ACT math benchmarks within one point	Does not assume equal variances	1	.081	.1164	.695	17.589	.496
		2	-.083	.1451	-.574	33.492	.570
		3	.136	.1145	1.190	16.490	.251
		4	-.164	.0979	-1.677	32.625	.103
		5	.055	.0406	1.363	265.111	.174

		6	.220	.0957	2.295	29.803	.029
Percentage of students who met the ACT science benchmarks within one point	Does not assume equal variances	1	.022	.0893	.247	17.929	.808
		2	-.023	.1102	-.210	33.144	.835
		3	.065	.0874	.745	16.424	.467
		4	-.045	.0744	-.607	33.716	.548
		5	.043	.0320	1.346	251.723	.179
		6	.088	.0721	1.225	29.737	.230
Percentage of students who met the ACT English benchmarks	Does not assume equal variances	1	.033	.1349	.245	18.416	.809
		2	-.081	.1613	-.502	31.476	.619
		3	.132	.1330	.993	17.418	.334
		4	-.114	.1067	-1.069	36.318	.292
		5	.099	.0553	1.789	280.580	.075
		6	.213	.1043	2.043	33.288	.049
Percentage of students who met the ACT composite benchmarks within one point	Does not assume equal variances	1	.210	.1331	1.575	17.466	.133
		2	.067	.1593	.421	30.606	.676
		3	.240	.1318	1.821	16.792	.087
		4	-.142	.1014	-1.405	33.969	.169
		5	.030	.0475	.638	282.130	.524
		6	.173	.0996	1.734	31.776	.093

In reading, the contrast test found marginal differences in Contrast 3, between DLI-NES and TBE (*p* = .073) and in Contrast 6, between DLI-NSS and TBE (p = .072). No significant differences were identified in Contrast 1, between DLI-NES and Mainstream (*p* = .177); in Contrast 2, between DLI-NES and DLI-NSS (*p* = .676), in Contrast 4, between Mainstream and DLI-NSS (*p* = .245), and in Contrast 5, between Mainstream and TBE (*p* = .181).

In math, the analysis found a statistically significant difference in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .029); a marginally significant difference in Contrast 4 between Mainstream and DLI-NSS (*p* = .103) and no statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .496), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .570), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .251), and in Contrast 5 between Mainstream and TBE/ESL (*p* = .174).

In science, the analysis found no statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .808), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .835), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .467), in Contrast 4 between Mainstream and DLI-NSS (p = .548), in Contrast 5 between Mainstream and TBE/ESL (p = .179) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .230).

In English, the analysis found a statistically significant difference in Contrast 6 between DLI-NSS and TBE/ESL (p = .049), a marginally significant difference in Contrast 5 between Mainstream and TBE/ESL (p = .075), and no statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .809); in Contrast 2 between DLI-NES and DLI-NSS (p = .619), in Contrast 3 between DLI-NES and TBE/ESL (p = .334), and in Contrast 4 between Mainstream and DLI-NSS (p = .292).

In the composite score, the analysis found marginally significant differences in Contrast 3 between DLI-NES and TBE/ESL (p = .087) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .093). No statistically significant differences were found in Contrast 1 between DLI-NES and Mainstream (p = .133), in Contrast 2 between DLI-NES and DLI-NSS (p = .676), in Contrast 4 between Mainstream and DLI-NSS (p = .169), and in Contrast 5 between Mainstream and TBE/ESL (p = .524).

Analysis discussion

The four groups exhibited differences on their percentage of students meeting the ACT benchmark, in all areas. This suggests that program type is a contributing factor to academic achievement for students. Students in the DLI programs once again succeeded at higher rates than students in the other programs.

In reading, DLI-NES had the highest percentage of students meeting ACT benchmark; surpassing DLI-NSS by 18.4% (p = .676), Mainstream by 75.2% (p = .177), and TBE/ESL by 135.5% (p = .073). DLI-NSS placed second, surpassing Mainstream by

48.0% (p = .245) and TBE/ESL by 98.9% (p = .072). Mainstream surpassed TBE/ESL by 34.4% (p = .181).

In math, DLI-NSS had the highest percentage of students meeting the ACT benchmark; surpassing DLI-NES by 33.2% (p = .570), Mainstream by 97.0% (p = .103), and TBE/ESL by 192.1% (p = .029). DLI-NES placed second, surpassing Mainstream by 47.9% (p = .496) and TBE/ESL by 119.3% (p = .251). Mainstream surpassed TBE/ESL by 48.2% (p = .174).

In science, DLI-NSS had the highest percentage of students meeting ACT benchmark; surpassing DLI-NES by 18.4% (p = .835), Mainstream by 43.7% (p = .548), and TBE/ESL by 146.7% (p = .230). DLI-NES placed second, surpassing Mainstream by 21.4% (p = .808) and TBE/ESL by 108.3% (p = .467). Mainstream surpassed TBE/ESL by 71.7% (p = .179).

In English, DLI-NSS had the highest percentage of students meeting ACT benchmark; surpassing DLI-NES by 18.5% (p = .619), Mainstream by 28.5% (p = .292), and TBE/ESL by 70.2% (p = .049). DLI-NES placed second, surpassing Mainstream by 8.4% (p = .809) and TBE/ESL by 43.6% (p = .334). Mainstream surpassed TBE/ESL by 32.5% (p = .075).

In composite score, DLI-NES had the highest percentage of students meeting the ACT benchmark; surpassing DLI-NSS by 18.4% (p = .676), Mainstream by 92.1% (p = .133), and TBE/ESL by 121.2% (p = .087). DLI-NSS placed second, surpassing Mainstream by 62.3% (p = .169) and TBE/ESL by 86.9% (p = .093). Mainstream surpassed TBE/ESL by 15.2% (p = .524).

Overall, the DLI groups had the highest percentages of students meeting ACT benchmarks; however, almost all differences were not identified as statistically significant. DLI-NSS placed first in regards of the percentage of students meeting ACT benchmarks. DLI-NSS had a higher percentage of students meeting the ACT benchmark than DLI-NES in three areas. However, the differences were not statistically significant. DLI-NSS surpassed DLI-NES in math by 33.2% (p = .570); in science by 18.4% (p = .835); and in English by 18.5% (p = .619).

DLI-NSS had a higher percentage of students meeting the ACT benchmark than Mainstream in all content areas. However, in most cases the differences were not statistically significant. DLI-NSS surpassed Mainstream in reading by 48.0% (p = .245); in math by 97.0% (p = .103); in science by 43.7% (p = .548); in English by 28.5% (p = .292), and in the composite score by 62.3% (p = .169).

DLI-NSS had a higher percentage of students meeting the ACT benchmark than TBE/ESL in all content areas. However, differences were statistically significant only in math and English, marginally significant in reading, and composite score, and not statistically significant in science. DLI-NSS surpassed TBE/ESL in reading by 98.9% (p = .072); in math by 192.1% (p = .029); in science by 146.7% (p = .230); in English by 70.2% (p = .049); and in the composite score by 86.9% (p = .093).

DLI-NES placed second in percentage of students meeting ACT benchmarks. DLI-NES had a higher percentage of students meeting the ACT benchmark than Mainstream in all content areas. DLI-NES surpassed Mainstream in reading by75.2% (p = .177); in math by 47.9% (p = .496); in science by 21.4% (p = .808); in English by 8.4% (p = .809), and in the composite score by 92.1% (p = .133).

DLI-NES had a higher percentage of students meeting the ACT benchmark than DLI-NSS in reading and composite score. However, these differences were not statistically significant. DLI-NES surpassed DLI-NSS in Reading by 18.4% (p = .676) and in the composite score by 18.4% (p = .676).

DLI-NES had a higher percentage of students meeting the ACT benchmark than TBE/ESL in all content areas. However, the differences were marginally significant only in reading and in the composite score. DLI-NES surpassed TBE/ESL in reading by 135.5% (p = .073); in math by 119.3% (p = .251), in science by 108.3% (p = .467); in English by 43.6% (p = .334), and in the composite score by 121.2% (p = .087).

Mainstream placed third in the percentage of students meeting ACT benchmarks. Mainstream had a higher percentage of students meeting the ACT benchmark than TBE/ESL in all content areas. However, the difference was only marginally significant in English, and not statistically significant in the other four areas. Mainstream surpassed TBE/ESL in reading by 34.4% (p = .181); in math by 48.2% (p = .174); in science by 71.7% (p = .179), in English by 32.5% (p = .075), and in the composite score by 15.2% (p = .524).

Summary of performance on college-readiness indicators.

The four groups exhibited differences in all analyses based on indicators of college readiness. In participation in Advanced Placement (AP) tests, both DLI groups surpassed the other two groups. DLI-NES and DLI-NSS tied with a participation rate of 100% (p = 1.000), surpassing Mainstream by 754.7% and TBE/ESL by 580.3%. In both cases, the differences were statistically significant (all p = .000). TBE/ESL surpassed Mainstream by 2.9% (p = .244).

In percentage of students passing at least one AP test with a score of 3 or higher, DLI-NES outscored all the other groups. DLI-NES surpassed TBE/ESL by 785.0% and surpassed Mainstream by 2,239.5%. In both cases, the difference was statistically significant (all $p = .000$). DLI-NES surpassed DLI-NSS by 29.2%; however, in this case, the difference was not statistically significant ($p = .148$). DLI-NSS placed second, surpassing TBE/ESL by 588.0% and surpassing Mainstream by 1,710.5%. In both cases, the difference was statistically significant ($p = .000$). TBE/ESL placed third, surpassing Mainstream by 163.2%. ($p = .002$).

In participation in AP tests other than Spanish, DLI-NSS had the largest percentage of students taking AP tests other than Spanish. DLI-NSS surpassed DLI-NES by 18.4%, ($p = .664$), TBE/ESL by 266.9% ($p = .003$) and Mainstream by 344.0% ($p = .002$). DLI-NES placed second, surpassing TBE/ESL by 209.9% ($p = .062$) and Mainstream by 275.0% ($p = .045$). TBE/ESL placed third, surpassing Mainstream by 21.0% ($p = .378$).

In percentage of students succeeding in AP tests other than Spanish, DLI-NES had the largest percentage of students passing an AP test other than Spanish with a score of 3 or higher. DLI-NES surpassed DLI-NSS by 100.9%, ($p = .412$), TBE/ESL by 477.5% ($p = .143$) and surpassed mainstream by 670.0% ($p = .126$). DLI-NSS placed second, surpassing TBE/ESL by 187.5% ($p = .252$) and Mainstream by 283.3% ($p = .199$). TBE/ESL placed third, surpassing Mainstream by 33.3% ($p = .530$).

In percentage of students taking an ACT Test, Both DLI groups tied in first place, with 100% participation. Both DLI groups surpassed TBE/ESL by 111.9% ($p = .000$) and surpassed mainstream by 114.1% (*p* = .000). TBE/ESL placed second, surpassing Mainstream by 1.1% (*p* = .912).

In students' performance in ACT, the DLI groups had always the highest score averages. DLI-NES had higher scores than Mainstream in all content areas. DLI-NES surpassed Mainstream in reading, 23.7% (*p* = .030); math, 6.8% (*p* = .182); science, 5.1% (*p* = .430); English, 14.5% (*p* = .051), and composite, 13.3% (*p* = .019).

DLI-NES had higher scores than DLI-NSS in three content areas. DLI-NES surpassed DLI-NSS in reading, 12.4% (*p* = .228), English 5.9% (*p* = .437), and composite 4.8% (*p* = .427),

DLI-NES had higher scores than TBE/ESL in all content areas. DLI-NES surpassed TBE/ESL in reading, 536.6% (*p* = .004); math, 9.3% (*p* = .078), science, 11.3% (*p* = .070); English, 21.5% (*p* = .010) and composite score, 20.2% (*p* = .000).

DLI-NSS placed second in regards of average ACT scores. DLI-NSS had higher scores than DLI-NES in two areas. DLI-NSS surpassed DLI-NES in math, 1.1% (*p* = .838) and in science, 1.1% (*p* = .852)

DLI-NSS had higher scores than Mainstream in all content areas. DLI-NSS surpassed Mainstream in reading, 10.1% (*p* = .104); math, 8.0% (*p* = .048); science, 6.2% (*p* = .205); English, 8.1% (*p* = .104), and composite, by 8.1% (*p* = .077).

DLI-NSS had higher scores than TBE/ESL in all content areas. DLI-NSS surpassed TBE/ESL in reading, 21.6% (*p* = .002); math, 10.5% (*p* = .011); science, 12.5% (*p* = .010), English, 14.7% (*p* = .008), and composite, 14.7% (*p* = .001).

Mainstream placed third in regards of average ACT scores. Mainstream had higher scores than TBE/ESL in all content areas. Mainstream surpassed TBE/ESL in reading, 10.5% (p = .002); math, 2.3% (p = 343); science, 6.0% (p = .021), English, 6.1% (p = .017), and composite, 6.1% (p = .009).

In percentage of Students performing successfully in ACT tests, DLI-NSS placed first. DLI-NSS had a higher percentage than DLI-NES in three areas. DLI-NSS surpassed DLI-NES in math, 33.2% (p = .570); science, 18.4% (p = .835); and English, 18.5% (p = .619).

DLI-NSS had a higher percentage than Mainstream in all content areas. DLI-NSS surpassed Mainstream in reading, 48.0% (p = .245); math, 97.0% (p = .103); science, 43.7% (p = .548); English, 28.5% (p = .292), and composite score, 62.3% (p = .169).

DLI-NSS had a higher percentage than TBE/ESL in all content areas. DLI-NSS surpassed TBE/ESL in reading, 98.9% (p = .072); math, 192.1% (p = .029); science, 146.7% (p = .230); English, 70.2% (p = .049); and composite score, 86.9% (p = .093).

DLI-NES placed second in percentage of students meeting ACT benchmarks. DLI-NES had a higher percentage than Mainstream in all content areas. DLI-NES surpassed Mainstream in reading, 75.2% (p = .177); math, 47.9% (p = .496); science, 21.4% (p = .808); English, 8.4% (p = .809), and composite score, 92.1% (p = .133).

DLI-NES had a higher percentage of students than DLI-NSS in two areas. DLI-NES surpassed DLI-NSS in reading, 18.4% (p = .676), and composite, 18.4% (p = .676).

DLI-NES had a higher percentage than TBE/ESL in all content areas. DLI-NES surpassed TBE/ESL in reading, 135.5% (p = .073); math, 119.3% (p = .251), science, 108.3% (p = .467); English, 43.6% (p = .334), and composite score 121.2% (p = .087).

Mainstream placed third in regards of the percentage of students meeting ACT benchmarks. Mainstream had a higher percentage than TBE/ESL in all content areas.

Mainstream surpassed TBE/ESL in reading, 34.4% (*p* = .181); math, 48.2% (*p* = .174); science, 71.7% (*p* = .179), English, 32.5% (*p* = .075), and composite, 15.2% (*p* = .524).

The DLI groups exhibited the best results on all the measures of academic achievement related with college readiness. For the fifteen measures, DLI-NES placed first in eight and placed second in the other seven. DLI-NSS placed first in nine indicators and second in the other six. Mainstream placed third in ten indicators and placed last in the other five. TBE/ESL placed third in five indicators and placed last in the other ten. It can be concluded that, from a college-readiness perspective, dual language instruction proved more effective in promoting academic achievement than TBE/ESL and mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Summary of Chapter 4.

As previously mentioned, the goal of this study was to identify which program was most effective in assisting Hispanic students to reach full educational parity with their native English speaking peers, as measured from a variety of indicators of academic achievement. This chapter included the data analysis of cohort 2005-2009. Once a demographic similarity was established between groups, 40 indicators of academic achievement were analyzed. The indicators were grouped in three categories including: overall performance on standardized assessments, overall high school performance, and overall performance in college-readiness indicators.

In the overall performance on standardized assessments such as the TAKS, DLI-NES had the best results in almost all measures of academic achievement. For the sixteen indicators analyzed, DLI-NES placed first in fifteen measures and last in one. DLI-NES placed last in meeting commended in math TAKS. DLI-NSS was the second best performer from a TAKS-related perspective. For the 16 measures, DLI-NSS placed first in six indicators, placed second in eight, and placed third in the other two.   Mainstream was the third best performing group. For the 16 measures, Mainstream placed second in three indicators, placed third in 10 indictors and placed last in the other three.

TBE/ESL was the group that exhibited the lowest academic performance, from a TAKS-related perspective. For the 16 measures of academic achievement, TBE/ESL placed third in four indicators and placed last in the other twelve.

In the overall high school performance, DLI-NES had the best results in almost all measures of academic achievement. For the nine measures analyzed, DLI-NES placed first in all nine of them. DLI-NSS had the second best results. For the nine measures, DLI-NSS tied in first place in two indicators and placed second in the other seven measures. Mainstream was the third best performing group. For the nine measures analyzed, Mainstream placed third in eight and last in one. TBE/ESL was the group that exhibited the lowest results from a high school performance perspective. For the nine measures of academic achievement, TBE/ESL placed third in one indicator and placed last in the other eight.

In the overall college-readiness performance, DLI-NSS had the best results. For the fifteen measures, DLI-NSS placed first in nine indicators and second in the other six. DLI-NES was the second best performing group. For the fifteen indicators, DLI-NES placed first in eight, and second in the other seven. Mainstream was the third best performing group from a college-readiness perspective. For the fifteen indicators, Mainstream placed ten times in third place and five times in last place. TBE/ESL was the group that exhibited the lowest results from a college-readiness perspective. For the fifteen measures of academic achievement, TBE/ESL placed third in five indicators and place last in the other ten.

Taking all indicators of academic performance in consideration, DLI-NES had the best results. For the 40 indicators of academic performance, DLI-NES placed first in 32 indicators, placed second in 7 and placed last in 1. DLI-NSS was the second best performing group. For the 40 indicators, DLI-NSS placed first in 17, placed second in 21, and placed third in 2.

Mainstream was the third best performing group. For the 40 indicators, Mainstream placed 3 times in second, 28 times in third and 9 times in last place. TBE/ESL exhibited the lowest results. For the 40 measures of academic achievement, TBE/ESL placed 10 times in third place and 30 times in last place.

It can be concluded, from a comprehensive perspective that included 40 key indicators of academic achievement, that dual language instruction proved more effective in promoting academic achievement, than transitional bilingual education and mainstream instruction. This claim holds true for students from both English and Spanish language backgrounds.

Even though DLI instruction proved superior in all 40 indicators, this claim is warranted only for the cohort analyzed. Therefore, a second cohort was analyzed using the same measures to look for similarities in group behavior. The data analysis of cohort 2006-2010 is included in chapter 5.

Chapter 5

ANALYSIS OF DATA FOR THE 2006-2010 COHORT

Introduction

In chapter IV, the data from cohort 2005-2009 was analyzed in relation with 40 different indicators of academic achievement, organized under three generic categories: performance on standardized assessments, high school performance, and performance in college-readiness indicators. In chapter V, the data of cohort 2006-2010 is analyzed, following the same process. In chapter IV, many steps of the analysis were fully explained and the rationale for the analysis was included. In chapter V, such information is no longer included. If some explanation or clarification is required, refer to the same process in chapter IV.

The 2006-2010 Cohort

This cohort included 669 participants distributed in 4 groups. The DLI-NES group had 13 native English speaking (NES) students enrolled in the Dual language instruction (DLI) program. The Mainstream group had 309 NES students enrolled in mainstream, English-only instruction. The DLI-NSS group had 26 native Spanish speaking (NSS) students enrolled in DLI. The TBE/Mainstream group had 321 NSS students who were initially enrolled in a transitional bilingual education program for the first years of elementary instruction and who were later transitioned into the mainstream English-only instruction program.

Demographics.

The demographic data of the 4 groups was compared to establish a similarity between groups or to identify significant differences between groups that could influence the study outcomes. Three demographic variables were analyzed: age, gender, and economic disadvantage.

Age.

The average age of the participants was analyzed to look for significant differences between groups. Table 110 and Figure 58 exhibit the initial data, which shows that the four groups had differences in students' average age.

Table 110: Students' average age per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Student's average age per group	17.77	17.76	17.62	17.83

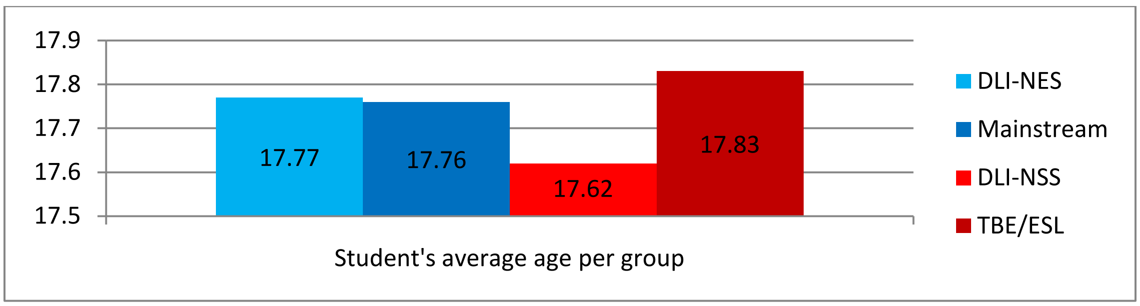

Figure 58: Students' average age per group

TBE/ESL had the highest average age, surpassing DLI-NES by 0.06 percentage points (0.338%), Mainstream by 0.07 percentage points (0.394%) and DLI-NSS by 0.21 percentage points (1.192%). DLI-NES placed second, surpassing Mainstream by 0.01 percentage points (0.056%) and DLI-NSS by 0.15 percentage points (0.851%). Mainstream placed third, surpassing DLI-NSS by 0.14 percentage points (0.795%).

Table 111 shows the results of the Levene's test for average age per group that found no statistically significant variance between groups (p = .340). Table 112 presents the ANOVA results for students' average age per group. The ANOVA table identified a marginally significant difference between groups (p = .102).

Table 111: Levene's Test of Homogeneity of Variances for Students' average age per group

Levene Statistic	df1	df2	Sig.
1.120	3	665	.340

Table 112: ANOVA table for students' average age per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.600	3	.533	2.075	.102
Within Groups	170.834	665	.257		
Total	172.433	668			

Table 113 presents the Contrast tests for students' average age per group. Because the Levene's statistic found no statistically significant variance between groups (*p* = .340), the Contrast tests' –assume equal variance- outcome was considered as valid.

Table 113: Contrast tests for students' average age per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Student's age	Assume equal variances	1	.012	.1435	.083	665	.934
		2	.154	.1722	.894	665	.372
		3	-.059	.1434	-.414	665	.679
		4	.142	.1035	1.371	665	.171
		5	-.071	.0404	-1.767	665	.078
		6	-.213	.1033	-2.064	665	.039

The Contrast tests found a significant difference in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .039) and a marginally significant difference in Contrast 5 between Mainstream and TBE/ESL (*p* = .078). No significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .934), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .372), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .679), and in Contrast 4 between Mainstream and DLI-NSS (*p* = .171).

Analysis discussion.

The groups exhibited differences in average age. TBE/ESL had the highest average age, surpassing DLI-NES by 0.338% (*p* = .679), surpassing Mainstream by 0.394% (*p* = .078), and surpassing DLI-NSS by 1.192% (*p* = .039). DLI-NES placed second, surpassing Mainstream by 0.056% (*p* = .934) and surpassing DLI-NSS by 0.851% (*p* = .679). Mainstream placed third, surpassing DLI-NSS by 0.795% (*p* = .171). The analysis shows that TBE/ESL has a slightly older population while DLI-NSS has the youngest population. A higher age average can be beneficial, assuming students are more mature; or can be considered as detrimental, assuming possible grade retention. These differences should be considered during interpretation.

Gender.

The percentage of males included in each group was analyzed to look for significant differences between groups. Table 114 and Figure 59 exhibit the initial data, which shows that the four groups exhibited differences in gender.

Table 114: Percentage of male students per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of male students per group	38.5%	46.6%	34.6%	46.1%

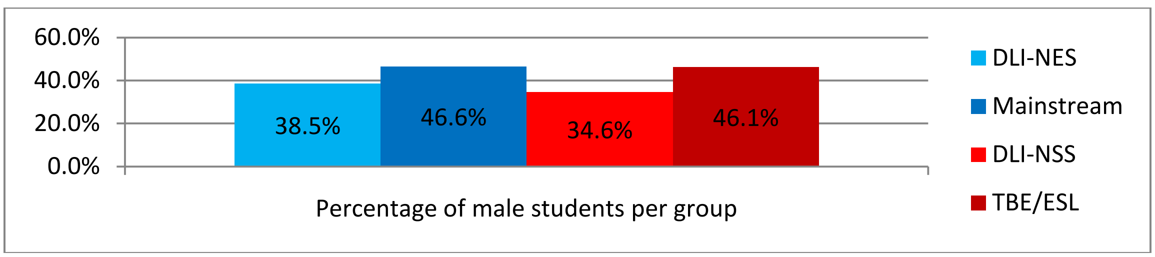

Figure 59: Percentage of male students per group

Mainstream had the highest percentage of male students, surpassing TBE/ESL by 0.5 percentage points (1.1%), DLI-NES by 8.1 percentage points (21.0%) and DLI-NSS by 12.0 percentage points (34.7%). TBE/ESL placed second, surpassing DLI-NES by 7.6 percentage points (19.7%) and DLI-NSS by 11.5 percentage points (33.2%). DLI-NES placed third, surpassing DLI-NSS by 3.9 percentage points (11.3%). Table 115 shows the results of the Levene's test of homogeneity of variance for gender. The test found significant variance between groups (p = .000). Table 116 presents the ANOVA results for gender for each group, that found no significant difference between groups (p = .642).

Table 115: Levene's test of Homogeneity of Variances for Percentage of male students per group

Levene Statistic	df1	df2	Sig.
7.979	3	665	.000

Table 116: ANOVA table for Percentage of male students per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.418	3	.139	.559	.642
Within Groups	165.618	665	.249		
Total	166.036	668			

Table 117 presents the Contrast tests for gender. Because the Levene's test found significant variances between groups (p = .000), the –*does not assume equal variances*-output was validated. However, none of the Contrast tests were identified as significant (all $p \geq .237$).

Table 117: Contrast tests for Percentage of male students per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Student's gender	Does not assume equal variances	1	-.081	.1433	-.568	13.002	.580
		2	.038	.1696	.227	23.198	.823
		3	-.076	.1432	-.534	12.963	.602
		4	.120	.0993	1.207	29.642	.237
		5	.005	.0398	.125	627.049	.901
		6	-.115	.0991	-1.159	29.456	.256

Analysis discussion.

Mainstream had the highest percentage of male students, surpassing TBE/ESL by 1.1% (p = .901), surpassing DLI-NES by 21.0% (p = .580), and surpassing DLI-NSS by 34.7% (p = .237). TBE/ESL placed second, surpassing DLI-NES by 19.7% (p = .602) and DLI-NSS by 33.2% (p = .256). DLI-NES placed third, surpassing DLI-NSS by 11.3% (p = .823). In the case of gender, even though differences exist between groups, these differences were not identified as statistically significant; supporting the claim that the existing gender differences between groups do not impact the study outcomes in a statistically significant way.

Economic disadvantage.

The percentage of students identified as economically disadvantaged was analyzed to look for significant differences between groups. Table 118 and figure 60 exhibit the initial data, which shows that the four groups exhibited differences in their percentage of economically disadvantaged students.

Table 118: Percentage of economically disadvantaged students per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of Economically disadvantaged students per group	76.9%	78.6%	92.3%	96.6%

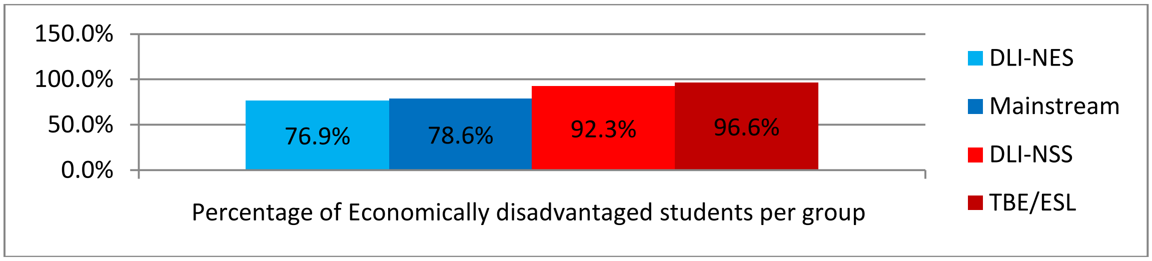

Figure 60: Percentage of economically disadvantaged students per group

TBE/ESL had the highest percentage of students identified as economically disadvantaged, surpassing DLI-NSS by 4.3 percentage points (4.7 %), Mainstream by 18.0 percentage points (22.9 %) and DLI-NES by 19.7 percentage points (25.6 %). DLI-NSS placed second, surpassing Mainstream by 13.7 percentage points (17.4 %) and DLI-NES by 15.4 percentage points (20.0%). Mainstream placed third, surpassing DLI-NES by 1.71 percentage points (2.2 %).

Table 119 shows the results of the Levene's test for percentage of students economically disadvantaged. The test found significant variances between groups in the percentage of economically disadvantaged students (p = .000).

Table 119: Levene's Test of Homogeneity of Variances for Percentage of economically disadvantaged students

Levene Statistic	df1	df2	Sig.
93.082	3	665	.000

Table 120 presents the ANOVA table for percentage of students economically disadvantaged. The ANOVA found significant differences between groups (p = .000).

Table 120: ANOVA table for Percentage of economically disadvantaged students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.269	3	1.756	17.517	.000
Within Groups	66.680	665	.100		
Total	71.949	668			

Table 121 shows the Contrast tests for percentage of economically disadvantaged students. Based on results of the Levene's test (*p* = .000), the analysis assume not equal variance.

Table 121: Contrast tests for Percentage of economically disadvantaged students

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Economically Disadvantaged	Does not assume equal variances	1	-.017	.1238	-.139	12.900	.892
		2	-.154	.1328	-1.159	16.754	.263
		3	-.197	.1221	-1.610	12.168	.133
		4	-.137	.0582	-2.349	35.416	.025
		5	-.179	.0255	-7.040	421.307	.000
		6	-.043	.0543	-.786	26.851	.439

The Contrast tests found significance differences in Contrast 4 between Mainstream and DLI-NSS (p = .025) and in Contrast 5 between Mainstream and TBE/ESL (.000). No significant differences were found in the other four tests ($p \geq .133$).

Analysis discussion.

TBE/ESL had the highest percentage of economically disadvantaged students, surpassing DLI-NSS by 4.7% (p = .439), Mainstream by 22.9% (p = .000) and DLI-NES by 25.6% (p = .133). DLI-NSS placed second, surpassing Mainstream by 13.7% (p = .025) and DLI-NES by 20.0% (p = .263). Mainstream was third, surpassing DLI-NES by 2.2% (p = .892).

Even though differences exist between groups, most of these differences were not statistically significant. The only differences in economic disadvantage identified as statistically significant that can impact the study outcomes were between Mainstream and DLI-NSS (p = .048) and between Mainstream and TBE/ESL (p = .000). Economic disadvantage has been frequently identified as highly influential in the academic development. Therefore, these differences should be taken in consideration during the interpretation of the analysis.

Summary for Demographics

The demographic analyses identified statistically significant differences in two of the three indicators analyzed. The analysis identified statistically significant differences in average age and in economic disadvantage. In both cases, the differences affected the same two groups.

TBE/ESL has the highest age average and the highest percentage of students labeled as economically disadvantaged. Age average was statistically significant when compared with DLI-NSS; age and economic disadvantage were statistically significant when compared with Mainstream. Therefore, the final comparison between TBE/ESL and DLI-NSS and between TBE/ESL and Mainstream should be interpreted with caution, taking into consideration these demographic differences. However, considering all the demographic variables as a whole, the groups do not exhibit statistically significant differences that can impact the study outcomes in a significant way.

Academic Outcomes of Program Participation.

The next step following the analysis of demographic data was to analyze the groups' dependent variables to identify significant differences between groups that could represent the differentiated outcomes of program participation.

Performance on standardized assessments

The analysis focused on high school TAKS scores to find statistically significant differences between groups. High school TAKS scores were analyzed in four different ways, including differences in score averages in all content areas, additional opportunities taken to pass the tests, percentage of students failing to pass the tests even after several attempts, and percentage of students who met the commended criteria. As mentioned before, due to space limitations, each description will only include the tables identified as highly significant for the analysis.

High school TAKS score averages.

Table 122 and figure 61 exhibits the initial data, which shows that the four groups exhibited differences in TAKS average scores in all content areas.

Table 122: TAKS average scores on each content area per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
TAKS average scores on each content area	ELA	2413	2271	2282	2212
	Math	2337	2189	2252	2171
	Science	2316	2142	2214	2100
	Social Studies	2426	2290	2312	2248

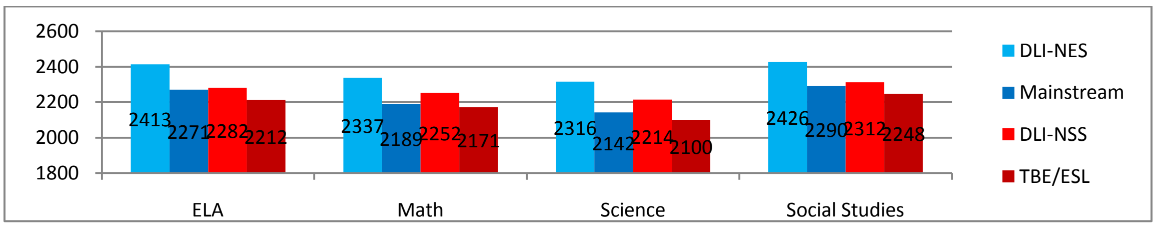

Figure 61: TAKS average scores on each content area per group

In ELA, DLI-NES had the highest score average, surpassing DLI-NSS by 131 percentage points (5.7%), Mainstream by 142 percentage points (6.3%), and TBE/ESL by 201 percentage points (8.3%). DLI-NSS placed second, surpassing Mainstream by 11 percentage points (0.5%) and TBE/ESL by 70 percentage points (3.2%). Mainstream placed third, surpassing TBE/ESL by 59 percentage points (2.7%).

In math, DLI-NES had the highest score average, surpassing DLI-NSS by 85 percentage points (3.8%), Mainstream by 148 percentage points (6.8%) and TBE/ESL by 166 percentage points (7.1%). DLI-NSS placed second, surpassing Mainstream by 63 percentage points (2.8%) and TBE/ESL by 81 percentage points (3.7%). Mainstream place third, surpassing TBE/ESL by 18 percentage points (0.8%).

In science, DLI-NES had the highest score average, surpassing DLI-NSS by 102 percentage points (4.6%), Mainstream by 174 percentage points (8.1%) and TBE/ESL by

216 percentage points (9.3%). DLI-NSS placed second, surpassing Mainstream by 72 percentage points (3.3%) and TBE/ESL by 114 percentage points (5.4%). Mainstream placed third, surpassing TBE/ESL by 42 percentage points (2.0%).

In social studies, DLI-NES had the highest score average, surpassing DLI-NSS by 114 percentage points (4.9%), Mainstream by 136 percentage points (5.9%), and TBE/ESL by 178 percentage points (7.3%). DLI-NSS placed second, surpassing Mainstream by 22 percentage points (1.0%) and TBE/ESL by 64 percentage points (2.8%). Mainstream placed third, surpassing TBE/ESL by 42 percentage points (1.9%).

Table 123 shows the results of the test of homogeneity of variance for TAKS scores. The test found statistically significant variance between groups only in science, while no significant variances were identified in all other areas (all $p \geq .510$). Therefore, the –assume equal variance- output was validated for all content areas except science.

Table 123: Levene's Test for TAKS average scores on each content area per group

	Levene Statistic	df1	df2	Sig.
ELA TAKS Average in High School	.771	3	665	.510
MATH TAKS Average in High School	.588	3	665	.623
Science TAKS Average in High school	3.926	3	665	.009
Social Studies TAKS average in High School	.532	3	665	.660

Table 124 presents the ANOVA results for average TAKS scores for each group. The ANOVA found significant differences between groups in all areas (all $p = .000$).

Table 124: ANOVA table for TAKS average scores on each content area per group

		Sum of Squares	df	Mean Square	F	Sig.
ELA TAKS Average in High School	Between Groups	944670.454	3	314890.151	17.434	.000
	Within Groups	12011091.800	665	18061.792		
	Total	12955762.254	668			
MATH TAKS Average in High School	Between Groups	485532.877	3	161844.292	6.724	.000
	Within Groups	16005318.370	665	24068.148		
	Total	16490851.247	668			
Science TAKS Average in High school	Between Groups	952250.585	3	317416.862	19.281	.000
	Within Groups	10947788.826	665	16462.840		
	Total	11900039.411	668			
Social Studies TAKS average in High School	Between Groups	633841.565	3	211280.522	10.604	.000
	Within Groups	13250302.008	665	19925.266		
	Total	13884143.572	668			

Table 125 presents the Contrast tests for the average TAKS scores for each content area. Based on the results of the Levene's test, the analysis assumed equal variances for all content areas except science, where the test found a statistically significant difference (p = .009). Therefore, for science the –not assume equal variances- outcome was validated.

Table 125: Contrast tests for TAKS average scores on each content area per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
ELA TAKS Average in High School	Assume equal variances	1	142.36	38.050	3.741	665	.000
		2	131.04	45.651	2.870	665	.004
		3	200.53	38.022	5.274	665	.000
		4	-11.32	27.443	-.413	665	.680
		5	58.17	10.711	5.431	665	.000
		6	69.49	27.403	2.536	665	.011
MATH TAKS Average in High School	Assume equal variances	1	148.19	43.924	3.374	665	.001
		2	85.15	52.698	1.616	665	.107
		3	166.20	43.890	3.787	665	.000
		4	-63.04	31.679	-1.990	665	.047
		5	18.00	12.364	1.456	665	.146
		6	81.04	31.633	2.562	665	.011
Science TAKS Average in High school	Does not assume equal variances	1	174.01	38.988	4.463	13.059	.001
		2	101.23	45.502	2.225	22.331	.037
		3	215.15	38.719	5.557	12.703	.000
		4	-72.78	26.008	-2.798	30.373	.009
		5	41.14	10.253	4.013	599.526	.000
		6	113.92	25.603	4.450	28.540	.000
Social Studies TAKS average in High School	Assume equal variances	1	136.19	39.965	3.408	665	.001
		2	114.31	47.949	2.384	665	.017
		3	178.17	39.935	4.461	665	.000
		4	-21.88	28.824	-.759	665	.448
		5	41.98	11.250	3.731	665	.000
		6	63.86	28.782	2.219	665	.027

In ELA, there are statistically significant differences in Contrast 1, between DLI-NES and Mainstream (p = .000); in Contrast 2, between DLI-NES and DLI-NSS (p = .004); in Contrast 3, between DLI-NES and TBE/ESL (p = .000); in Contrast 5, between Mainstream and TBE/ESL (p = .001) and in Contrast 6, between DLI-NSS and TBE/ESL (p = .011). No significant difference was identified in Contrast 4, between Mainstream and DLI-NSS (p = .680).

In math, statistically significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .001); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 4 between Mainstream and DLI-NSS (*p* = .047), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .011). No statistically significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .107) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .146).

In science, the analysis found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .001); differences in Contrast 2 between DLI-NES and DLI-NSS (*p* = .037); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 4 between Mainstream and DLI-NSS (*p* = .009); in Contrast 5 between Mainstream and TBE/ESL (*p* = .000) and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .000).

In social studies, statistically significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .001); in Contrast 2 between DLI-NES and DLI-NSS (*p* = .017), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 5 between Mainstream and TBE/ESL (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .027). The test found no significant difference in Contrast 4 between Mainstream and DLI-NSS (*p* = .820)

Analysis discussion.

The analysis found statistically significant differences on average scores in each of the content areas between most of the groups. This suggests that program type is a contributing factor to academic achievement for students.

In ELA, DLI-NES had the highest score average, surpassing DLI-NSS by 5.7% (p = .004), surpassing Mainstream by 6.3% (p = .000), and surpassing TBE/ESL by 8.3% (p = .000). DLI-NSS placed second, surpassing Mainstream by 0.5% (p = .680) and surpassing TBE/ESL by 3.2% (p = .011). Mainstream placed third, surpassing TBE/ESL by 2.7% (p = .000).

In math, DLI-NES had the highest score average, surpassing DLI-NSS by 5.7% (p = .107), Mainstream by 6.8% (p = .001), and TBE/ESL by 7.1% (p = .000). DLI-NSS placed second, surpassing Mainstream by 2.8% (p = .047) and TBE/ESL by 3.7% (p = .011). Mainstream placed third, surpassing TBE/ESL by 0.8% (p = .146).

In science, DLI-NES had the highest score average, surpassing DLI-NSS 4.6% (p = .037), Mainstream by 8.1% (p = .001), and TBE/ESL by 9.3% (p = .000). DLI-NSS placed second, surpassing Mainstream by 3.3% (p = .009) and TBE/ESL by 5.4% (p = .000). Mainstream placed third, surpassing TBE/ESL by 2.0% (p = .000).

In social studies, DLI-NES had the highest score average, surpassing DLI-NSS by 4.9% (p = .017), Mainstream by 5.9% (p = .001) and TBE/ESL by 7.3% (p = .000). DLI-NSS placed second, surpassing Mainstream by 1.0% (p = .820) and TBE/ESL by 2.8% (p = .027). Mainstream placed third, surpassing TBE/ESL by 1.9% (p = .000).

DLI-NES had the highest score averages in all content areas; and in most cases, the differences were identified as statistically significant. DLI-NES had higher scores than Mainstream in all content areas, and the differences were statistically significant. The differences between DLI-NES and Mainstream were: ELA, 6.3% (p = .000); math, 6.8% (p = .001); science, 8.1% (p = .001); and social studies, 5.9% (p = .001). DLI-NES had higher scores than DLI-NSS in all content areas. The differences between DLI-NES and DLI-NSS were: ELA, 5.7% (p = .004); math, 5.7% (p = .107); science, 4.6% (p = .037); and social studies 4.9% (p = .017). The differences were statistically significant in all content areas except math. DLI-NES had higher scores than TBE/ESL in all content areas. The differences between DLI-NES and TBE/ESL were: ELA, 8.3% (p = .000); math, 7.1% (p = .000); science, 9.3% (p = .000); and social studies, 7.3% (p = .000). The differences were always statistically significant.

DLI-NSS placed second in regards of average TAKS scores. DLI-NSS had higher scores than Mainstream in all content areas. DLI-NSS surpassed Mainstream in: ELA, 0.5% (p = .680); math, by 2.8% (p = .047); science, 3.3% (p = .009); and social studies 5.9% (p = .001). The differences were statistically significant for all content areas except ELA. DLI-NSS had higher scores than TBE/ESL in all content areas. The differences between DLI-NSS and TBE/ESL were: ELA, 1.7% (p = .011); math, 3.7% (p = .011); science, 5.4% (p = .000); and social studies, 2.8% (p = .027). The differences were always statistically significant.

Mainstream placed third in regards of average TAKS scores. Mainstream had higher scores than TBE/ESL in all content areas. The differences between mainstream and TBE/ESL were: ELA, 1.6% (p = .001); math, 0.8% (p = .146); science, 2.0% (p = .000) and social studies by 1.9% (p = .000). Differences were always statistically significant except for math.

Additional TAKS tests taken.

The percentage of additional tests that each group took in their attempt to pass the high school TAKS tests was analyzed to look for statistically significant differences between groups. Table 126 and Figure 62 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of additional tests taken, in all content areas.

