

A National Study of School Effectiveness for Language Minority Students’ Long-Term Academic Achievement

Findings from a Large Urban Research Site in the South-Central U.S.

The Regional Social Context

The states in the southwest U.S. from Texas to southern California are historically strongly linked with Mexico. This territory was owned by Spain and then Mexico as recently as 150 years ago. The Hispanic heritage of these states remains strong, and the peoples of Hispanic descent are numerous, including various regions of these states where Hispanics are the majority of the population. Some of these Hispanics are full-blooded Indians, descendants of the ancient peoples who populated these lands before the arrival of the Europeans, including many diverse Indian groups with distinct languages and cultures, who added Spanish to their language repertoire during the Spanish-Mexican period of domination. Others are descended from the first Spaniards to arrive in the 1500s and 1600s. The large majority are of mixed Indian and Spanish heritage. The U.S. government uses the term Mexican-American to refer to all these groups of peoples. In this report, we will use the term Mexican-American when referring to those of Mexican heritage, and we will use the term Hispanic-American when referring to groups that include U.S.-born and immigrant groups arriving from Mexico as well as Central and South America.

The four states along the Mexico-U.S. border — California, Arizona, New Mexico, and Texas — have carried out varying policies when addressing the needs of their Mexican-descent populations. As the populations of European descent have increased in each of these states, they have continued to tolerate some form of recognition of their culturally and linguistically diverse heritages. But tensions have arisen between groups as the numbers of immigrants coming from

Mexico and Central America have greatly increased over the past three decades. This has led to the development of the English-only movement, which has made some strong inroads with the voter passage of Proposition 227 in California and Proposition 203 in Arizona. These referenda limit the use of any languages other than English for schooling students of diverse linguistic heritages. Thus the states of New Mexico and Texas have experienced some increased social pressure to revisit issues related to bilingualism.

Notably, New Mexico is the only official bilingual state in the U.S. The two languages Spanish and English are legally accepted, although some English-only challenges have occasionally been brought to local schools. Spanish-English bilingual education is provided by most of the large city school systems in New Mexico, for schooling some of their students of Mexican descent, and a few two-way bilingual schools flourish, providing bilingual schooling for all whose parents choose for their children to attend.

The Social Context Within the State

Texas, the second largest state in the U.S. and known for its independent ways of conducting business, has developed its own unique response to its Hispanic heritage. Tolerance of bilingualism is the general social response to Hispanics in Texas. Some Texas communities respond even more positively, with not just tolerance but celebration of their diverse heritages, through local government services that acknowledge the region's diversity, and businesses that pay higher salaries to their bilingual staff, for assisting them with commerce that crosses the two countries' borders.

Texas state legislation. To make sure that children who do not yet speak English when they enroll in Texas schools receive "meaningful" schooling as required by *Lau v. Nichols (1974)*, the Texas legislature passed a bill in the 1970s requiring bilingual education for these children for

Grades K-3. This provision was later extended to Grades PK-5. According to this state legislation, each school district with an enrollment of 20 or more students of limited English proficiency of one language background in the same grade level is expected to offer bilingual schooling to these students. This is one of the stronger pieces of state legislation providing for equality of educational opportunity through public bilingual schooling, supporting transitional bilingual education for all of the elementary school years.

In May 2001, new Texas state legislation was passed unanimously by the House and Senate which strongly supports the development of more dual language programs for students in Texas. In the Senate concurrent resolution which preceded the bill, the focus was on preparing Texas citizens for economic competitiveness in the international arena and capitalizing on the cultural and linguistic richness that exists in the state:

... WHEREAS, The State of Texas has well-established bilingual programs already in the public education system; and

WHEREAS, Dual language bilingual programs integrate native English speakers and language-minority students for academic instruction; and

WHEREAS, Dual language bilingual programs create an additive bilingual environment for all students in which the first language is maintained while the second language is acquired; and

WHEREAS, Dual language bilingual programs promote bilingual proficiency, cross-cultural awareness, and high academic achievement in all students; and

WHEREAS, Dual language bilingual programs will prepare our students academically and linguistically to be multi-literate citizens in an international community as they master “English-Plus” another language; and

WHEREAS, The workforce of tomorrow must meet the demands of a global economy; now therefore be it

RESOLVED, That the 77th Legislature of the State of Texas hereby encourages school districts to develop and implement dual language bilingual programs in which students may participate throughout their education; and, be it further

RESOLVED, That the State of Texas work toward the worthy goal of ensuring that some day every Texas student will master “English-Plus” another language....
(Texas Senate Concurrent Resolution Number 50, 2001)

This piece of state legislation makes an even stronger statement to commit state resources to expand and maintain bilingualism among all citizens, for the future economic benefit of the state of Texas.

Status of Spanish and local language varieties. Given that Spanish is the most widely spoken minority language of the state of Texas, the state legislation that has been passed supporting dual language schooling has strong implications for development of the Spanish language in the region. Spanish is considered a high-status language, as the third largest world language, the official language of 20 countries (Baker & Prys Jones, 1998). But the regional varieties of Spanish present among the Spanish-speaking population throughout the southwest U.S. are not considered prestigious varieties. The lower status afforded the border dialects is similar to the experience of the French-speaking residents of northern Maine, who have in the recent past viewed their language as a “street language,” not to be taught in public schools. The language restoration taking place in northern Maine schools assists students with understanding bidialectal differences and valuing both their native variety and the standard varieties of French. A parallel process is taking place in the southwest region, where bilingual schools have assisted students to value and acknowledge their regional Spanish vocabulary and other features of local language, and at the same time acquire the written standard Spanish that has high status around the world.

