

# **Validating the Power of Bilingual Schooling: Thirty-two Years of Large-scale, Longitudinal Research**

by

Virginia P. Collier, Ph.D., Professor Emerita, Bilingual/Multicultural/ESL Education,  
George Mason University – [vcollier@gmu.edu](mailto:vcollier@gmu.edu)

Wayne P. Thomas, Ph.D., Professor Emeritus, Research Methodology and Program Evaluation,  
George Mason University – [wthomas@gmu.edu](mailto:wthomas@gmu.edu)

## **Abstract**

This chapter summarizes the findings of 32 years of research from all of our longitudinal studies to date, conducted in 36 school districts in 16 U.S. states, over 7.5 million student records analyzed, following English learners (of all language backgrounds) as far as Grades K-12. These studies are very generalizable to all regions and contexts of the U.S. and have been replicated in other countries, answering questions regarding program effectiveness for policy makers in education. We have shown that English-only and transitional bilingual programs of short duration only close about half of the achievement gap between English learners and native English speakers, while high quality long-term bilingual programs close all of the gap after 5-6 years of schooling through two languages (L1 and L2). In addition, our studies answer the linguistic question of how long it takes student groups to reach grade-level achievement in their second language, and we have developed and refined our theoretical Prism model by collecting and analyzing program effectiveness data, basing the Prism model on our empirical findings.

## **Introduction**

Our Thomas & Collier research, conducted from 1985 through 2017, has focused on analyzing the long-term academic achievement of language minority (LM) students of many different culturally and linguistically diverse backgrounds attending U.S. schools in Grades K-12, including those who are English learners (ELs) and those who are English-proficient (LM-not-ELs). Our research is designed to answer urgent policy questions of interest to federal, state, and local school district policy makers, since in U.S. schools this demographic group (LM students of Hispanic, Asian, and American Indian background) is now the largest “minority” group (projected to be 40 percent of the school-age population by 2025 [National Center for Education Statistics, 2016]) and in the recent past has been the least well served by U.S. schools, as measured by achievement on school tests.

Many Internet websites for school districts and language educators contain our research figure first published in 1997 (Thomas & Collier, 1997, p. 53; or search “Thomas and Collier graph” on the Internet), based at that time on 42,317 longitudinal records of English learners who started school with no English (beginning level of English as a Second Language [ESL]). The figure follows English learners throughout their schooling (Grades K-12), illustrating that in the long term, only dual language programs providing schooling through both L1 and L2 eventually close all of the achievement gap in second language. Since then our initial studies have been confirmed and validated by our additional analyses of over 7.5 million student records from a

total of 36 school districts in 16 U.S. states. The figure and its detailed explanation can be found in Thomas & Collier (2012, pp. 91-96).

The key finding illustrated in the figure is the crucial role that primary language (L1) plays in schooling English learners. Along with fellow researchers across the world, we continue to find in each study that we conduct that the most powerful predictor of LM student achievement in second language is nonstop development of students' L1 through the school curriculum (including schooling through the second language, usually the dominant language of the host country). Research syntheses from other countries on the importance of bilingual schooling for LM groups include, for example: Baker, 2011; Baker & Prys-Jones, 1998; Christian & Genesee, 2001; Cummins, 2000; Cummins & Hornberger, 2008; Dutcher, 2001; García, Skutnabb-Kangas & Torres-Guzmán, 2006; Hélot & de Mejía, 2008; May & Hill, 2005; Skutnabb-Kangas, Phillipson, Mohanty & Panda, 2009; and Tucker, 1999. Meta-analyses and research syntheses of U.S. studies examining long-term English learner achievement in bilingual schooling and the importance of L1 development for success in L2 are summarized and/or analyzed in Collier, 1992a; Dolson, 1985; Greene, 1998; Krashen & Biber, 1988; Lindholm-Leary, 2001; Lindholm-Leary & Borsato, 2006; Lindholm-Leary & Genesee, 2010; Lindholm-Leary & Howard, 2008; Ramírez, 1992; Rolstad, Mahoney & Glass, 2005; Thomas, 1992; Troike, 1978; and Willig, 1985.