Table 126: Percentage of additional tests taken per group

Cohort 2006-2010		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of additional test taken per group	ELA	0.0%	9.7%	7.7%	15.9%
	Math	0.0%	36.6%	26.9%	49.5%
	Science	0.0%	38.2%	23.1%	54.5%
	Social Studies	0.0%	7.8%	3.8%	10.9%

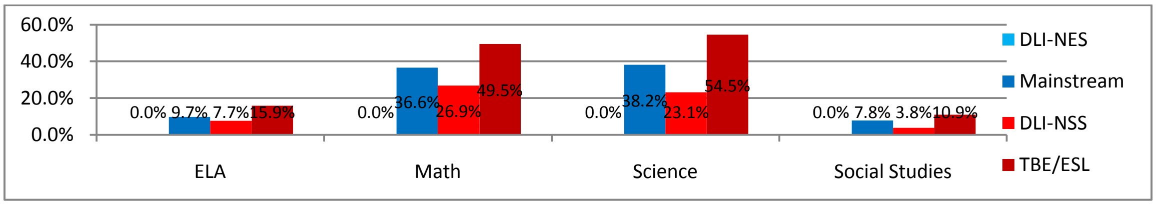

Figure 62: Percentage of additional tests taken per group

In ELA, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second, with 7.7% additional tests taken; 100% more than DLI-NES. Mainstream placed third with 9.7% additional test taken; 2.0 percentage points (20.6%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 15.9% additional tests taken; 6.2 percentage points (39.0%) more than Mainstream, 8.2 percentage points (51.6%) more than DLI-NSS, and (100%) more than DLI-NES.

In math, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second, with 26.9% additional tests taken; 100% more than DLI-NES. Mainstream placed third with 36.6% additional tests taken; 9.7 percentage points (26.5%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 49.5% additional tests taken; 12.9 percentage points (26.1%) more than Mainstream, 22.6 percentage points (45.7%) more than DLI-NSS, and 100% more than DLI-NES.

In science, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 23.1% additional tests; 100% more than DLI-NES. Mainstream placed third with 38.2% additional tests taken; 15.1 percentage points (39.5%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 54.5% additional tests taken; 16.3 percentage points (29.9%) more than Mainstream, 31.4 percentage points (57.6%) more than DLI-NSS, and 100% more than DLI-NES.

In social studies, DLI-NES had the best performance with 0.0% additional tests taken. DLI-NSS placed second with 3.8% additional tests; 100% more than DLI-NES. Mainstream placed third with 7.8% additional tests taken; 4.0 percentage points (51.3%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 10.9% additional tests taken; 3.1 percentage points (28.4%) more than Mainstream, 7.1 percentage points (65.1%) more than DLI-NSS, and (100%) more than DLI-NES. Table 127 shows the results of the Levene’s test for the percentage of additional tests taken in each area. Because the test found significant variance between groups (all $p \leq .045$), the –not assume equal variance- output was validated.

Table 127: Levene’s Test of Homogeneity of Variances for Percentage of additional tests taken per group

	Levene Statistic	df1	df2	Sig.
Extra opportunities for ELA TAKS	4.804	3	665	.003
Extra opportunities for Math TAKS	7.862	3	665	.000
Extra opportunities for Science TAKS	12.320	3	665	.000
Extra opportunities for Social Studies TAKS	2.705	3	665	.045

Table 128 presents the ANOVA results for the percentage of additional tests taken for each group. The ANOVA table found a statistically significant difference in science ($p = .028$); a marginally significant difference in math ($p = .086$), and no significant differences in ELA ($p = .311$) and in social studies ($p = .573$).

Table 128: ANOVA table for Percentage of additional tests taken per group

		Sum of Squares	df	Mean Square	F	Sig.
Extra opportunities for ELA TAKS	Between Groups	.872	3	.291	1.194	.311
	Within Groups	161.831	665	.243		
	Total	162.703	668			
Extra opportunities for Math TAKS	Between Groups	5.611	3	1.870	2.209	.086
	Within Groups	563.035	665	.847		
	Total	568.646	668			
Extra opportunities for Science TAKS	Between Groups	8.217	3	2.739	3.050	.028
	Within Groups	597.149	665	.898		
	Total	605.366	668			
Extra opportunities for Social Studies TAKS	Between Groups	.338	3	.113	.666	.573
	Within Groups	112.281	665	.169		
	Total	112.619	668			

Table 129 presents the Contrast tests for the percentage of additional tests taken for each content area per group. Based on the results of the Levene's test, the analysis does not assume equal variances.

Table 129: Contrast tests for Percentage of additional tests taken per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Extra opportunities for ELA TAKS	Does not assume equal variances	1	-.097	.0232	-4.190	308.000	.000
		2	-.077	.0533	-1.443	25.000	.161
		3	-.159	.0326	-4.880	320.000	.000
		4	.020	.0581	.347	35.241	.731
		5	-.062	.0400	-1.546	573.371	.123
		6	-.082	.0625	-1.312	46.638	.196
Extra opportunities for Math TAKS	Does not assume equal variances	1	-.366	.0504	-7.257	308.000	.000
		2	-.269	.1715	-1.570	25.000	.129
		3	-.495	.0542	-9.131	320.000	.000
		4	.096	.1787	.540	29.486	.593
		5	-.130	.0740	-1.751	626.145	.080
		6	-.226	.1799	-1.257	30.229	.218
Extra opportunities for Science TAKS	Does not assume equal variances	1	-.382	.0473	-8.073	308.000	.000
		2	-.231	.1393	-1.656	25.000	.110
		3	-.545	.0601	-9.064	320.000	.000
		4	.151	.1471	1.027	31.063	.312
		5	-.163	.0765	-2.134	599.844	.033
		6	-.314	.1517	-2.072	35.093	.046
Extra opportunities for Social Studies TAKS	Does not assume equal variances	1	-.078	.0220	-3.528	308.000	.000
		2	-.038	.0385	-1.000	25.000	.327
		3	-.109	.0252	-4.328	320.000	.000
		4	.039	.0443	.885	43.689	.381
		5	-.031	.0335	-.937	619.838	.349
		6	-.071	.0460	-1.535	50.326	.131

In ELA, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000) and in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .161), in Contrast 4 between Mainstream and DLI-NSS (*p* = .731), in Contrast 5 between Mainstream and TBE/ESL (*p* = .123), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .196).

In math, there are statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), and in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000). There is also a marginally significant difference in Contrast 5 between Mainstream and TBE/ESL (*p* = .080). No significant differences were indentified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .129), in Contrast 4 between Mainstream and DLI-NSS (*p* = .593), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .218).

In science, there are statistically significant differences in Contrast 3 between DLI-NES and TBE/ESL (*p* = .042) and in Contrast 5 between Mainstream and TBE/ESL (*p* = .031). No significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .155), Contrast 2 between DLI-NES and DLI-NSS (*p* = .474), Contrast 4 between Mainstream and DLI-NSS (*p* = .435), and Contrast 6 between DLI-NSS and TBE/ESL (*p* = .104).

In social studies, statistically significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .000); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .033) and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .046). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .110) and in Contrast 4 between Mainstream and DLI-NSS (*p* = .312).

Analysis discussion.

The four groups exhibit differences in the percentage of additional tests taken. This suggests that program type is a contributing factor to academic achievement for students.

In ELA, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second, with 100% more tests than DLI-NES (p = .161). Mainstream placed third with 20.6% more additional than DLI-NSS (p = .731) and 100% more than DLI-NES (p = .000). TBE/ESL had the worst performance with 39.0% more additional tests than Mainstream (p = .123), 51.6% more than DLI-NSS (p = .196), and 100% more tests than DLI-NES (p = .000).

In math, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second, with 100% more additional tests than DLI-NES (p = .129). Mainstream placed third with 26.5% more than DLI-NSS (p = .593) and 100% more tests than DLI-NES (p = .000). TBE/ESL had the worst performance with 26.1% more additional tests than Mainstream (p = .129), 45.7% more than DLI-NSS (p = .218), and 100% more tests than DLI-NES.

In science, DLI-NES had the best performance with 0.0% additional tests taken. DLI-NSS placed second with 100% more tests than DLI-NES (p = .110). Mainstream placed third with 39.5% more additional tests than DLI-NSS (p = .312) and 100% more tests than DLI-NES (p = .000). TBE/ESL had the worst performance with 29.9% more tests than Mainstream (p = .033), 57.6% more than DLI-NSS (p = .046), and 100% more than DLI-NES (p = .000).

In social studies, DLI-NES had the best performance, with 0.0% additional tests taken. DLI-NSS placed second with 100% more tests than DLI-NES (p = .327). Mainstream placed third with 51.3% more tests than DLI-NSS (p = .381) and 100% more than DLI-NES (p = .000). TBE/ESL had the worst performance with 28.4% more additional tests than Mainstream (p = .349), 65.1% more than DLI-NSS (p = .131), and 100% more tests than DLI-NES (p = .000).

Overall, DLI-NES had the best results, requiring the lowest percentage of additional tests in all content areas, and many of these differences were identified as statistically significant. DLI-NES required fewer additional TAKS tests than Mainstream in all content areas. The differences between DLI-NES and Mainstream were: ELA, 100% (p = .000); math, 100% (p = .000); science, 100% (p = .000); and social studies, 100% (p = .000). The differences were always statistically significant. DLI-NES required fewer additional TAKS tests than DLI-NSS in all content areas. The differences between DLI-NES and DLI-NSS were: ELA, 100% (p = .161); math, 100% (p = .129); science, 100% (p = .110); and social studies 100% (p = .327). All differences were not statistically significant. DLI-NES required fewer additional TAKS tests than TBE/ESL in all content areas. The differences between DLI-NES and TBE/ESL were: ELA, 100% (p = .000); math, 100% (p = .000); science, 100% (p = .000); and social studies, 100% (p = .000). Differences were always statistically significant.

DLI-NSS placed second in taking fewer additional TAKS tests. DLI-NSS required less additional tests than Mainstream in all content areas. The differences between DLI-NSS and Mainstream were: ELA, 26.0% (p = .731); math, 36.1% (p = .593); science, 65.4% (p = .312); and social studies 105.3% (p = .381). The differences were always not statistically significant. DLI-NSS required fewer additional TAKS tests than TBE/ESL in all content areas. The differences between DLI-NSS and TBE/ESL were: ELA, 106.5% (p = .196); math, 84.0% (p = .218); science, 135.9% (p = .046); and social studies, 173.7% (p = .131). The differences were always not statistically significant; except for math that was marginally significant.

Mainstream required less additional TAKS tests than TBE/ESL in all content areas. The differences between mainstream and TBE/ESL were: ELA, 63.9% (p = .123); math, 35.2% (p = .080); science, 42.7% (p = .033); social studies, 33.3% (p = .349). The differences were statistically significant for science, and marginally significant for math. The differences for ELA and social studies were not statistically significant.

Percentage of students failing the Exit-TAKS even after several attempts.

The percentage of students that failed the Exit-TAKS tests even after several attempts was compared, to find statistically significant differences between groups. Table 130 and Figure 63 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students failing the Exit TAKS even after several attempts, in all content areas.

Table 130: Percentage of students failing to pass the Exit-TAKS even after several attempts per group

Cohort 2006-2010		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of Students failing after several attempts per group	ELA	0.0%	1.3%	0.0%	1.9%
	Math	0.0%	4.9%	0.0%	5.9%
	Science	0.0%	4.9%	0.0%	6.2%
	Social Studies	0.0%	3.6%	0.0%	2.5%

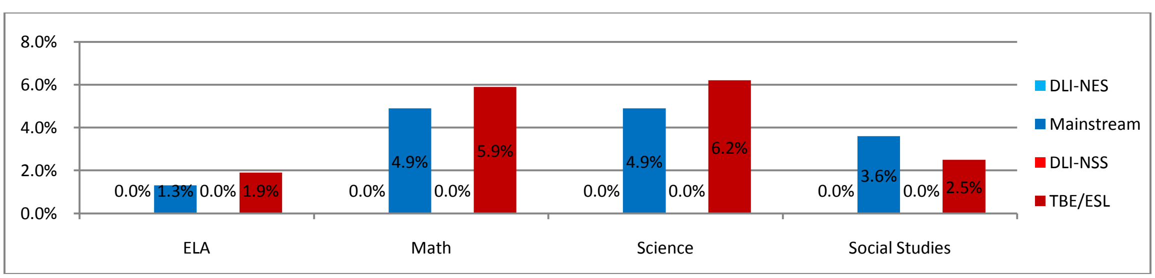

Figure 63: Percentage of students failing to pass the Exit-TAKS even after several attempts per group

In ELA, both DLI groups had the best performance, with 0.0% student failing the Exit-TAKS even after several attempts. Mainstream placed third with 1.3% students failing; 100% more than both DLI groups. TBE/ESL had the worst performance with 1.9% students failing; 0.6 percentage points (46.2%) more than Mainstream and 100% more than both DLI groups.

In math, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 4.9% students failing; 100% more than both DLI groups. TBE/ESL had the worst performance with 5.9% students failing; 1.0 percentage points (20.4%) more than Mainstream and 100% more than both DLI groups.

In science, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 4.9% students failing; 100% more than both DLI groups. TBE/ESL had the worst performance with 6.2% students failing; 1.3 percentage points (44.0%) more than Mainstream and 100% more than both DLI groups.

In social studies, both DLI groups had the best performance with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 2.5% students failing; 100% more than both DLI groups. Mainstream had the worst performance with 3.6% students failing; 1.1 percentage points (44.0%) more than TBE/ESL and 100% more than both DLI groups.

Table 131 shows the results of the Levene’s test for the percentage of failing students in each content area. The test found significant variance between groups in all content areas (all $p \leq .052$), except ELA ($p = .263$). Therefore, the –not assume equal variance- output was validated for all content areas except ELA.

Table 131: Levene's Statistic for Percentage of students failing to pass the Exit-TAKS even after several attempts

	Levene Statistic	df1	df2	Sig.
Failing ELA TAKS after several opportunities	1.332	3	665	.263
Failing MATH TAKS after several opportunities	3.815	3	665	.010
Failing Science TAKS after several opportunities	4.245	3	665	.006
Failing Social Studies TAKS after several opportunities	2.584	3	665	.052

Table 132 presents the ANOVA results for the percentage of students failing for each group. The ANOVA found no significant differences between groups (all $p \geq .411$).

Table 132: ANOVA table for Percentage of students failing to pass the Exit-TAKS even after several attempts per group

		Sum of Squares	df	Mean Square	F	Sig.
Failing ELA TAKS after several opportunities	Between Groups	.014	3	.005	.326	.807
	Within Groups	9.836	665	.015		
	Total	9.851	668			
Failing MATH TAKS after several opportunities	Between Groups	.125	3	.042	.861	.461
	Within Groups	32.147	665	.048		
	Total	32.272	668			
Failing Science TAKS after several opportunities	Between Groups	.143	3	.048	.961	.411
	Within Groups	33.026	665	.050		
	Total	33.169	668			
Failing Social Studies TAKS after several opportunities	Between Groups	.051	3	.017	.618	.603
	Within Groups	18.409	665	.028		
	Total	18.460	668			

Table 133 presents the Contrast tests for the percentage of students failing, for each content area per group. Because both, DLI-NES and DLI-NES had 0% students failing TAKS in all content areas, contrast 2 could not be performed. Based on the results of the Levene's test, the analysis does not assume equal variances, except for ELA.

Table 133: Contrast tests for Percentage of students failing to pass the Exit-TAKS even after several attempts per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Failing ELA TAKS after	Assume equal	1	-.013	.0344	-.376	665	.707
		3	-.019	.0344	-.543	665	.587

several opportunities	variances	4	.013	.0248	.521	665	.602
		5	-.006	.0097	-.593	665	.553
		6	-.019	.0248	-.754	665	.451
Failing MATH TAKS after several opportunities	Does not assume equal variances	1	-.049	.0122	-3.964	308.000	.000
		3	-.059	.0132	-4.487	320.000	.000
		4	.049	.0122	3.964	308.000	.000
		5	-.011	.0180	-.591	626.094	.554
		6	-.059	.0132	-4.487	320.000	.000
Failing Science TAKS after several opportunities	Does not assume equal variances	1	-.049	.0122	-3.964	308.000	.000
		3	-.062	.0135	-4.611	320.000	.000
		4	.049	.0122	3.964	308.000	.000
		5	-.014	.0182	-.755	624.106	.451
		6	-.062	.0135	-4.611	320.000	.000
Failing Social Studies TAKS after several opportunities	Does not assume equal variances	1	-.036	.0106	-3.372	308.000	.001
		3	-.025	.0087	-2.860	320.000	.005
		4	.036	.0106	3.372	308.000	.001
		5	.011	.0137	.780	601.787	.436
		6	-.025	.0087	-2.860	320.000	.005

Because DLI-NES and DLI-NSS had the same results for all four content areas, Contrast 2 between DLI-NES and DLI-NSS could not be evaluated. From a pragmatic perspective, a p = 1,000 can be claimed in all four content areas.

In ELA, no statistically significant differences were identified in Contrast 1 between DLI-NES and Mainstream (p = .707), in Contrast 3 between DLI-NES and TBE/ESL (p = .587), in Contrast 4 between Mainstream and DLI-NSS (p = .602), in Contrast 5 between Mainstream and TBE/ESL (p = .553), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .451).

In math, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .554).

In science, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 3 between DLI-NES and TBE/ESL (p =

.000), in Contrast 4 between Mainstream and DLI-NSS (p = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .451).

In social studies, there is a statistically significant difference in Contrast 1 between DLI-NES and Mainstream (p = .001), in Contrast 3 between DLI-NES and TBE/ESL (p = .005), in Contrast 4 between Mainstream and DLI-NSS (p = .001), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .005). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .436).

Analysis discussion.

The four groups exhibited differences in the percentage of students who failed to pass the Exit-TAKS tests even after several attempts. This suggests that program type is a contributing factor to academic achievement for students.

In ELA, both DLI groups had the best performance, with 0.0% student failing the Exit-TAKS even after several attempts. Mainstream placed third with 100% more failing students than both DLI groups ($p \geq .602$). TBE/ESL had the worst performance with 46.2% more failing students than Mainstream (p = .838) and 100% more than both DLI groups ($p \geq .587$).

In math, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 100% more students failing than both DLI groups (p = .000). TBE/ESL had the worst performance with 20.4% more failing students than Mainstream (p = .554) and 100% more than both DLI groups (p = .000).

In science, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. Mainstream placed third with 100% more students failing than both DLI groups (p = .000). TBE/ESL had the worst performance with 44.0% more failing students than Mainstream (p = .451) and 100% more than both DLI groups (p = .000).

In social studies, both DLI groups had the best performance, with 0.0% student failing the Exit TAKS even after several attempts. TBE/ESL placed third with 100% more than both DLI groups (p = .005). Mainstream had the worst performance with 44.0% more than TBE/ESL (p = .436) and 100% more than both DLI groups (p = .001).

Overall, both DLI groups had the best results, having the lowest percentage of students failing an Exit-TAKS test even after several attempts, in all content areas. The differences were always identified as statistically significant, except for ELA.

Both DLI groups had a lower percentage of students failing than Mainstream in all content areas. The differences between DLI groups and Mainstream were: ELA, 100% (p = .602); math, 100% (p = .000); science, 100% (p = .000); and social studies, 100% (p = .001). The differences were always statistically significant except for ELA.

Both DLI groups had a lower percentage of students failing than TBE/ESL in all content areas. The differences between DLI groups and TBE/ESL were: ELA, 100% ($p \geq$ .451); math, 100% (p = .000); science, 100% (p = .000); and social studies, 100% (p = .005). The differences were always statistically significant, except for ELA.

Mainstream had less students failing than TBE/ESL in ELA by 46.2% (p = .553), in math by 20.4% (p = .554) and in science by 26.5% (p = .451). TBE/ESL had less students failing the Exit-TAKS than Mainstream, in social studies by 44.0% (p = .436).

Percentage of students meeting commended criteria in Exit TAKS.

The percentages of students who met commented in Exit-TAKS tests were analyzed to look for statistically significant differences between groups. Table 134 and Figure 64 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students meeting commended criteria in Exit-TAKS in all content areas.

Table 134: Contrast tests for Percentage of students failing to pass the Exit-TAKS even after several attempts per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students who met commended in an Exit-TAKS per group	ELA	61.5%	32.4%	34.6%	20.9%
	Math	38.5%	18.1%	38.5%	19.9%
	Science	30.8%	9.1%	26.9%	4.4%
	Social Studies	84.6%	33.0%	50.0%	23.4%

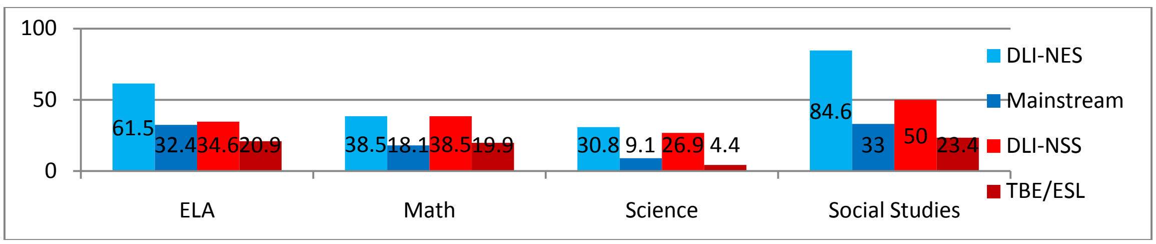

Figure 64: Percentage of students who met commended in Exit-TAKS per group

In ELA, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 26.9 percentage points (77.7%), surpassing Mainstream by 29.1 percentage points (89.8%), and surpassing TBE/ESL by 40.6percentage points (194.3%). DLI-NSS placed second, surpassing Mainstream by 2.2 percentage points (6.8%) and surpassing TBE/ESL by 13.7 percentage points (65.6%). Mainstream placed third, surpassing TBE/ESL by 11.5 percentage points (55.0%).

In math, DLI-NES and DLI-NSS tied in first place, with the highest percentage of commended students, surpassing TBE/ESL by 18.6 percentage points (93.5%), and surpassing Mainstream by 20.4 percentage points (112.7%). TBE/ESL placed third, surpassing Mainstream by 1.8 percentage points (9.0%).

In science, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 3.9 percentage points (14.5%), Mainstream by 21.7 percentage points (238.5%), and TBE/ESL by 26.4percentage points (600.0%). DLI-NSS placed second, surpassing Mainstream by 17.8 percentage points (195.6%) and TBE/ESL by 22.5 percentage points (511.4%). Mainstream placed third, surpassing TBE/ESL by 4.7 percentage points (106.8%).

In social studies, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 34.6 percentage points (69.2%), Mainstream by 51.6 percentage points (156.4%), and TBE/ESL by 61.2 percentage points (261.5%). DLI-NSS placed second, surpassing Mainstream by 17.0 percentage points (51.5%) and TBE/ESL by 26.6 percentage points (113.7%). Mainstream placed third, surpassing TBE/ESL by 9.6 points (41.0%).

Table 135 shows the results of the Levene's test for the percentage of students who met commended in Exit-TAKS tests. The test found significant variances in all content areas (all p = .000). Therefore, the –not assume equal variance- output was validated for all content areas

Table 135: Levene's Test for Percentage of students who met commended in an Exit-TAKS per group

	Levene Statistic	df1	df2	Sig.
Met Commended in ELA Exit TAKS	16.646	3	665	.000
Met Commended in Math Exit TAKS	6.366	3	665	.000
Met Commended in Science Exit TAKS	29.471	3	665	.000
Met Commended in Social Studies in	14.433	3	665	.000

Table 136 presents the ANOVA results for the percentage of students who met commended in Exit-TAKS tests, in all content areas. The ANOVA table found significant differences in all content areas ($p \leq .030$).

Table 136: ANOVA table for Percentage of students who met commended in an Exit-TAKS per group

		Sum of Squares	df	Mean Square	F	Sig.
Met Commended in ELA Exit TAKS	Between Groups	3.778	3	1.259	6.462	.000
	Within Groups	129.615	665	.195		
Met Commended in Math Exit TAKS	Between Groups	1.436	3	.479	2.994	.030
	Within Groups	106.322	665	.160		
Met Commended in Science Exit TAKS	Between Groups	2.064	3	.688	9.791	.000
	Within Groups	46.737	665	.070		
	Total	48.801	668			
Met Commended in Social Studies in	Between Groups	6.611	3	2.204	10.936	.000
	Within Groups	133.999	665	.202		

Table 137: Contrast tests for Percentage of students who met commended in an Exit-TAKS per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Met Commended in ELA Exit TAKS	Does not assume equal variances	1	.292	.1429	2.041	12.880	.062
		2	.269	.1696	1.587	23.198	.126
		3	.407	.1423	2.858	12.636	.014
		4	-.023	.0988	-.228	29.065	.821
		5	.115	.0350	3.280	608.768	.001
		6	.137	.0978	1.405	27.925	.171
Met Commended in Math Exit TAKS	Does not assume equal variances	1	.203	.1421	1.431	12.593	.177
		2	.000	.1709	.000	23.667	1.000
		3	.185	.1422	1.303	12.614	.216
		4	-.203	.0997	-2.039	27.603	.051
		5	-.018	.0313	-.580	627.998	.562
		6	.185	.0998	1.856	27.698	.074
Met Commended in Science Exit TAKS	Does not assume equal variances	1	.217	.1342	1.617	12.364	.131
		2	.038	.1601	.240	22.843	.812
		3	.264	.1337	1.975	12.177	.071
		4	-.179	.0902	-1.980	26.726	.058
		5	.047	.0199	2.356	554.534	.019
		6	.226	.0894	2.522	25.834	.018
Met Commended in Social Studies Exit TAKS	Does not assume equal variances	1	.516	.1075	4.798	13.639	.000
		2	.346	.1444	2.397	31.480	.023
		3	.613	.1068	5.735	13.269	.000
		4	-.170	.1035	-1.641	28.707	.112
		5	.096	.0357	2.699	615.391	.007
		6	.266	.1028	2.592	27.869	.015

Table 137 presents the Contrast tests for the percentage of students who met commended in Exit-TAKS tests, in all content areas. Based on the results of the Levene's test (all p = .000), the contrast test -*does not assume equal variances*- outcome was validated.

In ELA, the Contrast tests found statistically significant differences in Contrast 3 between DLI-NES and TBE/ESL (p = .014), and in Contrast 5 between Mainstream and TBE/ESL (p = .001). A marginally significant difference was identified in Contrast 1 between DLI-NES and Mainstream (*p* = .062), and no significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .1268), in Contrast 4 between Mainstream and DLI-NSS (*p* = .821) and in Contrast 6 between DLI-NSS and TBE/ESL (p = .171).

In math, marginally significant differences were identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .051) and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .074). No significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .177), in Contrast 2 between DLI-NES and DLI-NSS (*p* = 1.000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .216), and in Contrast 5 between Mainstream and TBE/ESL (*p* = .562).

In science, statistically significant differences were identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .019), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .018). Marginally significant differences were identified in Contrast 3 between DLI-NES and TBE/ESL (*p* = .071) and in Contrast 4 between Mainstream and DLI-NSS (*p* = .058). No statistically significant differences were found in Contrast 1 between DLI-NES and Mainstream (*p* = .131) and in Contrast 2 between DLI-NES and DLI-NSS (*p* = .812)

In Social Studies, a statistically significant difference was identified in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .023), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .007), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .015). No statistically significant difference was identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .112).

Analysis discussion.

The four groups exhibited large differences in their percentages of students who met the commended criteria in Exit-TAKS tests. This suggests that program type is a contributing factor to academic achievement for students.

In ELA, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 77.7% (p = .126), Mainstream by 89.8% (p = .062), and TBE/ESL by 194.3% (p = .014). DLI-NSS placed second, surpassing Mainstream by 6.8% (p = .821) and TBE/ESL by 65.6% (p = .171). Mainstream placed third, surpassing TBE/ESL by 55.0% (p = .001).

In math, DLI-NES and DLI-NSS tied in first place, with the highest percentage of commended students. DLI-NES surpassed TBE/ESL by 93.5% (p = .216) and Mainstream by 112.7% (p = .177). DLI-NSS surpassed TBE/ESL by 93.5% (p = .074) and Mainstream by 112.7% (p = .051). TBE/ESL placed third, surpassing Mainstream by 9.0% (p = .562).

In science, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 14.5% (p = .812), Mainstream by 238.5% (p = .131), and TBE/ESL by 600.0% (p = .071). DLI-NSS placed second, surpassing Mainstream by 195.6% (p = .058) and TBE/ESL by 511.4% (p = .018). Mainstream placed third, surpassing TBE/ESL by 106.8% (p = .019).

In social studies, DLI-NES had the highest percentage of commended students, surpassing DLI-NSS by 69.2% (p = .023), Mainstream by 156.4% (p = .000), and TBE/ESL by 261.5% (p = .000). DLI-NSS placed second, surpassing Mainstream by

51.5% (*p* = .112) and TBE/ESL by 113.7% (*p* = .015). Mainstream in third, surpassed TBE/ESL by 41.0% (*p* = .007).

Overall, DLI-NES outscored the other three groups by a wide margin in all content areas. DLI-NSS tied in first place in math and placed second in all the other content areas. Mainstream placed third in ELA, science, and social studies; and placed last in math. TBE placed third in math and last in all the other content areas.

DLI-NES outscored Mainstream in all content areas. The differences were: ELA, 89.8% (*p* = .062); math, 112.7% (*p* = .177); science, 238.5% (*p* = .131); and social studies, 156.4% (*p* = .000). Differences were statistically significant in social studies, marginally significant in ELA, and not statistically significant in math and science.

DLI-NES had a higher percentage of commended students than DLI-NSS in all content areas except math where they tied in first place (*p* = 1.000). The differences between DLI-NES and DLI-NSS were: ELA, 77.7% (*p* = .126); science, 14.5% (*p* = .812); and social studies 69.2% (*p* = .023). Differences were statistically significant only in social studies.

DLI-NES had a higher percentage of commended students than TBE/ESL in all content areas. The differences between DLI-NES and TBE/ESL were: ELA, 194.3% (*p* = .014); math, 93.5% (*p* = .216); science, 600.0% (*p* = .071); and social studies, 261.5% (*p* = .000). Differences were statistically significant in ELA and social studies and marginally significant in science.

DLI-NSS tied first place in Math, and placed second in ELA, science, and social studies. DLI-NSS had a higher percentage of commended students than Mainstream in all content areas. DLI-NSS surpassed Mainstream in: ELA, 6.8% (p = .821); math, 112.7% (p = .051); science, 195.6% (p = .058), and social studies, 51.5% (p = .112).

DLI-NSS had a higher percentage of commended students than TBE/ESL in all content areas. The differences between DLI-NSS and TBE/ESL were: ELA, 208.3% (p = .171); math, 93.5% (p = .074); science, 511.4% (p = .018); and social studies, 113.7% (p = .015). The difference was marginally significant in math.

Mainstream placed third in the percentage of commended students. Mainstream had a higher percentage than TBE/ESL in all content areas except math. The differences between mainstream and TBE/ESL were: ELA, 65.6% (p = .001); science, 106.8% (p = .019) and social studies by 41.0% (p = .007). Mainstream was surpassed by TBE/ESL in math, by 9.9% (p = .562). Differences were statistically significant ELA, in math and social studies.

Summary of Results on Standardized Assessments

The four groups exhibited differences in all analyses based on standardized assessments. This suggests that program type is a contributing factor to academic achievement for students.

In score average, DLI-NES surpassed all other groups in all content areas. DLI-NSS always placed second, Mainstream always placed third and TBE/ESL always placed last. The significance of the differences varied depending of the comparison group.

DLI-NES surpassed DLI-NSS by statistically significant differences in ELA (p = .004); science (p = .037); and social studies (p = .017); and by a no statistically significant difference in math (p = .107). DLI-NES surpassed Mainstream by statistically significant differences in ELA (p = .000); math (p = .001); science (p = .001); and social studies (*p* = .001). DLI-NES surpassed TBE/ESL by statistically significant differences in ELA (*p* = .000); math (*p* = .000); science (*p* = .000); and social studies (*p* = .000).

DLI-NSS surpassed Mainstream by statistically significant differences in math (*p* = .047) and science (*p* = .009); and by no statistically significant differences in ELA (*p* = .680) and social studies (*p* = .820). DLI-NSS surpassed TBE/ESL by statistically significant differences in ELA (*p* = .011); math (*p* = .011); science (*p* = .000); and social studies (*p* = .027).

Mainstream surpassed TBE/ESL by statistically significant differences in ELA (*p* = .000); science (*p* = .000); and social studies (*p* = .000); and by a no statistically significant difference in math (*p* = .146).

In the percentage of additional TAKS tests taken, DLI-NES had the best results in all content areas. DLI-NSS placed second, Mainstream placed third and TBE/ESL placed last. The significance of the differences varied depending of the group.

DLI-NES surpassed DLI-NSS in ELA (*p* = .161); math (*p* = .129); science (*p* = .110); and social studies (*p* = .327). All differences were not statistically significant. DLI-NES surpassed Mainstream in ELA (*p* = .000); math (*p* = .000); science (*p* = .000); and social studies (*p* = .000). DLI-NES surpassed TBE/ESL in ELA (*p* = .000); math (*p* = .000); science (*p* = .000); and social studies (*p* = .000). All differences were statistically significant.

DLI-NSS surpassed Mainstream in ELA (*p* = .731); math (*p* = .593); science (*p* = .312); and social studies (*p* = .381). All differences were not statistically significant. DLI-NSS surpassed TBE/ESL in ELA (*p* = .196); math (*p* = .218); science (*p* = .046); and social studies (*p* = .131). Only in math, the difference was statistically significant.

Mainstream surpassed TBE/ESL in ELA (p = .123); math (p = .080); science (p = .033); and social studies (p = .349). The difference was statistically significant difference in science and marginally significant in math.

In the percentage of students failing an Exit-TAKS test even after several attempts, both DLI groups had the best results in all content areas. Mainstream placed third in ELA, math and science and placed last in social studies. TBE/ESL placed third in social studies and placed last in all the other content areas. The significance of the differences varied depending of the comparison group.

DLI-NES surpassed Mainstream in ELA (p = .707), math (p = .000), science (p = .000), and social studies (p = .001). DLI-NES surpassed TBE/ESL in ELA (p = .587), math (p = .000); science (p = .000); and social studies (p = .005). All differences were statistically significant, except in ELA.

DLI-NSS surpassed Mainstream in ELA (p = .602), math (p = .000), science (p = .000), and social studies (p = .001), DLI-NSS surpassed TBE/ESL in ELA (p = .451), math (p = .000), science (p = .000), and social studies (p = .005). All differences were statistically significant except in ELA.

Mainstream surpassed TBE/ESL in ELA (p = .838); math (p = .554); and science (p = .451). All differences were not statistically significant.

TBE/ESL only surpassed Mainstream in social studies (p = .436). The difference was not statistically significant.

In the percentage of students excelling an Exit-TAKS test and meeting the commended criteria, DLI-NES had the best results in all content areas. DLI-NSS tied in first place in math and placed second in all other content areas. Mainstream placed third in ELA, science, and social studies; and placed last in math. TBE/ESL placed third in math and placed last in all the other content areas. The significance of the differences varied depending of the comparison group.

DLI-NES surpassed DLI-NSS in ELA (p = .126); science (p = .812); and social studies (p = .023). Only in social studies was the difference statistically significant. DLI-NES surpassed Mainstream in ELA (p = .062); math (p = .177); science (p = .131); and social studies (p = .000). The difference was statistically significant in social studies, and marginally significant in ELA. DLI-NES surpassed TBE/ESL in ELA (p = .014); math (p = .216); science (p = .071); and social studies (p = .001). Differences were statistically significant in ELA and in social studies, and marginally significant in science.

DLI-NSS surpassed Mainstream in ELA (p = .821); math (p = .051); science (p = .058); and social studies (p = .112). Differences were marginally significant in math and science. DLI-NSS surpassed TBE/ESL in ELA (p = .171); math (p = .074); science (p = .018); and social studies (p = .015). Differences were statistically significant in science and social studies, and marginally significant in math.

Mainstream surpassed TBE/ESL in ELA (p = .001); science (p = .019); and social studies (p = .015). Differences were always statistically significant. TBE/ESL surpassed Mainstream in math (p = .562). The difference was not statistically significant.

In general, DLI-NES exhibited the best results on all measures of academic achievement related to TAKS in all content areas. DLI-NES surpassed all other groups in score averages, had the lowest percentage of additional tests taken, the lowest percentage of students failing even after several attempts, and the highest percentage of students excelling the Exit TAKS and meeting the commended criteria. For the sixteen measures DLI-NES consistently placed first. DLI-NSS was second best on all indicators. For the sixteen measures, DLI-NSS tied five times at first place, and placed second eleven times. Mainstream ranked third place in almost all measures. For the sixteen indicators, Mainstream placed fourteen times in third place and two times in last place. TBE/ESL exhibited the worst results, placing last in almost all indicators of academic achievement related with TAKS. From the sixteen measures, TBE/ESL placed third two times and placed last fourteen times.

It can be concluded that, from a TAKS-related perspective, DLI proved more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Overall high school performance.

A variety of measures of high school performance were analyzed to look for significant differences between groups including high school graduation, graduation plan, grade point average and school ranking.

High School Graduation

The percentage of students graduating is a key indicator of academic achievement. Table 138 and Figure 65 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating on time.

Table 138: Percentage of students who met graduation requirements on time

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students who met graduation requirements	100%	94.8%	100%	94.4%

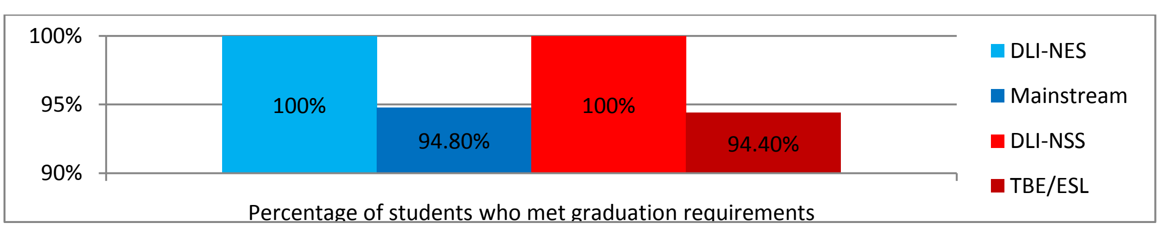

Figure 65: percentage of students who met graduation requirements on time

DLI-NES and DLI-NSS tied in first place, with all students graduating on time. Both DLI groups surpassed Mainstream by 5.2 percentage points (5.5%) and surpassed TBE/ESL by 5.6 percentage points (5.9%). Mainstream placed third, surpassing TBE/ESL by 0.4 percentage points (0.4%).

Table 139 shows the results of the Levene's test for the percentage of students graduating on time. The test found significant variance between groups (p = .018).

Table 139: Levene's statistic for percentage of students who met graduation requirements on time

Levene Statistic	df1	df2	Sig.
3.397	3	684	.018

Table 140 presents the ANOVA results for the percentage of students graduating on time. The ANOVA identified no significant differences between groups (p = .131).

Table 140: ANOVA table for percentage of students who met graduation requirements on time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.110	3	.037	.757	.518
Within Groups	32.162	665	.048		
Total	32.272	668			

Table 141 presents the Contrast tests for the percentage of students graduating on time. Because the Levene's statistic found significant variances between groups (*p* = .018), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 141: Contrast tests for percentage of students who met graduation requirements on time

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduating on time	Does not assume equal variances	1	.052	.0126	4.101	308.000	.000
		3	.056	.0129	4.360	320.000	.000
		4	-.052	.0126	-4.101	308.000	.000
		5	.004	.0180	.238	628.000	.812
		6	.056	.0129	4.360	320.000	.000

a. Contrast 2 cannot be evaluated for Percentage of Students graduating on time.

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (p = .812). Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had 100% of students graduating on time (p = 1.000).

Analysis discussion.

The four groups exhibited large differences in the percentage of students who met graduation requirements and therefore were able to graduate on time. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES and DLI-NSS tied with a graduation rate of 100% (p = 1.000). DLI-NES surpassed Mainstream by 5.5% (p = .000) and surpassed TBE/ESL by 5.9% (p = .000). DLI-NSS surpassed Mainstream by 5.5% (p = .000) and surpassed TBE/ESL by 5.9% (p = .000). Mainstream surpassed TBE/ESL by 0.4% (p = .812).

Percentage of students who met the Distinguished Achievement graduation plan

Because graduating under the Distinguished Achievement (DA) plan is an asset from the college-readiness perspective, the percentage of students graduating under the DA plan was analyzed to look for statistically significant differences between groups. Table 142 and Figure 66 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating under the DA plan.

Table 142: Percentage of students graduating under the Distinguished Achievement Plan per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students graduating as Distinguished	92.3%	28.2%	46.2%	15.0%

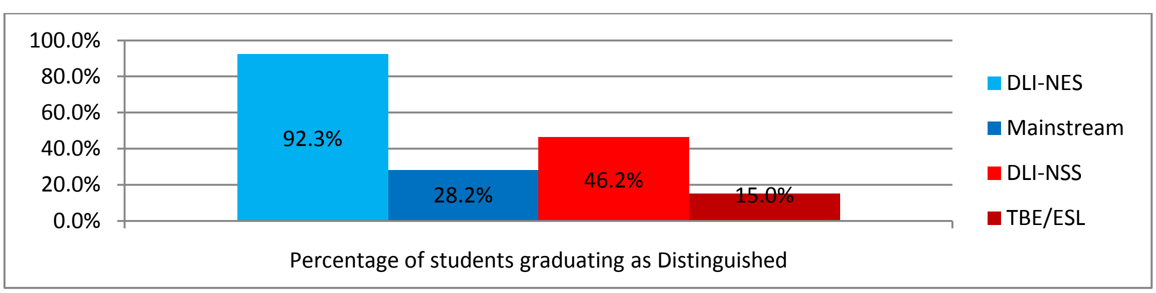

Figure 66: Percentage of students graduating under the Distinguished Achievement Plan per group

DLI-NES surpassed DLI-NSS by 46.1 percentage points (99.8%), Mainstream by 64.1 percentage points (227.3%), and TBE/ESL by 77.3 percentage points (515.3%). DLI-NSS surpassed Mainstream by 18.0 percentage points (63.8%) and surpassed TBE/ESL by 31.2 percentage points (208.0%). Mainstream surpassed TBE/ESL by 13.2 percentage points (88.0%). Table 143 shows the results of the Levene's test for the percentage of students graduating under the DA plan. The test found significant variance between groups (p = .000).

Table 143: Levene's test for Percentage of students graduating under the Distinguished Achievement Plan

Levene Statistic	df1	df2	Sig.
32.141	3	665	.000

Table 144 shows the ANOVA results for the percentage of students graduating as DA. The ANOVA table found significant differences between groups (p = .000).

Table 144: ANOVA table for Percentage of students graduating under the Distinguished Achievement Plan

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.499	3	3.500	21.021	.000
Within Groups	110.712	665	.166		
Total	121.211	668			

Table 145 presents the Contrast tests for the average TAKS scores for each content area per group. Because the Levene's test found significant variances between groups (*p* = .000), the *–not assume equal variances-* outcome was accepted as valid.

Table 145: Contrast tests for Percentage of students graduating under the Distinguished Achievement Plan

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduating as Distinguished	Does not assume equal variances	1	.642	.0811	7.912	14.805	.000
		2	.462	.1259	3.665	36.602	.001
		3	.774	.0795	9.734	13.664	.000
		4	-.180	.1029	-1.748	28.402	.091
		5	.132	.0325	4.066	586.743	.000
		6	.312	.1017	3.069	27.035	.005

The Contrast tests identified statistically significant differences between groups in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .001); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000);

in Contrast 5 between Mainstream and TBE/ESL (*p* = .000); and in Contrast 6 between DLI-NSS and TBE/ESL (p = .005). A marginally significant difference was identified in Contrast 4 between Mainstream and DLI-NSS (*p* = .091).

Analysis discussion.