Heritage language and culture restoration for purposes of economic development. The

Texas context also has parallels with northern Maine in regard to the emphasis in the state legislation on development of English plus other languages for the sake of the economy of Texas. Recognizing that “economic competitiveness is enhanced if citizens are fluent in both English and another language” and that “a global economy necessitates knowledge of the cultures and customs of others,” the state legislation encourages schools to develop dual language programs to “capitalize on the cultural richness that [the state’s] diversity provides” (Texas Senate Concurrent Resolution Number 50, 2001). This type of thinking is prevalent among many business leaders in the state. With the North American Free Trade Agreement now in place, the exchange of goods, services, and resources across the Mexican-U.S. border is increasing rapidly. Whereas economic interaction was largely with the English-speaking U.S. in past years, the need for proficient Spanish-English bilingual personnel across all sectors of the Texas economy is suddenly emerging. Adults who were punished for speaking Spanish at school are now being encouraged to enroll their children in programs to develop their standard Spanish as well as English skills. Goals of bilingual programs also include the enhancing of self-esteem among Hispanic students, who in earlier decades perceived their language and culture as lower in status, not respected and valued by the broader community.

These regional changes will take time. English is clearly the power, high status language and is in no danger of replacement. But Texas planners are thinking ahead to the future in these moves towards a broadened perception of the value of bilingualism/biculturalism for economic as well as educational reasons.

The School District Site

Texas is the location for one of our large urban school district sites. We have chosen Houston Independent School District as one of the sites for this research report, because of the staff’s strong commitment to change efforts to appropriately serve their large culturally and

linguistically diverse school population and their willingness to make school policy decisions based on their student achievement outcomes. The decisions this school system has made for schooling language minority students provide a mirror for viewing the needs and concerns of other school districts in the state of Texas, as well as for neighboring states.

Houston Independent School District is the fifth largest school district in the United States and the largest school district in the state of Texas. As of the school year 1999-2000, there were 210,547 students enrolled in this large urban school system which is 54 percent Hispanic, 33 percent African-American, 10 percent Euro-American, 2.9 percent Asian, and 0.1 percent Native American. Students on free or reduced lunch were 75.4 percent of the total student enrollment in the city. Students classified as limited in English proficiency represented 28 percent of the total, and 96 percent of these English language learners were on free and reduced lunch in 1999-2000. Newly arrived immigrants enrolling in Grades K-12 were only 5.4 percent of the total student enrollment. Thus the large majority of language minority students served by Houston's schools were born in the U.S. or arrived sometime between birth and age four, representing 51.4 percent of the total student population.

Hispanics are the fastest growing group in the school district. One decade ago in 1990-91, Hispanics were 44.8 percent of the school population, whereas ten years later they are now at 54 percent. Hispanics enrolled in the Houston schools who were born outside the U.S. come mostly from Mexico, El Salvador, Honduras, Guatemala, and Nicaragua. Asians increased in number only slightly during the same decade, from 2.7 percent to 2.9 percent. Asian immigrant arrivals have come mostly from Vietnam, Pakistan, or China. These two categories — Hispanic and Asian — represent the language minority population of Houston schools, at 56.9 percent in 1999-2000. During the same decade, African-Americans dropped in number from 38 percent to 33 percent of the total school enrollment, and Euro-Americans decreased in number from 14.3 percent to 10

percent.

Since language minority students are now the majority (56.9 percent) and those who are limited-English-proficient represent 28 percent of the total enrollment as well as half of all language minority students, the Houston city schools' challenge has been to create quality programs that enhance the academic performance of language minority students, who typically score, nationwide, at the 10th- 12th percentile on norm-referenced tests in the 11th grade, as we have seen in the data from many school districts in all regions of the U.S. (Thomas & Collier, 1997, 2001). The challenge is still greater when considering that 75.4 percent of all students in this urban school district are of low income background, as measured by free and reduced-price lunch, and there is considerable student mobility, from school to school, as well as in and out of the district.

The "at risk" factors present among this school population would lead to the prediction that this school district would be among the lowest-achieving school systems in the country. But it is not. Student achievement on the Stanford 9 (a national norm-referenced measure), as well as the Texas Assessment of Academic Skills (the state's standardized measure) is high for the student populations it serves and is improving every year. We shall examine in this report some of these patterns in the Houston student achievement data. First, let us survey the range of programs provided for language minority students in the school system, and some of the overall program characteristics.

Houston's Programs for Language Minority Students

The Multilingual Programs Department designs the overall program plans for limited-English-proficient and language minority students and provides staff development support and resources to implement the programs. The program choices include quite a range of services to assist the students. In this summary, we must necessarily be brief with this overview of program

characteristics.

Overall, the mission statement, beliefs, and goals for Multilingual Programs, that were approved by the Houston school board in July 1999, emphasize the importance of high academic achievement, English language proficiency development, and opportunities for all students to graduate proficient in two languages (English plus another). The final core belief states:

“Increasingly, Houston Independent School District should offer opportunities for all students to acquire two languages to excel in a competitive global marketplace.” To accomplish this core belief, the accompanying goal states, “Expansion of the two-way and developmental bilingual programs shall be encouraged ... and support for [these] existing programs is also essential” (Bilingual/ESL Program Guidelines, January, 2001).

State program mandates. Since all elementary schools in Houston are required by state law to offer a bilingual program for limited-English-proficient (LEP) students in Grades PK-5 whose home language is spoken by 20 or more students in any single grade in the entire school district, the large majority of elementary schools provide at least transitional bilingual education for Spanish-speaking LEP students. In 1996, Vietnamese bilingual classes were added for the next largest language group (1,118 Vietnamese speakers, compared to 52,156 Spanish speakers, in 1995, the planning year for the Vietnamese program). By 1998, 23.4 percent of the students in the Houston school system were attending enrichment or transitional bilingual classes. In 2001, Chinese, Arabic, and Urdu speakers may be of sufficient number to provide some academic work taught through these languages.