### **Research Methodology**

Our research methods are based in the field of research and evaluation methodology, as applied to educational contexts (Dr. Thomas' expertise), but are also informed by research questions, concepts, and methods from applied linguistics research (Dr. Collier's expertise). Our research is unusual because it is very long term, large scale, policy-oriented, and collaborative with local educators. Our research also has several characteristics which make it unusual in both the education and linguistics literatures, but which collectively serve to greatly increase its internal validity, external validity, and statistical conclusion validity, when compared to other available research studies. We discuss these overarching characteristics of our research below, and direct the reader to the methodology sections of Thomas and Collier (1997, 2002, 2009, 2014; Thomas, Collier & Collier, 2010; and the appendices in Collier & Thomas, 2009) for specific details of our research methods.

First, our research focuses on the long term, following individual students over 3-5 years at minimum, and from grades K-12 when possible. We use this strategy because we realize that the effects of interest to us are typically of small and perhaps insignificant size within a given school year, but that these effects also become cumulatively larger and very significant over time. Thus, we avoid the pitfalls of typical and very common short-term studies that tend to find "no significant difference" in the short term (1-2 years) in favor of following the same students' progress long enough for small effects to cumulatively become both statistically and practically significant in a longer time frame (3-5 years and more). Another important reason to conduct long-term longitudinal research is to detect the much larger between-program differences that occur after Grade 4 because of increased cognitive/academic demand in the curriculum and on the tests.

Second, our research is large scale in that it analyzes very large collections of individual student records from many schools and school districts. However, our large sample sizes also allow us to retain the capability to examine the performance of small groups of interest (e.g., low-socioeconomic-status [low-SES] English learners who speak Spanish) in a way that allows

for meaningful findings and statistically valid conclusions. This increases the statistical power and the statistical precision of our findings.

Third, our research is decision-facilitative and policy-oriented in that it emphasizes research and evaluation questions of great interest to the education professionals in the schools, and to the policy makers who lead and guide the schools. In addition, the outcome measures that we primarily use—state and normative tests—are those typically favored by policy makers and are designed to meet their needs for decision-making. However, we also address questions of academic and linguistic interest as well, as discussed elsewhere in this article, since school district educators, as well as academics, are vitally interested in these matters involving foreign language education and linguistically-effective teaching.

Fourth, we enhance the internal validity of our studies by controlling for extraneous variables using both procedural and statistical means. In particular, we control for level of implementation of the programs that we evaluate (see Collier & Thomas, 2014, p. 98, for our definition of well-implemented), because this variable is frequently confounded with program effect in many other studies. In other words, many researchers fail to acknowledge that comparing a poorly implemented version of one program to a well implemented version of another program leads to erroneous findings. In addition, we readily acknowledge that many variables other than the ones being studied as independent variables can influence outcomes such as student achievement. Since the number of potential extraneous variables is large, we concentrate our control strategies on those variables that the research literature, experience, and our prior research indicate are significant influences on our outcomes, while de-emphasizing those potential extraneous variables that have small and insignificant effects. Thus, we make substantial use of blocking as a strategy, and analyze each block separately, thus increasing the precision of our findings. We also use analysis of partial variance and matching as strategies for controlling extraneous variables retrospectively, since we often engage in data mining, the analysis of large existing data sets for which “real-time” control of extraneous variables is difficult or impossible.

Fifth, we address external validity (generalization across heterogeneous populations) and ecological validity (degree of generalizability to the “real world”). Since our studies have been conducted in all parts of the U.S., in large, medium, and small school districts, and have analyzed multiple “waves” or cohorts of students from entire school districts and one state, our findings are very “real world” and very generalizable across states, size of school district, and socioeconomic characteristics of schools. Following principles of robust analysis, we emphasize and publish the findings that occur in all of these contexts, not just from selected ones, and thus our major findings have much external validity for use in new school contexts.