The four groups exhibit differences in the percentage of students who met the distinguished graduation plan. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES had the highest percentage of students graduating under the Distinguished Achievement plan. DLI-NES surpassed DLI-NSS by 99.8% (*p* = .001), Mainstream by 227.3% (*p* = .000), and TBE/ESL by 515.3% (*p* = .000). DLI-NSS surpassed Mainstream by 63.8% (*p* = .091) and TBE/ESL by 208.0% (p = .005). Mainstream surpassed TBE/ESL by 88.0% (*p* = .000).

Percentage of students who met the Minimum Requirements graduation plan.

The percentage of students graduating with minimum requirements was analyzed to look for statistically significant differences between groups. Table 146 and Figure 67 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students graduating under the minimum requirements plan.

Table 146: Percentage of students graduating with minimum requirements

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
% of students graduating with minimum requirements	0.0%	0.3%	0.0%	2.2%

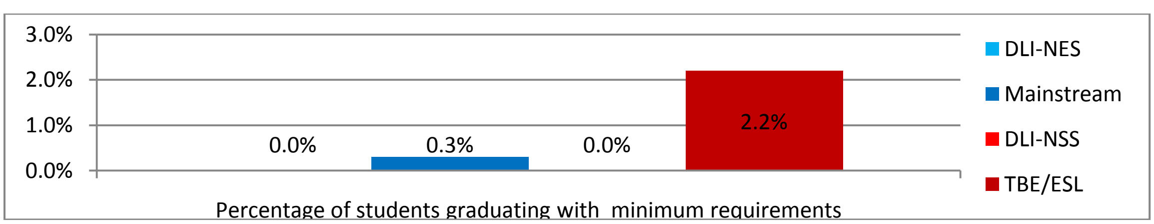

Figure 67: Percentage of students graduating with minimum requirements

Both DLI groups exhibited the best academic performance with 0.0% students graduating under the minimum requirements plan. Mainstream placed third with 0.3%

students graduating with minimum requirements; 100% more than both DLI groups. TBE/ESL had the worst performance with 2.2% of its students graduating with minimum requirements; 1.9 percentage points (86.4%) more than Mainstream and 100% more than both DLI groups. Table 147 shows the results of the Levene's test for percentage of students graduating under minimum requirements. The test found significant variance between groups (p = .000). Table 148 presents the ANOVA results for the percentage of students graduating under the minimum requirements plan. The ANOVA table identified no significant differences between groups (p = .165).

Table 147: Levene's Test for Percentage of students graduating with Minimum requirements

Levene Statistic	df1	df2	Sig.
7.011	3	665	.000

Table 148: ANOVA table for Percentage of students graduating with Minimum requirements

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.060	3	.020	1.702	.165
Within Groups	7.844	665	.012		
Total	7.904	668			

Table 149 presents the Contrast tests for the percentage of students graduating under the minimum requirements plan. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was validated.

Table 149: Contrast tests for Percentage of students graduating with Minimum requirements

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students graduating with Minimum Requirements	Does not assume equal variances	1	-.003	.0032	-1.000	308.000	.318
		3	-.022	.0082	-2.671	320.000	.008
		4	.003	.0032	1.000	308.000	.318
		5	-.019	.0088	-2.114	417.739	.035
		6	-.022	.0082	-2.671	320.000	.008

a. Contrast 2 cannot be evaluated for Percentage of Students graduation with Minimum Requirements.

The Contrast tests identified statistically significant differences in Contrast 3 between DLI-NES and TBE/ESL (*p* = .008); in Contrast 5 between Mainstream and TBE/ESL (*p* = .035), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .008). No significant differences were identified and in Contrast 1 between DLI-NES and Mainstream (p = .318) and in Contrast 4 between Mainstream and DLI-NSS (p = .318), Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had no students graduating with minimum requirements.

Analysis discussion.

The four groups exhibit differences in the percentage of students graduating with minimum requirements. This suggests that program type is a contributing factor to academic achievement for students. Both DLI groups exhibited the best academic performance with 0.0% students graduating under the minimum requirements plan (p = 1.000). Mainstream placed third with 100% more students graduating with minimum requirements than both DLI groups (p = .318). Mainstream had the worst performance with 77.8% more than Mainstream (p = .035) and 100% more than both DLI groups (p = .008).

Weighted grade point average.

The students' W-GPA was analyzed to look for statistically significant differences between groups. Table 150 and Figure 68 exhibit the initial data, which shows that the four groups exhibited differences in mean weighted grade point average

Table 150: Mean weighted grade point average per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Mean Weighted Grade point Average	98.1	85.9	92.4	83.5

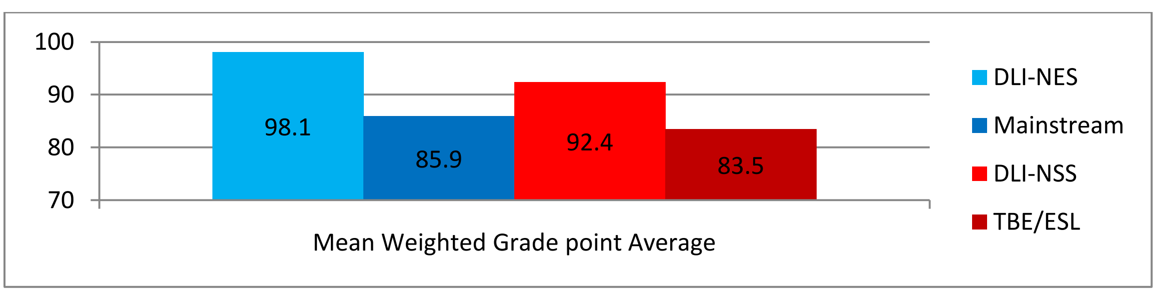

Figure 68: Mean weighted grade point average per group

DLI-NES surpassed DLI-NSS by 5.7 percentage points (6.2%), surpassed Mainstream by 12.2 percentage points (14.2%), and surpassed TBE/ESL by 14.6 percentage points (17.5%). DLI-NSS placed second, surpassing Mainstream by 6.5 percentage points (7.6%) and surpassing TBE/ESL by 8.9 percentage points (10.7%). Mainstream placed third by surpassing TBE/ESL by 2.4 percentage points (2.9%).

Table 151 shows the results of the Levene's test for mean weighted grade point average. The test found no significant variance between groups (p = .757)**.**

Table 151: Levene's Test for mean weighted grade point average

Levene Statistic	df1	df2	Sig.
1.248	3	665	.291

Table 152 presents the ANOVA results for mean weighted grade point average. The ANOVA table identified significant differences between groups (p = .000).

Table 152: ANOVA table for Mean weighted grade point average

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4640.533	3	1546.844	18.286	.000
Within Groups	56253.208	665	84.591		
Total	60893.741	668			

Table 153 presents the Contrast tests for mean weighted grade point average. Because the Levene's statistic found no significant variances between groups (*p* = .291), the Contrast tests' –assume equal variance- outcome was considered as valid.

Table 153: Contrast tests for Mean weighted grade point average

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Weighted Grade Point Average	Assume equal variances	1	12.1404977	2.60399319	4.662	665	.000
		2	5.6907054	3.12418525	1.822	665	.069
		3	14.6201006	2.60202740	5.619	665	.000
		4	-6.4497923	1.87810260	-3.434	665	.001
		5	2.4796029	.73299556	3.383	665	.001
		6	8.9293952	1.87537608	4.761	665	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .001), in

Contrast 5 between Mainstream and TBE/ESL (*p* = .001); and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). The Contrast tests also identified a marginally significant difference in Contrast 2 between DLI-NES and DLI-NSS (*p* = .069).

Analysis discussion.

The four groups exhibited differences in their students' weighted grade point average. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES students achieved the highest mean in WGPA, surpassing DLI-NSS by 6.2% (*p* = .069), surpassing Mainstream by 14.2% (*p* = .000), and surpassing TBE/ESL by 17.5% (*p* = .000). In second place, DLI-NSS surpassed Mainstream by 7.6% (*p* = .001) and TBE/ESL by 10.7% (p = .000). Mainstream placed third, surpassing TBE/ESL by 2.9% (*p* = .001).

Student's Ranking

The groups' average student ranking was analyzed to look for statistically significant differences between groups. Table 154 and Figure 69 exhibit the initial data, which shows that the four groups exhibited differences in students' average ranking. In this data, a lower number indicates a higher ranking and, thus, a better performance.

Table 154: Students' average ranking per group

Cohort 2005-2009	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Students average ranking per group	44.5	219.5	136.8	268.3

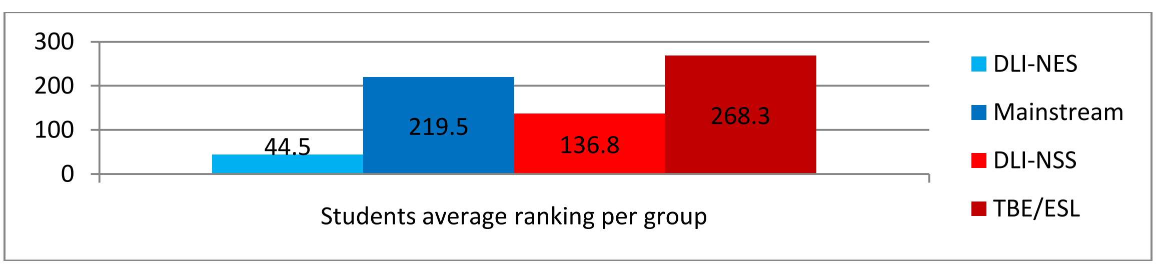

Figure 69: Students' average ranking per group

DLI had the best academic performance with a 44.5 ranking average. DLI-NSS placed second with a 136.8 ranking average; 92.3 percentage points (207.4%) higher than

DLI-NES. Mainstream placed third with a 219.5 ranking average; 82.7 percentage points (60.5%) higher than DLI-NSS and 175.0 percentage points (393.3%) higher than DLI-NES. TBE/ESL had the worst performance with a 268.3 average ranking; 48.8 percentage points (22.2%) higher than Mainstream, 131.5 percentage points (96.1%) higher than DLI-NSS, and 175.0 percentage points (393.3%) higher than DLI-NES. Table 155 shows the results of the Levene's test for in students' average ranking. The test found significant variance between groups (p = .000)**.**

Table 155: Levene's Test for Students' average ranking per group

Levene Statistic	df1	df2	Sig.
7.936	3	665	.000

Table 156 presents the ANOVA results for students' average ranking. The ANOVA table identified significant differences between groups (p = .000).

Table 156: ANOVA table for Students' average ranking per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1156478.992	3	385492.997	17.197	.000
Within Groups	14906902.850	665	22416.395		
Total	16063381.842	668			

Table 157 presents the Contrast tests for students' average ranking. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 157: Contrast tests for students' average ranking per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
place achieved in the school overall ranking	Does not assume equal variances	1	-174.983	13.5450	-12.919	31.896	.000
		2	-91.269	27.4011	-3.331	32.434	.002
		3	-223.770	13.6378	-16.408	32.763	.000
		4	83.713	26.6649	3.139	30.903	.004
		5	-48.787	12.0907	-4.035	627.998	.000
		6	-132.501	26.7122	-4.960	31.122	.000

The Contrast tests found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .002); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between

Mainstream and DLI-NSS (*p* = .004), in Contrast 5 between Mainstream and TBE/ESL (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000).

Analysis discussion.

T he four groups exhibit differences in the mean ranking of their students. This suggests that program type is a contributing factor to academic achievement for students.

DLI had the best academic performance with a 44.5 ranking average. DLI-NSS placed second with a ranking 207.4% higher than DLI-NES (p = .002). Mainstream placed third with a ranking 60.5% higher than DLI-NSS (p = .004) and 393.3% higher than DLI-NES (p = .000). TBE/ESL had the worst performance with a ranking 22.2% higher than Mainstream (p = .000), 96.1% higher than DLI-NSS (p = .000), and 393.3% higher than DLI-NES (p = .000).

Percentage of students in the top 10%.

The groups' representation in the top 10% was analyzed to look for statistically significant differences between groups. Table 158 and Figure 70 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in top 10%.

Table 158: Percentage of students per group ranked in the Top 10%

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 10%	53.8%	10.7%	30.8%	5.9%

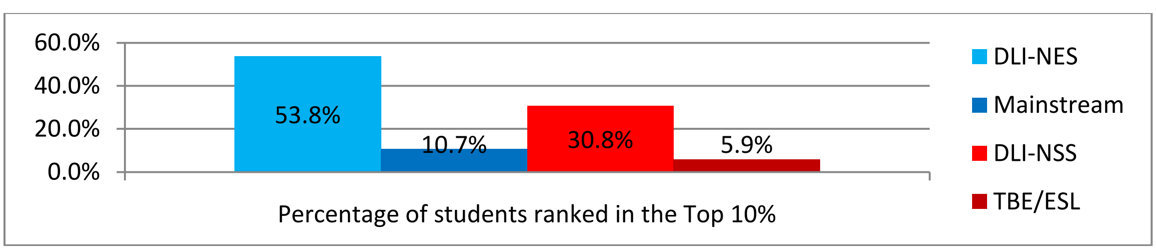

Figure 70: Percentage of students per group ranked in the Top 10%

DLI had the highest percentage of students ranked in the top 10%, surpassing DLI-NSS by 23.0 percentage points (74.7%), Mainstream by 43.1 percentage points

(402.8%), and TBE/ESL by 47.9 percentage points (811.9%). DLI-NSS placed second, surpassing Mainstream by 20.1 percentage points (187.9%) and TBE/ESL by 24.9 percentage points (422.0%). Mainstream placed third by surpassing TBE/ESL by 4.8 percentage points (81.4%). Table 159 shows the results of the Levene's test for the percentage of students ranked in the top 10%. The Levene's statistic found significant variance between groups (p = .000).

Table 159: Levene's test for Percentage of students per group ranked in the top 10%

Levene Statistic	df1	df2	Sig.
29.108	3	665	.000

Table 160 presents the ANOVA results for the percentage of students ranked in the top 10%. The ANOVA table found significant differences between groups (p = .000).

Table 160: ANOVA table for Percentage of students per group ranked in the top 10%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.170	3	1.390	16.469	.000
Within Groups	56.120	665	.084		
Total	60.290	668			

Table 161 presents the Contrast tests for the percentage of students ranked in the top 10%. Because the Levene's statistic found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 161: Contrast tests for Percentage of students per group ranked in the top 10%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Met top 10%	Does not assume equal variances	1	.432	.1450	2.977	12.361	.011
		2	.231	.1710	1.350	22.109	.191
		3	.479	.1445	3.316	12.202	.006
		4	-.201	.0940	-2.138	26.848	.042
		5	.048	.0220	2.165	576.252	.031
		6	.249	.0932	2.665	26.031	.013

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .011), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .006), in Contrast 4 between Mainstream and DLI-NSS (*p* = .042), in Contrast 5 between Mainstream and TBE/ESL (*p* = .031), and in Contrast 6 between

DLI-NSS and TBE/ESL (p = .013). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .191).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the top 10%. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES surpassed DLI-NSS by 74.7% (*p* = .191), Mainstream by 402.8% (*p* = .011) and TBE/ESL by 811.9% (*p* = .006). DLI-NSS surpassed Mainstream by 187.9% (*p* = .042) and TBE/ESL by 422.0% (p = .013). Mainstream surpassed TBE/ESL by 81.4% (*p* = .031).

Percentage of students in top 25%

The groups' percentage of students in top 25% was analyzed to look for statistically significant differences between groups. Table 162 and Figure 71 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in top 25%.

Table 162: Percentage of students per group, ranked in the top 25%

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 25%	92.3%	24.3%	53.8%	20.6%

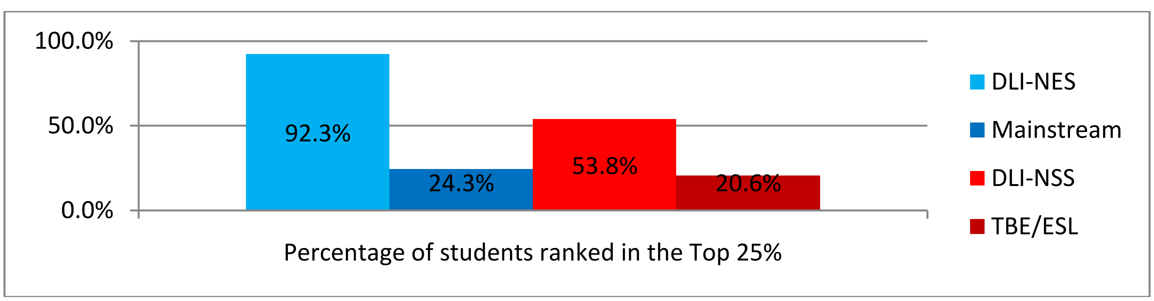

Figure 71: Percentage of students per group, ranked in the top 25%

DLI-NES surpassed DLI-NSS by 38.5 percentage points (71.6%), Mainstream by 68.0 percentage points (279.8%), and TBE/ESL by 71.7 percentage points (348.1%). DLI-NSS surpassed Mainstream by 29.5 percentage points (121.4%) and TBE/ESL by

33.2 percentage points (161.2%). Mainstream surpassed TBE/ESL by 3.7 percentage points (18.0%). Table 163 shows the results of the Levene's test for the percentage of students ranked in the top 25%. The test found significant variance between groups (p = .000).

Table 163: Levene's test for Percentage of students per group, ranked in the Top 25%

Levene Statistic	df1	df2	Sig.
9.111	3	665	.000

Table 164 presents the ANOVA results for the percentage of students ranked in the top 25%. The ANOVA table found significant differences between groups (p = .000).

Table 164: ANOVA table for Percentage of students per group, ranked in the Top 25%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.702	3	2.901	16.541	.000
Within Groups	116.611	665	.175		
Total	125.312	668			

Table 165 presents the Contrast tests for the percentage of students ranked in the top 25%. Because the Levene's test found significant variances between groups (*p* = .000), the contrast tests' –not assume equal variance- outcome was considered as valid.

Table 165: Contrast tests for Percentage of students per group, ranked in the Top 25%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the top 25%	Does not assume equal variances	1	.680	.0807	8.430	14.537	.000
		2	.385	.1259	3.054	36.602	.004
		3	.717	.0802	8.949	14.156	.000
		4	-.296	.1027	-2.881	28.084	.008
		5	.037	.0333	1.115	622.131	.265
		6	.333	.1022	3.256	27.627	.003

The Contrast tests identified significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .004), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .008), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .003). No statistically significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .173).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in top 25%. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES surpassed all other groups in the percentage of students included in the Top 25% bracket. DLI-NES surpassed DLI-NSS by 71.6% (*p* = .004), Mainstream by 279.8% (*p* = .000) and TBE/ESL by 348.1% (*p* = .000). DLI-NSS placed second by surpassing Mainstream by 121.4% (*p* = .008) and TBE/ESL by 161.2% (p = .003). Mainstream placed third by surpassing TBE/ESL by 18.0% (*p* = .265).

Percentage of students in top 50%

The percentage of students ranked in top 50% was analyzed to looks for statistically significant differences between groups. Table 166 and Figure 72 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in top 50%.

Table 166: Percentage of students per group ranked in the top 50%

Cohort 2006=2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the Top 50%	100%	54.7%	76.9%	41.1%

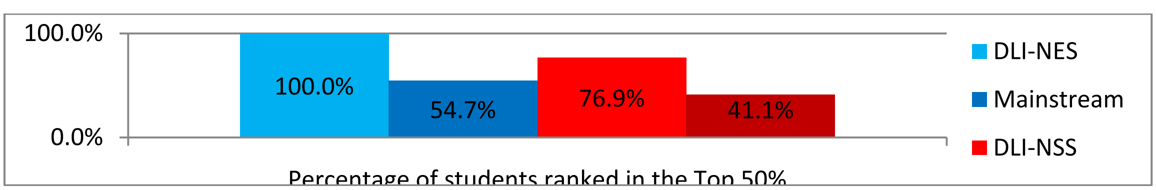

Figure 72: Percentage of students per group ranked in the top 50%

DLI-NES surpassed DLI-NSS by 23.1 percentage points (30.0%), Mainstream by 45.3 percentage points (82.8%), and TBE/ESL by 58.9 percentage points (143.3%). DLI-

NSS surpassed Mainstream by 22.2 percentage points (40.6%) and TBE/ESL by 35.8 percentage points (87.1%). Mainstream surpassed TBE/ESL by 13.6 percentage points (33.1%).

Table 167 shows the results of the Levene's test for the percentage of students ranked in the top 50%. The test found significant variance between groups (p = .000).

Table 167: Levene's test for Percentage of Students by group ranked in the top 50%

Levene Statistic	df1	df2	Sig.
172.130	3	665	.000

Table 168 presents the ANOVA results for the percentage of students ranked in the top 50%. The ANOVA table found significant differences between groups (p = .000).

Table 168: ANOVA table for Percentage of students per group ranked in the top 50%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.345	3	2.782	11.641	.000
Within Groups	158.905	665	.239		
Total	167.250	668			

Table 169 presents the Contrast tests for the percentage of students ranked in the top 50%. Because the Levene's test found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 169: Contrast Test for Percentage of students per group ranked in the top 50%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the top 50%	Does not assume equal variances	1	.453	.0284	15.973	308.000	.000
		2	.231	.0843	2.739	25.000	.011
		3	.589	.0275	21.405	320.000	.000
		4	-.222	.0889	-2.500	30.954	.018
		5	.136	.0395	3.435	626.445	.001
		6	.358	.0886	4.039	30.585	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .011); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .018), in Contrast 5 between Mainstream and TBE/ESL (p = .001), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the top 50%. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES surpassed DLI-NSS by 30.0% (p = .011), Mainstream by 82.8% (p = .000) and TBE/ESL by 143.3% (p = .000). DLI-NSS surpassed Mainstream by 40.6% (p = .018) and surpassed TBE/ESL by 87.1% (p = .000). Mainstream surpassed TBE/ESL by 33.1% (p = .001).

Percentage of students in last 25%

The percentage of students ranked in the last 25% was measured to look for statistically significant differences between groups. Table 170 and Figure 73 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students ranked in last 25%. In this data, a lower percentage indicates better academic performance.

Table 170: Percentage of students per group ranked in the last 25%

Cohort 2006=2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students ranked in the last 25%	0.0%	21.4%	7.7%	31.2%

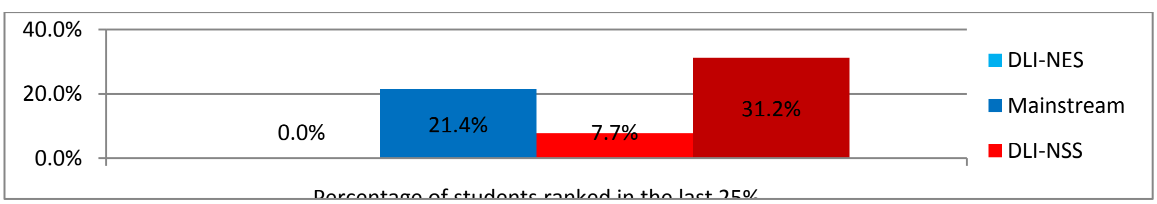

Figure 73: Percentage of students per group ranked in the last 25%

DLI-NES had the best performance, with 0.0% students in the last 25%. DLI-NSS placed second with 7.7% of its students in the last quartile; 100% more than DLI-NES.

Mainstream placed third with 21.4% of its students in the last quartile; 13.7 percentage points (177.9%) more than DLI-NSS and 100% more than DLI-NES. TBE/ESL had the worst performance with 31.2% of it students in the last quartile; 9.8 percentage points (45.8%) more than Mainstream, 23.5 percentage points (305.2%) more than DLI-NSS, and 100% more than DLI-NES. Table 171 shows the results of the Levene's test for the percentage of students ranked in the last 25%. The Levene's test found significant variance between groups (p = .000)**.**

Table 171: Levene's test for Percentage of students per group ranked in the last 25%

Levene Statistic	df1	df2	Sig.
36.220	3	665	.000

Table 172 presents the ANOVA results for the percentage of students ranked in the last 25%. The ANOVA table identified significant differences between groups (p = .001).

Table 172: ANOVA test for Percentage of students per group ranked in the last 25%

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.215	3	1.072	5.813	.001
Within Groups	125.596	665	.184		
Total	125.812	668			

Table 173 presents the Contrast tests for the percentage of students ranked in the last 25%. Because the Levene's test found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 173: Contrast tests for Percentage of students per group ranked in the last 25%

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of Students in the last 25%	Does not assume equal variances	1	-.214	.0234	-9.146	308.000	.000
		2	-.077	.0533	-1.443	25.000	.161
		3	-.312	.0259	-12.033	320.000	.000
		4	.137	.0582	2.349	35.416	.025
		5	-.098	.0349	-2.809	623.637	.005
		6	-.235	.0592	-3.960	38.026	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and

TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .025), in Contrast 5 between Mainstream and TBE/ESL (p = .005), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 2 between DLI-NES and DLI-NSS (p = .161).

Analysis discussion.

The four groups exhibit differences in the percentage of students ranked in the last 25%. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES had the best performance, with 0.0% students in the last 25%. DLI-NSS placed second with 100% more than DLI-NES (p = .161). Mainstream placed third with 177.9% more students in the last quartile than DLI-NSS (p = .025) and 100% more than DLI-NES (p = .000). TBE/ESL had the worst performance with 45.8% more students in the last 25% than Mainstream (p = .005), 305.2% more than DLI-NSS (p = .000), and 100% more than DLI-NES (p = .000).

Summary of results on overall high school performance.

The four groups exhibited differences in all analyses based on indicators of high school performance. This suggests that program type is a contributing factor to academic achievement for students.

In high school graduation rate, both DLI groups surpassed the other two groups. DLI-NES and DLI-NSS tied with a graduation rate of 100% (p = 1.000), surpassing Mainstream by 5.5% and TBE/ESL by 5.9%. In all cases, the differences were statistically significant (all p = .000). Mainstream placed third, surpassing TBE/ESL by 0.4%; however, the difference was not statistically significant (p = .244).

In the percentage of students who met the Distinguished Achievement graduation plan, DLI-NES outscored all the other groups. DLI-NES surpassed DLI-NSS by 26.8%; surpassed Mainstream by 227.3% and surpassed TBE/ESL by 515.3%. In all cases, the differences were statistically significant ($p \leq .001$). DLI-NSS placed second, surpassing Mainstream by a marginally significant difference of 63.8% ($p = .091$), and surpassing TBE/ESL by a statistically significant difference of 208.0% ($p = .005$). Mainstream placed third, surpassing TBE/ESL by 88.0%. The difference was statistically significant ($p = .000$).

In the percentage of students graduating with minimum requirements, both DLI groups had the best results. DLI-NES and DLI-NSS tied in first place, with 0.0% students graduating under the minimum requirements plan. Both DLI groups surpassed Mainstream by 100%; however, the difference was not identified as statistically significant ($p = .318$). Both DLI groups surpassed TBE/ESL by a statistically significant difference of 100% ($p = 158$). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference of 86.4% ($p = .035$).

In weighted grade point average, DLI-NES achieved the highest average, surpassing Mainstream by 14.2% and surpassing TBE/ESL by 17.5%. In both cases the differences were statistically significant ($p \leq .001$). DLI-NES also surpassed DLI-NSS in WGPA by 6.2%; however, the difference was only marginally significant ($p = .062$). DLI-NSS placed second, surpassing Mainstream by 7.6% and TBE/ESL by 10.7%. In both cases the differences were statistically significant ($p \leq .001$). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference of 2.9% ($p = .001$).

In student ranking, DLI-NES outperformed all the other groups. DLI-NES surpassed DLI-NSS by 207.4%, Mainstream by 393.3% and TBE/ESL by 502.9%. In all cases the differences were statistically significant ($p \leq .002$). DLI-NSS placed second by outperforming Mainstream by 60.5% and TBE/ESL by 96.1%. In both cases the differences were statistically significant ($p \leq .004$). Mainstream place third, outperforming TBE/ESL by a statistically significant difference of 22.2% ($p = .000$).

In the percentage of students ranked in top 10%, DLI-NES surpassed all the other groups. DLI-NES surpassed Mainstream by 402.8% and TBE/ESL by 811.9%. In both cases the differences were statistically significant ($p \leq .011$). DLI-NES surpassed DLI-NSS by 74.7%. However, the difference was not identified as statistically significant ($p = .191$). DLI-NSS placed second, surpassing Mainstream by 187.9% and TBE/ESL by 422.0%. In both cases, the differences were statistically significant ($p \leq .042$). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference of 81.4% ($p = .031$).

In the percentage of students ranked in top 25%, DLI-NES exhibited the best results by surpassing DLI-NSS by 71.6%, Mainstream by 279.8% and TBE/ESL by 348.1%. In all cases, the differences were statistically significant ($p \leq .004$). DLI-NSS placed second, surpassing Mainstream by 121.4% and TBE/ESL by 161.2%. In all cases the differences were statistically significant ($p \leq .008$) Mainstream placed third, surpassing TBE/ESL by 18.0%. However, the difference was not identified as statistically significant ($p = .265$).

In the percentage of students ranked in the top 50%, DLI-NES placed first, surpassing DLI-NSS by 30.0%, Mainstream by 82.8%, and TBE/ESL by 143.3%. All differences were statistically significant ($p \leq .011$). DLI-NSS placed second, surpassing Mainstream by 40.6% and TBE/ESL by 87.1%. Both differences were statistically significant ($p \leq .018$). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference of 33.1% ($p = .001$).

In the percentage of students ranked in the last 25%, DLI-NES had the best results by having no representation in the last quartile. DLI-NES surpassed all three other groups by a difference of 100%. The differences were statistically significant for Mainstream ($p = .000$) and for TBE/ESL ($p = .000$), and not statistically significant for DLI-NSS ($p = .161$). DLI-NSS placed second best, outperforming Mainstream by 64.0% and TBE/ESL by 75.3%. In both cases the differences were statistically significant ($p \leq .025$). Mainstream placed third, surpassing TBE/ESL by a statistically significant difference of 31.4% ($p = .005$).

DLI-NES exhibited the best results in all measures of academic achievement related with high school performance. For the nine measures of high school performance, DLI-NES placed consistently in first place. DLI-NSS exhibited the second best results. DLI-NSS tied at first place in 2 indicators –graduation rate and percentage of students graduating with minimum requirements- and placed second in the other 7 measures. Mainstream consistently placed third and TBE/ESL exhibited the worst results, placing last in all nine indicators related with high school performance.

It can be concluded that, from the perspective of high school performance, dual language instruction proved much more effective in promoting academic achievement than TBE/ESL or Mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Performance on college-readiness indicators.

A variety of measures of performance in college-readiness were analyzed to look for significant differences between groups. The variables analyzed include overall performance on AP tests and overall performance on ACT tests. Each variable was analyzed from different perspectives to provide a more comprehensive analysis.

Students' performance on Advanced Placement (AP) tests.

Participation in AP courses and assessments is a reliable indicator of how well prepared students are for college. Because AP course participation and AP test passing are key indicators of college readiness, both measures were analyzed to look for differences between groups.

*Participation on Advanced Placement (AP) tests***.**

The percentage of students taking at least one AP test was analyzed to look for differences between groups. Table 174 and Figure 74 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students that took an AP test.

Table 174: Percentage of students that took an AP test, by groups

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
percentage of students who took an AP test	100%	52.8%	100%	48.6%

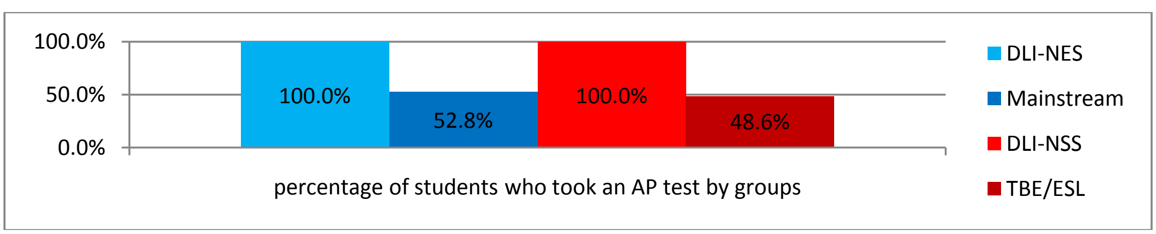

Figure 74: percentage of students who took an AP test, by groups

DLI-NES and DLI-NSS tied in first place, with all students taking at least one AP test during their 4 years of high school education. Both DLI groups surpassed Mainstream by 47.2 percentage points (89.4%) and surpassed TBE/ESL by 51.4

percentage points (105.8%). Mainstream placed third, surpassing TBE/ESL by 4.2 percentage points (8.6%). Table 175 shows the results of the Levene's test for the percentage of students taking an AP test. The Levene's statistic found significant variance between groups (p = .000).

Table 175: Levene's test for Percentage of Students per group taking an AP test

Levene Statistic	df1	df2	Sig.
6846753	3	665	.000

Table 176 presents the ANOVA results for the percentage of students taking an AP test. The ANOVA table identified significant differences between groups (p = .000).

Table 176: ANOVA table for Percentage of students per group taking an AP test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.221	3	3.074	13.003	.000
Within Groups	157.203	665	.236		
Total	166.425	668			

Table 177 presents the Contrast tests for the percentage of students taking at least one AP test during their high school education. Because the Levene's test found significant variances between groups (*p* = .000), the Contrast tests' –not assume equal variance- outcome was considered as valid.

Table 177: Contrast Test for Percentage of students per group taking an AP test

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an AP test	Does not assume equal variances	1	.472	.0284	16.610	308.000	.000
		3	.517	.0279	18.397	320.000	.000
		4	-.472	.0284	-16.610	308.000	.000
		5	.042	.0399	1.041	627.137	.298
		6	.514	.0279	18.397	320.000	.000

a. Contrast 2 cannot be evaluated for Percentage of students who took an AP test.

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 4 between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No statistically significant difference was identified in Contrast 5 between Mainstream and TBE/ESL (*p* = .298). Contrast 2 between DLI-NES and DLI-NSS could not be performed because both groups had 100% students taking the test (*p* = 1.000).

Analysis discussion.

The four groups exhibited large differences in the percentage of students taking at least one AP test. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES and DLI-NSS tied in first place, with all their students taking at least one AP test during their 4 years of high school education. Both DLI groups surpassed Mainstream by 89.4% (*p* = .000) and surpassed TBE/ESL by 105.8% (*p* = .000). Mainstream placed third, surpassing TBE/ESL by 8.6% (*p* = .298).

Percentage of students succeeding in Advanced Placement (AP) tests.

The percentage of students passing at least one AP test with a score of 3 or more was analyzed to look for differences between groups. Table 178 and Figure 75 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students passing an AP test with a score of 3 or higher.

Table 178: Percentage of students who passed an AP test with a score of 3 or higher

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
percentage of students who passed an AP test	84.6%	10.1%	80.8%	21.6%

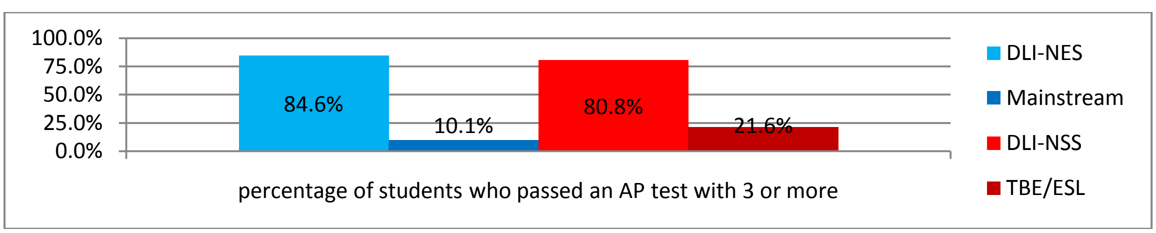

Figure 75: percentage of students that passed an AP test with a score of 3 or higher

DLI-NES had the largest percentage of students passing at least one AP test with a score of 3 or higher during their 4 years of high school education. DLI-NES surpassed DLI-NSS by 3.8 percentage points (4.7%), TBE/ESL by 63.0 percentage points (291.7%)

and mainstream by 74.5 percentage points (737.6%). DLI-NSS placed second, surpassing TBE/ESL by 59.2 percentage points (274.1%) and Mainstream by 70.7 percentage points (700.0%). TBE/ESL placed third, surpassing Mainstream by 11.5 percentage points (53.2%).

Table 179 shows the results of the Levene's test for the percentage of students passing an AP test. The Levene's test found significant variance between groups (p = .000).

Table 179: Levene's test for Percentage of Students passing an AP test

Levene Statistic	df1	df2	Sig.
23.352	3	662	.000

Table 180 presents the ANOVA results for the percentage of students passing an AP test. The ANOVA table identified significant differences between groups (p = .000).

Table 180: ANOVA table for Percentage of students passing an AP test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.152	3	6.051	45.680	.000
Within Groups	87.686	662	.132		
Total	105.838	665			

Table 181 presents the Contrast tests for the percentage of students passing an AP test. Because the Levene's test found significant variances between groups (*p* = .000), the contrast tests' –not assume equal variance- outcome was considered as valid.

Table 181: Contrast Test for Percentage of students per group passing an AP test

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who passed an AP test with 3 or more	Does not assume equal variances	1	.746	.1056	7.062	12.661	.000
		2	.038	.1306	.294	25.644	.771
		3	.630	.1067	5.904	13.207	.000
		4	-.707	.0807	-8.764	27.424	.000
		5	-.116	.0288	-4.019	582.483	.000
		6	.591	.0821	7.200	29.457	.000

The Contrast tests identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 3 between DLI-NES and

TBE/ESL (p = .000), in Contrast 4 between Mainstream and DLI-NSS (p = .000), in Contrast 5 between Mainstream and TBE/ESL (p = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified in Contrast 2 between DLI-NES and DLI-NSS (p = .771).

Analysis discussion.

The four groups exhibited large differences in the percentage of students passing at least one AP test with a score of 3 or higher. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES had the highest percentage of students successfully passing an AP test. DLI-NES surpassed DLI-NSS by 4.7% (p = .771), TBE/ESL by 291.7% (p = .000) and Mainstream by 737.6% (p = .000). DLI-NSS placed second, surpassing TBE/ESL by 274.1% (p = .000) and Mainstream by 700.0% (p = .000). TBE/ESL surpassed Mainstream by 53.2% (p = .000).

Participation in AP tests other than Spanish

The students' participation in AP tests other than Spanish-related was analyzed to look for differences between groups. Table 182 and Figure 76 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students that took an AP test other than Spanish.

Table 182: Percentage of students that took an AP test other than Spanish, by groups

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
percentage of students who took an AP test other than Spanish	92.3%	51.5%	65.4%	41.4%

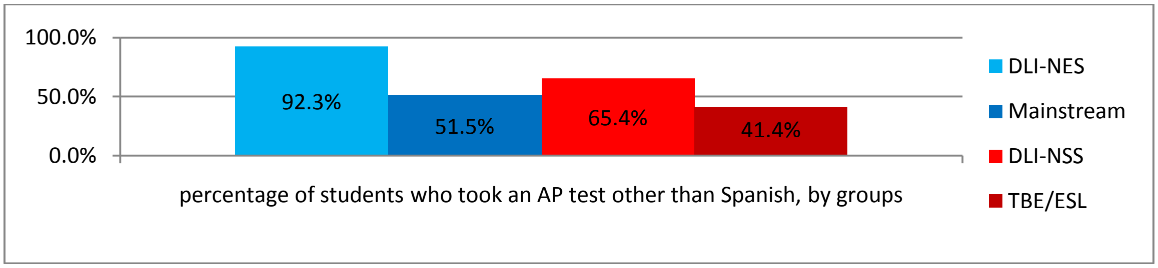

Figure 76: percentage of students that took an AP test other than Spanish, by groups

DLI-NES had the largest percentage of students taking an AP test other than Spanish. DLI-NES surpassed DLI-NSS by 26.9 percentage points (41.1%), mainstream by 40.8 points (79.2%) and TBE/ESL by 50.9 percentage points (122.9%). DLI-NSS placed second, surpassing Mainstream by 13.9 percentage points (27.0%) and TBE/ESL by 24.0 percentage points (58.0%). Mainstream placed third, surpassing TBE/ESL by 10.1 percentage points (24.4%). Table 183 shows the results of the Levene's test for the percentage of students taking an AP test other than Spanish. The test found significant variance between groups (p = .000).

Table 183: Levene's test for Percentage of Students that took an AP test other than Spanish, by groups

Levene Statistic	df1	df2	Sig.
100.673	3	665	.000

Table 184 presents the ANOVA results for the percentage of students taking an AP test other than Spanish. The ANOVA table found significant differences between groups (p = .000).

Table 184: ANOVA table for Percentage of students that took an AP test other than Spanish, by groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.091	3	1.697	6.971	.000
Within Groups	161.886	665	.243		
Total	166.978	668			

Table 185 presents the Contrast tests for the percentage of students taking an AP test other than Spanish. Because the Levene's test found significant variances between groups (p = .000), the –not assume equal variance- outcome was considered as valid.

Table 185: Contrast Test for Percentage of students that took an AP test other than Spanish, by groups

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an AP test other than Spanish	Does not assume equal variances	1	.409	.0820	4.980	15.503	.000
		2	.269	.1224	2.200	36.170	.034
		3	.509	.0817	6.227	15.263	.000
		4	-.139	.0993	-1.402	29.660	.171
		5	.100	.0396	2.530	626.261	.012
		6	.240	.0991	2.418	29.347	.022

The test identified statistically significant differences in Contrast 1 between DLI-NES and Mainstream (p = .000), in Contrast 2 between DLI-NES and DLI-NSS (p = .034), in Contrast 3 between DLI-NES and TBE/ESL (p = .000), in contrast 5 between Mainstream and TBE/ESL (p = .012), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .022). The contrast test found no statistically significant difference in Contrast 4 between Mainstream and DLI-NSS (p = .171),

Analysis discussion.

The four groups exhibited differences in the percentage of students taking at least one AP test other than Spanish. This suggests that program type is a contributing factor to academic achievement for students. DLI-NES surpassed DLI-NSS by 41.1%, (p = .034), Mainstream by 79.2% (p = .000) and TBE/ESL by 122.9% (p = .000). DLI-NSS placed second, surpassing Mainstream by 27.0% (p = .171) and TBE/ESL by 58.0% (p = .022). Mainstream placed third, surpassing TBE/ESL by 24.4% (p = .012).

Percentage of students succeeding in AP tests other than Spanish.

The percentage of students passing at least one AP tests other than Spanish with a grade of 3 or more was analyzed to look for differences between groups. Table 186 and Figure 77 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students passing an AP test other than Spanish.

Table 186: Percentage of students who passed an AP test other than Spanish with a score of 3 or higher

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
% of students who passed an AP test other than Spanish	23.1%	8.7%	11.5%	3.4%

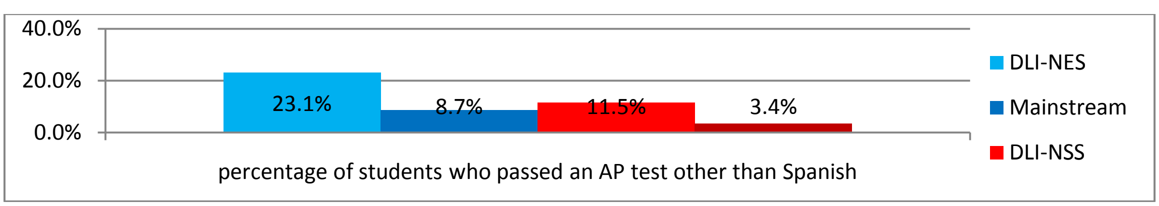

Figure 77: percentage of students that passed an AP test other than Spanish with a score of 3 or higher

DLI-NES had the largest percentage of students passing at least one AP test other than Spanish-related, with a score of 3 or higher. DLI-NES surpassed DLI-NSS by 11.6 percentage points (100.9%), Mainstream by 14.4 percentage points (165.5%) and TBE/ESL by 19.7 percentage points (579.4%). DLI-NSS placed second, surpassing Mainstream by 2.8 percentage points (32.2%) and TBE/ESL by 8.1 percentage points (238.2%). Mainstream placed third, surpassing TBE/ESL by 5.3 points (155.9%).