For speakers of other languages where the numbers are less than 20 in one grade level across the district, elementary schools are required by state law to offer alternative language support programs, such as English as a Second Language (ESL). The Houston school system provides an

ESL Content program for these students, and ESL Content teaching is an important component of all bilingual programs in the school system. All secondary schools are required by state law to offer ESL Content and Sheltered Content programs for their LEP students in post-elementary through secondary grades. As of 1998-99, 12.1 percent of the students in Houston were attending ESL content classes with no additional native language support. In all, 35.5 percent of the total student enrollment of Houston attended bilingual and/or ESL classes in 1998-99. Bilingual programs are offered in some middle and high schools where resources are available, especially those schools serving as feeder schools for the strongest bilingual programs, described in the next paragraphs.

Enrichment bilingual education. Two additional bilingual program models are available as choices for parents in the Houston school system. In 1997 these two programs, Two-way Bilingual Immersion and Developmental Bilingual Education, received strong backing from Dr. Rod Paige, then Superintendent of the Houston school system. He became convinced that the research strongly supports enrichment forms of bilingual education, and he wanted all schools in Houston to work on enhanced models of bilingual instruction that lead to very high academic achievement. During the Spring of 1997, the Multilingual Programs staff refined and added greater specificity to their existing bilingual program model descriptions, to ensure that the programs offered were exemplary models based on current research findings and to ensure greater consistency and continuity throughout the district's 198 elementary schools, given high student mobility rates from school to school within the system.

Two-way Bilingual Immersion. The Two-way Bilingual Immersion program (including native English speakers) was begun in 1992 at one school, Herod Elementary, as a 50-50 model, and was converted to a 90-10 model by 1997. The second school to implement this program was Cunningham Elementary in 1995, also converting to a 90-10 model by 1997. By 1996, the

program was in place in 7 elementary schools. As of August 2001, there are now 11 two-way bilingual 90-10 schools in Houston Independent School District. Each school started the initial year of the two-way program in Grades K-1, adding one grade level with each additional school year. The highest grade levels of implementation of this program are those of the bilingual students from Herod and Cunningham who are now attending the feeder middle school, Johnston, having reached Grades 6 and 7 in the Fall of 2001. In this report, student achievement data on this program will be presented through Grade 5 (Year 2000). Several of these schools are over 90 percent students of low-income background.

Developmental Bilingual Programs. The second type of enrichment bilingual program provided in Houston is Developmental Bilingual Education, designed for Spanish-speaking students. These are one-way dual-language classes (one language group receiving their schooling through two languages), providing strong grade-level schooling in Spanish throughout the elementary school years, and gradually increasing the amount of instruction in English with each year until 50 percent of the content instruction is in English, by fourth grade. As of August, 2001, there are 22 elementary and two middle schools providing developmental bilingual education for their Spanish-speaking students. To date, student achievement data has been collected on this model from 1997 to 2000, and we will present these analyses in the next major section of this report.

Balance of the two languages of instruction. The three types of bilingual program models in Houston schools — Transitional Bilingual, Developmental Bilingual, and Two-way Bilingual Immersion — were purposely designed to be identical in Grades PK-3 to ensure greater program continuity for students moving from school to school within the district. In the early grades, instruction starts with 90 percent of the day in Spanish and 10 percent in English. The amount of English instruction is increased each year until fourth grade, at which time students in

Transitional Bilingual are moving towards the goal of all-English instruction while students in both Developmental Bilingual and Two-way Bilingual Immersion are moving into half a day in each language. The goal in the Transitional Bilingual Program is to mainstream students into the all-English curriculum; whereas the goal in both the Developmental Bilingual Program and the Two-way Bilingual Immersion Program is to promote bilingualism and biliteracy, reaching a level of proficiency in both languages that leads to a 50 percent native language curriculum and 50 percent English curriculum by Grades 4 and 5. In the program guidelines, the 50-50 ratio of instruction provided in each language will continue throughout middle and high school, with half of the subjects of instruction in English and half in Spanish. Three feeder middle schools to date have implemented this model, as the students who have received these programs in elementary school reach their secondary years of schooling.

In the two enrichment bilingual models, initially almost all grade-level content instruction is in Spanish (or Vietnamese). As English increases in the percentage of instructional time, more content is introduced through English. Language of instruction alternates by subject, sometimes taught through thematic units. By fourth grade, mathematics and Spanish language arts (including reading and writing) are taught in Spanish; and science, social studies and literature are taught in English. In fifth grade, science, social studies and literature are taught in Spanish; while mathematics and English language arts (including reading and writing) are taught in English. Special or ancillary subjects are taught in English (e.g. physical education, music, art, library, computer lab), although the eventual goal of the school system is to provide more of these specials in Spanish too.

Bilingual teachers are strongly advised not to translate or code-switch between the two languages, but to adhere to the strict rule that instruction in Spanish is never combined with instruction in English. Following the research findings that separating the two instructional languages leads to

deeper proficiency development in each language, teachers confirm that this classroom practice leads to stronger English and Spanish development. Furthermore, in the Two-way Bilingual Immersion model, students are integrated for all instruction — native-English speakers with native-Spanish speakers, except in kindergarten and first grade, when they are separated for the English language development time. By Grade 2, they are schooled together all day and serve as peer tutors for each other as each group acquires the other language of instruction.