Sixth, we emphasize degree of achievement gap closure among programs as our primary criterion for program success. We also emphasize practical significance of findings (e.g., effect sizes) in addition to statistical significance, which can be largely determined by sample size alone. Many other researchers emphasize pre-test vs post-test score differences and the statistical significance of these differences. However, while we compute these differences, we also point out that it is quite possible for one program’s pre-post scores to be statistically significantly greater than a second program’s scores, while neither program has a substantial effect on achievement, and neither program closes the existing achievement gap in any substantial way. In other words, one weak and ineffective program can be slightly better than another weak and ineffective program. For example, we have consistently found that transitional bilingual education (TBE) is better by the end of elementary school than ESL taught through content by

statistically significant amounts, but that both programs close only about half of English learners' long-term achievement gap. In contrast, dual language programs can completely close English learners' achievement gap during the elementary school years, and have almost twice the effect size of ESL Content and TBE.

Seventh, our research is collaborative with local school district educators, and includes research questions of direct interest to them as well as our theory-based and literature-based research questions. We engage with them as fellow researchers, since they know their schools and districts much better than we do, and we employ them to collect data that would be otherwise difficult or impossible for us to collect as visiting researchers. In effect, we become temporary members of their administrative, research and testing, and curricular staffs, and we operate as "insiders" much as they do. In effect, we assist them to carry out their own local research and this local research is much more valued by most educators than the results of studies conducted elsewhere. Thus, educators are much more inclined to use "their" research findings to make meaningful changes to their school's and district's practices and programs that will lead to better achievement for their students.

We establish a collaborative research agreement with each school district that chooses to participate, following every LM student who entered the school district for every year of his/her attendance in that school district, by each program type attended including mainstream English-only education and by cohorts of similar student background (e.g. SES, L1 and L2 proficiency upon entry, years of prior schooling). Qualitative analyses include interviews, school visits, surveys, and source documents, including historical demographic patterns of linguistically diverse groups of each U.S. region, the sociolinguistic and social context for the school programs, and specific implementation characteristics of each program type. Quantitative measures of student achievement are those administered by the school district, including English proficiency tests; measures of literacy development; standardized, norm-referenced test scores; and in recent years, state-developed mastery tests. We report generalizations across school districts based on group performance on standardized measures in normal curve equivalents (NCEs—equal-interval percentiles). When state tests are used, our analyses are based on scale scores (students' raw scores converted to allow students to be compared on the same scale) and state-assigned mastery levels for each grade. By written agreement, the school districts participating in each study are promised anonymity until they choose to self-identify.

### **Research Findings**

**How long?** The applied linguistics research question that we have asked in every study we have conducted is, "How long does it take for school-age English learners, just beginning acquisition of the English language, to achieve grade level (age-appropriate achievement across the school curriculum) in their second language and stay at grade level (or above) throughout the remainder of their schooling?" This question has often been mistakenly represented as "how long does it take to learn a second language?" But what we are focusing on is *the use of the L2 in a school context*, for students of ages 5-17/18 in Grades K-12.

The answer to this question is that it takes a long time—an average of six years for those who start in kindergarten and receive quality dual language schooling in both L1 and L2 for a minimum of six years, with at least half of the instructional time in their L1. It takes still longer, 7-10 years or more, if students have not had the opportunity to be schooled in their L1, and many in this situation do not reach grade-level achievement and are often referred to by school personnel as "long-term English learners."

In our first studies (Collier, 1987, 1988, 1989, 1992a; Collier & Thomas, 1989), we thought that the English proficiency test would be the most meaningful predictor of success in L2 in school. Testing listening, speaking, reading, and writing skills in L2 is the most common method for ESL teachers to determine that English learners are making steady progress in their English language development. An English language proficiency measure is also used by the federal government to determine the amount of federal funds provided for English learners in the school district, as states use this test to re-classify students as “proficient” in English. So the English proficiency test has policy relevance, with funds attached.

However, we were shocked by the results of our initial study, when we compared results from the locally-developed English proficiency measure to students’ scores on the standardized achievement test (in this case, the SRA—Science Research Associates test, commonly used in the 1970s and 1980s in U.S. schools). The former English learners (classified as proficient in English) scored abysmally low on the English reading subtest, which measured English development across all subjects, at their grade level. We and the school district had expected these students to do extremely well on this test because they were making high grades in school after exiting from the ESL program. The majority were of Asian middle class background. They had received ESL classes in a carefully planned and well implemented ESL program, with small class size, many resources for high quality materials, and well trained ESL teachers.