Table 187 shows the results of the Levene's test for the percentage of students passing an AP test other than Spanish with a score of 3 or higher. The Levene's test found significant variance between groups (p = .000).

Table 187: Levene's test for percentage of students passing an AP test

Levene Statistic	df1	df2	Sig.
18.161	3	665	.000

Table 188 presents the ANOVA results for the percentage of students passing an AP test. The ANOVA table identified significant differences between groups (p = .002).

Table 188: ANOVA table for percentage of students passing an AP test other than Spanish

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.881	3	.294	4.854	.002
Within Groups	40.225	665	.060		
Total	41.106	668			

Table 189 presents the results of the Contrast tests for the percentage of students passing an AP test other than Spanish. Because the test found significant variances between groups (*p* = .000), the–not assume equal variance- outcome was validated.

Table 189: Contrast Test for percentage of students per group passing an AP test other than Spanish

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who passed an AP test other than Spanish	Does not assume equal variances	1	.143	.1227	1.169	12.424	.264
		2	.115	.1374	.840	18.849	.412
		3	.197	.1221	1.610	12.168	.133
		4	-.028	.0659	-.425	28.262	.674
		5	.053	.0190	2.790	522.896	.005
		6	.081	.0647	1.254	26.281	.221

The Contrast tests only identified a statistically significant difference in Contrast 5 between Mainstream and TBE/ESL (p = .005). No statistically significant differences were indentified in Contrast 1 between DLI-NES and Mainstream (p = .264), in Contrast 2 between DLI-NES and DLI-NSS (p = .412), in Contrast 3 between DLI-NES and TBE/ESL (p = .133), in Contrast 4 between Mainstream and DLI-NSS (p = .674), and in Contrast 6 between DLI-NSS and TBE/ESL (p = .221).

Analysis discussion.

The four groups exhibited differences in the percentage of students passing at least one AP test other than Spanish with a score of 3 or higher. This suggests that program type is a contributing factor to academic achievement for students.

DLI-NES had the largest percentage of students passing an AP test other than Spanish with a score of 3 or higher. DLI-NES surpassed DLI-NSS by 100.9%, (p = .412), Mainstream by 165.5% (p = .264) and TBE/ESL by 579.4% (p = .133). DLI-NSS placed second, surpassing Mainstream by 32.2% (p = .674) and TBE/ESL by 238.2% (p = .221). Mainstream surpassed TBE/ESL by 155.9% (p = .005).

Students' performance in Standardized College-Admission tests.

Because ACT is the test of choice of the selected school district, the analysis was made upon participation on ACT tests. Participation on other college-admission tests such as SAT was not analyzed due to the limited number of students taking such tests.

Percentage of students taking an ACT Test.

The percentage of students participating in an ACT test was analyzed to look for differences between groups. Table 190 and Figure 78 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students participating in ACT.

Table 190: Percentage of students that took an ACT test, per group

Cohort 2006-2010	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students that took an ACT test	100%	79.9%	100%	74.8%

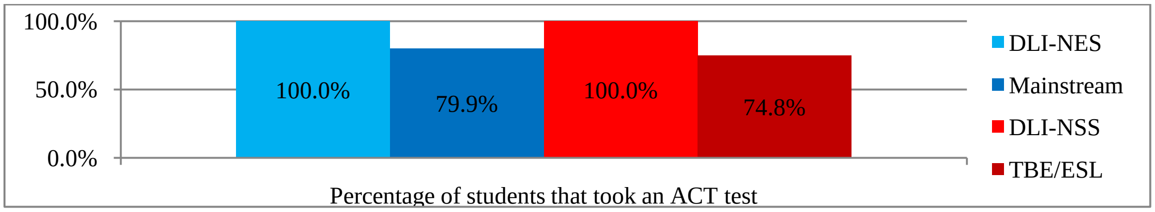

Figure 78: percentage of students that took an ACT test, per group

Both DLI groups tied in first place in percentage of students that took an ACT test, with 100% participation. All DLI students took at least one ACT tests during their high school years. Both DLI groups surpassed mainstream by 20.1 percentage points (25.2%) and TBE/ESL by 25.2 percentage points (33.7%). Mainstream placed second, surpassing TBE/ESL by 5.1 percentage points (6.8%). Table 191 shows the results of the Levene's test for the percentage of students that took an ACT test. The test found significant variance between groups (p = .000)**.**

Table 191: Levene's test for Percentage of Students that took an ACT test, per group

Levene Statistic	df1	df2	Sig.
33.919	3	665	.000

Table 192 presents the ANOVA results for the percentage of students that took an ACT test. The ANOVA table found significant differences between groups (p = .003).

Table 192: ANOVA table for Percentage of students that took an ACT test, per group

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.313	3	.771	4.656	.003
Within Groups	110.121	665	.166		
Total	112.433	668			

Table 193 presents the results of the Contrast tests for percentage of students that took an ACT test. Because the Levene's test found significant variances between groups (*p* = .000), the–not assume equal variance- outcome was validated.

Table 193: Contrast Test for Percentage of students that took an ACT test, per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who took an ACT test	Does not assume equal variances	1	.201	.0228	8.793	308.000	.000
		3	.252	.0243	10.392	320.000	.000
		4	-.201	.0228	-8.793	308.000	.000
		5	.052	.0333	1.551	626.847	.121
		6	.252	.0243	10.392	320.000	.000

a. Contrast 2 cannot be evaluated for Percentage of students who took an ACT test.

The Contrast tests identified significant differences between DLI-NES and Mainstream (p = .000), between DLI-NES and TBE/ESL (p = .000), between Mainstream and DLI-NSS (p = .000), and between DLI-NSS and TBE/ESL (p = .000). No significant difference was identified between Mainstream and TBE/ESL (p = .121).

Analysis discussion.

The four groups exhibited differences in the percentage of students that took an ACT test. This suggests that program type is a contributing factor to academic achievement for students.

Both DLI groups tied in first place in percentage of students that took an ACT test, with 100% participation. Both DLI groups surpassed mainstream by 25.2% (p = .000) and TBE/ESL by 33.7% (p = .000). Mainstream placed second, surpassing TBE/ESL by 6.8% (p = .121).

Students' performance on ACT.

The percentage of students participating successfully on ACT was analyzed through a variety of indicators including average scores and meeting established benchmark scores per content area. It is important to consider that the analysis included only students participating on ACT tests. All students (100%) from both DLI groups were included but only 79.9% of the Mainstream students and 74.8% of the TBE/ESL students took an ACT test.

Students' average scores on ACT per content area per group.

Table 194 and Figure 79 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students participating in ACT.

Table 194: ACT average scores per content area per group

Cohort 2006-2010		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
ACT average scores per content area per group	Reading	22.3	16.9	18.2	15.1
	Math	21.5	18.3	19.3	17.4
	Science	22.7	18.2	19.5	17.1
	English	22.2	17.6	18.6	16.3
	Composite	22.0	17.5	18.6	16.1

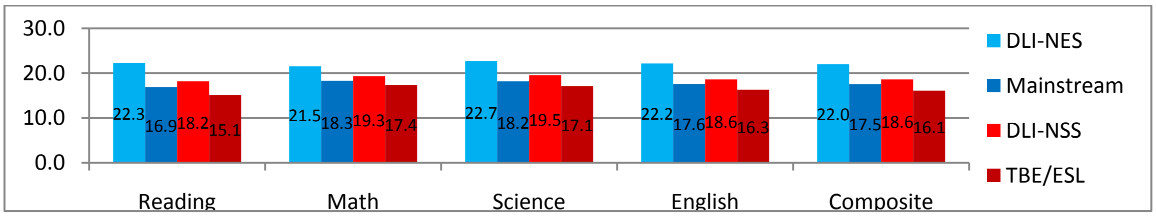

Figure 79: ACT average scores per content area per group

In reading, DLI-NES had the highest score average, surpassing DLI-NSS by 4.1 percentage points (22.5%), Mainstream by 5.4 percentage points (32.0%), and TBE/ESL by 7.2 percentage points (47.7%). DLI-NSS placed second, surpassing Mainstream by 1.3 percentage points (7.7%) and TBE/ESL by 3.1 percentage points (20.5%). Mainstream placed third, surpassing TBE/ESL by 1.8 percentage points (11.9%).

In math, DLI-NES had the highest score average, surpassing DLI-NSS by 2.2 percentage points (11.4%), Mainstream by 3.2 percentage points (17.5%), and TBE/ESL by 4.1 percentage points (23.6%). DLI-NSS placed second, surpassing Mainstream by 1.0 percentage points (5.5%) and TBE/ESL by 1.9 percentage points (10.9%). Mainstream placed third, surpassing TBE/ESL by 0.9 percentage points (5.2%).

In science, DLI-NES had the highest score average, surpassing DLI-NSS by 3.2 percentage points (16.4%), Mainstream by 4.5 percentage points (24.7%), and TBE/ESL by 5.6 percentage points (32.7%). DLI-NSS placed second, surpassing Mainstream by

1.3 percentage points (7.1%) and TBE/ESL by 2.4 percentage points (14.0%). Mainstream placed third, surpassing TBE/ESL by 1.1 percentage points (6.4%).

In English, DLI-NES had the highest score average, surpassing DLI-NSS by 3.6 percentage points (19.4%), Mainstream by 4.6 percentage points (26.1%), and TBE/ESL by 5.9 percentage points (36.2%). DLI-NSS placed second, surpassing Mainstream by 1.0 percentage points (5.7%) and TBE/ESL by 2.3 percentage points (14.1%). Mainstream placed third, surpassing TBE/ESL by 1.3 percentage points (8.0%).

In a composite score, DLI-NES had the highest average, surpassing DLI-NSS by 3.4 percentage points (18.3%), Mainstream by 4.5 percentage points (25.7%), and TBE/ESL by 5.9 percentage points (36.6%). DLI-NSS placed second, surpassing Mainstream by 1.1 percentage points (6.3%) and TBE/ESL by 2.5 percentage points (15.5%). Mainstream placed third, surpassing TBE/ESL by 1.4 percentage points (8.7%).

Table 195 shows the results of the Levene's test for ACT average scores. The test found a significant variance in math (p = .000). No statistically significant variances were identified for reading (p = .496), science (p = .354), English (p = .143) and the composite score (p = .165).

Table 195: Levene's Tests for ACT average scores per content area per group

	Levene Statistic	df1	df2	Sig.
ACT score Reading	.797	3	522	.496
ACT score Math	6.077	3	522	.000
ACT score Science	1.086	3	522	.354
ACT score English	1.817	3	522	.143
ACT score Composite	1.703	3	522	.165

Table 196 presents the ANOVA results for the ACT average scores. The ANOVA found significant differences between groups in all content areas (all $p \leq .000$). Table 197 presents the results of the Contrast tests for ACT average scores. Based on the results of the Levene's tests, the –not assume equal variance- outcome was validated for math, while the –assume equal variance- outcome was validated for the other four areas.

Table 196: ANOVA table for ACT average scores per content area per group

		Sum of Squares	df	Mean Square	F	Sig.
ACT score Reading	Between Groups	976.033	3	325.344	17.552	.000
	Within Groups	9675.619	522	18.536		
	Total	10651.652	525			
ACT score Math	Between Groups	311.843	3	103.948	8.997	.000
	Within Groups	6031.003	522	11.554		
	Total	6342.846	525			
ACT score Science	Between Groups	517.282	3	172.427	12.246	.000
	Within Groups	7349.868	522	14.080		
	Total	7867.150	525			
ACT score English	Between Groups	609.612	3	203.204	15.315	.000
	Within Groups	6926.230	522	13.269		
	Total	7535.842	525			
ACT score Composite	Between Groups	634.425	3	211.475	16.611	.000
	Within Groups	6645.629	522	12.731		
	Total	7280.053	525			

Table 197: Contrast Test for ACT average scores per content area per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
ACT score Reading	Assume equal variances	1	5.409	1.2251	4.415	522	.000
		2	4.154	1.4624	2.840	522	.005
		3	7.179	1.2260	5.855	522	.000
		4	-1.255	.8877	-1.414	522	.158
		5	1.770	.3902	4.535	522	.000
		6	3.025	.8889	3.403	522	.001
ACT score Math	Does not assume equal variances	1	3.259	1.6045	2.031	12.517	.064
		2	2.192	1.6670	1.315	14.512	.209
		3	4.126	1.5997	2.579	12.369	.024
		4	-1.067	.5586	-1.910	36.320	.064
		5	.867	.3036	2.855	474.182	.004
		6	1.934	.5447	3.550	32.924	.001
ACT score Science	Assume equal variances	1	4.466	1.0678	4.182	522	.000
		2	3.231	1.2746	2.535	522	.012
		3	5.526	1.0685	5.171	522	.000
		4	-1.235	.7737	-1.596	522	.111
		5	1.060	.3401	3.117	522	.002
		6	2.295	.7747	2.962	522	.003
ACT score English	Assume equal variances	1	4.530	1.0365	4.371	522	.000
		2	3.538	1.2373	2.860	522	.004
		3	5.854	1.0373	5.643	522	.000
		4	-.992	.7510	-1.321	522	.187
		5	1.323	.3302	4.009	522	.000
		6	2.315	.7521	3.079	522	.002
ACT score Composite	Assume equal variances	1	4.474	1.0153	4.406	522	.000
		2	3.385	1.2120	2.793	522	.005
		3	5.854	1.0161	5.762	522	.000
		4	-1.089	.7357	-1.480	522	.139
		5	1.380	.3234	4.269	522	.000
		6	2.470	.7367	3.352	522	.001

In reading, the test found statistically significant differences in Contrast 1, between DLI-NES and Mainstream (*p* = .000); in Contrast 2, between DLI-NES and DLI-NSS (*p* = .005); in Contrast 3, between DLI-NES and TBE (*p* = .000); in Contrast 4, between Mainstream and DLI-NSS (*p* = .000), and in Contrast 6, between DLI-NSS and TBE (p = .001). The test found no statistically significant difference in Contrast 5, between Mainstream and TBE (*p* = .002)

In math, the test found statistically significant differences in Contrast 3 between DLI-NES and TBE/ESL (*p* = .024); in Contrast 5 between Mainstream and TBE/ESL (*p* = .004), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .001). Marginally significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .062) and in Contrast 4 between Mainstream and DLI-NSS (*p* = .048). The test found no statistically significant difference in Contrast 2 between DLI-NES and DLI-NSS (*p* = .209).

In science, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .012), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 5 between Mainstream and TBE/ESL (*p* = .002), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .003). The test found no significant difference in Contrast 4 between Mainstream and DLI-NSS (*p* = .111).

In English, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .0000); in Contrast 2 between DLI-NES and DLI-NSS (*p* = .004); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 5 between Mainstream and TBE/ESL (*p* = .000), and in Contrast 6 between

DLI-NSS and TBE/ESL (*p* = .002). The test found no significant difference in Contrast 4 between Mainstream and DLI-NSS (*p* = .187).

In the composite score, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .000); in Contrast 2 between DLI-NES and DLI-NSS (*p* = .005); in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000); in Contrast 5 between Mainstream and TBE/ESL (*p* = .000), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .001). No significant difference was found between Mainstream and DLI-NSS (*p* = .139).

Analysis discussion.

The four groups exhibited differences on average scores in each of the content areas. This suggests that program type is a contributing factor to academic achievement for students.

In reading, DLI-NES had the highest score average, surpassing DLI-NSS by 22.5% (*p* = .005), Mainstream by 32.0% (*p* = .000), and TBE/ESL by 47.7% (*p* = .000). DLI-NSS placed second, surpassing Mainstream by 7.7% (*p* = .158) and TBE/ESL by 20.5% (*p* = .001). Mainstream placed third, surpassing TBE/ESL by 11.9% (*p* = .000).

In math, DLI-NES had the highest score average, surpassing DLI-NSS by 11.4% (*p* = 209), Mainstream by 17.5% (*p* = .064), and TBE/ESL by 23.6% (*p* = .024). DLI-NSS placed second, surpassing Mainstream by 5.5% (*p* = .064) and TBE/ESL by 10.9% (*p* = .001). Mainstream placed third, surpassing TBE/ESL by 5.2% (*p* = .004).

In science, DLI-NES had the highest score average, surpassing DLI-NSS by 16.4% (*p* = .012), Mainstream by 24.7% (*p* = .000), and TBE/ESL by 32.7% (*p* = .000).

DLI-NSS placed second, surpassing Mainstream by 7.1% (p = .111) and TBE/ESL by 14.0% (p = .003). Mainstream placed third, surpassing TBE/ESL by 6.4% (p = .002).

In English, DLI-NES had the highest score average, surpassing DLI-NSS by 19.4% (p = .004), Mainstream by 26.1% (p = .000), and TBE/ESL by 36.2% (p = .000). DLI-NSS placed second, surpassing Mainstream by 5.7% (p = .187) and TBE/ESL by 14.1% (p = .002). Mainstream placed third, surpassing TBE/ESL by 8.0% (p = .000).

In composite score, DLI-NES had the highest average, surpassing DLI-NSS by 18.3% (p = .005), Mainstream by 25.7% (p = .000), and TBE/ESL by 36.6% (p = .000). DLI-NSS placed second, surpassing Mainstream by 6.3% (p = .139) and TBE/ESL by 15.5% (p = .001). Mainstream placed third, surpassing TBE/ESL by 8.7% (p = .000).

The DLI groups had the best ACT score averages, and many of these differences were identified as statistically significant. DLI-NES had higher scores than DLI-NSS in all content areas: in reading 22.5% (p = .005), math 11.4% (p = .209), science 16.4% (p = .012), English 19.4% (p = .004), and in composite score 18.3% (p = .005). Differences were statistically significant in all areas except math. DLI-NES had higher scores than Mainstream in all content areas: in reading 32.0% (p = .000), math 17.5% (p = .064), science 24.7% (p = .000), English 26.1% (p = .000), and composite 25.7% (p = .000). The differences were statistically significant in all content areas except math. DLI-NES had higher scores than TBE/ESL in all areas: in reading 47.7% (p = .000), math 23.6% (p = .024), science 32.7% (p = .000), English 36.2% (p = .000), and composite score 36.6% (p = .000). The differences were always statistically significant.

DLI-NSS placed second in regards of average ACT scores. DLI-NSS had higher scores than Mainstream in all content areas: in reading, 7.7% (p = .158); math, 5.5% (p =

.064); science, 7.1% (p = .111); English, 5.7% (p = .187), and composite, by 6.3% (p = .139). The differences were always not statistically significant except in math where it was marginally significant. DLI-NSS surpassed TBE/ESL in all areas: in reading, 20.5% (p = .001); math, 10.9% (p = .001); science, 14.0% (p = .003), English, 14.1% (p = .002), and composite, 15.5% (p = .001). The differences were always statistically significant.

Mainstream placed third in regards of average ACT scores. Mainstream surpassed TBE/ESL in all content areas: in reading, 11.9% (p = .000); math, 5.2% (p = .004); science, 6.4% (p = .002), English, 8.0% (p = .000), and composite, 8.7% (p = .000). The differences were always statistically significant.

Percentage of students performing successfully on ACT tests.

The percentage of students scoring within one point of the ACT benchmark for all content areas (except English, where the benchmark is already low), was analyzed. Table 198 and Figure 80 exhibit the initial data, which shows that the four groups exhibited differences in the percentage of students meeting ACT benchmarks.

Table 198: percentage of students meeting ACT benchmarks per area per group

Cohort 2005-2009		DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Percentage of students meeting ACT benchmarks per group	Reading	76.9	25.5	34.6	15.0
	Math	46.2	26.3	23.1	15.8
	Science	46.2	13.4	19.2	3.8
	English	84.6	48.6	65.4	35.4
	Composite	76.9	27.5	42.3	15.4

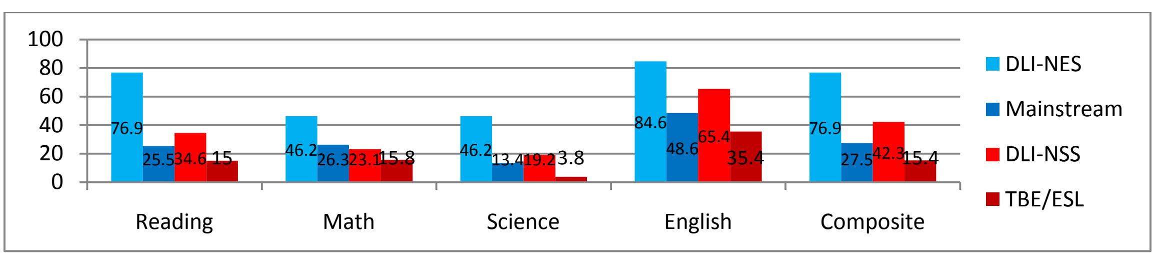

Figure 80: percentage of students meeting ACT benchmarks per area per group

In reading, DLI-NES had the highest percentage of students meeting ACT benchmarks; surpassing DLI-NSS by 42.3 percentage points (122.3%), Mainstream by

51.4 percentage points (201.6%), and TBE/ESL by 61.9 percentage points (412.7%). DLI-NSS placed second, surpassing Mainstream by 9.1 percentage points (35.7%) and TBE/ESL by 19.6 percentage points (130.7%). Mainstream placed third, surpassing TBE/ESL by 10.5 percentage points (70.0%).

In math, DLI-NES had the highest percentage of students meeting ACT benchmarks; surpassing DLI-NSS by 23.1 percentage points (100%), Mainstream by 19.9 percentage points (75.7%), and TBE/ESL by 30.4 percentage points (192.4%). Mainstream placed second, surpassing DLI-NSS by 3.2 percentage points (13.9%) and TBE/ESL by 10.5 percentage points (66.5%). DLI-NSS surpassed TBE/ESL by 7.3 percentage points (46.2%).

In science, DLI-NES had the highest percentage of students meeting ACT benchmarks; surpassing DLI-NSS by 27.0 percentage points (140.6%), Mainstream by 32.8 percentage points (244.8%), and TBE/ESL by 42.4 percentage points (1,115.8%). DLI-NSS placed second, surpassing Mainstream by 5.8 percentage points (43.3%) and TBE/ESL by 15.4 percentage points (405.3%). Mainstream surpassed TBE/ESL by 9.6 percentage points (252.6%).

In English, DLI-NES had the highest percentage meeting the ACT benchmark, surpassing DLI-NSS by 19.2 percentage points (29.4%), Mainstream by 36.0 percentage points (74.1%), and TBE/ESL by 49.2 percentage points (139.0%). DLI-NSS placed second, surpassing Mainstream by 16.8 percentage points (34.6%) and TBE/ESL by 30.0 percentage points (84.7%). Mainstream surpassed TBE/ESL by 13.2 points (37.3%).

In composite, DLI-NES had the highest percentage of students meeting ACT benchmarks; surpassing DLI-NSS by 34.6 percentage points (81.8%), Mainstream by

49.9 percentage points (179.6%), and TBE/ESL by 61.5 percentage points (399.4%). DLI-NSS placed second, surpassing Mainstream by 14.9 percentage points (53.8%) and TBE/ESL by 26.9 percentage points (174.7%). Mainstream surpassed TBE/ESL by 12.1 percentage points (78.6%).

Table 199 shows the results of the Levene's test for percentage of students meeting the ACT benchmark. The test found significant variances between groups in all content areas and in the composite score (all $p = .000$).

Table 199: Levene's Test for percentage of students meeting ACT benchmarks per area per group

	Levene Statistic	df1	df2	Sig.
Percentage of students who met the ACT reading benchmarks within one point	14.932	3	522	.000
Percentage of students who met the ACT math benchmarks within one point	13.931	3	522	.000
Percentage of students who met the ACT science benchmarks within one point	36.750	3	522	.000
Percentage of students who met the ACT English benchmarks	23.748	3	522	.000
Percentage of students who met the ACT composite benchmarks within one point	19.867	3	522	.000

Table 200 presents the ANOVA results for percentage of students meeting ACT benchmarks. The test found significant differences between groups in all areas ($p \leq .006$).

Table 200: ANOVA table for percentage of students meeting ACT benchmarks per area per group

		Sum of Squares	df	Mean Square	F	Sig.
Percentage of students who met the ACT reading benchmarks within one point	Between Groups	5.805	3	1.935	11.783	.000
	Within Groups	85.723	522	.164		
	Total	91.529	525			
Percentage of students who met the ACT math benchmarks within one point	Between Groups	2.133	3	.711	4.231	.006
	Within Groups	87.724	522	.168		
	Total	89.857	525			
Percentage of students who met the ACT science benchmarks within one point	Between Groups	3.137	3	1.046	12.259	.000
	Within Groups	44.523	522	.085		
	Total	47.660	525			
Percentage of students who met the ACT English benchmarks	Between Groups	5.616	3	1.872	7.869	.000
	Within Groups	124.173	522	.238		
	Total	129.789	525			
Percentage of students who met the ACT composite benchmarks within one point	Between Groups	6.588	3	2.196	12.848	.000
	Within Groups	89.229	522	.171		
	Total	95.817	525			

Table 201 presents the results of the Contrast tests for the percentage of students meeting ACT benchmarks. Because the test found significant variances between groups ($p = .000$); the –not assume equal variance- outcomes were validated.

Table 201: Contrast Test for percentage of students meeting ACT benchmarks per area per group

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Percentage of students who met the ACT reading benchmarks within one point	Does not assume equal variances	1	.514	.1248	4.121	13.284	.001
		2	.423	.1544	2.740	26.431	.011
		3	.619	.1238	5.002	12.880	.000
		4	-.091	.0991	-.919	29.426	.366
		5	.105	.0361	2.907	471.605	.004
		6	.196	.0979	2.003	28.023	.055
Percentage of students who met the ACT math benchmarks within one point	Does not assume equal variances	1	.198	.1466	1.353	12.930	.199
		2	.231	.1668	1.384	20.483	.181
		3	.303	.1458	2.079	12.654	.059
		4	.032	.0888	.365	30.820	.718
		5	.105	.0367	2.857	473.338	.004
		6	.072	.0875	.828	29.062	.415
Percentage of students who met the ACT science benchmarks within one point	Does not assume equal variances	1	.328	.1455	2.253	12.551	.043
		2	.269	.1641	1.641	19.440	.117
		3	.424	.1444	2.936	12.176	.012
		4	-.059	.0818	-.718	28.913	.478
		5	.096	.0249	3.855	388.099	.000
		6	.155	.0798	1.941	26.229	.063
Percentage of students who met the ACT English benchmarks	Does not assume equal variances	1	.360	.1089	3.308	14.346	.005
		2	.192	.1411	1.363	30.268	.183
		3	.492	.1087	4.528	14.205	.000
		4	-.168	.1003	-1.674	30.883	.104
		5	.132	.0444	2.965	484.888	.003
		6	.300	.1001	2.995	30.529	.005
Percentage of students who met the ACT composite benchmarks within one point	Does not assume equal variances	1	.494	.1249	3.954	13.350	.002
		2	.346	.1567	2.209	27.349	.036
		3	.615	.1238	4.966	12.901	.000
		4	-.148	.1028	-1.437	29.305	.161
		5	.121	.0368	3.289	469.577	.001
		6	.269	.1015	2.649	27.863	.013

In reading, the test found marginal differences in Contrast 1, between DLI-NES and Mainstream (p = .001), in Contrast 2, between DLI-NES and DLI-NSS (p = .011), in Contrast 3, between DLI-NES and TBE (p = .000), and in Contrast 5, between

Mainstream and TBE (*p* = .004). The test found a marginally significant difference in Contrast 6, between DLI-NSS and TBE (p = .055) and no significant differences were identified in Contrast 4, between Mainstream and DLI-NSS (*p* = .366).

In math, the analysis found a statistically significant difference in Contrast 5 between Mainstream and TBE/ESL (*p* = .004) and a marginally significant difference in Contrast 3 between DLI-NES and TBE/ESL (*p* = .059). No statistically significant differences were identified in Contrast 1 between DLI-NES and Mainstream (*p* = .199), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .181), in Contrast 4 between Mainstream and DLI-NSS (*p* = .718), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .415).

In science, the analysis found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = 043), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .012), and in Contrast 5 between Mainstream and TBE/ESL (*p* = .000). The test also found a marginally significant difference in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .063). No statistically significant differences were found in Contrast 2 between DLI-NES and DLI-NSS (*p* = .117) and in Contrast 4 between Mainstream and DLI-NSS (*p* = .478).

In English, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .005), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .003), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .005). No significant differences were identified in Contrast 2 between DLI-NES and DLI-NSS (*p* = .183) and in Contrast 4 between Mainstream and DLI-NSS (*p* = .104).

In the composite score, the test found statistically significant differences in Contrast 1 between DLI-NES and Mainstream (*p* = .002), in Contrast 2 between DLI-NES and DLI-NSS (*p* = .036), in Contrast 3 between DLI-NES and TBE/ESL (*p* = .000), in Contrast 5 between Mainstream and TBE/ESL (*p* = .001), and in Contrast 6 between DLI-NSS and TBE/ESL (*p* = .013). The test found no statistically significant difference in Contrast 4 between Mainstream and DLI-NSS (*p* = .169).

Analysis discussion.

The four groups exhibited differences on their percentage of students meeting the ACT benchmark. This suggests that program type is a contributing factor to academic achievement.

In reading, DLI-NES had the highest percentage of students meeting ACT benchmark; surpassing DLI-NSS by 122.3% (*p* = .011), Mainstream by 201.6% (*p* = .001), and TBE/ESL by 412.7% (*p* = .000). DLI-NSS placed second, surpassing Mainstream by 35.7% (*p* = .366) and TBE/ESL by 130.7% (p = .055). Mainstream surpassed TBE/ESL by 70.0% (*p* = .004).

In math, DLI-NES had the highest percentage of students meeting the ACT benchmark; surpassing DLI-NSS by 100% (*p* = .181), Mainstream by 75.7% (*p* = .199), and TBE/ESL by 192.4% (*p* = .059). Mainstream placed second, surpassing DLI-NSS by 13.9% (*p* = .718) and TBE/ESL by 66.5% (*p* = .004). DLI-NSS surpassed TBE/ESL by 46.2% (*p* = .415).

In science, DLI-NES had the highest percentage of students meeting ACT benchmark; surpassing DLI-NSS by 140.6% (*p* = .117), Mainstream by 244.8% (*p* = .043), and TBE/ESL by 1,115.8% (*p* = .012). DLI-NSS placed second, surpassing

Mainstream by 43.3% (p = .478) and TBE/ESL by 405.3% (p = .063). Mainstream surpassed TBE/ESL by 252.6% (p = .000).

In English, DLI-NES had the highest percentage of students meeting ACT benchmark; surpassing DLI-NSS by 29.4% (p = .183), Mainstream by 74.1% (p = .005), and TBE/ESL by 139.0% (p = .000). DLI-NSS placed second, surpassing Mainstream by 34.6% (p = .104) and TBE/ESL by 84.7% (p = .005). Mainstream surpassed TBE/ESL by 37.3% (p = .003).

In composite score, DLI-NES had the highest percentage of students meeting the ACT benchmark; surpassing DLI-NSS by 81.8% (p = .036), Mainstream by 179.6% (p = .002), and TBE/ESL by 399.4% (p = .000). DLI-NSS placed second, surpassing Mainstream by 53.8% (p = .161) and TBE/ESL by 174.7% (p = .013). Mainstream surpassed TBE/ESL by 78.6% (p = .001).

Overall, DLI groups had the highest percentages of students meeting ACT benchmarks. DLI-NES surpassed DLI-NSS in all areas: in reading by 122.3% (p = .011); in math by 100% (p = .181); in science by 140.6% (p = .117); in English by 29.4% (p = .183); and in composite score by 81.8% (p = .036). Differences were statistically significant in reading and in composite score.

DLI-NES surpassed Mainstream in all areas: in reading by 201.6% (p = .001); in math by 75.7% (p = .199); in science by 244.8% (p = .043); in English by 74.1% (p = .005), and in the composite score by 179.6% (p = .002). The differences were statistically significant in reading, science, English, and in the composite score.

DLI-NES surpassed TBE/ESL in all content areas: in reading by 412.7% (p = .000); in math by 192.4% (p = .059); in science by 1,115.8% (p = .012); in English by

139.0% (p = .000); and in the composite score by 399.4% (p = .000). Differences were statistically significant in all areas except math, where it was marginally significant.

DLI-NSS placed second in the percentage of students meeting ACT benchmarks. DLI-NSS surpassed Mainstream in all areas except math. DLI-NSS surpassed Mainstream in reading by 35.7% (p = .366); in science by 43.3% (p = .478); in English by 34.6% (p = .104), and in the composite score by 53.8% (p = .161). DLI-NSS was surpassed by mainstream in math by 13.9% (p = .718). In all cases, the differences were not statistically significant.

DLI-NSS surpassed TBE/ESL in all content areas: in reading by 130.7% (p = .055); in math by 46.2% (p = .415), in science by 405.3% (p = .063); in English by 84.7% (p = .005), and in the composite score by 174.7% (p = .013). Differences were significant in English and in the composite score; marginally significant in reading and science; and not significant in math.

Mainstream placed third in the percentage of students meeting ACT benchmarks. Mainstream surpassed TBE/ESL in all content areas: in reading by 70.0% (p = .004); in math by 66.5% (p = .415); in science by 252.6% (p = .000), in English by 37.3% (p = .003), and in the composite score by 15.2% (p = .001). The differences were significant in all areas except math.

Summary of performance in college-readiness indicators

The four groups exhibited differences in all analyses based on indicators of college readiness. In participation in Advanced Placement (AP) tests, both DLI groups surpassed the other two groups. DLI-NES and DLI-NSS tied with a participation rate of 100% (p = 1.000), surpassing Mainstream by 89.4% and TBE/ESL by 105.8%. In both cases, the differences were statistically significant (all $p = .000$). Mainstream surpassed TBE/ESL by 2.9% ($p = .244$).

In percentage of students passing at least one AP test with a score of 3 or higher, DLI-NES outscored all the other groups. DLI-NES surpassed DLI-NSS by 4.7%, surpassed TBE/ESL by 291.7% and surpassed Mainstream by 737.6%. The difference was statistically significant for Mainstream and TBE/ESL ($p = .000$), but not with DLI-NSS ($p = .771$). DLI-NSS placed second, surpassing TBE/ESL by 274.1% and surpassing Mainstream by 700.0%. In both cases, the difference was statistically significant ($p = .000$). TBE/ESL placed third, surpassing Mainstream by 53.2%. ($p = .000$).

In participation in AP tests other than Spanish, DLI-NES had the largest percentage of students taking AP tests other than Spanish. DLI-NES surpassed DLI-NSS by 41.1%, ($p = .034$), Mainstream by 79.2% ($p = .000$) and TBE/ESL by 122.9% ($p = .000$). DLI-NSS placed second, surpassing Mainstream by 27.0% ($p = .171$) and TBE/ESL by 58.0% ($p = .022$). Mainstream placed third, surpassing TBE/ESL by 24.4% ($p = .012$).

In percentage of students succeeding in AP tests other than Spanish, DLI-NES had the largest percentage with a score of 3 or higher. DLI-NES surpassed DLI-NSS by 100.9%, ($p = .412$), mainstream by 165.5% ($p = .264$), and TBE/ESL by 579.4% ($p = .133$). DLI-NSS placed second, surpassing Mainstream by 32.2% ($p = .674$) and TBE/ESL by 238.2% ($p = .221$). Mainstream placed third, surpassing TBE/ESL by 155.9% ($p = .005$).

In percentage of students taking an ACT Test, Both DLI groups tied in first place, with 100% participation. Both groups surpassed mainstream by 25.2% ($p = .000$) and TBE/ESL by 33.7% ($p = .000$). Mainstream placed third, surpassing TBE/ESL by 6.8% ($p = .121$).

In students' performance on ACT, the DLI groups had the highest score averages. DLI-NES had higher scores than DLI-NSS in all areas: reading 22.5% ($p = .005$), math 11.4% ($p = .209$), science 16.4% ($p = .012$), English 19.4% ($p = .004$), composite 18.3% ($p = .005$). DLI-NES had higher scores than Mainstream in all areas: in reading 32.0% ($p = .000$), math 17.5% ($p = .064$), science 24.7% ($p = .000$), English 26.1% ($p = .000$), and composite, 25.7% ($p = .000$). DLI-NES had higher scores than TBE/ESL in all areas: in reading 47.7% ($p = .000$), math 23.6% ($p = .024$), science 32.7% ($p = .000$), English, 36.2% ($p = .000$), and composite 36.6% ($p = .000$).

DLI-NSS placed second in regards of average ACT scores. DLI-NSS had higher scores than Mainstream in all areas: in reading 7.7% ($p = .158$), math 5.5% ($p = .064$), science 7.1% ($p = .111$), English 5.7% ($p = .187$), and composite 6.3% ($p = .139$). DLI-NSS had higher scores than TBE/ESL in all areas: in reading 20.5% ($p = .001$), math 10.9% ($p = .001$), science 14.0% ($p = .003$), English 14.1% ($p = .002$), and composite 15.5% ($p = .001$).

Mainstream placed third in regards of average ACT scores. Mainstream had higher scores than TBE/ESL in all areas: in reading 11.9% ($p = .000$), math 5.2% ($p = .004$), science 6.4% ($p = .002$), English 8.0% ($p = .000$), and composite 8.7% ($p = .000$).

In percentage of students performing successfully on ACT tests, DLI-NES placed first. DLI-NES had a higher percentage of students meeting ACT benchmarks than DLI-

NSS in all areas: reading 122.3% (p = .011), math 100% (p = .181), science 140.6% (p = .117), English 29.4% (p = .183) and composite 81.8% (p = .036). DLI-NES had a higher percentage than Mainstream in all areas: in reading 201.6% (p = .001), math 75.7% (p = .199), science 244.8% (p = .043), English 74.1% (p = .005), and composite score 179.6% (p = .002). DLI-NES had higher percentage than TBE/ESL in all areas: in reading 412.7% (p = .000), math 192.4% (p = .059), science 1,115.8% (p = .012), English 139.0% (p = .000), and composite 399.4% (p = .000).

DLI-NSS placed second in percentage of students meeting ACT benchmarks. DLI-NSS had a higher percentage than Mainstream in all areas except math: in reading, 35.7% (p = .366); science, 43.3% (p = .478); English, 34.6% (p = .104), and composite score, 53.8% (p = .161). Mainstream only surpassed DLI-NSS in math, by 66.5% (p = .004). DLI-NSS had a higher percentage than TBE/ESL in all areas: in reading, 130.7% (p = .055); math, 46.2% (p = .415), science, 405.3% (p = .063); English, 84.7% (p = .005), and composite score 174.7% (p = .013).

Mainstream placed third in the percentage of students meeting ACT benchmarks. Mainstream had a higher percentage than TBE/ESL in all areas: in reading, 70.0% (p = .004); math, 66.5% (p = .004); science, 252.6% (p = .000), English, 37.3% (p = .003), and composite, 78.6% (p = .001).

The DLI groups exhibited the best results in all measures. For the 15 measures analyzed, DLI-NES placed first in all of them. DLI-NSS placed first in two indicators, second in 12, and third in one. Mainstream placed second in one, placed third in 13 and placed last in one. TBE/ESL placed third in 1 indicator and placed last in the other 14.

It can be claimed that, from a college-readiness perspective, dual language instruction proved more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Summary of Chapter 5

In the overall performance in standardized assessments, DLI-NES had the best results in all measures. For the 16 indicators analyzed, DLI-NES placed 16 times in first place. DLI-NSS was the second best performer. For the 16 measures, DLI-NSS tied five times in first place, and 11 times in second. Mainstream ranked in third place in almost all measures of academic achievement measured by TAKS. For the 16 indicators, Mainstream placed 14 times in third place and two times in last place. TBE/ESL exhibited the worst results, placing last in almost all indicators of academic achievement related with TAKS. For the 16 measures, TBE/ESL placed 2 times in third place and 14 times in last place.

In the overall high school performance, DLI-NES had the best results in all measures of academic achievement. For the 9 measures, DLI-NES placed first consistently in all of them. DLI-NSS exhibited the second best overall results. DLI-NSS tied in first place in two indicators –graduation rate and percentage of students graduating with minimum requirements- and placed second in the other seven. Mainstream placed third consistently and TBE/ESL exhibited the worst results, placing last in all nine indicators of academic achievement.

In the overall college-readiness performance, DLI-NES had the best results in all measures. For the 15 measures, DLI-NES placed first consistently. DLI-NSS tied at first in 2 indicators, placed second in 12, and placed third in one. Mainstream placed second in one indicator, placed third in thirteen and placed last in one. TBE/ESL placed third in one indicator and placed last in the other fourteen.

Taking all indicators of academic performance in consideration, DLI-NES had the best results. For the 40 indicators of academic performance, DLI-NES placed first consistently in all of them. DLI-NSS was the second best performing group. For the 40 indicators, DLI-NSS placed first in nine, placed second in 30, and placed third in one. Mainstream was the third best performing group. From the 40 indicators analyzed, Mainstream placed second in one, placed third in 37, and placed last in three. TBE/ESL exhibited the poorest results. From the 40 measures of academic achievement, TBE/ESL never ranked in first or second place; placed third in 3 and place last in 37 measures.

It can be concluded, from a comprehensive perspective that included 40 key indicators of academic achievement, that dual language instruction thoroughly proved more effective in promoting academic achievement than TBE/ESL and mainstream instruction. This claim holds true for students from both English and Spanish language backgrounds. Even though DLI instruction proved superior in all 40 indicators, this claim cannot be generalized beyond the cohort analyzed. To extend the margin of generalization, a contrast analysis was executed to identify similarities or discrepancies between results. The results of such contrast analyses are presented in chapter 6.

Chapter 6

COMPARISON BETWEEN COHORTS

Introduction

The goal of this study was to identify how the long-term academic achievement of Hispanic students schooled in the dual language instruction (DLI) program of a selected school district compares with the academic achievement of Hispanic students schooled in the transitional bilingual education/English as a second language program and with the academic achievement of Hispanic students schooled in the mainstream program within the same district. To accomplish the goal, the students' academic performance was measured and compared on 40 different indicators, for two consecutive cohorts. In Chapter 4, the data of the 2005-2009 cohort was analyzed to look for significant differences between groups. The data of the 2006-2010 cohort was analyzed in Chapter 5.

As was explained in Chapter 3, three sets of variables were gathered. Independent variables such as program of instruction and home language provided the framework to define the groups. Demographic variables such age, gender and economic disadvantage were used for the establishment of the similarity between groups. The dependent variables included forty indicators of academic achievement organized under three categories: standardized assessments, high school performance, and college-readiness. Even though two cohorts do not provide enough data to support the claim that they represent trends, the data can be analyzed to determine whether or not the two cohorts show similarities or consistency in characteristics. If the two cohorts can be shown to be similar, then stronger claims can be made that differences in their academic achievement can be attributed to their program of study. In this chapter, the data of the two cohorts is contrasted to look for similarity. First, the demographic data was analyzed.

Demographics.

Both cohorts shared similar characteristics in the proportional representation of the groups. The cohort of 2005-2009 had 688 participants including 16 in DLI-NES (2.3%), 291 in Mainstream (42.3%), 27 in DLI-NSS (3.9%) and 354 in TBE/ESL (51.5%). The cohort of 2006-2010 had 669 participants including 13 in DLI-NES (1.9%), 309 in Mainstream (46.2%), 26 in DLI-NSS (3.9%) and 321 in TBE/ESL (48.0%). There were no statistically significant differences between the cohorts in their proportional representation. Table 202 displays the cohorts' demographics by groups.