Teacher credentials and teaching practice. In 1999-2000, 18.6 percent of the 11,674 teachers in the Houston school district were bilingual/ESL teachers. Over 90 percent of the schools provided some form of bilingual or ESL services to language minority students. Teachers' ethnicity was somewhat representative of the student population, although not nearly enough Hispanic teachers have been hired by the system. African-American teachers are the largest in number at 43.5 percent, Euro-American teachers 38 percent, Hispanic teachers 16.6 percent, and Asian teachers 1.8 percent. Thirty percent of the teachers in the system have masters degrees and 64 percent have bachelors degrees, and 1.4 percent have completed the doctoral degree. Half of the teachers have over ten years of teaching experience; 37 percent have five years or less of teaching experience. Only one percent of the bilingual/ESL teachers in a given year may not be certified when initially hired but they take coursework and receive their teaching credentials during the first year of teaching.

Over 40 staff development courses and workshops are offered each year for bilingual/ESL teachers. The central school district office staff do not monitor teachers' implementation practices, except at the building level by administrative staff. General descriptions of teaching practices include use of cooperative learning, visuals and manipulatives, whole language combined with balanced literacy instruction, literature-rich approaches to reading and writing (although some individual schools have chosen "packaged" approaches such as Success for All),

multicultural literature, integrating content and language instruction through thematic units, emphasis on cognitive development and developmentally appropriate practices, and incorporation of students' bilingual/bicultural knowledge into the curriculum.

Generally, most of the bilingual classes are taught by one teacher who provides instruction in both English and Spanish, with the languages separated by subject taught. However, team-teaching is practiced in some of the Two-way Bilingual Immersion schools and the Developmental Bilingual schools, with each teacher representing one language of instruction.

Results in Student Academic Achievement

First, we present overall results from the school district reports of student achievement data as of 1999, analyzed by our collaborative researchers within the school system who are staff members of the Research and Accountability Department of Houston Independent School District. In the sections that follow this first section, we will then present our own analyses of the student achievement data, focusing in on the two highest-achieving programs in the school district to date, the Two-way Bilingual Immersion Program and the Developmental Bilingual Program.

Comparisons of native-English speakers and former LEP students. The first cross-sectional analyses demonstrate the English achievement levels of four groups of students in Houston schools district-wide, as measured by the Stanford 9 Reading and Math tests, in normal curve equivalents (NCEs). As can be seen in Figure C-1 and Table C-1, native-English speaking students in Houston clustered around the 50th NCE (which is equivalent to the 50th percentile) or slightly below on the total reading subtest of the Stanford 9, for all Grades 2-11. This is excellent achievement for a large mostly low-income school district.

Hispanic students who were graduates of the transitional bilingual education program (and former

LEP students), when they were first tested in English on the Stanford 9 reading measure at fourth grade scored slightly above the native-English speakers. By sixth grade, the Hispanic students scored at the 54th NCE (57th percentile), 6 NCEs higher in English achievement than their native-English-speaking counterparts, which is a moderately significant difference in terms of effect size, based on a national standard deviation of 21.06 NCEs. For Grades 7-9, the Hispanic graduates of transitional bilingual education achieved slightly higher or at the same level as native-English speakers, and they were slightly but not significantly below the native-English speakers in their tenth and eleventh grade scores. The Hispanic graduates of bilingual classes are thus maintaining their relatively high level of English achievement throughout their schooling, an unusual finding for former English language learners in general (Thomas & Collier, 1997).

English language learners who received all of their schooling through English, initially enrolling in the ESL content program, also fared quite well, until they reached the high school years. As seen in Figure C-2 and Table C-1, initially, when first tested on the Stanford 9 in fourth grade, they outscored the bilingually schooled students, at the 57th NCE (63rd percentile) and reaching the 59th NCE (66th percentile) in fifth grade. Then they scored equally with the bilingually schooled students through eighth grade. But beginning in ninth grade, their scores began to drop, and they reached only the 40th NCE (31st percentile) by eleventh grade. At the end of schooling, the seven-NCE higher achievement of the bilingually schooled former LEPs, in comparison to the graduates of the ESL content program, is a very significant difference in terms of effect size — what is termed by program evaluators an “actionable” difference, equivalent to one-third of a national standard deviation. We have seen this pattern in many other data sets for other school districts. Generally, bilingually schooled students outperform students schooled only through English, but the significant differences do not show up until the secondary years of schooling.

The biggest shock is the achievement levels of those students who were not proficient in English

upon enrollment in the Houston schools whose parents signed a waiver requesting that their children be placed in the mainstream, with no bilingual or ESL support. As seen in Figure C-1 and Table C-1, these students were doing very well when first tested, at the 49th NCE (49th percentile) on the Stanford 9 reading test in second grade. Their scores lowered to the 45th NCE (40th percentile) by third grade and continued to go down throughout their schooling, reaching the 22nd NCE (9th percentile) in tenth grade and the 25th NCE (12th percentile) in eleventh grade. This is a very large and significant difference in achievement, 22 NCEs lower than the graduates of bilingual classes, and 15 NCEs lower than the graduates of ESL content classes. This is an important finding for parents, and illustrates the academic benefits of students receiving bilingual/ESL services. This finding also illustrates the wisdom of *Lau v. Nichols* (1974), the U.S. Supreme Court decision requiring that students not yet proficient in English receive a “meaningful education.” The Court further ruled that submersing these students in the mainstream with no extra support is not considered a meaningful education. The cost of doing nothing for LEP students, as seen in this research finding, is dramatic underachievement.