When we examined the results by student variables, such as socioeconomic status, country of origin, primary language, amount of schooling in home country, and parent education, we found that in the multiple linear regressions, the one factor that stood out as the strongest influence on their standardized test scores was how much schooling they had received in their home country before they emigrated to the U.S. These students were receiving only English schooling in the U.S., and those who were the youngest when they arrived (5 to 7 years old) and had lived in the U.S. for the longest time were doing the least well in school. We analyzed data in the following years from this and other school districts, and concluded that our long-term research goal would be to follow longitudinally the achievement of English learners on the standardized tests to continue to answer this question. Our “short answer” to this research question is in the second paragraph of this section above.

Why does it take so long—at least six years, and longer if English learners do not receive L1 schooling? The norm group for the test is native English speakers. They are a moving target; they make on average ten months of progress each school year. This performance defines the 50<sup>th</sup> percentile (grade-level achievement) on standardized tests as the students progress from grade to grade. These tests measure continuous linguistic, cognitive, and academic growth in English. To eventually close the gap, English learners need to make more progress each year than the native English speakers make, because they start far below the level of native English speakers when they first take the test. The key to accelerated progress is for English learners to receive peer-equivalent grade-level bilingual schooling, so that they are not falling behind in cognitive and academic development. (For more detailed explanations, see Collier & Thomas, 2009.)

**Cognition and L1.** Another outcome of our research is confirmation of the role that the primary language serves in relation to cognitive development. Grosjean (1982) and Baker (2011) have published research syntheses summarizing this relationship, and Cummins (1981, 1991, 2000) highlights the importance of nonstop development of L1 to “a cognitive threshold,” which is generally considered to be around the age of 11-12, when they should reach young adult levels of cognitive development (thinking skills) in L1. In our research, we have found that English

learners who learn to read and write their L1 and continue developing cognitively through schoolwork in L1 are at least 2-3 years ahead of their peers who do not get this opportunity (Collier & Thomas, 2009; Thomas & Collier, 1997, 2002, 2012, 2014). In addition, when we follow students longitudinally who start dual language schooling in kindergarten, we find that the English learners reach grade level achievement in both L1 and L2 by around fifth or sixth grade. This is the same age range, ages 11-12, that the cognitive threshold research found significant. Dual language classes allow students to reach the cognitive threshold in L1, while students in only-L2 schooling typically do not reach the L1 cognitive threshold. The two major outcomes of all of our Thomas & Collier studies are that students schooled bilingually have higher levels of cognitive/academic development (as measured by school tests and teacher ratings) and they are much more deeply engaged with the learning process than their peers not in dual language classes (Collier & Thomas, 2009, 2014; Thomas & Collier, 2009, 2012, 2014; Thomas, Collier & Collier, 2010). Furthermore, dual language students' attendance is better; their overall interest in school is higher; and they report higher levels of satisfaction and enjoyment in dual language classes (Lindholm-Leary, 2001; Thomas & Collier, 2012, 2014).

In our studies, we have also confirmed the related sociolinguistic concept from Lambert (1975) that additive bilinguals (who acquire L2 at no cost to their proficient development of L1) do much better in school than subtractive bilinguals (who gradually lose use of L1 as they acquire L2). As an example of subtractive bilingualism, in the southwest U.S. during the 20<sup>th</sup> century many Spanish speakers experienced some significant loss of their L1 as they were discriminated against for speaking Spanish, including being physically punished in school, and consequently they did less well in school (Meier & Stewart, 1991). In the first two decades of the 21<sup>st</sup> century, bilingual schools are expanding rapidly throughout the U.S. including in the southwest, and we have seen a dramatic rise in Hispanic student achievement in each school district where we have analyzed the test scores of Spanish speakers attending dual language schools, in comparison to their Spanish-speaking peers not in dual language classes who sometimes continue to experience the negative results of subtractive bilingualism. The native English speakers attending two-way bilingual classes, being language-majority students, are already additive bilinguals, adding a second language to their linguistic repertoire at no cost to their English and their self-identity. When schools provide dual language education for language-minority students, these students can also become additive bilinguals, thereby creating the same opportunity for both majority and minority groups.