Table 202: Cohorts' demographics by groups

	DLI-NES	Mainstream	DLI-NSS	TBE/ESL
Cohort 2005-09	2.3%	42.3%	3.9%	51.5%
Cohort 2006-10	1.9%	46.2%	3.9%	48%

In students' average age, DLI-NES, Mainstream and TBE/ESL maintain some similarity across cohorts. The only group that exhibits significant change between cohorts is DLI-NSS. In cohort 2005-2009, DLI-NSS has the highest average age (17.98 years) while in cohort 2006-2010, DLI-NSS has the lowest average (17.62 years). For cohort 2005-2009, the differences among groups were not statistically significant. For cohort 2006-2010, the differences among groups were also not statistically significant except between TBE/ESL and DLI-NSS (p = .039). The TBE/ESL participants were, on average, 2 months older than the DLI-NSS participants. For participants with an average age of 17 years and eight months, a difference of 2 months can be considered as irrelevant; however, statistically speaking, is identified as significant.

In students’ gender, the groups showed certain similarities across cohorts. In both cohorts, the DLI groups had a lower percentage of male students than mainstream or TBE/ESL. These gender differences among groups decreased in the 2006-2010 cohort. In any case, gender differences were found to be not statistically significant (all $p \geq .237$) for both cohorts.

Economic disadvantage was the only demographic variable that exhibited significant differences between groups, and across cohorts. The analyses found statistically significant differences between DLI-NSS and mainstream ($p \leq .048$) and between TBE/ESL and Mainstream ($p = .000$); in both cohorts. There was a clear relationship between language background and socioeconomic status. In both cohorts, the native Spanish-speaking groups (DLI-NSS and TBE/ESL) exhibited a higher percentage of students labeled as economically disadvantaged, than the native English-speaking groups (DLI-NES and Mainstream). This outcome is congruent with the literature reviewed. Many Hispanic students exhibit large socioeconomic gaps in comparison with their native English speaking peers (Gándara & Contreras, 2009; Carhill & Paez, 2008). Because economic disadvantage has frequently been shown to negatively impact academic achievement (Telles & Ortiz, 2008; Glick & White, 2004); the differences identified should be considered during the analysis of academic performance as related to program participation.

In general, the four groups were similar in background characteristics. Differences in age and gender were relatively small and did not impact the study outcomes in a significant way. The only demographic differences identified as significant were in economic disadvantage, between mainstream and TBE/ESL and between

Mainstream and DLI-NSS. These differences could be said to partially influence the study outcomes.

Academic Outcomes of Program Participation.

The initial objective of the study was to contrast the academic performance of students enrolled in the DLI groups against academic performance of their peers enrolled in non-DLI groups. However to compare apples to apples, or similarities of akin groups, it was necessary to compare groups that share the same home language. The rationale supporting this approach was that if the DLI program was not available, the students participating in DLI groups would have been educated through the instructional program most commonly used for students with their same home language and those students would have shown academic performances similar to the performances exhibited by their linguistic peers. For example, the students participating in the DLI-NES group, due to the fact that they were native English-speakers, would have been enrolled in Mainstream; while their DLI-NES peers would have been enrolled in TBE/ESL. Therefore the first sets of cross-comparisons were between DLI-NES and Mainstream and between DLI-NSS and TBE/ESL. Any significant differences between groups can be partially attributed to program participation.

However, because the ultimate goal of this study was, as recommended by Thomas and Collier (1997), to identify which program was most effective in assisting students to reach "full educational parity with native English speakers (NES) in all school content subjects" (p. **7**), three more contrast analyses became necessary. First of all it was necessary to identify the differences in academic performance between native Spanish speakers (NSS) educated in the traditional TBE/ESL program, and native English speakers (NES) educated in mainstream instruction. This comparison provided a frame of reference for the next comparison where the academic performance shown by native Spanish speakers enrolled in dual language instruction (DLI-NSS) was compared with the academic performance of their native English peers educated in Mainstream instruction. The last comparison was between DLI-NSS and DLI-NES to identify differences in academic performance among students from different linguistic backgrounds but educated through the same instructional program.

In Chapters 4 and 5, the data from the two cohorts was analyzed using 40 different indicators of academic achievement organized into three generic categories: performance on standardized assessments, high school performance, and performance in college-readiness indicators. This chapter follows the same organizational pattern, this time looking for similarities and differences between the two cohorts.

A special focus was given to science in the discussion of each one of the indicators for two main reasons. First of all, because as part of the DLI curriculum, all students enrolled in the DLI groups received most of their science education delivered in Spanish. During all their pre-K-to-5 education DLI students received their education exclusively in Spanish. During their high school instruction, DLI students had the opportunity to take science courses such as biology, chemistry and physics in Spanish. The second reason is because the education of Hispanics has been specifically identified as responsible for the national underperformance in science education (Fleischman, H., Hopstock, P., Pelczar, M., & Shelley, B., 2010). Therefore, it is extremely important to identify if dual language instruction generated significant differences in the science proficiency of its students.

Performance on standardized assessments.

In this section, the analyses focused on academic outcomes as traditionally measured by standardized tests. Because the study took place in Texas, the analyses focused on the Texas Assessment of Knowledge and Skills (TAKS) test results. The analysis focused on high school TAKS scores because at the high school level, the differences among instructional programs implemented over time and their academic outcomes can more clearly be seen.

Four different indicators related to high school TAKS results were analyzed: high school TAKS average scores, the percentage of additional tests taken, the percentage of students failing an Exit-TAKS even after several attempts, and the percentage of students meeting the commended criteria. All four indicators were analyzed for four core content areas: English language arts (ELA), math, science, and social studies. In total, 16 measures of performance on standardized assessments were independently analyzed for each one of the cohorts.

The four groups exhibited significant differences in all the measures of performance related to the TAKS. Most of these differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students. It is important to mention that the 2005-2009 cohort was outperformed by the 2006-2010 cohort in almost all indicators or academic achievement.

High school TAKS score averages.

DLI-NES showed the highest score averages in all content areas, for both cohorts. DLI-NES outscored Mainstream in all content areas in both cohorts. In all cases the differences were statistically significant or increased in percentage or significance from one cohort to the next. The differences between DLI-NES and Mainstream increased in ELA from 5.5% (p = .000) to 6.3% (p = .000), in math from 2.9% (p = .085) to 6.8% (p = .001), in science from 4.7% (p = .015) to 8.1% (p = .001), and social studies from 3.6% (p = .015) to 5.9% (p = .001).

DLI-NES outscored TBE/ESL in all content areas in both cohorts. The differences were statistically significant or increased in percentage or significance from one cohort to the next. Differences increased in ELA from 7.2% (p = .000) to 9.1% (p = .000), in math from 3.5% (p = .038) to7.6% (p = .000), in science from 5.8% (p = .000) to 10.3% (p = .000), and in social studies from 4.9% (p = .001) to7.9% (p = .000).

DLI-NES outscored DLI-NSS in both cohorts but not in all content areas. In most cases, the differences were statistically significant or increased in percentage or significance from one cohort to the next. Differences increased in ELA from 5.5% (p = .002) to 5.7% (p = .004), in math from 0.0% (p = 1.000) to 3.8% (p = .107), in science from 2.7% (p = .077) to 4.6% (p = .037), and in social studies from 3.3% (p = .066) to4.9% (p = .017).

Overall, DLI-NSS was the group that exhibited the second highest score averages in all content areas, for both cohorts. DLI-NSS outscored mainstream in both cohorts, in all content areas. In most cases, the differences were statistically significant or increased in percentage or significance from one cohort to the next. Differences increased in ELA, from 0.1% (p = .931) to 0.5% (p = .680); in math, from 2.9% (p = .028) to 2.9% (p = .047); in science, from 1.9% (p = .061) to 3.4% (p = .009); and in social studies, from 0.3% (p = .820) to 1.0% (p = .448).

DLI-NSS outscored TBE/ESL in both cohorts, in all content areas. The differences were statistically significant or increased in percentage or significance from one cohort to the next. Differences increased in ELA, from 1.6% (p = .142) to 3.2% (p = .011); in math, from 3.3% (p = .008) to3.7% (p = .011); in science, from 2.9% (p = .004) to 5.4% (p = .000); and in social studies, from 1.6% (p = .155) to 2.8% (p = .027).

Mainstream outscored TBE/ESL in both cohorts, in all content areas, and the differences were statistically significant. The differences remained similar or increased marginally in percentage or significance from one cohort to the next. Differences remained equal in ELA, from 1.6% (p = .001) to 2.7% (p = .001), in math, from 0.6% (p = .268) to 0.8% (p = .146); in science, from 1.0% (p = .010) to 2.0% (p = .000); and in social studies, from 1.3% (p = .003) to 1.9% (p = .000).

Analysis discussion.

In the analysis of high school TAKS score averages, the performance results match or surpass the expectations of the theoretical framework. As expected, both DLI groups showed better academic performance than their linguistic pairs.

DLI-NES outperformed Mainstream in both cohorts, by statistically significant differences ($\Delta \geq 2.9\%$; $p \leq .085$). DLI-NES surpassed Mainstream in all content areas including those highly correlated with English language proficiency such as ELA and social studies. In the case of science, DLI-NES outscored Mainstream by statistically significant differences of up to 148 TAKS scale-score points ($\Delta = 8.1\%$; $p = .001$). These findings are highly significant because they show that the academic performance and English academic language proficiency development of native English speakers is not hindered by dual language instruction. On the contrary, DLI seems to increase the academic performance and English academic language proficiency development of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts, in most cases by statistically significant differences ($\Delta \geq 1.6\%$; $p \leq .155$). DLI-NSS outperformed TBE/ESL in all content areas, including those highly correlated with English language. In the case of science, DLI-NSS outscored TBE/ESL by a highly significant difference of up to 162 TAKS scale-score points ($\Delta = 2.9\%$; $p = .004$). These findings are significant because they support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). This also refutes the time-on-task hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between traditional programs, Mainstream outperformed TBE/ESL in both cohorts and in several cases the differences were statistically significant ($\Delta \geq 0.6\%$; $p \leq .268$). Mainstream outperformed TBE/ESL in all content areas, including those highly correlated with English language. In the case of science, Mainstream outscored TBE/ESL by a difference of up to 42 TAKS scale-score points ($\Delta = 2.0\%$; $p = .000$). These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics constantly show lower academic performance in standardized assessments than their English speaking peers. (NCES, 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results met the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) outperformed their native English-speaking peers enrolled in Mainstream instruction. In most cases, the differences were statistically significant or increased in percentage or significance from one cohort to the next ($\Delta \geq 0.1\%$; $p \leq .931$). DLI-NSS surpassed Mainstream in all content areas, including those highly correlated with English language proficiency, such as ELA & social studies. In the case of science, DLI-NSS outscored Mainstream by a statistically significant difference of up to 72 TAKS scale-score points ($\Delta = 3.4\%$; $p = .009$). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. DLI-NES outscored DLI-NSS in both cohorts and in most content areas ($\Delta \geq 0.1\%$; $p \leq .931$). The differences were significant in content areas highly related with English language proficiency. In the case of science; DLI-NES outscored DLI-NSS by a statistically significant difference of up to 102 TAKS scale-score points ($\Delta = 4.6\%$; $p = .037$). These findings are important because they show that while dual language instruction is effective in closing the academic gap between

English language learners and native English speakers enrolled in mainstream education; a new academic gap is emerging between native English speakers and native Spanish speakers when both groups are educated through dual language instruction.

Additional TAKS tests taken.

The second indicator that was analyzed was the percentage of additional TAKs tests students took in attempting to pass. Students who fail to pass high stakes standardized tests and need to retake these exams suffer academic consequences. They not only waste valuable instructional time because they are placed in remedial, test-taking-oriented interventions, but their self-confidence is also affected. When a student struggles to pass a high school TAKS test, his college-readiness confidence diminishes. Therefore, the need for taking additional TAKS tests can be considered an important indicator of academic performance.

DLI-NES exhibited the best performance, by having the lowest percentage of additional TAKS tests, in all content areas, and for both cohorts. In most cases, the differences were statistically significant. It is important to clarify that in most content areas DLI-NES had 0.0% additional tests taken. Therefore, the difference with the other groups was quantified as 100%. However, this can be misleading because other less significant differences can generate difference values higher than 100%. In such cases, it is important to use the significance value as reference.

DLI-NES required fewer additional TAKS tests than mainstream in both cohorts, in all content areas. In most cases, the differences were statistically significant and increased in percentage and significance, from one cohort to the next. Differences increased in ELA, from 100% (p = .000) to100% (p = .000); in math, from 103.6% (p =

.169) to100% (p = .000); in science, from 143.1% (p = .184) to100% (p = .000); and in social studies, from 100% (p = .000) to100% (p = .000).

DLI-NES required fewer additional TAKS tests than TBE/ESL in both cohorts, in all content areas. The differences were statistically significant and increased in percentage or significance from one cohort to the next. Differences increased in ELA from 100% (p = .000) to100% (p = .000), in math from 167.6% (p = .032) to100% (p = .000), in science from 278.7% (p = .016) to 100% (p = .000), and in social studies from 100% (p = .000) to 100% (p = .000).

DLI-NES outperformed DLI-NSS in the percentage of additional tests taken, in both cohorts. However, this edge was not constant in all content areas. All the differences were not statistically significant; however the differences increased in percentage or significance from one cohort to the next. Differences increased in ELA from 100% (p = .357) to 100% (p = .161), in math from 107.6% (p = .307) to 100% (p = .129), in science from 96.8% (p = .493) to 100% (p = .110), and in social studies from 100% (p = .327) to 100% (p = .327).

DLI-NSS exhibited the second lowest percentage of additional tests taken; in all content areas and in both cohorts. DLI-NSS required fewer additional TAKS tests than mainstream in both cohorts, in almost all content areas. In most cases, the differences were not statistically significant and fluctuated in percentage or significance from one cohort to the next. Differences decreased in ELA, from 270.3% (p = .045) to 26.0% (p = .731) and in social studies, from 308.1% (p = .024) to 105.3% (p = .381); and increased in science, from 23.5% (p = .657) to 65.4% (p = .312). The content area that exhibited the highest variance between cohorts was math. In cohort 2005-2009, DLI-NSS was outperformed by Mainstream by 2.0% (p = .962). However, in cohort 2006-2010, DLI-NSS outperformed Mainstream by 36.1% (*p* = .593).

DLI-NSS required fewer additional TAKS tests than TBE/ESL in both cohorts, in all content areas. In most cases, the differences were not statistically significant and fluctuated in percentage or significance from one cohort to the next. Differences increased in math from 28.9% (*p* = .466) for the 2005-2006 cohort to 84.0% (*p* = .218) for the 2006-2010 cohort; and in science from 92.4% (*p* = .092) to 135.9% (*p* = .046). The differences decreased in ELA from 351.4% (*p* = .008) to 106.5% (*p* = .196), and in social studies from 273.0% (*p* = .029) to 168.8% (*p* = .131).

Mainstream was the group with the third lowest percentage of additional tests taken. Mainstream outperformed TBE/ESL in both cohorts, in all content areas except social studies. In most cases, the differences were not statistically significant and fluctuated between cohorts. The differences increased in ELA, from 21.9% (*p* = .509) to 63.9% (*p* = .123); and in math, from 31.4% (*p* = .059) to math, 35.2% (*p* = .080). The difference decreased in science, from 55.8% (*p* = .002) to 42.7% (*p* = .033). The content area that exhibited the highest variance between cohorts was social studies. In cohort 2005-2009, Mainstream was outperformed by TBE/ESL by 9.4% (p = .763). In cohort 2006-2010, DLI-NSS outperformed Mainstream by 39.7% (*p* = .349).

Discussion

In the analysis of additional high school TAKS test taken, the performance results surpass the expectations of the theoretical framework. Both DLI groups showed better academic performance than their similar linguistic peers by having the lowest percentage of additional TAKS taken, in all content areas and for both cohorts.

In the case of native English speakers, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 100\%$; $p \leq .169$). DLI-NES outperformed Mainstream in all content areas; especially in those highly correlated with English language proficiency. For example, in ELA as in social studies DLI-NES took no additional tests while Mainstream required up to 15.1% additional opportunities ($\Delta = 100\%$; $p = .000$). In the case of science DLI-NES outscored Mainstream by a highly significant difference. While DLI-NES required no additional science tests, Mainstream required up to 38.2% additional TAKS tests ($\Delta = 100\%$; $p = .000$). These findings are significant because they show that the academic performance and English language proficiency of native English speakers is not hindered by dual language instruction. On the contrary, DLI seems to increase the academic performance and English language proficiency of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts and in several cases, by statistically significant differences ($\Delta \geq 28.9\%$; $p \leq .466$). DLI-NSS outperformed TBE/ESL in all content areas, including those highly correlated with English language. In the case of science DLI-NSS outscored TBE/ESL by a highly significant difference. TBE/ESL required up to 34.2% additional TAKS tests more than DLI-NSS ($\Delta = 135\%$; $p = .046$). These findings support the claim that DLI increase the academic performance of linguistic minorities, refuting the time-on-task, English-only hypothesis.

In the comparison between traditional programs, Mainstream outperformed TBE/ESL in both cohorts in all content areas, and in most cases by statistically significant differences ($\Delta \geq 42.7\%$; $p \leq .033$). This claim is true for all content areas, including those highly correlated with English language. In the case of science TBE/ESL required up to 25.5% additional tests more than Mainstream (Δ = 55.8%; p = .002).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), DLI-NSS outperformed Mainstream in both cohorts. In several cases, the differences were statistically significant or increased in percentage or significance from one cohort to the next ($\Delta \geq$ 23.5%; $p \leq .657$). DLI-NSS outperformed Mainstream in all content areas including those highly correlated with English language proficiency. Mainstream required up to 10% more additional ELA tests (Δ = 270.3%; *p* = .009), and 11.4% more additional social studies tests (Δ = 308.1%; *p* = .024) than DLI-NSS. In the case of science, Mainstream required up to 15.1% more additional TAKS tests than DLI-NSS (Δ = 42.7%; p = .033). These findings support the claim that DLI can increase the academic performance and English language proficiency of linguistic minorities.

The results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers. However, the comparison between DLI-NES and DLI-NSS again challenges that conclusion. In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), DLI-NES outscored DLI-NSS in both cohorts in most content areas. However, the differences were not statistically significant ($\Delta \geq$ 96.8%; $p \leq .110$). In the case of science; DLI-NSS required up to 23.1% more additional tests than DLI-NES (Δ = 100%; p = .110).

These findings support the claim that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction; an academic gap exists between native English speakers and native Spanish speakers when both are educated through dual language instruction.

Percentage of students failing an Exit-TAKS even after several attempts.

Because passing all Exit-TAKS is a requirement for high school graduation, failing an Exit-TAKS even after several attempts, is a key indicator of poor academic performance. If students are unable to pass all Exit-TAKS by the end of their senior year, they are retained until passing the test or withdrawing from school. The inability to pass an Exit-TAKS is one of the most common reasons why students drop-out from high school.

Overall, both DLI groups exhibited the best academic performance, by having the lowest percentage of students failing an Exit-TAKS even after several attempts, in all content areas, and for both cohorts. In most cases, the differences were statistically significant. It is important to clarify that both DLI groups (DLI-NES and DLI-NSS) had 0.0% students failing an Exit-TAKS even after several attempts, in all content areas and in both cohorts. Therefore, the difference with the other groups was quantified as 100%. However, this can be misleading because other less significant differences between groups can generate difference values higher than 100%. In such cases, it is important to use the significance value as reference.

Both DLI groups outperformed Mainstream in the percentage of students failing an Exit-TAKS test, in both cohorts, in all content areas. The differences were always statistically significant except for ELA in the 2006-2010 cohort, were the difference was not statistically significant. The differences were in ELA from 100% (p = .000) to 100%

($p \geq .602$), in math from 100% ($p = .000$) to 100% ($p = .000$), in science from 100% ($p = .000$) to 100% ($p = .000$); and in social studies from 100% ($p = .000$) to 100% ($p = .001$).

Both DLI groups had fewer students failing an Exit-TAKS test than TBE/ESL in both cohorts, and in all content areas. The differences were always statistically significant except for ELA in the 2006-2010 cohort, where the difference was not statistically significant. The differences were in ELA from 100% ($p = .000$) to 100% ($p \geq .451$), in math from 100% ($p = .000$) to100% ($p = .000$), in science from 100% ($p = .000$) to 100% ($p = .000$), and in social studies from 100% ($p = .000$) to 100% ($p = .005$).

The comparison between Mainstream and TBE/ESL in their percentage of students failing an Exit-TAKS is more complex. In the 2005-2009 cohort, Mainstream and TBE/ESL had divided results by content areas. Three content areas exhibit a pattern of behavior across cohorts. Mainstream outperformed TBE/ESL across cohorts in math with differences of 41.7% ($p = .183$) and 20.4% ($p = .554$), and in science with differences of 37.1% ($p = .264$) and 26.5% ($p = .451$). TBE/ESL outperformed Mainstream across cohorts in social studies with differences of 48.6% ($p = .264$) and 44.0% ($p = .436$). The content area that exhibited the highest variance between cohorts was ELA. In the 2005-2009 cohort, TBE/ESL outperformed Mainstream by 8.3% (p = .838). In the 2006-2010cohort Mainstream outperformed TBE/ESL by 46.2% ($p = .553$).

The patterns of behavior exhibited by Mainstream in math and science are congruent with studies reported in the review of the literature. Native English speakers in a mainstream program traditionally exhibit better academic outcomes on standardized assessments, than their native Spanish speaking peers (Gándara & Contreras; 2009Grigg et al., 2003; Kinder, 2002; Siegel, 2002). The pattern of behavior exhibited by TBE/ESL in social studies, and the fact that TBE/ESL outperformed Mainstream in ELA in the 2005-2009 cohort is interesting because these results run counter to the studies reported in the review of literature. Those studies showed that native English speakers scored higher than native Spanish speakers on assessments highly correlated with English language proficiency such as ELA and social studies.

Analysis discussion.

In the analysis of the percentage of students failing an Exit-TAKS even after several attempts, the performance results surpass the expectations. Both DLI groups exhibited better academic performance than their linguistic pairs by having no students failing an Exit-TAKS even after several attempts. This was true in all content areas and for both cohorts.

In the case of native English speakers, DLI-NES surpassed Mainstream in both cohorts by statistically significant differences ($\Delta \geq 100\%$; $p \leq .000$). This was true for all content areas except ELA in the 2005-2009 cohort where the difference was not statistically significant ($p = .602$). In the case of science, DLI-NES outscored Mainstream by a highly significant difference. While DLI-NES had 0% students failing the science Exit-TAKS, Mainstream had up to 6.7% of its students failing the test even after several attempts ($\Delta = 100\%$; $p = .000$). These findings are highly significant because they support the claim that dual language instruction can increase the academic performance and English academic language proficiency of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts and the differences were statistically significant ($\Delta \geq 28.9\%$; $p \leq .466$). DLI-NSS outperformed TBE/ESL in all content areas, including those highly correlated with

English language. In the case of science DLI-NSS outscored TBE/ESL by a highly significant difference. While no DLI-NSS students failed the science test; up to 8.5% of the TBE/ESL students failed the science TAKS test even after several attempts (Δ = 100%; $p = .005$). These findings refute the time-on-task hypothesis and support the claim that DLI can increase the academic performance of linguistic minorities.

In the comparison between traditional programs, Mainstream outperformed TBE/ESL in both cohorts and in almost all content areas; however the differences were not statistically significant ($\Delta \geq$ 42.7%; $p \leq .033$). Surprisingly Mainstream was outscored by TBE/ESL in areas highly correlated with English language proficiency. Mainstream had more students failing social studies tests in both cohorts and had a higher percentage of students failing ELA tests in cohort2005-2009. The data gathered does not provide an answer to why more native English speaking students in Mainstream failed English-related tests than native Spanish speakers educated through TBE/ESL. In the case of science TBE/ESL had up to 2.3% more students failing the science Exit-TAKS than Mainstream (Δ = 37.1%; $p = .264$). Even though Mainstream exhibited higher academic proficiency than TBE/ESL; it did not display a significant difference in the percentage of students failing an exit-TAKS.

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations. DLI-NSS not only matched but outperformed Mainstream in the percentage of students failing an Exit-TAKS even after several attempts, in both cohorts. DLI-NSS surpassed Mainstream in both cohorts by statistically significant differences ($\Delta \geq$ 100%; $p \leq .000$). This was true for all content areas except ELA in cohort 2005-2009 where the difference was not statistically significant ($p = .602$). In the case of science DLI-NSS outscored Mainstream by a highly significant difference. While DLI-NSS had 0% students failing the science Exit-TAKS, Mainstream had up to 6.7% of its students failing the test even after several attempts ($\Delta = 100\%$; $p = .000$). These findings are highly relevant because they support the claim that DLI can increase the academic performance and English language proficiency of linguistic minorities and close the achievement gap.

The previous results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers; and in this case, the comparison between DLI-NES and DLI-NSS does support that conclusion. Both DLI groups exhibited a perfect outcome by having 0% of students failing an Exit-TAKS even after several attempts. This was true for all content areas in both cohorts. These findings support the claim dual language instruction can close the academic gap between English language learners and native English speakers.

Percentage of students meeting commended criteria in Exit TAKS

Meeting the commended criteria in state-developed standardized tests such as TAKS is a key indicator of academic performance. When students meet the Exit -TAKS commended criteria, not only do they demonstrate a high level of content knowledge and skills, but they increase their academic self-confidence and their volition to go to college.

DLI-NES exhibited the highest percentage of students meeting commended in Exit-TAKS, in all content areas, for both cohorts. The only exception was in math, in the 2005-2009 cohort where DLI-NES had the lowest percentage of commended students.

DLI-NES outscored Mainstream in both cohorts, in all content areas except math. The differences fluctuated in percentage or significance from one cohort to the next. The differences decreased in ELA from 272.8% (p = .000) to 89.8% (p = .062) and in science from 394.7% (p = .160) to 238.5% (p = .131). The difference between DLI-NES and Mainstream increased in social studies from 144.7% (p = .064) to 156.4% (p = .000). Math was the content area that exhibited the highest variance between cohorts. In the 2005-2009 cohort DLI-NES was not only surpassed by Mainstream by 9.6% (p = .169) but was outperformed by all other groups. However, in the Cohort 2006-2010 DLI-NES surpassed all other groups in math, including Mainstream by a difference of 112.7% (p = .177). The data analyzed does not provide enough information to explain why DLI-NES underperformed in their percentage of students meeting commended performance in the math Exit-TAKS for the 2005-2009 cohort.

DLI-NES outscored TBE/ESL in both cohorts in all content areas except math. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in ELA from 485.5 (p = .002) to194.3% (p = .014), in science from 408.1% (p = .157) to 600.0% (p = .071), and in social studies, from 236.9% (p = .031) to 261.5% (p = .000). The content area that exhibited the highest variance between cohorts was math. In the 2005-2009 cohort DLI-NES was outperformed by TBE/ESL by 1.6% (p = .981). However, in the 2006-2010 cohort DLI-NES outperformed TBE/ESL by a difference of 93.5% (p = .216).

DLI-NES outscored DLI-NSS in both cohorts; however, not in all content areas. In most cases the differences were statistically significant. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in ELA from 90.2% (p = .018) to 77.7% (p = .126), in science from 69.4% (p = .523) to 14.5% (p = .812), and in social studies from 195.9% (p = .059) to 69.2% (p = .023). The content area that exhibited the highest variance between cohorts was math. In the 2005-2009 cohort DLI-NES was outperformed by DLI-NSS by136.8% (p = .174). However, in the 2006-2010 cohort DLI-NES tied with DLI-NSS.

Overall, DLI-NSS was the group that exhibited the second highest percentage in commended students in all content areas, for both cohorts. DLI-NSS outscored mainstream in both cohorts, in all content areas except social studies. In all cases, the differences were not statistically significant and fluctuated in percentage or significance from one cohort to the next. Differences decreased in ELA from 96.0% (p = .670) to 6.8% (p = .821), decreased in math from 116.1% (p = .094) to 112.7% (p = .177), and increased in science from 192.1% (p = .252) to 195.6% (p = .058). The content area with the highest variance between cohorts was social studies. In the 2005-2009 cohort, Mainstream outperformed DLI-NSS by 20.9% (p = .679); while in the 2006-2010 cohort, DLI-NSS surpassed Mainstream in social studies by 51.5% (p = .112).

DLI-NSS outscored TBE/ESL in both cohorts in all content areas. The differences increased in percentage or significance from one cohort to the next. Differences increased in ELA from 208.3% (p = .261) to 65.6% (p = .261), in math from 133.1% (p = .074) to 93.5% (p = .074), in science from 200.0% (p = .244) to 511.4% (p = .018), and in social studies, from 13.8% (p = .802) to 113.7% (p = .015).

Mainstream outscored TBE/ESL in all content areas and the differences were statistically significant. The differences remained similar or increased in percentage or significance from one cohort to the next. Differences increased in ELA from 57.3% (p =

.036) to 55.0% (p = .001), in science from 2.7% (p = .943) to 106.8% (p = .019), and in social studies from 37.7% (p = .090) to 41.0% (p = .007). The content area that exhibited the highest variance between cohorts was math. In the 2005-2009 cohort, Mainstream outperformed TBE/ESL by 7.9% (p = .701). Yet, in the 2006-2010 cohort, TBE/ESL surpassed Mainstream in math, by 9.9% (p = .562).

Analysis discussion.

In the analysis of the percentage of students meeting the commended criteria in state-developed standardized tests such as TAKS, the exhibited performances met the expectations. Both DLI groups exhibited better academic performance than their linguistic pairs.

In the case of native English speakers, DLI-NES surpassed Mainstream in both cohorts by large differences ($\Delta \geq 89.9\%$; $p \leq .170$). DLI-NES surpassed Mainstream in all content areas except math in the 2005-2009 cohort where DLI-NES had the lowest percentage of commended students. DLI-NES surpassed Mainstream in content areas highly correlated with English language proficiency such as ELA and social studies. In ELA, DLI-NES had up to 41.2% more students than Mainstream meeting the commended criteria (Δ = 272.8%; p = .006) and in the case of social studies DLI-NES had up to 51.6% more students than Mainstream meeting the commended criteria (Δ = 156.4%; p = .000). In the case of science DLI-NES had up to 21.7% more students than Mainstream meeting the commended criteria (Δ = 238.5%; p = .131). Once more, the findings support the claim that dual language instruction can increase the academic performance and English academic language proficiency of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts, and in several cases the differences were statistically significant ($\Delta \geq 13.8\%$; $p \leq .802$). DLI-NSS outperformed TBE/ESL in all content areas, including those highly correlated with English language. In the case of science DLI-NSS outscored TBE/ESL by a large difference. DLI-NSS had up to 22.5% more students than TBE/ESL meeting the commended criteria ($\Delta = 511.4\%$; $p = .244$). These findings are significant because they refute the time-on-task hypothesis and support the claim that DLI can highly increase the academic performance and the development of English language proficiency of linguistic minorities.

In the comparison between traditional programs, Mainstream outperformed TBE/ESL in both cohorts and in almost all content areas. However, in most cases the differences were not statistically significant ($\Delta \geq 2.7\%$; $p \leq .943$). Surprisingly, TBE/ESL outscored Mainstream in math in the 2006-2010 cohort. In the case of science Mainstream outscored TBE/ESL by a significant difference. Mainstream had up to 4.7% more students than TBE/ESL meeting the commended criteria ($\Delta = 106.8\%$; $p = .019$).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations. DLI-NSS not only matched but outperformed Mainstream in the percentage of students meeting the commended criteria, in both cohorts. This is important even though the differences were not found to be statistically significant ($\Delta \geq 6.8\%$; $p \leq .821$). DLI-NSS outperformed Mainstream in all content areas except social studies in the 2005-2009 cohort where Mainstream surpassed DLI-NSS by a non-significant difference ($p = .679$). Surprisingly, in the case of ELA, DLI-NSS had up to 14.5% more students meeting the commended criteria than Mainstream ($\Delta = 96.0\%$; $p = .670$). In the case of science, DLI-NSS had up to 17.8% more students meeting the commended criteria in science than Mainstream ($\Delta \geq 195.6\%$; $p \leq .058$). These findings are relevant because they support the claim that DLI can increase the academic performance and English language proficiency of linguistic minorities and close the achievement gap.

The previous results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers; however, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) again challenges that conclusion. DLI-NES outscored DLI-NSS in both cohorts in all content areas except math in the 2005-2009 cohort where DLI-NSS outscored DLI-NES. The differences between DLI-NES and DLI-NSS were, in most cases, not statistically significant ($\Delta \geq 14.5\%$; $p \leq .812$). In the case of science; DLI-NES outscored DLI-NSS. DLI-NES had up to 7.7% more students meeting the commended criteria in science than DLI-NSS ($\Delta \geq 69.4\%$; $p \leq .523$). These findings support the claim that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction; a new gap is emerging between native English speakers and native Spanish speakers when both are educated through dual language instruction.

Summary of results on standardized assessments

The four groups exhibited differences in all four analyses based on standardized assessments. In most cases, the differences between groups were significant and consistent across cohorts. This consistency in differences supports the claim that program type is a contributing factor to academic achievement for students.

In score averages, DLI-NES exhibited the best academic performance, surpassing all other groups in all content areas in both cohorts. DLI-NSS consistently placed second, except in math in cohort 2005-2009, where it tied at first place with DLI-NES. Mainstream always placed third and TBE/ESL always placed last. For the eight indicators involved, DLI-NES placed first eight times, DLI-NSS placed first once and placed second seven times, Mainstream placed third eight times, and TBE placed last eight times.

In the percentage of additional TAKS tests taken, DLI-NES exhibited the best academic performance, having the lowest percentage of additional tests taken in all content areas in both cohorts. DLI-NSS placed second in all content areas in both cohorts except math, where it placed third in cohort 2005-2009. Mainstream placed third in all content areas in both cohorts, except in the 2005-2009 cohort, where Mainstream placed second in math, and forth in social studies. TBE/ESL placed last in all content areas in both cohorts, except for social studies where it placed third in the 2005-2009 cohort. For the eight indicators involved, DLI-NES placed first eight times, DLI-NSS placed second seven times and placed third once, Mainstream placed second once, placed third six times, and placed last one, and TBE/ESL placed third once and placed last seven times.

In the percentage of students failing an Exit-TAKS test even after several attempts, both DLI groups had the best results in all content areas in both cohorts. Both groups had no students failing an Exit-TAKS even after several attempts. Mainstream placed third in both cohorts in all content areas except social studies, where Mainstream placed last in both cohorts, and ELA where Mainstream placed last in the 2005-2009cohort. TBE/ESL placed last in both cohorts in all content areas except social studies, where TBE/ESL placed third in both cohorts, and in ELA where TBE/ESL placed third in the 2005-2009cohort. For the eight indicators involved, both DLI groups tied 8 times in first place; Mainstream placed third five times and placed last three times, and TBE/ESL placed third three times and placed last five times.

In the percentage of students excelling in an Exit-TAKS test and meeting the commended criteria, DLI-NES surpassed all other groups in both cohorts in all content areas, except math, where DLI-NES was outscored by all the other groups in the 2005-2009 cohort. DLI-NSS, in both cohorts placed first in math and second in all other content areas, except for social studies, where DLI-NSS placed third in the 2005-2009 cohort. Mainstream exhibited a fluctuating behavior. It consistently placed third in ELA and science in both cohorts. In math, Mainstream placed second in the 2005-2009 cohort and placed fourth in the 2006-2010 cohort. In social studies Mainstream placed second in the 2005-2009 cohort and placed third in the 2006-2010 cohort. TBE/ESL placed last in both cohorts in all content areas except math, where TBE/ESL placed third in both cohorts. For the eight indicators involved, DLI-NES placed first seven times and places last once, DLI-NSS placed first two times, placed second five times, and placed third once, Mainstream placed second two times, placed third five times, and placed last once, and TBE placed third two times and placed last six times.

In general, DLI-NES exhibited the best results in all measures of academic achievement related with TAKS; in all content areas and in both cohorts. DLI-NES surpassed all other groups in score averages, had the lowest percentage of additional tests taken, the lowest percentage of students failing even after several attempts, and the highest percentage of students excelling the Exit TAKS and meeting the commended criteria. For the 32 measures of academic proficiency on standardized assessments (four indicators * four content areas * two cohorts), DLI-NES placed 31 times on first place and one in last place.

DLI-NSS was second best on almost all indicators. For the 32 measures, DLI-NSS placed 11 times on first, 19 times on second and 2 times on third place. Mainstream placed third in academic achievement as measured by TAKS. For the 32 indicators, Mainstream placed 3 times on second place, 24 times on third place, and 5 times on last place. TBE/ESL exhibited the worst results, placing last on almost all indicators of academic achievement related with TAKS. For the 32 measures, TBE/ESL placed 6 times on third place and 26 times on last place.

In the overall analysis of performance on TAKS tests, the performance results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed better performance than their linguistic pairs in all four measures of academic performance based on TAKS. The DLI groups outperformed Mainstream and TBE/ESL in TAKS average scores, in the percentage of additional TAKS tests, in the percentage of students failing even after several attempts, and in the percentage of students meeting the commended criteria.

In the case of native English speakers, DLI-NES overwhelmingly surpassed Mainstream in the four indicators, in both cohorts, and in almost all content areas. In TAKS average scores DLI-NES surpassed Mainstream in both cohorts, in all content area, and by significant differences ($\Delta \geq 2.9\%$; $p \leq .085$). In additional TAKS tests taken, DLI-NES outperformed Mainstream in both cohorts in all content areas and by significant differences ($\Delta \geq 100\%$; $p \leq .169$). In the percentage of students failing an Exit-TAKS even after several attempts, DLI-NES surpassed Mainstream in both cohorts by statistically significant differences ($\Delta \geq 100\%$; $p \leq .000$). In the percentage of students meeting the commended criteria in TAKS tests, DLI-NES surpassed Mainstream by large differences ($\Delta \geq 89.9\%$; $p \leq .170$) in both cohorts and in all content areas except math in the 2005-2009 cohort, where Mainstream surpassed DLI-NES. In ELA, DLI-NES had up to 41.2% more students than Mainstream meeting the commended criteria ($\Delta = 272.8\%$; $p = .006$), and in social studies DLI-NES had up to 51.6% more students than Mainstream meeting the commended criteria ($\Delta = 156.4\%$; $p = .000$). In summary, the native English speakers enrolled in dual language instruction surpassed the native English speakers enrolled in mainstream in 31 of the 32 measures of academic performance on standardized assessments. These findings show that English language proficiency development and the academic performance of native English speakers are not hindered by dual language instruction. On the contrary, dual language instruction seems to increase the academic performance and the English academic language proficiency development of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts in the four indicators and in all content areas. In TAKS average scores, DLI-NSS outperformed TBE/ESL in both cohorts in all content areas and by significant differences ($\Delta \geq 1.6\%$; $p \leq .155$). In additional TAKS tests taken, DLI-NSS outperformed TBE/ESL in both cohorts in all content areas and by significant differences ($\Delta \geq 28.9\%$; $p \leq .466$). In the percentage of students failing an Exit-TAKS even after several attempts, DLI-NSS outperformed TBE/ESL in both cohorts in all content areas and by significant differences ($\Delta \geq 28.9\%$; $p \leq .466$). In the percentage of students meeting the commended criteria in TAKS tests, DLI-NSS outperformed TBE/ESL in both cohorts and in all content areas. In summary, the native Spanish speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction (TBE/ESL) in all 32 measures of academic performance on standardized assessments analyzed. These findings are significant because they support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001); and refute the time-on-task, English-only hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between native English speakers enrolled in Mainstream instruction and native Spanish speakers enrolled in TBE/ESL, Mainstream outperformed TBE/ESL in both cohorts in most indicators and in most content areas. In TAKS average scores Mainstream outscored TBE/ESL in both cohorts and in all content areas ($\Delta \geq 0.6\%$; $p \leq .268$). In additional TAKS tests taken Mainstream outperformed TBE/ESL in both cohorts and in all content areas ($\Delta \geq 42.7\%$; $p \leq .033$). In the percentage of students failing an Exit-TAKS even after several attempts, Mainstream outperformed TBE/ESL in both cohorts and in almost all content areas. However, the differences were not statistically significant ($\Delta \geq 42.7\%$; $p \leq .033$). Surprisingly, Mainstream had a higher percentage of students failing in content areas highly correlated with English language proficiency such as ELA and social studies. In the percentage of students meeting the commended criteria in TAKS tests, Mainstream outperformed TBE/ESL in both cohorts and in almost all content areas. However, most differences were not statistically significant ($\Delta \geq 2.7\%$; $p \leq .943$). The only content area where TBE/ESL surpassed Mainstream was math, in the 2006-2010 cohort. In summary, the native English speakers enrolled in mainstream instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction in 27 of the 32 measures of academic performance on standardized assessments. These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics constantly display lower academic performance on standardized assessments than their English speaking peers. (Aud et al., 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the theoretical expectations. The native Spanish speakers enrolled in dual language instruction outperformed the native English speakers enrolled in Mainstream instruction in all four indicators of academic proficiency in both cohorts and in all content areas, including those areas highly correlated with English language proficiency such as English language arts (ELA) and social studies. In TAKS score averages, DLI-NSS outperformed Mainstream in both cohorts in all content areas and by statistically significant differences ($\Delta \geq 0.6\%$; $p \leq .268$). In additional TAKS tests taken, DLI-NSS outperformed Mainstream in all content areas, including those highly correlated with English language proficiency. Mainstream required up to 10% more additional ELA tests (Δ = 270.3%; *p* = .009), and 11.4% more additional social studies tests (Δ = 308.1%; *p* = .024) than DLI-NSS. In the percentage of students failing an Exit-TAKS even after several attempts, DLI-NSS surpassed Mainstream in both cohorts and in all content areas by statistically significant differences (Δ ≥ 100%; p ≤ .000) except in ELA for the 2005-2009 cohort where the difference was not statistically significant (p = .602). In the percentage of students meeting the commended criteria in TAKS tests, DLI-NSS outperformed Mainstream in both cohorts and in all content areas except social studies in the cohort 2005-2009. DLI-NSS outperformed Mainstream in tests highly correlated with English language proficiency such as the ELA exit TAKS where DLI-NSS had up to 14.5% more students meeting the commended criteria than Mainstream (Δ = 96.0%; p = .670). In summary, the native Spanish speakers enrolled in dual language instruction (DLI-NSS) surpassed the native English speakers enrolled in mainstream in 30 of the 32 measures of academic performance on standardized assessments. These findings are extremely significant because they refute the time-on-task hypothesis that claims that the academic performance of linguistic minorities is hindered when instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996). These findings support the claim that DLI can increase the academic performance and English language proficiency of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001).

The previous results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction

(DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. DLI-NES outperformed DLI-NSS in both cohorts in most content areas in three of the four indicators of academic performance on standardized assessments and tied in the fourth one. In TAKS score averages, DLI-NES outscored DLI-NSS in both cohorts and in almost all content areas ($\Delta \geq 0.1\%$; $p \leq .931$). Only in math in the 2005-2009 cohort DLI- NES did not outperform but tied with DLI-NSS in first place. In additional TAKS tests taken, DLI-NES outperformed DLI-NSS in both cohorts and in all content areas ($\Delta \geq 96.8\%$; $p \leq .110$). In the percentage of students failing an Exit-TAKS even after several attempts, both DLI groups tied in first place and exhibited a perfect outcome by having no students failing an Exit-TAKS even after several attempts. In the percentage of students meeting the commended criteria in TAKS tests, DLI-NES outscored DLI-NSS in both cohorts and in all content areas except math in the 2005-2009 cohort where DLI-NSS outscored DLI-NES. In summary, the native English speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in dual language instruction in their performance on standardized assessments. For the 32 measures analyzed DLI-NES surpassed DLI-NSS in 21 measures and tied in 10 measures. Only in one measure DLI-NSS outperformed DLI-NES. These findings are significant because they show that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction, it generates a new academic gap between native English speakers and native Spanish speakers when both are educated through dual language instruction.