In math achievement, presented in Table C-2, the same general patterns are present as those of the reading achievement measure. Native-English speakers scored higher in math than in reading during the elementary school years, reaching the 56th NCE (61st percentile) by the end of fifth grade. Bilingually schooled students as well as ESL graduates scored even higher at the 66th NCE (77th percentile) in fourth grade and by seventh grade both of these groups were doing better than the native-English speakers. By eighth grade the three groups were relatively comparable in math achievement, slightly below the 50th NCE. However, in Grades 10 and 11, there was a dropoff in the ESL graduates’ math performance, causing them to finish at the 41st NCE (33rd percentile), while the bilingual graduates finished at the 44th NCE (39th percentile) in eleventh grade. Once again, the LEP students whose parents chose not to have their children attend bilingual/ESL classes started out doing well in second and third grade, but their scores went steadily down so

that at eleventh grade they finished at the 34th NCE (22nd percentile).

Figures C-3 and C-4 and Table C-3 illustrate the very high achievement of Spanish-speaking students in Spanish, as measured by the Aprenda 2 (a norm-referenced test in Spanish comparable to the Stanford 9), for the grades tested (1-8). For Grades 1-5 on the reading test, the Hispanic students were consistently outscoring the native-English speakers when tested in their native language, including at especially high levels in the early grades (when the most first language support is provided) — ranging from 7 to 13 NCEs higher than the English reading scores of native-English speakers on the Stanford 9. The Spanish speakers' eighth grade performance on the reading test at the 64th NCE (75th percentile) is dramatically high, especially given the cognitive demand of this middle school test. Likewise, both groups have done well in math achievement, expressed in both languages, staying at, above, or slightly below the 50th percentile. These analyses of Stanford 9 and Aprenda 2 results demonstrate that Hispanic students are staying on or close to grade level in both languages, and if continuing instruction is provided in both Spanish and English, the large majority will graduate proficiently bilingual, meeting a major goal of the school system.

Dropout, attendance, and retention rates. Included in the analyses of our collaborators in the Research and Accountability Department are additional measures of academic achievement — dropout, attendance, and retention data, for four groups — native-English speakers, LEP students currently attending bilingual/ESL education, former LEP students who received bilingual/ESL services, and former LEP students who did not receive bilingual/ESL services. The group with the lowest academic achievement (as seen in Figure C-1 and Tables C-1 and C-2) — former LEP students whose parents refused bilingual/ESL services — also had the highest dropout rate (4.6 percent), the highest retention rate (13.9 percent — meaning that they were retained in the same grade for two years), and the lowest attendance rate (93.5 percent). Former

LEP students who did receive bilingual/ESL support in the elementary school grades demonstrated their higher commitment to schooling on these three measures, with the lowest dropout rate (1.5 percent), lowest retention rate (9 percent), and highest attendance rate (96.8 percent) of any group in the school district. LEP students currently attending bilingual/ESL programs also attended school more (96.2 percent) than mainstream native-English speakers (93.6 percent), with these two groups comparable on dropout rates (both at 3 percent), and retention rate lower among native-English speakers (10.3 percent) compared to current LEP students (11.5 percent). Once again, the group most at risk consists of former LEP students who received no bilingual/ESL support. The group of students who attend school more, are retained in grade less, and drop out less are the graduates of bilingual/ESL education.

Student Achievement: Comparisons by Bilingual Program Type

In this section, we are presenting the results of our own data analyses, focusing on variations between different types of bilingual programs provided for students in the Houston school district. Since it is very evident in the district-wide data that bilingually schooled students outperform monolingually schooled students, the next step we took in examining the Houston data was to analyze what variations make a difference among the various types of bilingual services. We have examined these bilingual program variations through both cross-sectional and quasi-longitudinal analyses.

The data analyses include all students who were schooled bilingually for 1-5 years (1996-2000) in one of three program types — transitional bilingual education, developmental bilingual education (a one-way program for one language group, in this case Spanish speakers), and two-way bilingual immersion (a two-way program for two language groups, in this case Spanish and English speakers). These three programs are described in detail in the sections above on Houston's programs for language minority students. All three programs follow the same ratio of

Spanish-English instruction for Grades PK-3, with a higher proportion of Spanish in the early years (PK-2), increasing the amount of English instruction during Grade 3. Thus the programs are not significantly different, by the instructional language used, until Grade 4. By this grade, students in transitional bilingual education are transitioning into all-English instruction; whereas students in the other two models receive half a day of instruction in each language, throughout the remainder of their elementary school years (with the plan to continue this 50-50 ratio in secondary school). By the end of this study, the highest grade that students have reached in the developmental bilingual and two-way bilingual immersion schools is fifth grade. Future studies will continue to examine these students' progress as they move on through the secondary grades.

The other major difference between the two-way bilingual schools and the other two bilingual models in Houston is the inclusion of native-English speakers in the two-way bilingual classes. The research to date has found that interacting with same-age native-speaking peers assists the natural second language acquisition process and creates an additive bilingual context, with a positive social and emotional climate for all. Thus both language groups are peer teachers for each other. However, since Houston schools are only 10 percent Euro-American and 33 percent African-American, and these two native-English-speaking groups are not represented in every school, most of the two-way bilingual schools do not have the "research ideal" of 50 percent native-English speakers in each bilingual classroom. Thus the one-way and two-way bilingual programs in this particular school system are more alike than different, in contrast to two-way schools in other cities that have the natural demographics to create closer to a 50-50 ratio among the two student groups.

Spanish achievement. Figures C-5, C-6, and C-7 and Table C-4 present the cross-sectional analyses and Tables C-5 and C-6 present the quasi-longitudinal analyses for comparing these three bilingual program types on the Aprenda 2 reading, math, and language tests, administered to

the students in Spring, 2000. Cross-sectional analyses examine different students at each grade level, while longitudinal analyses follow the same groups of students across time. These are quasi-longitudinal data views, in that they are examining the same groups of students followed across time (e.g. those with one year of bilingual schooling, those with two years, etc., up to five years) but who had no pretest administered at the beginning of the program. A true longitudinal analysis would start with a pretest measure, which was not available for this study.