**Language teaching.** Another result of our research is its impact on methods of language teaching in the 36 school districts we have worked with. When we first started this research, most of our initial school district sites had two separate offices in the curriculum department, one for foreign language teaching mainly focused on native English speakers taking courses in languages other than English in middle and high school, and the other office for English as a second language services provided for English learners. The two offices rarely talked to each other. Foreign language courses were taught by teaching the language as a subject, focused on listening, speaking, reading, and writing skills, as well as grammar lessons and vocabulary acquisition. While foreign language teachers tried to add some "real life" activities to their lessons, the majority of the classes focused on learning *about* the language, with the goal that some students might one day travel to a country where that language was spoken and thus acquire more fluency in the language. ESL was also mostly taught as a subject, with minimal assistance for the students' other classwork in math, science, and social studies. At elementary school level, ESL was a support system for immigrants taught by pullout from the mainstream

class for 30-60 minutes, and secondary classes were one or two periods of ESL per day. Most ESL students were exited from these classes after two to three years of support.

As these school districts began to add bilingual schooling, they focused on providing it mainly for English learners, with some support from federal funds beginning in 1968. In the 1970s, 30 states had passed legislation supporting transitional bilingual education for English learners, to be provided for two or three years. There were some early experiments with integrated two-way bilingual schooling for native English speakers to join the classes along with English learners, but most of the bilingual classes were only for English learners. This led to ESL support being expanded to include some content instruction, to match the partner language teaching in the non-English language. Acquisition of a language for school contexts was no longer considered just a language class, but it required second language teachers to be certified to teach the subjects they were teaching, as well as to have knowledge of language teaching strategies, so that students received content subjects taught by teachers trained in second language teaching techniques. In the school districts that we have worked with, we provided feedback on the students' progress and strategies that seemed to work well for English learners to close the achievement gap with native English speakers. This has led to improved bilingual teaching strategies, incorporating well-developed systems for teaching language through academic content such as Sheltered Instruction (Echevarría, Vogt & Short, 2017) and Guided Language Acquisition Design ([www.ocde.us/projectglad](http://www.ocde.us/projectglad)).

During the decades since transitional bilingual education was first developed, an English-only political movement became a strong force that led to the dismantling of financial support for bilingual schooling at the federal government level, with some states reducing their support for this model. Three states (California, Massachusetts, and Arizona) passed voter referenda eliminating bilingual schooling for English learners. This led to an interesting development. Native English speaking parents who had enrolled their children in two-way (two language groups being schooled through their two languages) bilingual classes became determined to fight the English-only movement, by becoming advocates for this model and finding ways to continue this form of integrated bilingual schooling. The result is that current school policies in a number of U.S. states are encouraging the development of two-way dual language schooling for native English speakers and English learners to receive schooling through their two languages. California and Massachusetts voters are softening their stance on English-only, especially with the recent vote in California for Proposition 58 which no longer prohibits bilingual schooling for English learners. Several state governments (North Carolina, Utah, and Delaware) have chosen dual language schooling as a state-approved model for all students, with some state financial support when the school districts are prepared to implement this model. Some of our research studies have examined native English speakers' achievement in two-way dual language classes. We consistently find that they also achieve at significantly higher levels than their peers not in dual language (Collier, 1992b; Thomas & Collier, 2002, 2009, 2012, 2014; Thomas, Collier & Abbott, 1993; Thomas, Collier & Collier, 2010).

In the school districts that we have worked with, this dramatic shift in social attitudes towards bilingualism is influencing the current form of language teaching. Bilingual teachers are building a wealth of experience in innovations in teaching very heterogeneous classes, and these dual language classes mix students of different ethnicities, socioeconomic backgrounds, and linguistic and cultural diversity. Increasingly the teachers have come to understand that all students need to study through their primary language but that they can also successfully spend half of their instructional time in another language at no cost to their L1, making the students

additive bilinguals. Many of these school districts that we have worked with have gradually added secondary dual language classes to their curriculum and they offer K-12 studies in two languages (English plus the partner language) so that the students graduate deeply proficient and able to use both languages in their professional lives as adults. The focus is on dual language acquisition through all the subjects of the school curriculum, developing language proficiency at a far deeper level than that of the former foreign language and ESL classes of three decades ago. The most common name now for this enrichment model of bilingual schooling in the U.S. is called dual language education (Collier & Thomas, 2002, 2004, 2009, 2012; 2014; Thomas & Collier, 2012).