In the specific case of science the performance results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed a better performance than their linguistic peers in all four measures of academic performance based on TAKS. The DLI groups outperformed Mainstream and TBE/ESL in TAKS average scores, in the percentage of additional TAKS tests, in the percentage of students failing even after several attempts, and in the percentage of students meeting the commended criteria.

DLI-NES outperformed Mainstream in all four indicators in both cohorts. In science TAKS average scores, DLI-NES outscored Mainstream by statistically significant differences of up to 148 TAKS scale-score points ($\Delta = 8.1\%$; $p = .001$). In additional science TAKS tests taken, Mainstream required up to 38.2% additional TAKS tests ($\Delta = 100\%$; $p = .000$) while DLI-NES required no additional tests. In the percentage of students failing the science Exit-TAKS even after several attempts, Mainstream had up to 6.7% of its students failing the test even after several attempts while DLI-NES had no students failing ($\Delta = 100\%$; $p = .000$). In the percentage of students meeting the commended criteria in the science Exit-TAKS test, DLI-NES had up to 21.7% more students than Mainstream meeting the commended criteria ($\Delta = 238.5\%$; $p = .131$). DLI-NES significantly outperformed Mainstream in all indicators of academic proficiency related to the science TAKS test.

DLI-NSS outperformed TBE/ESL in all four indicators in both cohorts. In science TAKS average scores, DLI-NSS outscored TBE/ESL by up to 162 TAKS scale-score points ($\Delta = 2.9\%$; $p = .004$). In additional science TAKS tests taken, DLI-NSS outscored TBE/ESL by a highly significant difference. TBE/ESL required up to 34.2% additional

TAKS tests more than DLI-NSS (Δ = 135%; p = .046). In the percentage of students failing the science Exit-TAKS even after several attempts, TBE/ESL had up to 8.5% of its students failing the test even after several attempts while DLI-NES had no students failing (Δ = 100%; p = .005). In the percentage of students meeting the commended criteria in the science Exit-TAKS test, DLI-NSS had up to 22.5% more students than TBE/ESL meeting the commended criteria (Δ = 511.4%; p = .244). DLI-NES significantly outperformed Mainstream in all indicators of academic proficiency related to the science TAKS test.

Mainstream outperformed TBE/ESL in all four indicators in both cohorts. In science TAKS average scores, Mainstream outscored TBE/ESL by a difference of up to 42 TAKS scale-score points (Δ = 2.0%; p = .000). In additional science TAKS tests taken, TBE/ESL required up to 25.5% additional tests more than Mainstream (Δ = 55.8%; p = .002). In the percentage of students failing the science Exit-TAKS test even after several attempts, TBE/ESL had up to 2.3% more students failing than Mainstream (Δ = 37.1%; p = .264). In the percentage of students meeting the commended criteria in the science Exit-TAKS test, Mainstream had up to 4.7% more students than TBE/ESL meeting the commended criteria (Δ = 106.8%; p = .019). Mainstream significantly outperformed TBE/ESL in all indicators of academic proficiency related to the science TAKS test.

DLI-NSS outperformed Mainstream in all four indicators in both cohorts. In science TAKS average scores, DLI-NSS outscored Mainstream by a statistically significant difference of up to 72 TAKS scale-score points (Δ = 3.4%; p = .009). In additional science TAKS tests taken, Mainstream required up to 15.1% more additional

TAKS tests than DLI-NSS (Δ = 42.7%; $p = .033$). In the percentage of students failing the science Exit-TAKS even after several attempts, while DLI-NSS had 0% students failing the science Exit-TAKS, Mainstream had up to 6.7% of its students failing the test even after several attempts (Δ = 100%; $p = .000$). In the percentage of students meeting the commended criteria in the science Exit-TAKS test, DLI-NSS had up to 17.8% more students meeting the commended criteria in science than Mainstream (Δ ≥ 195.6%; $p \leq .058$). Overall, DLI-NSS significantly outperformed Mainstream in all indicators of academic proficiency related to to science TAKS test.

DLI-NES outperformed DLI-NSS in three indicators and tied in the fourth one. In science TAKS average scores, DLI-NES outscored DLI-NSS by statistically significant differences of up to 102 TAKS scale-score points (Δ = 4.6%; $p = .037$). In additional science TAKS tests taken, DLI-NSS required up to 23.1% more additional tests than DLI-NES (Δ = 100%; $p = .110$). In the percentage of students failing the science Exit-TAKS even after several attempts, Both DLI groups tied in first place and exhibited a perfect outcome by having no students failing the science Exit-TAKS even after several attempts. In the percentage of students meeting the commended criteria in the science Exit-TAKS test, DLI-NES had up to 7.7% more students meeting the commended criteria in science than DLI-NSS (Δ ≥ 69.4%; $p \leq .523$). Overall, DLI-NES outperformed TBE/ESL in three of the four indicators of academic proficiency related to the science TAKS test.

Overall high school Performance.

Quantitative measures such as high school graduation, grade point average, and class ranking are an important indicator of academic achievement. Therefore, a variety of measures of high school performance were analyzed to look for significant differences between groups including high school graduation, graduation plan, grade point average and school ranking.

High School Graduation.

From the accountability perspective, the percentage of students graduating is a key indicator of academic achievement. The four groups exhibited large differences in the percentage of students who met graduation requirements and were able to graduate on time. These differences were consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

In both DLI cohorts, DLI-NES and DLI-NSS, exhibited the best academic performance, tying at first place with a graduation rate of 100% (p = 1.000). Both DLI groups consistently outperformed the other two groups by statistically significant differences. The differences between both DLI groups and Mainstream fluctuated from 8.2% (p = .000) to 5.5% (p = .000), while the differences between both DLI groups and TBE/ESL decreased from 11.4% (p = .000) to 5.9% (p = .000). Mainstream outperformed TBE/ESL. The difference between Mainstream and TBE/ESL fluctuated from 2.9% (p = .244) to 0.4% (p = .812).

Percentage of students who met the Distinguished Achievement plan

From a college –readiness perspective, graduation plan is a key indicator of academic performance. Most universities look for Texas ‘students graduating under distinguished achievement plan because it challenges students to perform at a college level. On the other side, the minimum requirements plan is the least valued by colleges because is the least challenging.

Graduation plan was analyzed in two steps. First, because the distinguished achievement plan is most valued by colleges, the percentage of students graduating as distinguished was analyzed to look for differences between groups. Second, because the minimum requirements plan is least valued plan colleges, it was also analyzed to look for differences between groups. The groups exhibited differences in the percentage of students who met the distinguished achievement graduation plan. The differences were consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best academic performance by having the largest percentage of students graduating under the Distinguished Achievement plan in both cohorts. In most cases, the differences were statistically significant and fluctuated in percentage or significance across cohorts. The difference between DLI-NES and DLI-NSS increased from 26.8% (p = .469) in the 2005-2009 cohort to 99.8% (p = .001) in the 2006-2010 cohort. The difference between DLI-NES and Mainstream decreased from 256.3% (p = .007) to 227.3% (p = .000); and the difference between DLI-NES and TBE/ESL increased from 333.1% (p = .004) to 515.3% (p = .000). DLI-NSS exhibited the second best performance across cohorts, surpassing Mainstream and TBE/ESL by statistically significant differences. The difference between DLI-NSS and Mainstream fluctuated between cohorts from 181.0% (p = .008) to 63.8% (p = .091), and the difference between DLI-NSS and TBE/ESL fluctuated from 241.5% (p = .004) to 208.0% (p = .005). Mainstream placed third consistently across cohorts. The difference between Mainstream and TBE/ESL increased between cohorts from 24.6% (p = .314) to 88.0% (p = .000).

Percentage of students who met the minimum requirements' graduation plan

The four groups exhibit differences in the percentage of students graduating with minimum requirements in both cohorts. The differences are consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

Both DLI groups exhibited the best academic performance, having no students graduating under the minimum requirements plan (p = 1.000). Both DLI groups outperformed the other two groups by statistically significant differences in both cohorts. The difference between the DLI groups and Mainstream decreased from 100% (p = .004) to 100% (p = .318), while the difference between the DLI groups and TBE/ESL increased from 100% (p = .158) to 100% (p = .008). The comparison between Mainstream and TBE/ESL was more complex. TBE/ESL placed third in the 2005-2009 cohort, while Mainstream placed third in the 2006-2010 cohort.

Weighted grade point average

The four groups exhibit differences in the weighted grade point average (WGPA) of their participants. These differences between groups were consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best academic performance by having the highest mean WGPA in both cohorts. In most cases, the differences were statistically significant and increased in percentage or significance across cohorts. The difference in mean WGPA between DLI-NES and DLI-NSS increased from 2.9% (p = .389) in cohort 2005-2009 to 6.2% (p = .069) in cohort 2006-2010. The difference between DLI-NES and Mainstream increased from 9.5% (*p* = .001) to 14.2% (*p* = .000) and the difference between DLI-NES and TBE/ESL increased from 11.1% (*p* = .000) to 17.5% (*p* = .000).

DLI-NSS exhibited the second best performance across cohorts, surpassing Mainstream and TBE/ESL by significant differences; and these differences increased between cohorts. The difference between DLI-NSS and Mainstream slightly increased from 6.4% (*p* = .004) to 7.6% (*p* = .001) and the difference between DLI-NSS and TBE/ESL increased from 7.9% (p = .000) to 10.7% (p = .000). Mainstream placed third in both cohorts. The difference between Mainstream and TBE/ESL increased between cohorts from 1.4% (*p* = .092) to 2.9% (*p* = .001).

Student's Ranking

The four groups exhibited large differences in the average ranking of their students. The differences were significant and consistent between the 2005-2009 cohort and the 2006-2010 cohort, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best performance by having the lower mean ranking in both cohorts. The differences between DLI-NES and DLI-NSS fluctuated from 56.3% (p = .201) to 207.4% (p = .002), the differences between DLI-NES and Mainstream fluctuated from 117.9% (p = .001) to 393.3% (p = .000), and the differences between DLI-NES and TBE/ESL fluctuated from 147.5% (p = .000) to 502.9% (p = .000). DLI-NSS exhibited the second best performance in student ranking in both cohorts, surpassing Mainstream and TBE/ESL by statistically significant differences. The differences between DLI-NSS and Mainstream fluctuated from 39.5% (p = .028) to 60.5% (p = .004) and between DLI-NSS and TBE/ESL fluctuated from 58.4% (p = .001) to 96.1% (p =

.000). Mainstream placed third in both cohorts. The difference between Mainstream and TBE/ESL fluctuated between cohorts, from 13.6% (p = .008) to 22.2% (p = .000).

Percentage of students in the Top 10%

The representation of instructional programs in the top10% is a clear indicator of the academic effectiveness of an instructional program. For this reason, the groups' representation in the Top 10% was analyzed to look for statistically significant differences between groups.

The groups exhibited large differences in the percentage of students ranked in the top 10%. The differences were significant and consistent between the 2005-2009 cohort and the 2006-2010 cohort, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best academic performance by having the largest percentage of students ranked in the top 10%, surpassing the other groups by large margins. The differences fluctuated in percentage or significance between cohorts. The difference between DLI-NES and DLI-NSS fluctuated from 102.7% (p = .206) in the 2005-2009 cohort to 74.7% (p = .191) in the 2006-2010 cohort, the difference between DLI-NES and Mainstream fluctuated from 275.0% (p = .045) to 402.8% (p = .011), and the difference between DLI-NES and TBE/ESL fluctuated from 357.3% (p = .034) to 811.9% (p = .006). DLI-NSS exhibited the second best performance in both cohorts, surpassing Mainstream and TBE/ESL by significant differences that increased in proportion or significance between cohorts. The difference between DLI-NSS and Mainstream increased from 85.0% (p = .283) in the 2005-2009 cohort to 187.9% (p = .042) in the 2006-2010 cohort, and the difference between DLI-NSS and TBE/ESL increased from 125.6% (p = .194) to 422.0% (p = .013). Mainstream placed third in both cohorts. The disparity between Mainstream and TBE/ESL increased from 22.0% (p = .438) to 81.4% (p = .031).

Percentage of students in top 25%

Even though participation in top 25% does not identify students as outstanding, it does identify them as academically successful in high school and with possibilities to be successful in college. The instructional programs' representation in top 25% is a clear indicator of program effectiveness. The four groups exhibited large differences in the percentage of students ranked in top 25%. The differences were significant and consistent in both cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

As with the results for the top 10%, the analysis of the top 25% shows that students in the DLI programs succeed at higher rates than students in the other types of programs. DLI-NES exhibited the best academic performance by having the largest percentage of students ranked in the first quartile, surpassing the other groups by large margins. In several cases, the differences were statistically significant or increased in percentage or significance from one cohort to the next. The difference between DLI-NES and DLI-NSS increased, from 17.0% (p = .619) in the 2005-2009 cohort to 71.6% (p = .004) in the 2006-2010 cohort. The difference between DLI-NES and Mainstream increased from 118.2% (p = .033) to 279.8% (p = .000), and the difference between DLI-NES and TBE/ESL increased from 165.6% (p = .016) to 348.1% (p = .000).

DLI-NSS exhibited the second best performance in both cohorts, surpassing the other two groups by significant differences that increased in proportion or significance between cohorts. The difference between DLI-NSS and Mainstream increased from 86.4% (p = .035) in the 2005-2009 cohort to 121.4% (p = .008) in the 2006-2010 cohort, and the difference between DLI-NSS and TBE/ESL increased from 126.9% (p = .012) to 161.2% (p = .003). Mainstream placed third consistently across cohorts; however, the gap between Mainstream and TBE/ESL decreased from 21.7% (p = .173) to 18.0% (p = .265).

Percentage of Students in top 50%

Because it is more inclusive than top 10% or top 25%, the top 50% bracket is a more reliable measure of the effectiveness of an instructional program. By reaching the top 50%, students are placing themselves above average.

The four groups exhibited large differences in the percentage of students ranked in top 50%. The differences were consistent in both cohorts, supporting the claim that program type is a contributing factor to academic achievement for students. Once again, students in the DLI programs exhibit greater success than students in the other groups. A greater percentage of students in the DLI program rank in the top 50% of all students using WGPA as a measure.

DLI-NES exhibited the best academic performance by having the largest percentage of students ranked in the top 50% in both cohorts, surpassing the other groups by large margins. In several cases, the differences were statistically significant and increased in percentage or significance from one cohort to the next. The difference between DLI-NES and DLI-NSS increased, from 9.7% (p = .591) in the 2005-2009 cohort to 30.0% (p = .011) in the cohort 2006-2010. The difference between DLI-NES and Mainstream increased from 61.0% (p = .009) to 82.8% (p = .000), and the difference between DLI-NES and TBE/ESL increased from 75.6% (p = .004) to 143.3% (p = .000).

DLI-NSS exhibited the second best performance across cohorts, surpassing Mainstream and TBE/ESL by significant differences. The difference between DLI-NSS and Mainstream slightly decreased from 46.7% (p = .014) in the 2005-2009 cohort to 40.6% (p = .018) in the 2006-2010 cohort. The difference between DLI-NSS and TBE/ESL increased from 60.0% (p = .004) to 87.1% (p = .000). Mainstream placed third in both cohorts, and the difference between Mainstream and TBE/ESL increased from 9.1% (p = .290) to 33.1% (p = .001).

Percentage of students in last 25%

Ranking in the last quartile is detrimental for students because it signals an academic underperformance and implies a lack of preparation. The identification of low performing students is a practical way to measure instructional programs' effectiveness. The representation or underrepresentation in the last quartile is a key indicator of program effectiveness. The four groups exhibited large differences in the percentage of students ranked in the last 25%. These differences were consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best academic performance, having no students ranked in the last quartile. DLI-NES outperformed the other groups by significant differences. The difference between DLI-NES and DLI-NSS increased from 100% (p = .327) in the 2005-2009 cohort to 100% (p = .161) in the 2006-2010 cohort. The differences between DLI-NES and Mainstream and between DLI-NES and TBE/ESL kept constant across cohorts at 100% (p = .000). DLI-NSS exhibited the second best performance in both cohorts, surpassing Mainstream and TBE/ESL by significant differences. The difference between DLI-NSS and Mainstream slightly decreased from 83.7% (p = .000) in the 2005-2009 cohort to 64.0% (p = .025) in the 2006-2010 cohort. The difference between DLI-NSS and TBE/ESL also decreased, from 87.5% (p = .000) to 75.3% (p = .000). Mainstream placed third in both cohorts. The difference between Mainstream and TBE/ESL increased from 23.6% (p = .044) to 31.4% (p = .005).

Summary of results on overall high school performance

The four groups exhibited large differences in all analyses based on indicators of high school performance. In most cases, the differences were consistent in both cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

In school graduation, both DLI groups exhibited the best academic performance, by attaining a perfect graduation rate of 100% in both cohorts. Both DLI groups outperformed the other two groups by statistically significant differences ($\Delta \geq 5.5\%$; p = .000) in both cohorts. Mainstream placed third in both cohorts, surpassing TBE/ESL by differences not statistically significant ($\Delta \leq 2.9\%$; $p \geq .244$).

In the percentage of students who met the distinguished achievement graduation plan, DLI-NES exhibited the best academic performance by having the largest percentage of students graduating under the distinguished achievement plan in both cohorts. DLI-NES outscored the other groups by statistically significant differences ($\Delta \geq 99.8\%$; $p \leq$ .007) in both cohorts, except with DLI-NSS in cohort 2005-2009 where the difference was not statistically significant ($\Delta = 26.8\%$; p = .469). DLI-NSS exhibited the second best performance, surpassing Mainstream and TBE/ESL by significant differences in both cohorts ($\Delta \geq 63.8\%$; $p \leq .091$). Mainstream placed third, surpassing TBE/ESL in both cohorts ($\Delta \geq 24.6\%$; $p \leq .314$).

In the percentage of students graduating with minimum requirements, both DLI groups exhibited the best academic performance by having no students graduating under the minimum requirements plan. Both DLI groups outperformed Mainstream and TBE/ESL in both cohorts, by statistically significant differences ($\Delta = 100\%$; $p = .000$). The comparison between Mainstream and TBE/ESL was more complex. TBE/ESL placed third in the 2005-2009 cohort, while Mainstream placed third in the 2006-2010 cohort.

In weighted grade point average, DLI-NES exhibited the best academic performance by having the highest average in WGPA. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 9.5\%$; $p \leq .001$). DLI-NES also outscored DLI-NSS in both cohorts; however, the differences were not statistically significant ($\Delta \leq 6.2\%$; $p \geq .069$). DLI-NSS exhibited the second best performance; surpassing Mainstream and TBE/ESL by significant differences in both cohorts ($\Delta \geq 6.4\%$; $p \leq .004$). Mainstream consistently placed third, surpassing TBE/ESL in both cohorts ($\Delta \leq 6.2\%$; $p \geq .069$).

In student ranking, DLI-NES exhibited the best academic performance. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 117.9\%$; $p \leq .001$). DLI-NES outscored DLI-NSS in both cohorts; however, the differences were not always statistically significant ($\Delta \geq 56.3\%$; $p \leq .201$). DLI-NSS showed the second best performance; surpassing Mainstream and TBE/ESL by significant differences in both cohorts ($\Delta \geq 39.5\%$; $p \leq .028$). Mainstream placed third in both cohorts, surpassing TBE/ESL by statistically significant differences ($\Delta \geq 13.6\%$; $p \leq .008$).

In the percentage of students ranked in the top 10%, DLI-NES exhibited the best performance. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 275.0\%$; $p \leq .045$). DLI-NES also outscored DLI-NSS in both cohorts; however, the differences were not statistically significant ($\Delta \geq 74.7\%$; $p \geq .191$). DLI-NSS exhibited the second best performance; surpassing Mainstream and TBE/ESL in both cohorts ($\Delta \geq 85.0\%$; $p \leq .283$). Mainstream placed third in both cohorts, surpassing TBE/ESL by significant differences ($\Delta \geq 22.0\%$; $p \leq .438$).

In the percentage of students ranked in the top 25%, DLI-NES exhibited the best academic performance. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 118.2\%$; $p \leq .033$). DLI-NES also outscored DLI-NSS in both cohorts; however, the differences were not always statistically significant ($\Delta \geq 17.0\%$; $p \leq .619$). DLI-NSS exhibited the second best performance, surpassing Mainstream and TBE/ESL by significant differences in both cohorts ($\Delta \geq 86.4\%$; $p \leq .035$). Mainstream consistently placed third, surpassing TBE/ESL in both cohorts ($\Delta \geq 18.0\%$; $p \leq .265$).

In the percentage of students ranked in the top 50%, DLI-NES exhibited the best academic performance. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 61.0\%$; $p \leq .009$). DLI-NES also outscored DLI-NSS in both cohorts; however, the differences were not always statistically significant ($\Delta \geq 9.7\%$; $p \leq .591$). DLI-NSS exhibited the second best performance surpassing Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 40.6\%$; $p \leq .018$). Mainstream placed third, surpassing TBE/ESL in both cohorts ($\Delta \geq 9.1\%$; $p \leq .290$).

In the percentage of students ranked in the last 25%, DLI-NES exhibited the best academic performance, by having no students ranked in the last quartile. DLI-NES outperformed Mainstream and TBE/ESL by statistically significant differences in both cohorts ($\Delta = 100\%$; $p = .000$). DLI-NES also outscored DLI-NSS in both cohorts; however, the differences were not statistically significant ($\Delta \geq 100\%$; $p \leq .327$). DLI-NSS exhibited the second best performance, surpassing Mainstream and TBE/ESL by significant differences in both cohorts ($\Delta \geq 64.0\%$; $p \leq .025$). Mainstream consistently placed third, surpassing TBE/ESL by statistically significant differences in both cohorts ($\Delta \geq 23.6\%$; $p \leq .044$).

Overall, DLI-NES exhibited the best results in all measures of academic achievement related to high school performance. DLI-NES exhibited a better performance than all the other groups in high school graduation, in the percentage of students who met the distinguished achievement graduation plan, in the percentage of students graduating with minimum requirements, in weighted grade point average, in student ranking, in the percentage of students ranked in the top 10%, in the percentage of students ranked in the top 25%, in the percentage of students ranked in the top 50%, and in the percentage of students ranked in the last 25%. For the eighteen measures of performance analyzed (nine indicators * two cohorts), DLI-NES placed first in all eighteen of them.

DLI-NSS exhibited the second best performance. For the eighteen measures of high school performance, DLI-NSS tied four times for first place and placed second on the other fourteen measures. Mainstream had the third best performance. For the eighteen measures analyzed, Mainstream placed third seventeen times and placed last once. Mainstream placed last in the percentage of students graduating with minimum requirements in the 2005-2009 cohort. TBE/ESL showed the worst results, placing third once and placing last in seventeen of the eighteen indicators of academic achievement related with high school performance.

In the overall analysis of high school performance, the performance results exceeded the expectations generated by the theoretical framework. Even though most advocates of dual language instruction claim that DLI can increase the academic performance of the students, no one has mentioned gain margins as large as those found in this study. Both DLI groups showed better performance than their linguistic pairs in all nine indicators of high school performance. Both DLI groups outperformed Mainstream and TBE/ESL in high school graduation, in the percentage of students who met the distinguished achievement graduation plan, in the percentage of students graduating with minimum requirements, in weighted grade point average, in student ranking, in the percentage of students ranked in the top 10%, in the percentage of students ranked in the top 25%, and in the percentage of students ranked in the top 50%. The DLI groups had the lowest percentage of students ranked in the last 25%.

In the case of native English speakers, DLI-NES surpassed Mainstream in all nine indicators in both cohorts. In high school graduation rate DLI-NES surpassed Mainstream in both cohorts by statistically significant differences ($\Delta \geq 5.5\%$; $p = .000$). In the percentage of students who met the distinguished achievement graduation plan, DLI-NES outperformed Mainstream in both cohorts and by significant differences ($\Delta \geq 227.3\%$; $p \leq .007$). In the percentage of students graduating with minimum requirements, DLI-NES outperformed Mainstream in both cohorts. However, the differences were not always statistically significant ($\Delta = 100\%$; $p \leq .318$). In weighted grade point average, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 9.5\%$; $p = .000$). In student ranking, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 117.9\%$; $p \leq .001$). In the percentage of students ranked in the top 10%, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 275.0\%$; $p \leq .045$). In the percentage of students ranked in the top 25%, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 118.2\%$; $p \leq .033$). In the percentage of students ranked in the top 50%, DLI-NES outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 61.0\%$; $p \leq .009$). In the percentage of students ranked in the last 25%, DLI-NES showed a lower percentage of students than Mainstream in both cohorts and the differences were also statistically significant ($\Delta = 100\%$; $p = .000$). In summary, the native English speakers enrolled in dual language instruction surpassed the native English speakers enrolled in mainstream in all eighteen measures of high school performance. These findings show that the academic performance of native English speakers is not hindered by dual language instruction. On the contrary, dual language instruction seems to increase the academic performance of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in all nine indicators, in both cohorts. In high school graduation rate, DLI-NSS outperformed TBE/ESL in both cohorts by statistically significant differences ($\Delta \geq 5.9\%$; $p = .000$). In the percentage of students who met the distinguished achievement graduation plan, DLI-NSS outperformed TBE/ESL in both cohorts and by significant differences ($\Delta \geq 208.0\%$; $p \leq .005$). In the percentage of students graduating with minimum requirements, DLI-NSS outperformed TBE/ESL in both cohorts. However, the differences were not always statistically significant ($\Delta = 208.0\%$; $p \leq .158$). In weighted grade point average, DLI-NSS outperformed TBE/ESL in both cohorts and by statistically significant differences ($\Delta \geq 7.9\%$; $p = .000$). In student ranking DLI-NSS outperformed TBE in both cohorts and by statistically significant differences ($\Delta \geq 58.4\%$; $p \leq .001$). In the percentage of students ranked in the top 10%, DLI-NSS outperformed TBE/ESL in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 125.6\%$; $p \leq .194$). In the percentage of students ranked in the top 25%, DLI-NSS outperformed TBE/ESL in both cohorts and by statistically significant differences ($\Delta \geq 126.9\%$; $p \leq .012$). In the percentage of students ranked in the top 50%, DLI-NSS outperformed TBE/ESL in both cohorts and by statistically significant differences ($\Delta \geq 60.0\%$; $p \leq .004$). In the percentage of students ranked in the last 25%, DLI-NSS had a smaller percentage than TBE/ESL in both cohorts and the differences were statistically significant ($\Delta \geq 75.3\%$; $p \leq .000$). In summary, the native Spanish speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction, in all the eighteen measures of academic performance in high school. These findings are significant because they support the claim that DLI can increase the academic performance of linguistic minorities and refute the time-on-task hypothesis (Porter, 1990; Rossell & Baker, 1996).

In the comparison between native English speakers enrolled in Mainstream instruction and native Spanish speakers enrolled in TBE/ESL, Mainstream outperformed TBE/ESL in all nine indicators of high school performance in both cohorts. In high school graduation rate, Mainstream outscored TBE/ESL in both cohorts by non-significant differences ($\Delta \geq 0.4\%$; $p \leq .812$). In the percentage of students who met the distinguished achievement graduation plan, Mainstream outperformed TBE/ESL in both cohorts ($\Delta \geq 24.6\%$; $p \leq .314$). In the percentage of students graduating with minimum requirements, TBE/ESL outperformed Mainstream in the 2005-2009 cohort ($\Delta = 350\%$; $p \leq .158$) and Mainstream outperformed TBE/ESL in the 2006-2010 cohort ($\Delta = 86.4\%$; $p \leq .318$). In weighted grade point average, Mainstream outperformed TBE/ESL in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 1.4\%$; $p \leq .092$). In student ranking Mainstream outperformed TBE/ESL in both cohorts and by statistically significant differences ($\Delta \geq 13.6\%$; $p \leq .008$). In the percentage of students ranked in the top 10%, Mainstream outperformed TBE/ESL in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 22.0\%$; $p \leq .438$). In the percentage of students ranked in the top 25%, Mainstream outperformed TBE/ESL in both cohorts. However, the differences were not statistically significant ($\Delta \geq 18.0\%$; $p \leq .265$). In the percentage of students ranked in the top 50%, Mainstream outperformed TBE/ESL in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 9.1\%$; $p \leq .290$). In the percentage of students ranked in the top 50%, Mainstream outperformed TBE/ESL in both cohorts and by statistically significant differences ($\Delta \geq 23.6\%$; $p \leq .044$). In summary, the native English speakers enrolled in mainstream instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction in sixteen of the eighteen measures of academic performance on standardized assessments. However, in most cases the differences were not statistically significant. These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics constantly display lower academic performance than their English speaking peers in high school performance indicators. (NCES, 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the theoretical expectations. DLI-NSS outperformed Mainstream in all nine indicators of academic proficiency in both cohorts. In high school graduation rate, DLI-NSS outperformed Mainstream in both cohorts by statistically significant differences ($\Delta \geq 5.5\%$; $p \leq .000$). In the percentage of students who met the distinguished achievement graduation plan, DLI-NSS outperformed Mainstream in both cohorts and by significant differences ($\Delta \geq 63.8\%$; $p \leq .091$). In the percentage of students graduating with minimum requirements, DLI-NSS outperformed Mainstream in both cohorts. However, the differences were not always statistically significant ($\Delta = 100\%$; $p \leq .318$). In weighted grade point average, DLI-NSS outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 6.4\%$; $p \leq .004$).

In student ranking, DLI-NSS outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 39.5\%$; $p \leq .028$). In the percentage of students ranked in the top 10%, DLI-NSS outperformed Mainstream in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 85.0\%$; $p \leq .283$). In the percentage of students ranked in the top 25%, DLI-NSS outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 86.4\%$; $p \leq .035$). In the percentage of students ranked in the top 50%, DLI-NSS outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 40.6\%$; $p \leq .018$). In the percentage of students ranked in the last 25%, DLI-NSS had a smaller percentage than Mainstream in both cohorts and the differences were statistically significant ($\Delta \geq 64.0\%$; $p \leq .025$).

In summary, the native Spanish speakers enrolled in dual language instruction (DLI-NSS) surpassed the native English speakers enrolled in mainstream in all eighteen measures of academic performance in high school. These findings are highly significant because they refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996). At the same time, these findings support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001).

The results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. DLI-NES outperformed DLI-NSS in both cohorts, in seven of the nine indicators of high school performance, and tied in the other two. In high school graduation rate, DLI-NES tied with DLI-NSS in first place in both cohorts, with a perfect 100% graduation rate ($\Delta = 0.0\%$; $p = 1.000$). In the percentage of students who met the distinguished achievement graduation plan, DLI-NES surpassed DLI-NSS in both cohorts. However, the differences were not statistically significant ($\Delta \geq 26.8\%$; $p \leq .469$). In the percentage of students graduating with minimum requirements, DLI-NES tied with DLI-NSS in first place in both cohorts, with no students graduating with minimum requirements ($\Delta = 0.0\%$; $p = 1.000$). In weighted grade point average, DLI-NES outperformed DLI-NSS in both cohorts. However, the differences were not statistically significant ($\Delta \geq 2.9\%$; $p \leq .389$). In student ranking, DLI-NES outperformed DLI-NSS in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 56.3\%$; $p \leq .201$). In the percentage of students ranked in the top 10%, DLI-NES outperformed DLI-NSS in both cohorts. However, the differences were not statistically significant ($\Delta \geq 74.7\%$; $p \leq .206$). In the percentage of students ranked in the top 25%, DLI-NES outperformed DLI-NSS in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 17.0\%$; $p \leq .619$). In the percentage of students ranked in the top 50%, DLI-NES outperformed DLI-NSS in both cohorts. However, the differences were not always statistically significant ($\Delta \geq 9.7\%$; $p \leq .591$). In the percentage of students ranked in the last 25%, DLI-NES had a smaller percentage of students that DLI-NSS in both cohorts. However, the differences were not statistically significant ($\Delta = 100\%$; $p \leq .327$).

In summary, the native English speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in dual language instruction in their performance on high school indicators. For the 18 measures analyzed DLI-NES surpassed DLI-NSS in fourteen and tied in the other four. Even though all the differences between DLI-NES and DLI-NSS were found as not statistically significant, the differences show a performance gap between the two groups. These findings are significant because they show that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction, it can also generate a new gap between native English speakers and native Spanish speakers when both are educated through dual language instruction.

It can be concluded that, from the perspective of high school performance, dual language instruction proved much more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Overall performance on college-readiness indicators

For most colleges across the nation, the most reliable predictors of college-readiness are those designed with a college-level challenge in mind; such as college-level courses and standardized college-admission tests. College-level courses such as the *College Board AP* are reliable predictors of students' college performance because the students are following a college-level curriculum and are expected to meet expectations on college-level assessments.

Standardized college-admission tests such as ACT are also very reliable predictors of college-readiness because they are designed to measure the knowledge and skills students need in order to be academically successful in college, freshmen-level courses.

Students' performance on Advanced Placement (AP) tests

The overall participation and performance on AP courses and assessments is a highly reliable indicator of how well prepared students are for college. Because AP course participation and AP test performance are key indicators of college readiness, both measures were analyzed to look for significant differences between groups.

Participation in Advanced Placement (AP) tests

When students actively participate in challenging courses, such as AP courses, they demonstrate a higher commitment to academic success. Therefore, the percentage of students who actively participate in AP courses is a key indicator of academic commitment.

AP course active participation was measured by the percentage of students who actually took at least one AP test. When students take an AP course test, they are expressing a degree of confidence in the knowledge acquired. AP testing is voluntary and not mandatory by course participation. Only those students who want to obtain college credits take the test.

The four groups exhibited large differences in the percentage of students taking at least one AP test during the four years of high school instruction. The differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

Both DLI groups exhibited the best academic performance by having all their students (100%) taking at least one AP test during their 4 years of high school education. Both DLI groups outperformed the other two groups by statistically significant differences in both cohorts. The difference between the DLI groups and Mainstream decreased between cohorts from 754.7% (p = .000) in the 2005-2009 cohort to 89.4% (p = .000) in the 2006-2010 cohort. The difference between the DLI groups and TBE/ESL also decreased from 580.3% (p = .000) to 105.8% (p = .000). The comparison between TBE/ESL and Mainstream was more complex. TBE/ESL placed third in cohort 2005-2009 (Δ = 25.6%; p = .260) while Mainstream placed third in cohort 2006-2010 (Δ = 8.6%; p = .298).

Discussion

In the analysis of participation in College-Board Advanced Placement (AP) tests, the performance results matched or surpassed the expectations of the theoretical framework. Both DLI groups showed a perfect participation rate (100%) in both cohorts, outperforming their linguistic peers.

In the case of native English-speaking Hispanics DLI-NES outperformed Mainstream in both cohorts by significant differences. For example, in the cohort 2005-2009 while 100% of the DLI-NES participants took an AP test, only 11.7% of the Mainstream students took an AP test (Δ = 754.7%; p = .000). Even though the gap decreased in the 2006-2010 cohort, the difference remained statistically significant (Δ = 89.4%; p = .000). Since AP test participation is a key indicator of college readiness (U.S. Dept. of Ed. 2010a), these large differences between DLI-NES and Mainstream are significant. These findings show that the active participation of native English speakers in college-level courses and assessments is not hindered by dual language instruction. In contrast, DLI seems to increase students' participation in college-level courses.

In the case of native Spanish-speaking Hispanics DLI-NSS outperformed TBE/ESL in both cohorts by significant differences. For example, in the 2005-2009 cohort while 100% of the DLI-NSS participants took an AP test, only 14.7% of the TBE/ESL students took an AP test ($\Delta = 580.3\%$; $p = .000$). Even though the difference decreased for the 2006-2010 cohort, it remained statistically significant ($\Delta = 105.8\%$; $p = .000$). Since AP test participation is a key indicator of college readiness (U.S. Dept. of Ed. 2010a) these large differences between DLI-NSS and TBE/ESL are significant ($\Delta \geq 1.6\%$; $p \leq .155$). These findings support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). These findings also refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between native English-speaking Hispanics enrolled in Mainstream instruction and native Spanish speaking Hispanics enrolled in the TBE/ESL program the results are mixed. In the 2005-2009 cohort, TBE/ESL had a higher percentage of students taking an AP test than Mainstream ($\Delta = 25.6\%$; $p \leq .260$) while Mainstream had a higher percentage of students participating in AP tests than TBE/ESL in the cohort of 2006-2010 ($\Delta \geq 8.6\%$; $p \leq .298$). It is important to mention that the percentage of students participating in AP tests significantly increased from one cohort to the next. Mainstream participation increased from 11.7% in the 2005-2009 cohort to 52.8% in the 2006-2010 cohort. TBE/ESL participation increased from 14.7% to 48.6%. The data analyzed does not provide an answer to this significant increase in AP participation. One explanation can be a change in school district policy, from TAKS accountability compliance to college-readiness accountability.

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) not only matched but significantly surpassed their native English-speaking peers enrolled in Mainstream instruction in their participation in AP exams. DLI-NSS outperformed Mainstream in both cohorts by significant differences. In the 2005-2009 cohort, 100% of the DLI-NES students took an AP test, while only 11.7% of the Mainstream students took an AP test (Δ = 754.7%; $p = .000$). Even though the gap decreased in the 2006-2010 cohort, the difference remained statistically significant (Δ = 89.4%; $p = .000$). These large differences between DLI-NES and Mainstream are significant because AP test participation a key indicator of college readiness (U.S. Dept. of Ed. 2010a). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. In the case of AP test participation the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) support that conclusion. DLI-NES tied with DLI-NSS in both cohorts with a perfect rate of participation of 100% (Δ = 0.0%; $p \leq$

1.000). These findings show that dual language instruction is effective in closing the academic gap between English language learners and native English speakers.

Percentage of students succeeding in Advanced Placement (AP) tests.

Even though active participation in AP courses is considered a reliable predictor of college readiness; it can be misleading. A more reliable indicator of college readiness is when students not only actively participate in college-level courses and take the final exams, but when students are academically capable of meeting the expectations of such exams. When students succeed in challenging courses such as AP, they not only demonstrate a higher commitment for academic success, they also demonstrate college-level readiness.

The four groups exhibited large differences in the percentage of students passing at least one AP test with a score of 3 or higher. The differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

Both DLI groups exhibited the best academic performance by having the largest percentage of students passing an AP test with a score of 3 or higher. Both DLI groups consistently outscored Mainstream and TBE/ESL by statistically significant differences in both cohorts (all $\Delta \geq 274.1\%$; all $p = .000$). However, the comparison between DLI groups is more complex. DLI-NSS outscored DLI-NES by 29.2%, ($p = .148$) in cohort 2005-2009; while DLI-NES outscored DLI-NSS by 4.7% ($p = .771$) in cohort 2006-2010. TBE/ESL placed third; outscoring Mainstream by statistically significant differences in both cohorts (all $\Delta \geq 113.9\%$; all $p \leq .002$).

Discussion

In the analysis of the percentage of students succeeding in Advanced Placement (AP) tests, the performance results surpassed the expectations of the theoretical framework. Both DLI groups outperformed their linguistic peers in both cohorts with higher percentages of students passing at least one AP test with a score of 3 or higher.

In the case of native English-speaking Hispanics DLI-NES outperformed Mainstream in both cohorts by significant differences. In the cohort 2005-2009, 68.9 % of the DLI-NES students passed an AP test compared to only 3.8% of Mainstream students passing (Δ = 1,710.5%; p = .000). In the 2006-2010 cohort, 84.6% of the DLI-NES students and 10.1% of Mainstream students passed an AP test with a score of 3 or more (Δ = 737.6%; p = .000). Successful AP test participation is a key indicator of college readiness highly valued by colleges nationwide (College Board, 2010a). Therefore these large differences between DLI-NES and Mainstream are highly significant. These findings show that the successful participation of native English speakers in college-level courses and assessments is not hindered by dual language instruction. On the contrary, DLI seems to increase students' success in college-level courses.

In the case of native Spanish-speaking Hispanics DLI-NSS outperformed TBE/ESL in both cohorts by significant differences. In the cohort 2005-2009, 88.9% of the DLI-NSS students passed an AP test compared to only 10.0% of TBE/ESL students passing (Δ = 789.0%; p = .000). In the 2006-2010 cohort, 80.8% of the DLI-NSS students and 21.6% of TBE/ESL students passed an AP test with a score of 3 or more (Δ = 274.1%; p = .000). These large differences between DLI-NSS and TBE/ESL are significant because a successful AP test participation is a key indicator of college readiness. These findings support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). These findings also refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison of native English-speaking Hispanics enrolled in Mainstream instruction and native Spanish-speaking Hispanics enrolled in the TBE/ESL the results challenge the literature reviewed. In both cohorts, TBE/ESL had a higher percentage of students than Mainstream passing an AP test with a score of three or more. In the 2005-2009 cohort 10.0% of the TBE/ESL students passed the test compared to only 3.8% of Mainstream students passing ($\Delta = 163.2\%$; $p \leq .002$). In the cohort of 2006-2010 TBE/ESL and Mainstream increased their percentages to 21.6% and 10.1% respectively ($\Delta = 113.9\%$; $p \leq .000$). It is important to mention that the percentage of students participating in AP tests significantly increased from one cohort to the next. This increase in participants impacted the percentage of successful participants in both groups. The results of this analysis challenge the literature reviewed that claims that native English speakers exhibit a higher level of academic success than their native Spanish-speaking peers. However, an explanation to this result is the extensive participation of Hispanics in Spanish language AP tests. According to College Board Hispanic students exhibit similar rates of successful participation in AP tests than the national average. However such successful participation is highly related with participation in the Spanish AP test.

In the comparison between Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) and Hispanic native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) not only matched but significantly surpassed their native English-speaking peers enrolled in Mainstream instruction in their successful participation in AP exams. DLI-NSS outperformed Mainstream in both cohorts by significant differences. In the 2005-2009 cohort, 88.9% of the DLI-NSS students took an AP test, while only 3.8% of the Mainstream students took an AP test (Δ = 2,239.5%; p = .000). In the 2006-2010 cohort, 80.8% of the DLI-NSS students and 10.1% of Mainstream students passed an AP test with a score of 3 or more. Even though the gap decreased in the 2006-2010 cohort, the difference remained statistically significant (Δ = 274.1%; p = .000). These large differences between DLI-NSS and Mainstream are significant because AP test participation a key indicator of college readiness (U.S. Dept. of Ed. 2010a). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. In the case of AP test successful participation, the comparison between Hispanic native English speakers enrolled in dual language instruction (DLI-NES) and

Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) support that conclusion. In the 2005-2009 cohort, DLI-NSS surpassed DLI-NES in the percentage of students passing at least one AP test with a score of 3 or more. DLI-NSS had an 88.9% passing rate while DLI-NES had 68.8% ($\Delta = 29.2\%$; $p \leq .148$). However, in the 2006-2010 cohort DLI-NES surpassed DLI-NSS with passing rates of 84.6% to 80.8% respectively ($\Delta = 4.7\%$; $p \leq .771$). These findings show that dual language instruction is effective in closing the academic gap between English language learners and native English speakers.

Participation in AP tests other than Spanish

According to the College Board (2010), Hispanic participation in AP tests is relatively similar to the national average. However, this participation is often centered on Spanish language AP tests. When Spanish language tests are not considered, the level of participation significantly decreases (College Board, 2010).

The four groups exhibited differences in the percentage of students taking at least one AP test other than Spanish. The differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

Both DLI groups exhibited the best academic performance by having the largest percentage of students taking at least one AP test other than Spanish. Both DLI groups consistently outscored Mainstream and TBE/ESL in both cohorts (all $\Delta \geq 58.0\%$; all $p \leq .171$). However, the comparison between DLI groups is more complex. DLI-NSS outscored DLI-NES in the 2005-2009 cohort by 18.4% ($p = .664$), while DLI-NES outscored DLI-NSS by 41.1% ($p = .034$) in the cohort of 2006-2010. The comparison between Mainstream and TBE/ESL is also complex. TBE/ESL outscored Mainstream by 21.0%, (p = .378) in the 2005-2009cohort, while Mainstream outscored TBE/ESL by 24.4% (p = .012) in the cohort of 2006-2010.