Comparison groups attending transitional bilingual education (TBE) programs were chosen for these analyses, to compare to the performance of the LEP students in the developmental (DBE) and two-way (TWBI) bilingual schools. These comparison groups were chosen by matching schools that had comparable proportions of LEP students in the two categories of socioeconomic status (free & reduced lunch versus paid lunch), and by proximity, meaning that the two schools being compared served the same neighborhood of the city. Each set of scores presented in Tables C-4 through C-9 has four comparisons. First is the TBE comparison group (labeled non-DBE) matched with the DBE group. Second is the DBE group. Third is the TBE comparison group (labeled non-TWBI) matched with the TWBI group. Fourth is the TWBI group. In addition, Table C-4 includes a fifth group — native-English speakers attending TWBI. They are placed in this table between the non-TWBI comparison group and the TWBI LEP group.

To summarize all of these groups' achievement in Spanish, it is dramatically high and above the 50th percentile by statistically and practically significant amounts. All groups are above grade level performance on reading, math, and language, except for math achievement of the LEP first graders who had only received one or two years of schooling to date. However, the first graders who had received three years of schooling (PK-1) are at or above the 50th NCE. All groups remain at or above the 50th percentile/NCE through fifth grade, the last year of test data available for this report. Overall, both the Developmental Bilingual Education students and the Two-way Bilingual

Immersion students outscore their comparison groups and the TWBI students outscore the DBE students on reading, math, and language in Spanish. In the cross-sectional analyses (Figures C-5, C-6, C-7, and Table C-4), by Grade 5, the LEP students attending two-way bilingual schools are at the 61st NCE (70th percentile) in reading and language and the 59th NCE (67th percentile) in math; while the LEP students attending developmental bilingual schools are at the 55th NCE (60th percentile) in reading and the 57th NCE (63rd percentile) in math and language. Their comparison LEP groups attending transitional bilingual classes are scoring in fifth grade at the 53rd and 50th NCEs in reading, 54th and 56th NCEs in math, and 54th and 53rd NCEs in language (ranging from the 50th to the 61st percentile).

Tables C-5 and C-6 illustrate the same patterns of achievement in Spanish, presented first by number of years in the program (Table C-5) and second broken down by both grade and number of years in the program (Table C-6). Among all groups, their performance is at or above grade level. But in overall achievement, the TWBI students outscore the DBE students in subjects taught in Spanish by 2-6 NCEs, and both of these groups outscore the TBE students — the TWBI students by 3-11 NCEs (a very significant amount) and the DBE students by 2-3 NCEs.

Furthermore, the native-English speakers in the two-way bilingual classes are benefitting greatly from this bilingual schooling. As seen in Table C-4, and later in Table C-12, native-English speakers' performance in Spanish increased at each subsequent grade level. Generally, these students have attended the program since kindergarten, so after three years of Spanish academic development, by the end of the second grade when they were first tested on this norm-referenced test in Spanish, they consistently scored above grade level in Spanish — at the 59th NCE (67th percentile) in reading, the 51st NCE (51st percentile) in math, and the 55th NCE (60th percentile) in language. With each additional year of bilingual schooling, they increased their achievement in Spanish until in fifth grade, they reached the 74th NCE (87th percentile) in reading, the 70th NCE

(83rd percentile) in math, and the 68th NCE (80th percentile) in language. However, it must be pointed out that the number of native-English speakers with test data was very small in the first years of the program, so that as the number of these students increases, these high achievement levels will likely decrease to a more normal level of achievement, perhaps more comparable to that of the Spanish speakers, whose test scores are more reliable because of the greater number of students tested.

English achievement. Figures C-8, C-9, C-10, and present the cross-sectional analyses, and Table C-8 presents the quasi-longitudinal analyses for comparing these three bilingual program types on the Stanford 9 reading, math, and language tests, administered to the students in Spring 2000. The same comparison groups were used for the English measure as for the Spanish measure for the LEP student groups — TBE schools of the same socioeconomic status and neighborhood as the DBE and TWBI schools.

Since these students had significantly fewer hours of instruction in English in Grades PK-3 than the number of hours of instruction in Spanish (the 90-10 bilingual program model), it was expected that their performance in English would not yet be on grade level by the end of elementary school, but that they would be approaching grade-level performance in their second language, English, sometime during the middle school years (6th or 7th grade), as we have seen in our data from other bilingual schools and other researchers' studies of bilingual schooling. But once they reach the 50th percentile in English, bilingually schooled students typically maintain that general level of achievement through the remainder of their secondary years (as seen in Thomas & Collier, 1997). In this school district, that pattern is evident among the graduates of transitional bilingual education in the district-wide data presented in a previous section. This represents a remarkable level of achievement, higher than that we have seen in other research sites

implementing traditional transitional bilingual programs that provide only 2-3 years of native language support for a small portion of the day, before transition into all-English instruction.

Another expectation for LEP achievement in English is that transitional bilingual students might initially outperform the developmental bilingual and two-way bilingual students in English, because they receive a greater percentage of English instruction in Grades 4 and 5 than the other two groups. But overall, DBE and TWBI should eventually result in the highest achievement in both English and Spanish, with each additional year of school, as seen in other research studies (e.g. Cummins, 2000; Lindholm-Leary, 2001; Thomas & Collier, 1997). The general patterns in this dataset, however, show that all three groups were doing remarkably well in English, with the Two-way Bilingual Immersion former LEP students scoring the highest on all three measures. As can be seen in Table C-7, as well as in Figures C-8, C-9, and C-10, the Two-way LEP students were above the 50th NCE on all measures in English for every grade level.

On the reading measure (Figure C-8), the Two-way LEP students were at the 60th NCE (68th percentile) in first grade, such a high level that it typically cannot be maintained, as the test becomes cognitively more complex in subsequent grades. In the remaining grades, they ranged from the 51st to the 55th NCE, a more normal range of scoring. They ended fifth grade at the 51st NCE, well above their comparison groups, who dropped to the 39th-41st NCE range, having initially achieved at the 50th percentile in first grade.

In mathematics achievement in English (Figure C-9), all three groups were mostly on or above grade level, with most of the scores in the 45th-54th NCE range at each grade level for TBE and DBE students. The DBE students started at the 45th NCE in first grade and reached the 51st NCE by fifth grade, and the TBE students reached mostly comparable levels. But again, the Two-way LEP students achieved higher levels in math in English than their comparison groups, and they

stayed consistently above the other groups' achievement, ranging from the 56th to the 61st NCE, at the 59th NCE (66th percentile) by fifth grade. The Two-way LEP students ranged from 7 to 16 NCEs higher than their TBE comparison group, which is very significant high achievement, given that the TBE group performed in the range of the 50th NCE (46th-54th) for four of the five grade levels.

On the language arts measure in English (Figure C-10), again the Two-way LEP group outperformed their comparison groups, at the 55th NCE (60th percentile) in fifth grade, 7 NCEs higher than the DBE group and 9 NCEs higher than their TBE comparison group. All groups at all grade levels ranged from the 45th to the 62nd NCE, generally just above or just below the 50th percentile, excellent achievement in English. This demonstrates that their academic work in Spanish did not in any way hinder their English language development. In fact, in comparison to our other data from schools that teach LEP students exclusively in English, these scores are very high, much higher than LEP students who are schooled only in English.

The quasi-longitudinal look at the Stanford 9 data in Table C-8 is somewhat less meaningful than the same analysis on the Aprenda 2, because as the data is broken down by grade level as well as by number of years in the program, the number of students in each group becomes too low to compare students' performance statistically. When the number (N) is less than 20-30, the mean becomes less reliable in the measurement sense in this large a dataset, but may still be useful for some decision making. We have adopted the criterion that groups with Ns less than 10 should be skipped for comparisons between groups. The reason for lower numbers of students in this test administration is that it is not appropriate to administer the Stanford 9 to new arrivals not yet proficient in English, until they have had at least two years of exposure to the English language. Overall in this table, where the number of students is sufficiently large in each group to analyze comparisons, the same general pattern is present as seen in the cross-sectional examination. Two-

way LEP students remain the highest achievers, scoring mostly above the 50th percentile in every measure except for the reading test in some occasions. Since this is the most difficult subtest at this level, requiring knowledge across the curriculum, we do not typically see students reach the 50th percentile in reading in their second language until sometime during the middle school years (Grades 6-8). In math achievement, all three groups do quite well, generally staying at or above the 50th percentile.

Waivered LEP Students. Although the Texas state legislation requires that LEP students receive bilingual/ESL services, parents in U.S. schools may choose what school programs their children attend. Accordingly, parents may sign a waiver requesting that their children not be placed in the state-mandated or district-mandated programs. Although bilingual/ESL staff counsel against such a decision, some parents choose for their children to be placed in the English mainstream classroom with no special support provided by bilingual and ESL teachers. In the initial section on student achievement, we presented the district-wide findings on these waivered LEP students. Their academic achievement was dramatically below that of their counterparts who received bilingual/ESL services, completing the eleventh grade reading measure at the 12th percentile (25th NCE), with a dropout rate of 4.6 percent and retention-in-grade rate of 13.9 percent, the highest of any group in the school district.

In Tables C-9 and C-10, we present a subset of the data on waivered LEP students, focusing on those who attended the TBE and DBE schools. Our assumption we were testing was that perhaps the waivered students would do better in school than the district-wide analyses showed when they attended the same schools where their Hispanic counterparts were attending bilingual classes. This might be true because they would interact in social situations in the school, during recess and lunch and specials (art, music, physical education, etc.) and support each other on the social/emotional side of learning, making it a little less oppressive for these LEP students

attending all-English mainstream classes from the first day of their arrival.

Our assumption was not supported by the data. When comparing data in our analyses in Table C-9 to the district-wide analyses in Figure C-1 and Tables C-1 and C-2, these LEP waived students' English achievement in both reading and math is comparable to the district-wide data on LEP waived students. They are not doing at all well in school. In reading, first grade students are at the 48th NCE, but the average scores go down with each succeeding grade, until this group in Grade 6 is at the 25th NCE (12th percentile). In math, scores are at the 44th NCE in first grade and reach grade-level achievement at the 53rd NCE in third grade but by sixth grade, they are achieving at the 36th NCE (25th percentile). In English language arts, average scores start at the 52nd NCE but reach the 30th NCE (17th percentile) by sixth grade. Table C-10 breaks these groups down by type of school they attend, with mostly similar results. Only the TBE schools that served as comparisons for the Two-way Bilingual schools provided a context for higher achievement among the waived LEP students. This higher achievement may be related to socioeconomic factors, since a few of the TWBI schools and their comparison TBE schools serve neighborhoods that are somewhat more middle-class. Overall, given the very low achievement district-wide of the waived LEP students, we would strongly recommend that parents be counseled as to the long-term consequences of their denying their children bilingual/ESL services.