Discussion

In the analysis of the percentage of students participating in Advanced Placement (AP) tests other than Spanish, the performance results met the expectations of the theoretical framework. Both DLI groups outperformed their linguistic peers in both cohorts with higher percentages of students participating in AP tests other than the Spanish AP or the Spanish Literature AP.

In the comparison between Hispanic native English speakers DLI-NES outperformed Mainstream in both cohorts by significant differences. In the cohort 2005-2009, 37.5% of the DLI-NES students took an AP test other than Spanish while only 10.0% of Mainstream students did (Δ = 275.0%; p = .045). In the 2006-2010 cohort, 92.3% of the DLI-NES students and 51.5% of Mainstream students took an AP test other than Spanish (Δ = 79.2%; p = .000). These large differences between DLI-NES and Mainstream are highly significant. These findings show that the participation of native English speakers in college-level courses is not hindered by dual language instruction. On the contrary, DLI seems to increase students' participation in college-level courses.

In the comparison between Hispanic native Spanish speakers DLI-NSS outperformed TBE/ESL in both cohorts by significant differences. In the cohort 2005-2009, 44.4% of the DLI-NSS students passed an AP test while only 12.1% of TBE/ESL students did (Δ = 266.9%; p = .000). In the 2006-2010 cohort, 65.4% of DLI-NSS students and 41.8% of TBE/ESL students took an AP test other than Spanish (Δ = 58.0%;

$p = .022$). These large differences between DLI-NSS and TBE/ESL are significant because AP test participation is a key indicator of college readiness. These findings support the claim that DLI can increase the academic performance of linguistic minorities. These findings also refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English.

In the comparison of Hispanic native English speakers enrolled in Mainstream instruction and Hispanic native Spanish speakers enrolled in the TBE/ESL the results are mixed. In the 2005-2009 cohort, TBE/ESL had a higher percentage of students taking an AP test than Mainstream ($\Delta = 21.0\%$; $p \leq .378$) while Mainstream had a higher percentage of students participating in AP tests than TBE/ESL in the cohort of 2006-2010 ($\Delta \geq 24.4\%$; $p \leq .012$). It is important to mention that the percentage of students participating in AP tests other than Spanish significantly increased from one cohort to the next. Mainstream participation increased from 10.0% in the 2005-2009 cohort to 51.5% in the 2006-2010 cohort. TBE/ESL participation increased from 12.1% to 41.4%. The data analyzed does not provide an answer to this significant increase in AP participation. One explanation can be a change in school district policy, from TAKS accountability compliance to a college-readiness emphasis.

In the comparison between Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) and Hispanic native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction

(DLI-NSS) not only matched but significantly surpassed their native English-speaking peers enrolled in Mainstream instruction in their participation in AP tests other than Spanish. DLI-NSS outperformed Mainstream in both cohorts by significant differences. In the 2005-2009 cohort, 44.4% of the DLI-NSS students took an AP test, while only 10.0% of the Mainstream students took an AP test (Δ = 344.0%; p = .002). In the 2006-2010 cohort 65.4% of the DLI-NSS students and 51.5% of Mainstream students took an AP test other than Spanish (Δ = 27.0%; p = .171). These large differences between DLI-NSS and Mainstream are significant because AP test participation a key indicator of college readiness (U.S. Dept. of Ed. 2010a). The fact that Hispanic native Spanish speakers are surpassing Hispanic native English speakers in their participation in college-level tests refute the time-on-task, English-only hypothesis and support the claim that DLI which includes a significant amount of content instruction in Spanish can increase the academic performance and English academic language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. In the case of the percentage of participation in AP tests other than Spanish, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) supports that conclusion. In the 2005-2009 cohort, DLI-NSS surpassed DLI-NES in the percentage of students participating in AP tests other than Spanish. DLI-NSS had a 44.4% participation rate while DLI-NES had 37.5% (Δ = 18.4%; p $\leq$ .664). However, in the 2006-2010 cohort DLI-NES surpassed DLI-NSS with passing rates of 92.3% to 65.4% respectively (Δ = 41.1%; p $\leq$ .034).

Percentage of students succeeding in AP tests other than Spanish.

The four groups exhibited large differences in the percentage of students passing at least one AP test other than Spanish with a score of 3 or higher. The differences between groups were significant and consistent across cohorts; supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES exhibited the best academic performance by having the largest percentage of students succeeding in AP tests other than Spanish. DLI-NES surpassed all the other groups by large margins in both cohorts. The difference between DLI-NES and DLI-NSS was the same in both cohorts, with 100.9% (p = .412) in the 2005-2009 cohort and 100.9% (p = .412) in the 2006-2010 cohort. The difference between DLI-NES and Mainstream decreased from 670.0% (p = .126) to 165.5% (p = .264). The difference between DLI-NES and TBE/ESL increased from 477.5% (p = .143) to 579.4% (p = .133).

DLI-NSS exhibited the second best performance across cohorts, surpassing Mainstream and TBE/ESL by large differences. The difference between DLI-NSS and Mainstream changed from 283.3% (p = .199) in the 2005-2010 cohort to 32.2% (p = .674) in the cohort of 2006-2010. Between DLI-NSS and TBE/ESL, the difference changed from 187.5% (p = .252) to 238.2% (p = .221).

The comparison between Mainstream and TBE/ESL was more complex. TBE/ESL outscored Mainstream by 33.3% (p = .530) in the 2005-2009cohort, while Mainstream outscored TBE/ESL by 155.9% (p = .005) in the cohort of 2006-2010.

Analysis discussion.

In the analysis of the percentage of students succeeding in Advanced Placement (AP) tests other than Spanish, the performance results surpassed the expectations of the theoretical framework. Both DLI groups outperformed their linguistic peers in both cohorts with higher percentages of students passing at least one AP test other than Spanish AP or Spanish Literature AP with a score of 3 or higher.

In the comparison between Hispanic native English speakers DLI-NES outperformed Mainstream in both cohorts by significant differences. In the 2005-2009 cohort, 23.1 % of the DLI-NES students passed an AP test other than Spanish while only 3.0% of Mainstream students did ($\Delta = 670.0\%$; $p = .126$). In the 2006-2010 cohort, 23.1% of the DLI-NES students and 8.7% of Mainstream students passed an AP test other than Spanish with a score of 3 or more ($\Delta = 165.5\%$; $p = .264$). A successful AP test score is a key indicator of college readiness highly valued by colleges nationwide (College Board, 2010a). Therefore these differences between DLI-NES and Mainstream are significant. These findings show that the successful participation of native English speakers in college-level courses and assessments is not hindered by dual language instruction. On the contrary, DLI seems to increase students' success in college-level courses.

In the comparison between Hispanic native Spanish speakers DLI-NSS outperformed TBE/ESL in both cohorts by significant differences. In the cohort 2005-2009, 11.5% of the DLI-NSS students passed an AP test other than Spanish while only 4.0% of TBE/ESL students did ($\Delta = 187.5\%$; $p = .252$). In the 2006-2010 cohort, 11.5% of the DLI-NSS students and 3.4% of TBE/ESL students passed an AP test other than Spanish with a score of 3 or more ($\Delta = 238.2\%$; $p = .221$). These differences between DLI-NSS and TBE/ESL are significant because a successful AP test score is a key indicator of college readiness. These findings support the claim that DLI can increase the academic performance and the English academic language proficiency of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). These findings also refute the time-on-task, English-only instruction hypothesis that claims that the academic performance and English language development of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996). Here is important to mention that even though the participation of Spanish speaking students in AP test other than Spanish increased significantly from one cohort to the other, the successful participation did not increased. More students are taking the tests, but not more students are passing such tests.

In the comparison of native English speakers enrolled in Mainstream instruction and native Spanish speakers enrolled in the TBE/ESL the results are mixed. TBE/ESL surpassed Mainstream in the 2005-2009 cohort ($\Delta = 33.3\%$; $p \leq .530$) while Mainstream surpassed TBE/ESL in the 2006-2010 cohort ($\Delta = 155.9\%$; $p \leq .005$). Here is important to mention that even though the participation in AP tests other than Spanish increased significantly from one cohort to the other, the successful participation did not increase. More students are taking the tests, but not more students are passing such tests.

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) not only matched but significantly surpassed their native English-speaking peers enrolled in Mainstream instruction in their successful participation in AP exams other than Spanish.

DLI-NSS outperformed Mainstream in both cohorts by significant differences. In the 2005-2009 cohort, 11.5% of the DLI-NSS students took an AP test other than Spanish while only 3.0% of Mainstream students did (Δ = 283.3%; $p = .199$). In the 2006-2010 cohort 11.5% of the DLI-NSS students and 8.7% of Mainstream students passed an AP test other than Spanish with a score of 3 or more (Δ = 32.2%; $p = .674$). These differences between DLI-NSS and Mainstream are significant because AP test participation is a key indicator of college readiness (U.S. Dept. of Ed. 2010a). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. In the case of AP test successful participation, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. In both cohorts DLI-NES surpassed DLI-NSS in the percentage of students passing at least one AP test other than Spanish with a score of 3 or more (Δ = 100.9%; $p = .412$). These findings are important because they show that while dual language instruction is effective in closing the academic gap between English language learners and native English speakers enrolled in mainstream education, a new academic gap exists between native English speakers and native Spanish speakers when both groups are educated through dual language instruction.

Students' performance on standardized college-admission tests

Students' performance on standardized college-admission tests such as ACT is a key indicator of college readiness. Several indicators of college-admission test performance were analyzed including percentage of students taking a college-admission test, mean averages on college admission tests, and the percentage of students reaching the national benchmark in college-admission tests.

Percentage of students taking an ACT Test

Not all the participants in the study took an ACT test; even though it was offered and paid for by the school district. All the participants had the opportunity to take an ACT test during their junior and senior years and they could take the test both times free of charge. Many students took the test twice. Others took the test only once, and a large percentage of students never took an ACT test during their high school years.

The four groups exhibited large differences in the percentage of students that took an ACT test. These differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

Both DLI groups exhibited the best academic performance by having all students taking an ACT test 100% (p = 1.000). Both DLI groups outperformed the other two groups in both cohorts by statistically significant differences. The difference between the DLI groups and Mainstream fluctuated from 114.1% (p = .000) in the 2005-2010 cohort to 25.2% (p = .000) in the cohort of 2006-2010, while the difference between DLI groups and TBE/ESL fluctuated from 111.9% (p = .000) to 33.7% (p = .000).

The comparison between Mainstream and TBE/ESL was complex. TBE/ESL surpassed Mainstream by 1.1% (p = .912) on ACT test participation in the 2005-2009 cohort, while Mainstream placed third in the 2006-2010 cohort, surpassing TBE/ESL by 6.8% (p = .121).

Analysis discussion.

In the analysis of the percentage of students participating in ACT tests, the performance results surpassed the expectations of the theoretical framework. Both DLI groups showed a perfect participation rate (100%) in both cohorts, outperforming their linguistic peers.

In the comparison between Hispanic native English speakers DLI-NES outperformed Mainstream in both cohorts by significant differences. In the cohort 2005-2009 while 100% of the DLI-NES participants took a ACT test, only 46.7% of the Mainstream students did (Δ = 114.1%; p = .000). Even though the gap decreased in the 2006-2010 cohort, the difference remained statistically significant (Δ = 25.2%; p = .000). Because participation in college admission tests is a key indicator of college readiness (U.S. Dept. of Ed. 2010a), these differences between DLI-NES and Mainstream are significant. These findings show that the participation of native English speakers in college admission tests such as ACT is not hindered by dual language instruction. On the contrary, DLI seems to increase students' participation in college admission tests.

In the comparison between Hispanic native Spanish speakers DLI-NSS outperformed TBE/ESL in both cohorts by significant differences. In the 2005-2009 cohort while 100% of the DLI-NSS participants took an AP test, only 47.2% of the TBE/ESL students took an AP test (Δ = 111.9%; p = .000). Even though the difference decreased for the 2006-2010 cohort, the difference remained statistically significant (Δ = 33.7%; p = .000). These findings support the claim that DLI can increase the academic performance and college readiness of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). These findings also refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between native English speakers enrolled in Mainstream instruction and native Spanish speakers enrolled in the TBE/ESL program the results are mixed. In the 2005-2009 cohort, TBE/ESL had a higher percentage of students taking ACT tests than Mainstream ($\Delta = 1.1\%$; $p \leq .912$) while Mainstream had a higher percentage of students participating in ACT tests than TBE/ESL in the cohort of 2006-2010 ($\Delta \geq 6.8\%$; $p \leq .121$). It is important to mention that the percentage of students participating in ACT tests significantly increased from one cohort to the next. Mainstream participation increased from 46.7% in the 2005-2009 cohort to 79.9% in the 2006-2010 cohort. TBE/ESL participation increased from 47.2% to 74.8%. The data analyzed does not provide an answer to this significant increase in AP participation. One explanation can be a change in school district policy, from TAKS accountability compliance to a college-readiness emphasis.

In the comparison between Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) and Hispanic native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) not only matched but significantly surpassed their native English-speaking peers enrolled in Mainstream instruction in their participation in ACT exams. DLI-NSS outperformed Mainstream in both cohorts by significant differences. In the cohort 2005-2009, 100% of the DLI-NES students took an ACT test, while only 46.7% of the Mainstream students took an AP test (Δ = 114.1%; p = .000). Even though Mainstream participation significantly increased in the 2006-2010 cohort to 79.9%, the difference remained significant (Δ = 25.2%; p = .000). These differences between DLI-NES and Mainstream are significant because ACT test participation is a key indicator of college readiness (U.S. Dept. of Ed. 2010a). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish can increase the academic performance and English academic language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. In the case of ACT test participation the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) support that conclusion. DLI-NES tied with DLI-NSS in both cohorts with a perfect rate of participation of 100% (Δ = 0.0%; $p \leq$ 1.000). These findings show that dual language instruction is effective in closing the academic gap between English language learners and native English speakers.

Students' performance on ACT tests.

The four groups exhibited large differences in their students' performance on ACT. The differences were significant and consistent across cohorts; supporting the claim that program type is a contributing factor to academic achievement for students.

When interpreting the outcomes of this analysis it is important to consider that the analysis focused on those students participating in ACT tests. All students (100%) from both DLI groups were included but only 46.7% of the Mainstream students and 47.2% of the TBE/ESL students were analyzed. The remaining students were not included in the analysis because they never took an ACT test.

Since less than half the Mainstream and TBE/ESL students took the test, one might conclude that fewer of the students in those groups planned to enter college. At the same time, one could also predict higher scores for these groups since a more selective sample from each group took the test. However, as the results show, students in the DLI programs showed higher rates of success despite the selectivity of students in the other two groups.

Students' average scores on ACT tests per content area

The four groups showed differences in ACT average scores in all five ACT areas. The differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES was the group that had the highest score averages on ACT tests in all test areas and across cohorts. DLI-NES outscored mainstream in both cohorts, in all five ACT areas. The differences increased in percentage or significance from one cohort to the next. The differences increased in reading from 23.7% (p = .030) in the 2005-2009 cohort to 32.0% (p = .000) in the 2006-2010 cohort. The differences also increased in math from 6.8% (p = .182) to 17.5% (p = .064), in science from 5.1% (p = .430) to 24.7% (p = .000), in English from 14.5% (p = .051) to 26.1% (p = .000). and in the composite score from 13.3% (p = .019) to 25.7% (p = .000).

DLI-NES outscored TBE/ESL in both cohorts, in all five ACT areas. The differences increased in percentage or significance from one cohort to the next. The differences increased in reading from 36.6% (p = .004) to 47.7% (p = .000), in math from 9.3% (p = .078) to 23.6% (p = .024), in science from11.3% (p = .070) to 32.7% (p = .000), in English from 21.5% (p = .010) to 36.2% (p = .000), and in the composite score from 20.2% (p = .000) to 36.6% (p = .000).

DLI-NES outscored DLI-NSS in both cohorts and in all content areas, except for math and science in cohort 2005-2009 where DLI-NSS outscored DLI-NES. The differences fluctuated in percentage or significance from one cohort to the next. DLI-NES outscored DLI-NSS in both cohorts in reading from 12.4% (p = .228) to 22.5% (p = .005), in English from 5.9% (p = .437) to 19.4% (p = .004), and in the composite score, from 4.8% (p = .427) to 18.3% (p = .005). In DLI-NSS outperformed DLI-NES in the 2005-2009 cohort in math by 1.1% (p = .838) and in science, by 1.1% (p = .852). However, DLI-NES outperformed DLI-NSS in the following cohort in math by 11.4% (p = .209) and in science by 16.4% (p = .012).

DLI-NSS was the group that exhibited the second highest average score on ACT tests. DLI-NSS outscored mainstream in both cohorts and in all test areas. The differences were not statistically significant and fluctuated in percentage or significance from one cohort to the next. The differences fluctuated in reading from 10.1% (p = .104) in the 2005-2009 cohort to 7.7% (p = .158) in the cohort of 2006-2010, in math from 8.0% (p = .048) to 5.5% (p = .064), in science from 6.2% (p = .205) to 7.1% (p = .111), in English, from 8.1% (p = .104) to 5.7% (p = .187), and in the composite score from 8.1% (p = .077) to 6.3% (p = .139).

DLI-NSS outscored TBE/ESL in both cohorts and in all content areas. The differences were always statistically significant and increased in percentage or significance from one cohort to the next. Differences fluctuated in reading from 21.6% ($p = .002$) in the 2005-2010 cohort to 20.5% ($p = .001$) in the cohort of 2006-2010, in math from 10.5% ($p = .011$) to 10.9% ($p = .001$), in science from 12.5% ($p = .010$) to 14.0% ($p = .003$), in English from 14.7% ($p = .008$) to 14.1% ($p = .002$), and in the composite score from 14.7% ($p = .001$) 15.5% ($p = .001$).

Mainstream outscored TBE/ESL in both cohorts in all test areas and the differences were statistically significant. The differences remained similar or increased marginally in percentage or significance from one cohort to the next. Differences increased in reading from10.5% ($p = .002$) in the 2005-2009 cohort to 11.9% ($p = .000$) in the cohort of 2006-2010, in math from 2.3% ($p = 343$) to 5.2% ($p = .004$), in science from 6.0% ($p = .021$) to 6.4% ($p = .002$), in English from 6.1% ($p = .017$) to 8.0% ($p = .000$), and in the composite score from 6.1% ($p = .009$) to 8.7% ($p = .000$).

Discussion

In the analysis of ACT average scores, the performance results surpassed the expectations of the theoretical framework. As expected, both DLI groups had better academic performance than their linguistic peers.

In the comparison between Hispanic native English speakers DLI-NES outperformed Mainstream in both cohorts and in all test areas including those highly correlated with English language proficiency. DLI-NES surpassed Mainstream in reading ($\Delta \geq 23.7\%$; $p \leq .030$), in math ($\Delta \geq 6.8\%$; $p \leq .182$), in science ($\Delta \geq 5.1\%$; $p \leq .430$), in English ($\Delta \geq 14.5\%$; $p \leq .051$), and in the composite score ($\Delta \geq 13.3\%$; $p \leq .019$). In the case of science DLI-NES outscored Mainstream by statistically significant differences of up to 5.4 ACT points ($\Delta = 24.7\%$; $p = .000$). These findings are significant because they show that the academic performance and English academic language proficiency development of native English speakers is not hindered by dual language instruction. On the contrary, DLI seems to increase the academic performance and English academic language proficiency development of native English speakers.

In the comparison between Hispanic native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts by statistically significant differences. DLI-NSS outperformed TBE/ESL in all test areas, including those highly correlated with English language. DLI-NSS surpassed TBE/ESL in reading ($\Delta \geq 20.5\%$; $p \leq .001$), in math ($\Delta \geq 10.5\%$; $p \leq .011$), in science ($\Delta \geq 12.5\%$; $p \leq .010$), in English ($\Delta \geq 14.1\%$; $p \leq .008$), and in the composite score ($\Delta \geq 14.7\%$; $p \leq .001$). In the case of science DLI-NSS outscored TBE/ESL by a significant difference of up to 2.4 ACT points ($\Delta = 14.0\%$; $p = .003$). These findings are significant because they support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). This also refutes the English-only, time-on-task hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between Mainstream and TBE/ESL, Mainstream outperformed TBE/ESL in both cohorts. Mainstream outperformed TBE/ESL in all content areas, including those highly correlated with English language. Mainstream surpassed TBE/ESL in reading ($\Delta \geq 10.5\%$; $p \leq .002$), in math ($\Delta \geq 2.3\%$; $p \leq .343$), in science ($\Delta \geq 6.0\%$; p

$\leq$.021), in English ($\Delta \geq 6.1\%$; $p \leq .008$), and in the composite score ($\Delta \geq 6.1\%$; $p \leq .009$). In the case of science Mainstream outscored TBE/ESL by a difference of up to 1.1 points ($\Delta = 6.4\%$; $p = .002$). These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics show lower academic performance in standardized assessments than their English speaking peers. (Aud et al., 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) and Hispanic native English speakers enrolled in mainstream instruction (Mainstream), the results met the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) outperformed their native English-speaking peers enrolled in Mainstream instruction. DLI-NSS surpassed Mainstream in all content areas, including those highly correlated with English language proficiency. DLI-NSS surpassed Mainstream in reading ($\Delta \geq 7.7\%$; $p \leq .158$), in math ($\Delta \geq 5.5\%$; $p \leq .064$), in science ($\Delta \geq 6.2\%$; $p \leq .205$), in English ($\Delta \geq 5.7\%$; $p \leq .187$), and in the composite score ($\Delta \geq 6.3\%$; $p \leq .139$). In the case of science, DLI-NSS outscored Mainstream by up to 1.3 points ($\Delta = 7.1\%$; $p = .111$). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. DLI-NES outscored DLI-NSS in both cohorts and in most test areas. The differences were significant in content areas highly related with English language proficiency. DLI-NES surpassed DLI-NSS in both cohorts in reading ($\Delta \geq 12.4\%$; $p \leq .228$), in English ($\Delta \geq 5.9\%$; $p \leq .437$), and in the composite score ($\Delta \geq 4.8\%$; $p \leq .427$). In the case of math DLI-NSS surpassed DLI-NES in the 2005-2009 cohort ($\Delta = 1.1\%$; $p = .838$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort ($\Delta = 5.2\%$; $p = .004$). In the case of science DLI-NSS surpassed DLI-NES in the 2005-2009 cohort ($\Delta = 1.1\%$; $p = .852$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort ($\Delta = 6.4\%$; $p = .002$). These findings are important because they show that while dual language instruction is effective in closing the academic gap between English language learners and native English speakers enrolled in mainstream education; a new academic gap is emerging between native English speakers and native Spanish speakers when both groups are educated through dual language instruction. Here again is important to consider that DLI-NSS had a higher percentage of students labeled as economically disadvantaged than DLI-NES. This condition can partially explain the academic gap between these two groups.

Percentage of students performing successfully on ACT tests.

ACT benchmarks are key indicators of college-readiness because they reflect the level of preparation students need to be successful in college. Therefore, the percentage of students meeting ACT benchmarks is a clear indicator of the effectiveness of an instructional program. The four groups exhibited differences in their students' successful performance on ACT tests, in all five ACT areas. The differences were significant and consistent across cohorts; supporting the claim that program type is a contributing factor to academic achievement for students.

DLI-NES was the group that exhibited the best performance on ACT tests, in most test areas, and across cohorts. DLI-NES outscored Mainstream in both cohorts, in all five ACT areas.

The differences fluctuated in percentage and significance from one cohort to the next. The differences fluctuated in reading from 75.2% (p = .177) in the 2005-2009 cohort to 201.6% (p = .001)in the cohort of 2006-2010, in math from 47.9% (p = .496) to 75.7% (p = .199), in science from 21.4% (p = .808) to 244.8% (p = .043), in English from 8.4% (p = .809) to 74.1% (p = .005), and in the composite score from 92.1% (p = .133) to 179.6% (p = .002).

DLI-NES outscored TBE/ESL in both cohorts in all five ACT areas. The differences increased in percentage or significance from one cohort to the next. The differences increased in reading from 135.5% (p = .073) in the 2005-2009 cohort to 412.7% (p = .000) in the cohort of 2006-2010, in math from 119.3% (p = .251) to 192.4% (p = .059), in science from 108.3% (p = .467) to 1,115.8% (p = .012), in English from 43.6% (p = .334) to 139.0% (p = .000), and in the composite score from 121.2% (p = .087) to 399.4% (p = .000).

DLI-NES outscored DLI-NSS in all content areas in cohort 2006-2009, but only in reading and in the composite score in cohort 2005-2009. The differences fluctuated in percentage or significance from one cohort to the next. DLI-NES outscored DLI-NSS in both cohorts in reading from 18.4% (p = .676) in the 2005-2010 cohort to 122.3% (p = .011) in the cohort of 2006-2010, and in the composite score from 18.4% (p = .676) to

81.8% (*p* = .036). DLI-NSS surpassed DLI-NES in cohort 2005-2009 in math by 33.2% (*p* = .570), in science by 18.4% (*p* = .835) and in English, by 18.5% (*p* = .619). However, DLI-NES surpassed DLI-NSS in cohort 2006-2010 in math by 100% (*p* = .181), in science by 140.6% (*p* = .117), and in English by 29.4% (*p* = .183).

DLI-NSS was the group that exhibited the second highest average score on ACT tests. DLI-NSS outscored mainstream in both cohorts and in all ACT areas, except for math in the 2006-2010 cohort, where DLI-NSS was outscored by Mainstream. Overall, the differences were not statistically significant and fluctuated in percentage or significance from one cohort to the next. The differences fluctuated in reading from 48.0% (*p* = .245) in the cohort 2005-2009 to 35.7% (*p* = .366) in the cohort of 2006-2010, in science from 43.7% (*p* = .548) to 43.3% (*p* = .478), in English from 28.5% (*p* = .292) to 34.6% (*p* = .104), and in the composite score from 62.3% (*p* = .169) to 53.8% (*p* = .161). In the case of math, DLI-NSS surpassed Mainstream in cohort 2005-2009 by 97.0% (*p* = .103). However, Mainstream surpassed DLI-NSS in cohort 2006-2010 by 13.9% (*p* = .718).

DLI-NSS outscored TBE/ESL in both cohorts, in all content areas. The differences were always statistically significant and fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading, from 98.9% (p = .072) to 130.7% (*p* = .055); in math, from 192.1% (*p* = .029) to 46.2% (*p* = .415); in science, from 146.7% (*p* = .230) to 405.3% (*p* = .063); in English, from 70.2% (*p* = .049) to 84.7% (*p* = .005); and in the composite score, from 86.9% (*p* = .093) to 174.7% (*p* = .013).

Mainstream outscored TBE/ESL in both cohorts, in all ACT areas, and the differences were statistically significant. The differences remained similar or increased marginally in percentage or significance from one cohort to the next. Differences increased in reading, from 34.4% (p = .181) to 70.0% (p = .004); in math, from 48.2% (p = .174) to 66.5% (p = .415); in science, from 71.7% (p = .179) to 252.6% (p = .000); in English, from 32.5% (p = .075) to 37.3% (p = .003); and in the composite score, from 15.2% (p = .524) to 78.6% (p = .001).

Analysis discussion.

In the analysis of the percentage of students performing successfully on ACT tests, the performance results surpassed the expectations of the theoretical framework. As expected, both DLI groups showed better academic performance than their linguistic peers.

DLI-NES outperformed Mainstream in both cohorts and in all test areas including those highly correlated with English language proficiency. DLI-NES surpassed Mainstream in reading ($\Delta \geq$ 75.2%; $p \leq .177$), in math ($\Delta \geq$ 47.9%; $p \leq .496$), in science ($\Delta \geq$ 21.4%; $p \leq .808$), in English ($\Delta \geq$ 8.4%; $p \leq .809$), and in the composite score ($\Delta \geq$ 92.1%; $p \leq .133$). In the case of science DLI-NES had up to 46.2% of its students meeting the ACT benchmark while Mainstream had only up to 13.4% (Δ = 1,115.8%; p = .012). These findings are highly significant because they show that the academic performance and English academic language proficiency development of native English speakers is not hindered by dual language instruction. On the contrary, DLI seems to increase the academic performance and English academic language proficiency development of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ESL in both cohorts by statistically significant differences. DLI-NSS outperformed TBE/ESL in all test areas, including those highly correlated with English language. DLI-NSS surpassed TBE/ESL in reading ($\Delta \geq 98.9\%$; $p \leq .072$), in math ($\Delta \geq 46.2\%$; $p \leq .415$), in science ($\Delta \geq 146.7\%$; $p \leq .230$), in English ($\Delta \geq 70.2\%$; $p \leq .049$), and in the composite score ($\Delta \geq 86.9\%$; $p \leq .093$). In the case of science DLI-NSS had up to 19.2% of its students meeting the ACT benchmark while TBE/ESL had only up to 6.0% ($\Delta = 405.3\%$; $p = .063$). These findings are significant because they support the claim that DLI can increase the academic performance of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). This also refutes the time-on-task hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between Mainstream and TBE/ESL, Mainstream outperformed TBE/ESL in both cohorts. Mainstream outperformed TBE/ESL in all content areas, including those highly correlated with English language. Mainstream surpassed TBE/ESL in reading ($\Delta \geq 34.4\%$; $p \leq .181$), in math ($\Delta \geq 48.2\%$; $p \leq .174$), in science ($\Delta \geq 71.7\%$; $p \leq .179$), in English ($\Delta \geq 32.5\%$; $p \leq .075$), and in the composite score ($\Delta \geq 15.2\%$; $p \leq .524$). In the case of science Mainstream had up to 13.4% of its students meeting the ACT benchmark while TBE/ESL had only up to 6.0% ($\Delta = 146.7\%$; $p = .230$). These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics show lower academic performance in standardized assessments than their

English speaking peers. (NCES, 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results met the expectations of DLI theorists and practitioners. Native Spanish speakers enrolled in dual language instruction (DLI-NSS) outperformed their native English-speaking peers enrolled in Mainstream instruction. DLI-NSS surpassed Mainstream in all content areas, including those highly correlated with English language proficiency. DLI-NSS surpassed Mainstream in reading ($\Delta \geq 35.7\%$; $p \leq .366$), in science ($\Delta \geq 43.3\%$; $p \leq .478$), in English ($\Delta \geq 28.5\%$; $p \leq .292$), and in the composite score ($\Delta \geq 53.8\%$; $p \leq .161$). In the case of math DLI-NSS outperformed Mainstream in the 2005-2009 cohort ($\Delta = 97.0\%$; $p = .103$) while Mainstream outscored DLI-NSS in the 2006-2010 cohort ($\Delta = 13.9\%$; $p = .718$). In the case of science, DLI-NSS outscored Mainstream by up to 5.8 points ($\Delta = 43.3\%$; $p = .478$). These findings refute the time-on-task, English-only hypothesis and support the claim that DLI, which includes a significant amount of content instruction in Spanish, can increase the academic performance and English language proficiency of Hispanics.

The previous results support the claim that dual language instruction can effectively close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) challenges that conclusion. DLI-NES outscored DLI-NSS in both cohorts and in most test areas. The differences were significant in content areas highly related with English language proficiency. DLI-NES surpassed DLI-NSS in both cohorts in reading ($\Delta \geq$ 18.4%; $p \leq .676$), and in the composite score ($\Delta \geq$ 18.4%; $p \leq .676$). In math DLI-NSS surpassed DLI-NES in the 2005-2009 cohort (Δ = 33.2%; $p = .570$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort (Δ = 100%; $p = .181$). In science DLI-NSS surpassed DLI-NES in the 2005-2009 cohort (Δ = 18.4%; $p = .835$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort (Δ = 140.6%; $p = .117$). In English DLI-NSS surpassed DLI-NES in the 2005-2009 cohort (Δ = 18.5%; $p = .619$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort (Δ = 29.4%; $p = .783$). These findings are important because they show that while dual language instruction is effective in closing the academic gap between English language learners and native English speakers enrolled in mainstream education; a new academic gap is emerging between native English speakers and native Spanish speakers when both groups are educated through dual language instruction. Here again is important to consider that DLI-NSS had a higher percentage of students labeled as economically disadvantaged than DLI-NES. This condition can partially explain the academic gap between these two groups.

Summary of performance on college-readiness indicators

The most reliable predictors of college readiness are those designed with a college-level challenge in mind. College-level courses and standardized college-admission tests are good examples of predictors intended to show college readiness.

Students' performance on Advanced Placement (AP) tests

The overall participation and performance on AP courses and assessments is a highly reliable indicator of how well prepared students are for college. The four groups exhibited large differences in all analyses based on indicators of college readiness. In most cases, the differences were significant and consistent across cohorts, supporting the claim that program type is a contributing factor to academic achievement for students.

In participation in AP tests, both DLI groups exhibited the best performance by attaining a perfect participation rate of 100% in both cohorts ($p = 1.000$). All DLI participants took at least one AP tests during their secondary education. In both cohorts, the DLI groups outperformed the non-DLI groups by statistically significant differences: Mainstream ($\Delta \geq 89.4\%$; $p = .000$) and TBE/ESL ($\Delta \geq 105.8\%$; $p = .000$). The comparison between Mainstream and TBE/ESL is more complex. TBE/ESL placed third in the 2005-2009 cohort ($\Delta = 25.6\%$; $p = .260$); while Mainstream placed third in the cohort of 2006-2010 ($\Delta = 8.6\%$; $p = .298$). In both cases, the differences were not statistically significant.

In the percentage of students succeeding in AP tests, both DLI groups exhibited the best academic performance in both cohorts by having the largest percentage of students obtaining a grade of 3 or more in at least one AP test. In both cohorts, the DLI groups outperformed the non-DLI groups by statistically significant differences: Mainstream, ($\Delta \geq 700.0\%$; $p = .000$) and TBE/ESL ($\Delta \geq 274.1\%$; $p = .000$). The comparison between DLI groups is more complex. DLI-NSS outscored DLI-NES in the 2005-2009 cohort ($\Delta = 29.2\%$; $p = .148$) while DLI-NES outscored DLI-NSS in the cohort of 2006-2010 ($\Delta = 4.7\%$; $p = .771$). TBE/ESL outscored Mainstream consistently in both cohorts and by significant differences ($\Delta \geq 113.9\%$; $p \leq .002$).

In the percentage of students participating in AP tests other than Spanish, both DLI groups showed the highest participation, by statistically significant differences in both cohorts: with Mainstream, ($\Delta \geq 700.0\%$; $p = .000$) and with TBE/ESL ($\Delta \geq 274.1\%$;

p = .000). The comparison between DLI groups is more complex. DLI-NSS had a higher percentage of students participating in AP tests other than Spanish than DLI-NES in the 2005-2009 cohort (Δ = 18.4%; *p* = .664), while DLI-NES had a higher participation than DLI-NSS in the cohort of 2006-2010 (Δ = 41.1%; *p* = .034). The comparison between Mainstream and TBE/ESL is also complex. TBE/ESL had a higher participation than Mainstream in the 2005-2009 cohort (Δ = 21.0%; *p* = .378); while Mainstream had a higher participation than TBE/ESL in the 2006-2010 cohort (Δ = 24.4%; *p* = .012).

In the percentage of students succeeding in AP tests other than Spanish, DLI-NES exhibited the best academic performance in both cohorts, surpassing DLI-NSS (Δ = 100.9%; *p* = .412), Mainstream ($\Delta \geq$ 165.5%; $p \leq$ .264), and TBE/ESL ($\Delta \geq$ 477.5%; $p \leq$ .143). DLI-NSS exhibited the second best academic performance in both cohorts, surpassing Mainstream ($\Delta \geq$ 32.2%; $p \leq$ .674), and TBE/ESL ($\Delta \geq$ 187.5%; $p \leq$ .252).

The comparison between Mainstream and TBE/ESL is more complex. TBE/ESL outscored Mainstream in the 2005-2009 cohort (Δ = 33.3%; *p* = .530), while Mainstream outscored TBE/ESL in the 2006-2010 cohort (Δ = 155.9%; *p* = .005).

Students' performance on standardized college-admission tests

Students' performance on standardized college-admission tests such as ACT is a key indicator of college readiness. The four groups showed large differences in all analyses based on indicators of college readiness. In all cases, the differences were significant and consistent across cohorts; supporting the claim that program type is a contributing factor to academic achievement for students.

In the percentage of students taking at least one ACT test during high school, all students in both DLI groups took at least one ACT test, attaining a perfect participation rate (100%) in both cohorts. The DLI groups outperformed the other two groups in both cohorts and by statistically significant differences: Mainstream ($\Delta \geq 25.2\%$; $p = .000$) and TBE/ESL ($\Delta \geq 33.7\%$; $p = .000$). The comparison between Mainstream and TBE/ESL is more complex. A higher percentage of TBE/ESL students took at least one ACT test than Mainstream in the 2005-2009 cohort ($\Delta = 1.1\%$; $p = .912$), while Mainstream had a higher percentage of students taking an ACT test than TBE/ESL in the cohort of 2006-2010 ($\Delta = 6.8\%$; $p = .121$). In both cases, the differences were not identified as statistically significant.

In ACT average scores, both DLI groups had the best score averages, outperforming the other two groups by statistically significant differences in all test areas and across cohorts.

DLI-NES was the group that had the highest ACT score averages in most test areas, in both cohorts. DLI-NES outscored mainstream in both cohorts, in all test areas. In most cases, the differences were statistically significant, and increased in percentage or significance from one cohort to the next. Differences increased in reading from 23.7% ($p = .030$) in the 2005-2010 cohort to 32.0% ($p = .000$) in the cohort of 2006-2010, in math from 6.8% ($p = .182$) to 17.5% ($p = .064$), in science from 5.1% ($p = .430$) to 24.7% ($p = .000$), in English from 14.5% ($p = .051$) to 26.1% ($p = .000$), and in the composite score from 13.3% ($p = .019$) to 25.7% ($p = .000$).

DLI-NES outscored TBE/ESL in both cohorts, in all test areas. The differences were always statistically significant and increased in percentage or significance from one cohort to the next. Differences increased in reading from 36.6% ($p = .004$) in the 2005-2009 cohort to 47.7% ($p = .000$) in the cohort of 2006-2010, in math from 9.3% ($p =$

.078) to 23.6% (p = .024), in science from 11.3% (p = .070) to 32.7% (p = .000), in English from 21.5% (p = .010) to 36.2% (p = .000), and in the composite score from 20.2% (p = .000) to 36.6% (p = .000).

The comparison between DLI-NES and DLI-NSS is much more complex. DLI-NES outscored DLI-NSS in both cohorts but not in all test areas. DLI-NES outscored DLI-NSS in both cohorts in reading ($\Delta \geq 2.5\%$; $p \leq .228$), in English ($\Delta \geq 19.4\%$; $p \leq .437$), and in the composite score ($\Delta \geq 18.3\%$; $p \leq .427$). In the other two test areas, the results fluctuated between cohorts. In the 2005-2009 cohort DLI-NSS outscored DLI-NES in math ($\Delta = 1.1\%$; $p = .838$) and in science ($\Delta = 1.1\%$; $p = .852$). In the 2006-2010cohort DLI-NES outscored DLI-NSS in math ($\Delta = 11.4\%$; $p = .209$) and science ($\Delta = 16.4\%$; $p = .012$).

Overall, DLI-NSS was the group that showed the second performance in score averages in all test areas, for both cohorts. DLI-NSS outscored mainstream in both cohorts, in all content areas. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 10.1% (p = .104) in the 2005-2009 cohort to 7.7% (p = .158) in the 2006-2010 cohort, in math from 8.0% (p = .048) to 5.5% (p = .064), in science from 6.2% (p = .205) to 7.1% (p = .111), in English from 8.1% (p = .104) to 5.7% (p = .187), and in the composite score from 8.1% (p = .077) to 6.3% (p = .139).

DLI-NSS outscored TBE/ESL in both cohorts, in all content areas. The differences were statistically significant and fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 21.6% (p = .002) to 20.5% (p = .001), in math from 10.5% (p = .011) to 10.9% (p = .001), in science from 12.5% (p

= .010) to 14.0% (*p* = .003), in English from 14.7% (*p* = .008) to 14.1% (*p* = .002), and in the composite score, from 14.7% (*p* = .001) to 15.5% (*p* = .001).

Mainstream outscored TBE/ESL in both cohorts, in all content areas, and the fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 11.9% (*p* = .000) to 10.5% (*p* = .002), in math from 5.2% (*p* = .004) to 2.3% (*p* = 343), in science from 6.4% (*p* = .002) to 6.0% (*p* = .021), in English from 8.0% (*p* = .000) to 6.1% (*p* = .017), and in the composite score from 8.7% (*p* = .000) to 6.1% (*p* = .009)

In the percentage of students meeting ACT benchmarks, both DLI groups exhibited the best academic performance, outperforming the other two groups by statistically significant differences in all test areas and across cohorts. DLI-NES exhibited the highest percentage of students meeting ACT benchmarks in most test areas in both cohorts.

DLI-NES outscored mainstream in both cohorts, in all test areas. In most cases, the differences fluctuated in percentage and significance from one cohort to the next. Differences fluctuated in reading from 75.2% (*p* = .177) in the 2005-2009 cohort to 201.6% (*p* = .001) in the cohort of 2006-2010, in math from 47.9% (*p* = .496) to 75.7% (*p* = .199), in science from 21.4% (*p* = .808) to 244.8% (*p* = .043), in English from 8.4% (*p* = .809) to 74.1% (*p* = .005), and in the composite score from 92.1% (*p* = .133) to 179.6% (*p* = .002).

DLI-NES outscored TBE/ESL in both cohorts, in all test areas. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 135.5% (*p* = .073) in the 2005-2009 cohort to 412.7% (p =

.000) in the 2006-2010 cohort, in math from 119.3% (p = .251) to 192.4% (p = .059), in science from 108.3% (p = .467) to 1,115.8% (p = .012), in English from 43.6% (p = .334) to 139.0% (p = .000), and in the composite score from 121.2% (p = .087) to 399.4% (p = .000).

The comparison between DLI-NES and DLI-NSS is much more complex. DLI-NES outscored DLI-NSS in both cohorts but not in all test areas. DLI-NES outscored DLI-NSS in both cohorts in reading ($\Delta \geq$ 18.4%; $p \leq$ .676) and in the composite score ($\Delta \geq$ 18.4%; $p \leq$ .676). In the other three test areas the results fluctuated between cohorts. In the 2005-2009 cohort DLI-NSS outscored DLI-NES in math (Δ = 33.2%; p = .570), in science (Δ = 18.4%; p = .835), and in English (Δ = 18.5%; p = .619). In the 2006-2010 cohort DLI-NES outscored DLI-NSS in math (Δ = 100%; p = .181), in science (Δ = 140.6%; p = .117), and in English (Δ = 29.4%; p = .183).

Overall, DLI-NSS was the group that exhibited the second highest score averages in all test areas, for both cohorts. DLI-NSS outscored mainstream in both cohorts and in all content areas except math in the 2006-2010cohort, where Mainstream surpassed DLI-NSS. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 48.0% (p = .245) in the 2005-2009 cohort to 35.7% (p = .366) in the 2006-2010 cohort, in science from 43.7% (p = .548) to 43.3% (p = .478), in English from 28.5% (p = .292) to 34.6% (p = .104), and in the composite score from 62.3% (p = .169) to 53.8% (p = .161). In the case of math, DLI-NSS outscored Mainstream in the 2005-2009 cohort (Δ = 97.5%; p = .103), while Mainstream outscored DLI-NSS in the 2006-2010 cohort (Δ = 13.9%; p = .718).

DLI-NSS outscored TBE/ESL in all content areas in both cohorts. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 98.9% (p = .072) in the 2005-2009 cohort to 130.7% (p = .055) in the 2006-2010 cohort, in math from 192.1% (p = .029) to 46.2% (p = .415), in science from 146.7% (p = .230) to 405.3% (p = .063), in English from 70.2% (p = .049) to 84.7% (p = .005), and in the composite score from 86.9% (p = .093) to 174.7% (p = .013).