Native-English speakers in Two-way Bilingual classes. Finally, how are the native-English speakers doing when schooled through two languages? Tables C-11 and C-12 summarize the data on these students. As can be seen in these tables, the number of students from these datasets are not yet high enough to make any grand generalizations, but the small number of students tested in both Spanish (N = 42) and English (N = 68) are certainly doing well. They are well above the 50th percentile in all subjects in both languages, for the grades tested, and their scores are increasing with each subsequent grade level. Their overall mean across the grade levels tested is the 66th

NCE in Spanish reading, 63rd NCE in Spanish math, 62nd NCE in Spanish language arts, 61st NCE in English reading, 61st NCE in English math, and 63rd NCE in English language arts (70th-78th percentile). They are receiving schooling 90 percent of the day in Spanish for kindergarten and first grade in this integrated model with Spanish-speakers, yet their English language achievement is equally high with their Spanish achievement. Not until Grade 4 does the instruction become 50 percent in each language. The 90-10 bilingual model does not in any way lessen these students' achievement in English. In fact, schooling intensely through Spanish in the early grades seems to enhance their English achievement, when compared to district-wide test scores, which cluster around the 50th percentile. This provides still more evidence that in the long-term, bilingually schooled students outperform monolingually schooled students.

Conclusions

The Houston data makes a very compelling case for U.S. school reform efforts to address language minority students' needs through strong (not watered down), effective, enrichment bilingual programs. This is the fifth-largest school system in the country, serving a majority "at risk" population — over 75 percent of low-income and 90 percent minority student population — presenting a huge challenge to educate so many students with great needs. The school staff admit that the programs are still a "work in progress." There are many needs yet to be addressed, and not all teachers are implementing the program models faithfully. But school improvement is occurring every year with demonstrated higher student achievement each year, both on the state's standardized measures, the Texas Assessment of Academic Skills (which we have not reported on here, since this is a national study), and on the national norm-referenced tests given at every grade level — the Stanford 9 and the Apenda 2.

The bilingual/ESL experts in the Multilingual Programs Department have made a concerted effort to define in detail and then continue to refine the program models for bilingual and ESL classes.

They also disseminate the models that work best through continuous staff development efforts throughout the school district. The Houston multilingual staff are exemplary implementors of ongoing school reform, identifying what works from the research on school effectiveness for language minority students, defining clear plans for changes to be made, and evaluating the results by measuring student achievement year by year. They know that change does not occur quickly, but it must be implemented steadily and effectively. Each school year, several more Houston schools commit to implementing the two models found most effective, two-way and one-way enrichment bilingual education, with 11 two-way bilingual and 24 one-way developmental bilingual schools as of August, 2001.

Student achievement is clearly the highest in the two-way bilingual immersion schools, both for students who begin schooling with no or limited proficiency in English, and for native-English speakers who choose to be in the bilingual classes. Both of these groups, by fifth grade, are on or above grade level in both English and Spanish. Both groups have reached at least the 70th percentile in Spanish reading, math, and language arts; and the 60th to 66th percentile in English language arts and math. In English reading (the most difficult subtest, because it tests all curricular subjects), the Spanish speakers reached the 51st percentile in fifth grade.

The next highest language minority student achievement occurs in the schools where a strong emphasis on primary language instruction is provided in the first years of schooling. Because the transitional bilingual classes and the developmental bilingual classes are both implemented as a 90-10 model (emphasizing the minority language in the early grades PK-1) through third grade, it is not until fourth grade that these two models are differentiated in Houston. Therefore we found fewer differences in student achievement between these two models by fifth grade (the last year of this study), although among some groups the developmental bilingual students were achieving at a higher level than the transitional bilingual students. We would predict that more differences

will emerge as the students reach the middle school years, with developmental bilingual students outperforming transitional bilingual students. Many of the schools that have offered transitional bilingual education are gradually transforming their bilingual services into more primary language support in fourth and fifth grades, so that students receive half a day of instruction in each language, thus becoming a one-way developmental bilingual education model.

Transitional bilingual graduates are achieving at a significantly higher level than students who received content ESL services, as shown in the district-wide data for Grades 2-11. It is worth noting that, initially, students who receive all their schooling in English through ESL content classes appear to be doing better on the English tests than their bilingually schooled counterparts. But by ninth grade, significant between-group differences in achievement begin to appear, and those that received primary language support in their elementary school years reach a higher level of achievement than those who received an ESL content program without primary language support. This difference is most visible in the reading measure of the Stanford 9 at eleventh grade, with bilingually schooled students 7 NCEs higher than the ESL content graduates, a significant difference equivalent to one-third of a national standard deviation.

Those LEP students who received no bilingual/ESL services because their parents chose to place them in the English mainstream upon enrollment are the lowest achievers of all. Their eleventh grade achievement was the 12th percentile in English reading and the 22nd percentile in math. They are the group with the highest dropout rate and they have been retained in grade more than any other group. We would not recommend this alternative to language minority families.

Houston Independent School District has taken the initiatives of their former superintendent, Dr. Rod Paige, who is currently serving as the U.S. Secretary of Education, and has continued to improve upon their school reform models for language minority students. The school board

approved the following mission statement in July, 1999:

It is the mission of HISD's Multilingual Programs to strengthen the social and economic foundations of Houston by assuring that its students achieve their full academic potential and by providing opportunities for all students to graduate proficient in multiple languages. Limited-English-proficient children also will learn to read, write, and speak English as rapidly as individually possible.

The core beliefs attached to the mission statement end with this sentence: "Increasingly, HISD should offer opportunities for all students to acquire two languages to excel in a competitive global marketplace." Given the high level of academic achievement attained by the graduates of all three bilingual program types in Houston schools, as measured in both English and Spanish, this urban school system seems to be on a continuing course for providing strong, quality bilingual instruction to as many students as possible. Based on their testing results, we believe that the Houston school district's program and implementation strategies are worthy of emulation by other school districts who wish to provide more effective instruction for both language minority and native-English-speaking students. Ultimately, the region and the nation will benefit, as the schools prepare the future workforce of the 21st century.