Mainstream outscored TBE/ESL in all content areas in both cohorts. The differences fluctuated in percentage or significance from one cohort to the next. Differences fluctuated in reading from 34.4% (p = .181) in the 2005-2009 cohort to 70.0% (p = .004) in the 2006-2010 cohort, in math from 48.2% (p = .174) to 66.5% (p = .415), in science from 71.7% (p = .179) to 252.6% (p = .000), in English from 32.5% (p = .075) to 37.3% (p = .003), and in the composite score from 15.2% (p = .524) to 78.6% (p = .001).

Overall, DLI-NES exhibited the best results in all measures of academic achievement related to college-readiness. Of the 30 measures of college-readiness (15 indicators * two cohorts), DLI-NES exhibited the best academic performance by placing first in 23 measures and placing second in the other seven. DLI-NSS had the second best performance by placing first in 11 measures, placing second in 18, and placing third in one measure of college readiness. Mainstream placed third in college-readiness. Of the 30 measures of performance Mainstream placed second once, placed third 23 times, and placed last six times. TBE/ESL exhibited the worst results, placing third six times and placing last 24 times.

In the overall analysis of performance on indicators of college-readiness, the performance results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed better performance than their linguistic peers in all fifteen measures of academic performance based on college-level courses such as AP and in college admission tests such as ACT. The DLI groups outperformed Mainstream and TBE/ESL in the percentage of students participating in AP tests, in the percentage of students succeeding in AP tests, in the percentage of students participating in AP tests other than Spanish, in the percentage of students succeeding in AP tests other than Spanish, in the percentage of students participating on ACT tests, in ACT average scores in five test indicators, and in the percentage of students performing successfully on ACT tests by meeting the benchmarks in the five different test indicators.

In the case of native English speakers, DLI-NES surpassed Mainstream in all 15 indicators of college readiness in both cohorts. In the percentage of students participating in AP tests, DLI-NES surpassed Mainstream in both cohorts by significant differences ($\Delta \geq 89.4\%$; $p \leq .000$). In the percentage of students succeeding in AP tests, DLI-NES outperformed Mainstream in both cohorts by significant differences ($\Delta \geq 737.6\%$; $p \leq .000$). In the percentage of students participating in AP tests other than Spanish, DLI-NES surpassed Mainstream in both cohorts by statistically significant differences ($\Delta \geq 79.2\%$; $p \leq .000$). In the percentage of students succeeding in AP tests other than Spanish, DLI-NES surpassed Mainstream in both cohorts and by significant differences ($\Delta \geq 165.5\%$; $p \leq .264$). In the percentage of students participating on ACT tests, DLI-NES surpassed Mainstream in both cohorts and by significant differences ($\Delta \geq 25.2\%$; $p \leq .000$). In ACT average scores DLI-NES surpassed Mainstream in both cohorts in all five indicators and by significant differences ($\Delta \geq 13.3\%$; $p \leq .019$). In the percentage of students performing successfully on ACT tests DLI-NES surpassed Mainstream in both cohorts in all five indicators and by significant differences ($\Delta \geq 92.1\%$; $p \leq .133$).

In summary, the native English speakers enrolled in dual language instruction surpassed the native English speakers enrolled in mainstream in all 30 measures of academic performance on college readiness indicators. These findings show that the academic performance and English academic language proficiency development of native English speakers are not hindered by dual language instruction. On the contrary, dual language instruction seems to increase the academic performance and the English academic language proficiency development of native English speakers.

In the case of native Spanish speakers, DLI-NSS outperformed TBE/ in all 15 indicators of college readiness in both cohorts. In the percentage of students participating in AP tests, DLI-NSS outperformed TBE/ESL in both cohorts and by significant differences ($\Delta \geq 105.8\%$; $p \leq .000$). In the percentage of students succeeding in AP tests, DLI-NSS outperformed TBE/ESL in both cohorts in all content areas and by significant differences ($\Delta \geq 274.1\%$; $p \leq .000$). In the percentage of students participating in AP tests other than Spanish, DLI-NSS outperformed TBE/ESL in both cohorts in all content areas and by significant differences ($\Delta \geq 58.0\%$; $p \leq .022$). In the percentage of students succeeding in AP tests other than Spanish, DLI-NSS outperformed TBE/ESL in both cohorts and by significant differences ($\Delta \geq 187.5\%$; $p \leq .252$). In the percentage of students participating on ACT tests, DLI-NSS surpassed TBE/ESL in both cohorts and by significant differences ($\Delta \geq 33.7\%$; $p \leq .000$). In ACT average scores DLI-NSS surpassed TBE/ESL in both cohorts, in all five indicators, and by significant differences

($\Delta \geq 14.7\%$; $p \leq .001$). In the percentage of students performing successfully on ACT tests DLI-NSS surpassed TBE/ESL in both cohorts in all five indicators and by significant differences ($\Delta \geq 86.9\%$; $p \leq .093$).

In summary, the native Spanish speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction (TBE/ESL) in all 30 measures of academic performance on indicators of college readiness. These findings are significant because they support the claim that DLI can increase the academic performance and the development of English academic language proficiency of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001). These findings refute the time-on-task, English-only hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

In the comparison between native English speakers enrolled in Mainstream instruction and native Spanish speakers enrolled in TBE/ESL, Mainstream outperformed TBE/ESL. However, this was not true for all 15 indicators of college readiness in both cohorts. In several indicators the results were divided between cohorts. TBE/ESL outperformed Mainstream in one cohort while Mainstream outperformed TBE/ESL in the other cohort. In the percentage of students participating in AP tests the results are mixed. In the 2005-2009 cohort, TBE/ESL surpassed Mainstream ($\Delta = 25.6\%$; $p \leq .260$) while Mainstream surpassed TBE/ESL in the cohort of 2006-2010 ($\Delta \geq 8.6\%$; $p \leq .298$). In the percentage of students succeeding in AP tests the results were mixed. TBE/ESL surpassed Mainstream in the 2005-2009 cohort ($\Delta = 163.2\%$; $p \leq .002$) while Mainstream surpassed TBE/ESL in cohort 2006-2010 ($\Delta = 113.9\%$; $p \leq .000$). In the percentage of students participating in AP tests other than Spanish, the results are mixed. TBE/ESL surpassed Mainstream in the 2005-2009 cohort ($\Delta = 21.0\%$; $p \leq .378$) while Mainstream surpassed TBE/ESL in the 2006-2010 cohort ($\Delta \geq 24.4\%$; $p \leq .012$). In the percentage of students succeeding in AP tests other than Spanish, the results are mixed. BE/ESL surpassed Mainstream in the 2005-2009 cohort ($\Delta = 33.3\%$; $p \leq .530$) while Mainstream surpassed TBE/ESL in the 2006-2010 cohort ($\Delta = 155.9\%$; $p \leq .005$). In the percentage of students participating on ACT tests, the results are mixed. TBE/ESL surpassed Mainstream In the 2005-2009 cohort ($\Delta = 1.1\%$; $p \leq .912$) while Mainstream surpassed TBE/ESL in the 2006-2010 cohort ($\Delta \geq 6.8\%$; $p \leq .121$). In ACT average scores Mainstream surpassed TBE/ESL in both cohorts, in all five indicators, and by significant differences ($\Delta \geq 6.1\%$; $p \leq .009$). In the percentage of students performing successfully on ACT tests Mainstream surpassed TBE/ESL in both cohorts in all five indicators and by significant differences ($\Delta \geq 15.2\%$; $p \leq .524$).

In summary, the native English speakers enrolled in mainstream instruction surpassed the native Spanish speakers enrolled in transitional bilingual education/English as a second language instruction in 24 of the 30 measures of academic performance on indicators of college readiness. These findings are aligned with the expectations of the literature reviewed. Spanish-speaking Hispanics constantly display lower academic performance than their English speaking peers. (Aud et al., 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

In the comparison between native Spanish speakers enrolled in dual language instruction (DLI-NSS) and native English speakers enrolled in mainstream instruction (Mainstream), the results surpassed the theoretical expectations. The native Spanish speakers enrolled in dual language instruction outperformed the native English speakers enrolled in Mainstream instruction in all 15 indicators of college readiness in both cohorts. In the percentage of students participating in AP tests DLI-NSS outperformed Mainstream in both cohorts and by statistically significant differences ($\Delta \geq 89.4\%$; $p \leq .000$). In the percentage of students succeeding in AP tests, DLI-NSS outperformed Mainstream in both cohorts and by significant differences ($\Delta \geq 274.1\%$; $p \leq .000$). In the percentage of students participating in AP tests other than Spanish, DLI-NSS surpassed Mainstream in both cohorts and by significant differences ($\Delta \geq 27.0\%$; $p \leq .171$). In the percentage of students succeeding in AP tests other than Spanish, DLI-NSS outperformed Mainstream in both cohorts ($\Delta \geq 32.2\%$; $p \leq .674$). In the percentage of students participating on ACT tests, DLI-NSS surpassed Mainstream in both cohorts and by significant differences ($\Delta \geq 25.2\%$; $p \leq .000$). In ACT average scores DLI-NSS surpassed Mainstream in both cohorts, in all five indicators, and by significant differences ($\Delta \geq 6.3\%$; $p \leq .139$). In the percentage of students performing successfully on ACT tests DLI-NSS surpassed Mainstream in both cohorts in all five indicators and by significant differences ($\Delta \geq 53.8\%$; $p \leq .161$).

In summary, the native Spanish speakers enrolled in dual language instruction (DLI-NSS) surpassed the native English speakers enrolled in mainstream in all 30 measures of academic performance on indicators of college readiness. These findings are significant because they refute the time-on-task hypothesis that claims that the academic performance of linguistic minorities is hindered when instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996). At the same time, these findings support the claim that DLI can increase the academic performance and English language proficiency of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001).

The previous results support the claim that dual language instruction can close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) partially challenges that conclusion. Of the 15 indicators of college readiness DLI-NES and DLI-NSS tied in two indicators in both cohorts. DLI-NES outperformed DLI-NSS in both cohorts in six indicators and split decisions in seven indicators. In the percentage of students participating in AP tests, DLI-NES tied with DLI-NSS in both cohorts with a participation rate of 100% ($\Delta = 0.0\%$; $p \leq 1.000$). In the percentage of students succeeding in AP tests, the results were mixed. DLI-NSS surpassed DLI-NES in the 2005-2009 cohort ($\Delta = 29.2\%$; $p \leq .148$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort ($\Delta = 4.7\%$; $p \leq .771$). In the percentage of students participating in AP tests other than Spanish, he results were mixed. DLI-NSS surpassed DLI-NES in the 2005-2009 cohort ($\Delta = 18.4\%$; $p \leq .664$) while DLI-NES surpassed DLI-NSS in the 2006-2010 cohort ($\Delta = 41.1\%$; $p \leq .034$). In the percentage of students succeeding in AP tests other than Spanish, DLI-NES surpassed DLI-NES in the percentage of students passing at least one AP test other than Spanish with a score of 3 or more ($\Delta = 100.9\%$; p

= .412). In the percentage of students participating on ACT tests, DLI-NES tied with DLI-NSS in both cohorts with a participation rate of 100% ($\Delta = 0.0\%$; $p \leq 1.000$). In ACT average scores DLI-NES surpassed Mainstream in both cohorts in all five indicators except for math and science in cohort 2005-2009 ($\Delta \geq 4.8\%$; $p \leq .427$). In the percentage of students performing successfully on ACT tests DLI-NES surpassed DLI-NSS in both cohorts in two indicators and had split decisions in three.

In summary, the native English speakers enrolled in dual language instruction surpassed the native Spanish speakers enrolled in dual language instruction in their performance on standardized assessments. For the 30 measures analyzed DLI-NES surpassed DLI-NSS in 19 measures tied in 10 and was surpassed by DLI-NSS in seven. However in most cases, the differences were not statistically significant. These findings are noteworthy because they show that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction, it can generate a new academic gap between native English speakers and native Spanish speakers when both are educated through dual language instruction.

In the specific case of science the performance results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed a better performance than their linguistic peers in both measures of college readiness related to science. The DLI groups outperformed Mainstream and TBE/ESL in ACT science average scores and in the percentage of students meeting the ACT science benchmark.

DLI-NES outperformed Mainstream in both indicators in both cohorts. In ACT science average scores, DLI-NES outscored Mainstream by statistically significant differences of up to 5.4 ACT points (Δ = 24.7%; p = .000). In the percentage of students meeting the ACT science benchmark DLI-NES had up to 32.8% more students than Mainstream (Δ = 244.8%; p = .043).

DLI-NSS outperformed TBE/ESL in both indicators in both cohorts. In ACT science average scores, DLI-NSS outscored TBE/ESL by up to 2.4 ACT points (Δ ≥ 6.0%; p ≤.021). In the percentage of students meeting the ACT science benchmark DLI-NSS had up to 15.4% more students than TBE/ESL (Δ = 405.3%; p = .063).

Mainstream outperformed TBE/ESL in both indicators in both cohorts. In ACT science average scores, Mainstream outscored TBE/ESL by a difference of up to 1.1 ACT points (Δ = 6.0%; p = .021). In the percentage of students meeting the ACT science benchmark Mainstream had up to 9.6% more students than TBE/ESL (Δ = 252.6%; p = .000).

DLI-NSS outperformed Mainstream in both indicators in both cohorts. In ACT science average scores, DLI-NSS outscored Mainstream by a difference of up to 1.3 ACT points (Δ = 7.1%; p = .111). In the percentage of students meeting the ACT science benchmark DLI-NSS had up to 5.8% more students than Mainstream (Δ = 43.5%; p = .478).

DLI-NES outperformed DLI-NSS in both indicators but not in both cohorts. In ACT science average scores, DLI-NES and DLI-NSS had split results each one surpassing the other in one cohort. In the percentage of students meeting the ACT science benchmark DLI-NES had up to 27.0% more students than mainstream (Δ = 140.6%; p = .117)

It can be concluded that from the perspective of college readiness performance, dual language instruction proved more effective in promoting academic achievement than TBE/ESL or mainstream instruction. This holds true for students from both English and Spanish language backgrounds.

Summary of Chapter 6

The goal of this study was to identify which program was most effective in assisting Hispanic students to reach full educational parity with their native English speaking peers, as measured from a variety of indicators of academic achievement. In this chapter, the results of the data analyses of cohort 2005-2009 (chapter 4) and cohort 2006-2010 (chapter 5) were contrasted to look for patterns in the academic behavior of the groups analyzed.

Forty indicators of academic achievement were analyzed for each cohort. The indicators were grouped in three categories including: overall performance on standardized assessments, overall high school performance, and overall performance in college-readiness indicators.

In the overall performance on standardized assessments, DLI-NES had the best results in almost all measures of academic achievement. For the 32 measures analyzed (16 indicators in two cohorts) DLI-NES placed first in 31 measures and placed last in one. DLI-NES placed last in meeting commended in math TAKS in cohort 2005-2009. The data analyzed does not provide enough information to answer why DLI-NES behaved in such a different way, exclusively for this indicator. DLI-NSS showed the second best performance, from a TAKS-related perspective. For the 32 measures, DLI-NSS placed first 11 times, placed second 19 times, and placed third two times.

Mainstream was the third best performing group. For the 32 measures, Mainstream placed second three times, placed third 24 times, and placed last 5 times. TBE/ESL exhibited the lowest academic performance. For the 32 measures or academic achievement related with TAKS, TBE/ESL placed third 6 times and placed last 26 times.

In the overall high school performance, DLI-NES had the best results in all measures of academic achievement. For the 18 measures analyzed (9 indicators in two cohorts) DLI-NES placed first in all 18 of them. DLI-NSS exhibited the second best performance, from a high school perspective. For the 18 measures analyzed, DLI-NSS tied for first place in four measures and placed second on the other 14 measures. Mainstream was the third best performing group. For the 18 measures analyzed, Mainstream placed third 17 times and placed last once. TBE/ESL had the lowest results from a high school performance perspective. For the 18 measures of academic achievement TBE/ESL placed third once and placed last in the other 17.

In the overall college-readiness performance, DLI-NES had the best results. For the 30 measures analyzed, DLI-NSS exhibited the best academic performance by placing first in 23 measures and second in the other seven. DLI-NSS was the second best performing group. For the 30 measures of performance, DLI-NSS placed first 11 times, placed second in 18, and placed third once. Mainstream was the third best group from a college-readiness perspective. For the 30 measures, Mainstream placed second once, placed third 23 times, and placed last six times. TBE/ESL exhibited the lowest results from a college-readiness perspective. For the 30 measures of academic achievement, TBE/ESL placed third 6 times and placed last 24 times.

Taking all indicators of academic performance in consideration, DLI-NES had the best results overall. For the 80 measures of analyzed (40 indicators in two cohorts), DLI-NES placed first 72 times, placed second seven times, and placed last once. DLI-NSS was the second best performing group overall. For the 80 measures of academic performance analyzed, DLI-NSS placed first 26 times, placed second 51 times, and placed third three times. DLI-NSS never placed last in any of the measures analyzed. Mainstream was the third best performing group overall. For the 80 measures of academic performance analyzed, Mainstream placed second 4 times, placed third 65 times, and placed last 12 times. Mainstream never placed first in any of the 80 measures. TBE/ESL exhibited the lowest results overall. Of the 80 measures of performance, TBE/ESL placed third in 13 measures and placed last in the other 67. TBE/ESL never placed first or second in any of the 80 measures of academic performance.

It can be concluded, from examining the 40 key indicators of academic achievement in two consecutive cohorts, that dual language instruction proved highly effective in promoting academic achievement for students. This claim holds true for Hispanic students from both English and Spanish language backgrounds. Together, both DLI groups (DLI-NES and DLI-NSS) surpassed the transitional bilingual education / English as a second language group (TBE/ESL) and the mainstream instruction group (Mainstream). Of the 80 measures analyzed, the DLI groups claimed all 80 first places (100%), and 77 second places (96.3%). Meanwhile, Mainstream and TBE/ESL were consistently in the last places. Of the 80 measures of academic performance analyzed, Mainstream and TBE/ESL placed third in 77 measures (96.3%) and placed last in 79 measures (98.8%).

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Hispanics in general, and Hispanic ELLs in particular, enrolled in public school systems across the United States, have historically exhibited an educational achievement gap when compared with grade-level peers from other racial, ethnic, and linguistic backgrounds (Gándara & Contreras, 2009; Brown, 2008). Even though the levels of academic achievement for Hispanics have increased during the last thirty years, the difference between the achievement of Hispanics and the achievement of their White peers remains wide (NCES, 2010). There is an urgent need to identify and implement effective instructional programs that can promote the academic success of Hispanics and Hispanic ELLs and help to close the achievement gap.

One of the goals of bilingual education research has been the identification of programs and instructional practices that have been shown to be effective in closing the academic achievement gap seen in Hispanics. Therefore, the goal of this study was to examine the academic programs for Hispanic ELLs in one school district in order to identify which program was most effective in helping Hispanic students reach full educational parity with their native English speaking peers as measured by a variety of indicators of academic achievement.

The theoretical framework of this study is based on the work of Cummins (1978, 1979, 2000b). According to Cummins' Underlying Proficiency Model (CUP), there is a common proficiency that underlies specific languages. For bilinguals, knowledge, skills, or attitudes developed in one language are thus available in either language. According to

Cummins' (1979, 1980) Developmental Interdependence Hypothesis, any knowledge acquired through one of the languages is easily transferred to the other language. The more learners develop their first language and acquire knowledge in their first language, the greater their possibilities to use that knowledge and language competence in their second language. Therefore, there is a positive correlation between the level of bilingualism and the level of cognitive development. As the level of bilingual proficiency increases, the likelihood of higher levels of cognitive development also increases. According to Cummins' Threshold hypothesis, bilinguals who achieve different levels of proficiency in their two languages experience different cognitive effects. When the first language is not developed fully, the development of the second language is limited. A limited academic competence in both languages can generate negative cognitive effects. On the other hand, when emergent bilinguals reach grade level academic proficiency in both languages, positive cognitive effects can take place. The results of this study may be evidence of this theoretical framework, which could be an explanation why both English and Spanish speaking students enrolled in dual language instruction excelled academically.

However, to achieve this level of bilingualism and biliteracy, students must be exposed to a bilingual learning environment where core content instruction is delivered in both languages. Unfortunately, most schools across the nation have an assimilationist orientation and view linguistic diversity as a problem. Most schools promote a swift assimilation into the dominant language and exclude the home languages other than English from the curriculum as much as possible. This type of assimilationist orientation, results in instruction that is often remedial and subtractive for ELLs. According to

Cummins, the alternative to a remedial and subtractive assimilationist orientation is an additive intercultural orientation where linguistic diversity is appreciated as an educational and socio-economic asset. In schools that take an intercultural orientation the use of primary languages and cultures is encouraged and integrated into the school curriculum. By supporting the development of the first language, educators not only enhance the learners' possibilities to fully develop their second language, but also increase the students' possibilities to learn academic content more thoroughly.

Description of the Study

There is a need for research on the effectiveness of additive bilingual education models, such as Dual Language Instruction, as opposed to traditional models such as transitional bilingual education and sheltered English Immersion instruction. Additive bilingual education models promote long-term academic and linguistic proficiency that extends to the secondary level. This study looked at dual language, an additive bilingual model, and compared it with subtractive models in the same school district. The study addressed the following question:

How does the long-term academic achievement of Hispanic students schooled in a Dual Language Instruction (DLI) program compare with the academic achievement of comparable students schooled in a Transitional Bilingual Education (TBE) program and students enrolled in Mainstream instruction, all within the same school district?

Because the focus of the study was, as recommended by Thomas and Collier (1997), "to identify which program [of instruction] is most effective in assisting Hispanics and Hispanic ELLs to reach "full educational parity with native English speakers in all school content subjects after a period of at least five to six years" (p. **7**), the study took place in a school district with a large Hispanic population (98.7%) and a large population of ELLs (41.5%) and where the three different instructional programs were consistently implemented over a long period of time. The school district was selected also because it is one of the very few school districts in the nation that is implementing dual language instruction from pre-k to 12th grade.

To measure the differences in the long-term academic outcomes generated by the different instructional programs, a quantitative, retrospective research was implemented. Two consecutive cohorts of students were selected for analysis. The cohorts included all the students that enrolled for the first time in 9th grade in a specific year and were expected to graduate four years later. Therefore, the year of enrollment and the year of expected graduation became the cohort identifiers. The 2005-2009 cohort included all the students that enrolled for the first time in 9th grade in 2005 and expected to graduate in 2009. The 2006-2010 cohort enrolled in 2006 and was expected to graduate in 2010. From the all the students in each cohort, only those who met three specific criteria were selected for the study. First, only Hispanic students were selected because they were the focus of the study and because the non-Hispanic population was too small to be analyzed. Second, because the goal was to analyze the long-term effects of each program of instruction, only those students who had been enrolled in the school district since first grade were included.

Each cohort was divided into groups according to two criteria: program of instruction and student's home language. Each cohort had four groups. The Mainstream group included all native English-speaking Hispanic students enrolled in mainstream instruction since first grade. The TBE/ESL group included all the native Spanish-speaking Hispanic students who were initially enrolled either in a transitional bilingual education (TBE) program or in the English as a Second Language (ESL) program and later transitioned into the mainstream program. The DLI-NES group included all the native English-speaking Hispanic students enrolled in dual language instruction (DLI) since first grade. The DLI-NSS group included all the native Spanish-speaking Hispanic students enrolled in dual language instruction (DLI) since first grade.

The physical and electronic records of each one of the participating students were reviewed and forty indicators of academic achievement were analyzed. These indicators were grouped into three categories: overall performance on standardized assessments, overall high school performance, and overall performance on college-readiness indicators.

Overall performance on Standardized Assessments

The indicators of performance on standardized assessments included high school TAKS average scores, the percentage of additional tests taken, the percentage of students failing an Exit-TAKS even after several attempts, and the percentage of students meeting the commended criteria. All indicators were analyzed for four core content areas: English language arts (ELA), math, science, and social studies. In total, 16 measures of performance on standardized assessments were analyzed for each one of the cohorts.

In the overall performance on standardized assessments, DLI-NES had the best results in almost all measures of academic achievement. For the 32 measures analyzed (16 measures in each of two cohorts) DLI-NES placed first on 31 measures and placed last on one. DLI-NES only placed last in meeting commended in math TAKS in the 2005-2009 cohort and the data analyzed does not provide enough information to answer why DLI-NES behaved in such a way exclusively for this indicator. DLI-NSS showed the second best performance on standardized assessments. For the 32 measures, DLI-NSS placed first 11 times, placed second 19 times, and placed third two times. Mainstream was the third best performing group. For the 32 measures, Mainstream placed second three times, placed third 24 times, and placed last five times. TBE/ESL exhibited the lowest academic performance among the groups analyzed. For the 32 measures of performance, TBE/ESL placed third six times and placed last 26 times.

Overall High School Performance

The indicators of high school performance included the percentage of students who graduated on time, the percentage of students who met the distinguished achievement graduation plan, the percentage of students graduating with the minimum requirements, weighted grade point average, student ranking, the percentage of students ranked in the top 10%, the percentage of students ranked in the top 25%, the percentage of students ranked in the top 50%, and the percentage of students ranked in the last 25%. In total, 9 indicators of high school performance were independently analyzed for each one of the cohorts.

In the overall high school performance, DLI-NES had the best results in all measures of academic achievement. For the 18 measures analyzed (9 indicators in each of two cohorts) DLI-NES placed first in all 18 of them. DLI-NSS exhibited the second best high school performance. For the 18 measures analyzed, DLI-NSS tied for first place in four measures and placed second on the other 14 measures. Mainstream was the third best performing group. For the 18 measures analyzed, Mainstream placed third 17 times and placed last once. TBE/ESL had the lowest performance. For the 18 measures TBE/ESL placed third once and placed last 17 times.

Overall Performance on College-Readiness Indicators

The college-readiness indicators included the percentage of students taking Advanced Placement (AP) tests, the percentage of students succeeding in AP tests by getting a score of 3 or more in at least one AP test, the percentage of students participating in AP tests other than Spanish, the percentage of students succeeding in AP tests other than Spanish, the percentage of students participating in ACT college-admission tests, the students' average scores on ACT tests in five different test indicators (reading, math, science, English, and the composite score), and the percentage of students performing successfully on ACT tests by meeting the ACT benchmarks in five different test indicators. In total, 15 indicators of colleg23e readiness performance were independently analyzed for each of the cohorts.

In the overall college-readiness performance, DLI-NES had the best results. For the 30 measures analyzed (15 indicators in two cohorts), DLI-NES exhibited the best performance by placing first in 23 measures and second in the other seven. DLI-NSS was the second best performing group. For the 30 measures of performance, DLI-NSS placed first 11 times, placed second in 18, and placed third once. Mainstream was the third best group in college-readiness. For the 30 measures Mainstream placed second once, placed third 23 times, and placed last six times. TBE/ESL exhibited the lowest results in college-readiness. For the 30 measures of academic achievement, TBE/ESL placed third six times and placed last 24 times.

Overall Performance on all 40 Indicators of Academic Performance

Taking all indicators of academic performance into consideration, DLI-NES had the best results overall. For the 80 measures of academic performance analyzed (40 indicators in two cohorts), DLI-NES placed first 72 times, placed second seven times, and placed last once.

DLI-NSS was the second best performing group overall. For the 80 measures of academic performance analyzed, DLI-NSS placed first 26 times, placed second 51 times, and placed third three times. DLI-NSS never placed last in any of the measures analyzed.

Mainstream was the third best performing group. For the 80 measures of academic performance analyzed, Mainstream placed second 4 times, placed third 65 times, and placed last 12 times. Mainstream never placed first in any of the 80 measures of academic performance.

TBE/ESL exhibited the lowest results. Of the 80 measures of academic performance TBE/ESL placed third in 13 measures and placed last in the other 67. TBE/ESL never placed first or second in any of the 80 measures of academic performance.

Overall Comparison between Groups

The goal of the study was to measure the long –term effects of implementing the different instructional programs over two different Hispanic populations: native English-speaking Hispanics and native Spanish-speaking Hispanics. Therefore a cross-examination of the program effects on the two linguistic groups was implemented. In the overall analysis of performance on all 40 indicators of academic performance, the results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed better performance than their linguistic peers in almost all measures of academic performance.

Overall comparative results between native English-speaking Hispanics enrolled in dual language instruction (DLI-NES) and native English-speaking Hispanics enrolled in Mainstream instruction (Mainstream).

The Hispanic native English speakers enrolled in DLI-NES surpassed the Hispanic native English speakers enrolled in Mainstream in 79 of the 80 measures of academic achievement. The only measure where Mainstream outperformed DLI-NES was in the percentage of students meeting the commended criteria in the math Exit-TAKS. In most cases, the differences between DLI-NES and Mainstream were statistically significant and consistent across cohorts. Also, the differences were larger in college-readiness and high school performance indicators than in the indicators related to TAKS. This finding is important from a college readiness perspective because it shows that by participating in dual language instruction, Hispanic native English speakers not only obtained better results on standard assessments, but graduated from high school at higher rates, and graduated with distinction at higher rates. DLI students also participated more, and more successfully in college-level courses and assessments, and increased their weighted grade point average. Finally, Hispanic native English speakers had better ranking positions, and performed much better than their Mainstream peers in college-admission tests.

These findings strongly support the claim that the academic performance, English academic language proficiency development, and college readiness of native English-speaking Hispanics was not hindered by dual language instruction. On the contrary, dual language instruction increased the academic performance, the English academic language proficiency development and the college readiness of native English-speaking Hispanics.

Overall comparative results between native Spanish-speaking Hispanics enrolled in dual language instruction (DLI-NES) and native Spanish-speaking Hispanics initially enrolled in transitional bilingual education (TBE) or in English as a Second language (ESL) and later transitioned into mainstream instruction.

The academic performance of Hispanic native Spanish speakers enrolled in dual language instruction (DLI-NSS) surpassed the academic performance of Hispanic native Spanish speakers enrolled in TBE/ESL in all 80 measures of academic achievement. In most cases, the differences between DLI-NSS and TBE/ESL were statistically significant and consistent across cohorts. Also, the differences were larger in college-readiness and high school performance indicators than in the indicators related to TAKS. This is important from a college-readiness perspective because it shows that by participating in dual language instruction, Hispanic native Spanish speakers are not only obtaining better results on standard assessments, but are graduating from high school at higher rates, graduating distinguished at higher rates, participating more, and more successfully in college-level courses and assessments, increasing their weighted grade point average and therefore placing themselves in better ranking positions, and eventually performing much better than their TBE/ESL peers in college-admission tests.

These findings support the claim that DLI can increase the academic performance and English academic language proficiency development of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard &

Sugarman, 2001). These findings refute the time-on-task, English-only hypothesis that claims that the academic performance of linguistic minorities is hindered when valuable instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996).

Overall comparative results between native English-speaking Hispanics enrolled in Mainstream and native Spanish-speaking Hispanics enrolled in TBE/ESL.

Mainstream outperformed TBE/ESL in 68 of the 80 measures of academic performance analyzed. In most cases, the differences between DLI-NSS and TBE/ESL were not statistically significant but consistent across cohorts. Unlike the two previous cases, the differences between Mainstream and TBE/ESL were not larger in the college-readiness and high school performance indicators than in the indicators related to TAKS. Even though Mainstream students are outperforming their TBE/ESL peers on standardized assessments, the mainstream students are not graduating from high school at much higher rates, or graduating distinguished at higher rates, nor participating more and more successfully in college-level courses and assessments. Mainstream students do display a higher weighted grade point average and therefore better ranking positions, and are performing better than their TBE/ESL peers in college-admission tests. These findings are aligned with the expectations of the literature reviewed. Native Spanish-speaking Hispanics constantly display lower academic performance than their native English-speaking peers. (Aud et al., 2010; US Dept. of Ed., 2010d; Gándara & Contreras 2009).

Overall comparative results between native Spanish-speaking Hispanics enrolled in dual language instruction (DLI-NSS) and native English-speaking Hispanics enrolled in mainstream.

The results surpassed the theoretical expectations. The native Spanish speakers enrolled in dual language instruction outperformed the native English speakers enrolled in Mainstream instruction in 77 of the 80 measures of academic performance analyzed. In most cases, the differences between DLI-NSS and Mainstream were statistically significant and consistent across cohorts even in those indicators highly related with English academic language proficiency. Also, the differences were greater in college-readiness and high school performance indicators than in the indicators related to TAKS. This finding is important from a college readiness perspective because it shows that by participating in dual language instruction, Hispanic native Spanish speakers not only obtained better results on standard assessments, but graduated from high school at higher rates, and graduated with distinction at higher rates DLI-NESS students participated more, and more successfully in college-level courses and assessments, increased their weighted grade point average and therefore placed themselves in better ranking positions. They performed much better than their Mainstream peers in college-admission tests.

These findings are significant because they refute the time-on-task, English-only instruction hypothesis that claims that the academic performance of linguistic minorities is hindered when instructional time is spent delivering instruction in a language other than English (Porter, 1990; Rossell & Baker, 1996). At the same time, these findings support the claim that DLI can increase the academic performance, the English academic language proficiency, and the college readiness of linguistic minorities (US Dept. of Ed., 2010d; Garcia & Bartlet, 2007; Thomas & Collier, 2004; Howard & Sugarman, 2001).

Overall comparative results between native Spanish-speaking Hispanics enrolled in dual language instruction (DLI-NSS) and native English speaking Hispanics also enrolled in dual language instruction (DLI-NES).

The results mentioned in the previous paragraphs support the claim that DLI can close the academic gap between native English speakers and native Spanish speakers. However, the comparison between native English speakers enrolled in dual language instruction (DLI-NES) and native Spanish speakers enrolled in dual language instruction (DLI-NSS) partially challenges that conclusion. Of the 80 measures of academic performance analyzed, DLI-NES outperformed DLI-NSS in 58 and tied in 14. DLI-NSS only outperformed DLI-NES on 8 measures.

It is important to mention that in most cases, the differences between DLI-NES and DLI-NSS were not statistically significant and fluctuated across cohorts. It is also important to mention that the advantage of DLI-NES over DLI-NSS was higher in the TAKS-related and high school performance indicators than on the college readiness indicators. This finding is important from a college readiness perspective because it shows that even though native English-speaking Hispanics participating in dual language instruction obtained better results on standard assessments, obtained higher weighted grade point averages, had better ranking positions, and graduated with distinction at higher rates, than their native Spanish-speaking Hispanic DLI peers;, DLI-NES students did not graduate at a higher rates, nor did they participate more successfully in college-level courses and assessments. They did not perform significantly better than their native Spanish-speaking peers on college-admission tests.

These findings are noteworthy because they show that while dual language instruction can close the academic gap between English language learners and native English speakers enrolled in Mainstream instruction, it can generate a new academic gap between native English speakers and native Spanish speakers when both are educated through dual language instruction, a point made by Valdés (1997).

Hispanics and Science Instruction

The low achievement of Hispanics in science has been specifically identified as a problem in our educational system (National Academy of Sciences, 2010).The study analyzed six indicators related to science including average scores on the science TAKS, the percentage of additional science TAKS tests required, the percentage of students failing the science Exit TAKS even after several attempts, the percentage of students meeting the commended criteria in the science Exit-TAKS, average ACT science scores, and the percentage of students meeting the science ACT benchmark. The indicators were measured for both cohorts.

In the specific case of science the performance results met or exceeded the expectations generated by the theoretical framework. Both DLI groups showed a better performance than their linguistic peers in all 12 measures (six indicators in two cohorts) of academic performance related to science.

In the case of native English-speaking students, DLI-NES outperformed Mainstream in all six science indicators in both cohorts. In the case of native Spanish-speaking Hispanics DLI-NSS outperformed TBE/ESL in all 12 measures of academic performance related to science. In the comparison between traditional programs, Mainstream outperformed TBE/ESL in all six indicators in both cohorts. In the comparison between Spanish-speaking students in DLI-NSS and English-speaking students in Mainstream, DLI-NSS outperformed Mainstream in all 12 measures of academic science performance. In the comparison between students from different language backgrounds enrolled in dual language instruction, DLI-NES outperformed DLI-NSS in eight of the 12 measures and tied in two. DLI-NSS outperformed DLI-NSS on two measures of academic performance related to science: in ACT science average scores and in meeting the ACT benchmarks for science; both for the 2005-2009 cohort. These results are especially important because researchers have been especially concerned about the performance of Hispanics in science. Dual language instruction with early and continued instruction in science in the native language produced excellent science related results.

It can be concluded, from examining 40 key indicators of academic achievement in two consecutive cohorts, that dual language instruction proved more effective in promoting academic achievement for Hispanic students than TBE/ESL or Mainstream instruction. This claim holds true for students from both English and Spanish language backgrounds. Both DLI groups (DLI-NES and DLI-NSS) overwhelmingly surpassed the transitional bilingual education/English as a second language group (TBE/ESL) and the mainstream instruction group (Mainstream).

This claim is especially true for science education where DLI surpassed the other two groups in all 12 measures of academic proficiency related to science. This is an important finding because science is one of the two content areas delivered exclusively in

Spanish in elementary grades in the model of dual language used by this district. All DLI students took science and social studies exclusively in Spanish from pre-K to 5th grade. Later, at the high school level, DLI students had the option to take science courses such as biology, chemistry and physics in Spanish. The science results are also important because the academic proficiency exhibited by both DLI groups in the science measures not only surpass the performance of their district peers, but meets or surpasses national standards. The Hispanic students enrolled in dual language instruction performed at similar or higher levels than the white population in measures of science academic proficiency. Therefore, dual language instruction can be considered as highly effective in closing the science academic achievement gap of the Hispanic population.

These results provide compelling evidence for the benefits of dual language instruction for both native English speaking and native Spanish speaking Hispanics. In this respect, this study adds to a significant body of research on the efficacy of dual language and expands the research base through this detailed study of students in a single district in each of three instructional programs.

Recommendations

There are schools and school districts across the nation with similar demographic backgrounds as the school district analyzed and therefore results similar to the ones presented in this study can be expected if such school districts implement pre-k to 12th strands of dual language instruction. However, it is important to consider that dual language instruction can provide academic benefits to all participants regardless of their ethno-linguistic or socio-economic background. Therefore, DLI should not be considered as exclusive for the education of linguistic minorities. As the results of this study show, the native English-speaking participants enrolled in DLI exhibited much higher levels of academic performance than their mainstream peers. Paraphrasing Thomas and Collier (2005), the beauty of dual language instruction is that it works, and it works for all.

Some school districts across the nation already have strands of dual language instruction in some of their elementary campuses. Therefore, it is highly recommended for them to expand their dual language programs into their secondary campuses. This recommendation is offered not only to continue the academic instruction of their DL populations coming from elementary schools, but also because dual language instruction can be helpful to scaffold the education of older newcomers. For example, Spanish-speaking recent immigrants enrolled in secondary schools can be placed in ESL courses for language development and in dual language core content courses delivered exclusively in Spanish instead of placing them in remedial content courses where the curriculum is watered-down to facilitate comprehension. When older emergent bilinguals are placed in remedial courses, their academic development has been shown to be affected and many drop out of school (Gándara & Contreras, 2009; Capps et al, 2005). When emergent bilinguals are placed in challenging core content courses provided in their home language they are more successful and more likely to engage in learning. The school district analyzed has implemented a similar program with promising results. This is an area of research that requires further analysis.

It is important to understand that dual language instruction is not a remedial program exclusively for linguistic minorities but an enrichment program beneficial for all. When emergent bilinguals are placed in dual language instruction, their first language proficiency becomes a valuable asset, highly appreciated by the learning community.

This has been thoroughly analyzed at the elementary school level. However, further qualitative research is necessary at the secondary school level, where peer acceptance and peer pressure are highly influential in the academic development of adolescent students.

It is very important to understand that dual language instruction should not be used as a remedial program for long-term LEPs. Many students across the nation do not develop enough English language proficiency to be removed from their LEP label even after six or more years of instruction in U.S. schools. However, because they have been intentionally deprived of instruction in their home language, they are limited in proficiency in both languages. According to Cummins' Threshold hypothesis, long-term LEP students can experience detrimental cognitive effects due to their limited bilingualism. Placing them in secondary school dual language instruction would not necessarily help them. After years of exposure to English only instruction, many of these students may have developed a rejection of their linguistic background so they would resist being placed in a dual language instruction program. In addition, because they have been deprived of academic instruction in their home language, they might not possess the academic language required to be successful in a challenging content class delivered in their home language with academic rigor.

Therefore, dual language instruction at the secondary school level must be considered as the program of choice for newcomers and an enrichment program for all other populations. All linguistic minority newcomers should be placed in the dual language program immediately upon enrollment, regardless of their academic background. The dual language program is their best instructional option. All other populations should be granted the opportunity to participate in a dual language program in the elementary years.

However, at the secondary school level, placement in dual language is dependent on their proficiency in the language other than English. If students do not possess enough language proficiency in the language of instruction, their participation might not be successful. Once again, more quantitative and qualitative research is needed in the topic.

Adequate implementation is critical for the success of dual language instruction. All stake-holders should understand the benefits of dual language instruction, but also the theoretical framework that supports dual language instruction, and especially, they must be aware of the conditions required for its implementation. DLI implementation requires that administrators and teachers fully be committed to the program. DLI teachers must be highly qualified in their content area but also highly proficient in their language of instruction. Unfortunately, dual language teachers are sometimes hired by administrators or department heads more concerned with the content of instruction than with the language of instruction. Some administrators do not understand the difference between being able to speak Spanish and having the enough academic language proficiency to deliver a challenging high school content course in Spanish.

Implementation also requires the understanding that the benefits of dual language instruction are measurable only in the long term. In some cases, administrators withdraw their support to dual language instruction after only a few years of implementation because they can see no immediate gains in comparison with the traditional programs. As Thomas and Collier have (2004) shown, there are no significant differences between the different instructional programs during the first years of implementation. The differences become measurable and significant after six or more years of participation. As this study demonstrates, the differences increase as the program expands. The differences found in this study are wider than the differences reported by Thomas & Collier because the students analyzed in this study have been in dual language instruction for up to 12 years while the students analyzed by Thomas and Collier were enrolled in a dual language program up to 5th grade.

Another important recommendation is the relationship exhibited between dual language instruction and performance on science-related indicators. The Hispanic student population has been signaled as partially responsible for the national underperformance in science education. This study shows that students who receive science content instruction in a language other than English through at least fifth grade can excel in science in the long run. Further study of the effects of dual language on science education is warranted.

Limitations of the Study

As mentioned above, a difference between this study and the Thomas and Collier' study is the length of participation in dual language instruction. A number of students in the school district analyzed participated in dual language instruction in elementary, but because of a variety of reasons did not continue in the program at the secondary level and, therefore, they were not included as part of this DLI research population. These students provide an opportunity to analyze the difference between implementing a dual language program from K-to 5th and implementing it from K to 12th. This research gap is being considered for a forthcoming study.

Another limitation of the study resides in its quantitative design. Education and academic success has much to do with the emotions and feelings of the students, the quality of the teachers and the instruction, and the involvement of parents. Much of the success exhibited by dual language instruction in this study could related to factors other than test scores and other quantitative data collected for this study Therefore, extensive qualitative analysis is required to complement this study.

One more limitation of this study is that it relied exclusively in the data provided by the school district. Due to a strong state accountability based on standardized assessments, the school district has abundant data available about such assessments. However, this is not the case for high school performance and college-readiness indicators. The recollection of data such as AP and ACT participation was painful and time-consuming. Some key data initially considered for the study was not available, such as the percentage of students enrolling in college the fall immediately after graduation or the percentage of high school graduates enrolled in remedial courses in college.

Of course, this study only looked at the data for two cohorts of students in a particular district with a very specific student population. Therefore, without further study, the results of this study cannot be generalized to other populations. Nevertheless, this researcher hopes that the results of this study will contribute to the field of bilingual education in particular and to the field of education in particular as educators work to improve the education of Hispanics in this country.

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