### **Theory Development: The Prism Model**

The Prism model, first published in Collier (1995a, 1995b, 1995c) and expanded in Thomas and Collier (1997) and Collier and Thomas (2007, 2009), grew out of our analyses of dataset after dataset, as we noticed repeating patterns emerging in the data pictures from our research sites. The research syntheses upon which the Prism model is based can be found in the above references as well as Ovando, Collier and Combs (2003). Overall, the Prism model defines major developmental processes that children experience during their school years that need to be supported at school for full, complete language acquisition and learning to take place. These include four major components: sociocultural, linguistic, academic, and cognitive processes, and for bilingual learners all four of these need to be fully developed in both L1 and L2.

Sociocultural processes are the emotional heart of experiences in school. They can include influences from the student's past and present, in all contexts—home, school, community, and the broader society. The second component of the model consists of the subconscious aspects of language development as well as the metalinguistic, conscious, formal teaching of the two languages in school. To assure cognitive and academic success in L2, the student's L1 must be developed to a high cognitive level throughout the elementary school years, including literacy in L1. The third component, academic development, includes all school work in every subject for every grade level, and the fourth component, cognitive development, is a natural, subconscious process that occurs from birth to the end of schooling and into adulthood. As discussed before, cognitive development in L1 to at least age 11-12 is crucial to success in full development of L2. These four components developed through both L1 and L2 are interdependent; if one is developed to the neglect of another, this may be detrimental to the student's overall growth. For example, since sociocultural processes can strongly influence students' access to cognitive, academic, and language development in both positive and negative ways, educators need to provide a socioculturally supportive school environment. When all Prism components are fully supported in school through both L1 and L2, learning and language acquisition can flourish and be sustained across the years of schooling.

Our original conceptualization of the Prism model grew out of discussions with Hispanic parents concerned about their children's education in the U.S. The general categories initially identified by the Hispanic parents matched with emerging theories based on research in second language acquisition (Ellis, 1985, 1994; Larsen-Freeman & Long, 1991; Wong Fillmore, 1991), as well as Cummins's theories on the interdependence of a student's first and second languages (Cummins, 2000). The real-world realities passionately shared by the Hispanic parents and the patterns emerging in our data analyses led to these insights. Our most up-to-date figures

illustrating the Prism model and their detailed explanation can be found in Collier and Thomas (2009, pp. 31-44).

Using the Prism model as a foundation for essentials that must be present in a school program, with each additional study we have added to our understanding of what happens to English learners across time and which school program and student background variables have the most influence on their academic success. We have also used the Prism model to compare what happens to native English speakers with what happens to English learners. Building on this knowledge base, we have identified distinguishing characteristics of the major program models provided in U.S. schools for English learners. These characteristics help to define what can become crucial differences for student success. In Collier and Thomas (2007, 2009) and Thomas and Collier (2012) we define each of these programs in detail and illustrate the use of the components of the Prism model. The results of our program comparisons over time throughout our 32 years of research with 36 school district research sites indicate that the degree of long-term achievement of English learners in each program is directly related to the number of Prism model dimensions addressed, the degree of coverage of these dimensions, and the duration of the program in years. We interpret this as evidence that the Prism model has construct validity, as well as predictive validity.

Many educators believe that socioeconomic status is the most powerful predictive factor in student achievement. Overall, it does have a lot of explanatory power, but we have found that well implemented dual language programs can substantially overcome the negative effect of this variable. In multiple linear regressions of the data from many of our research sites, we have found that in the mainstream monolingual English curriculum, socioeconomic status accounts for an average of 18 percent of English learners' achievement, while in a quality dual language program, socioeconomic status is reduced to only a 5 percent impact. In summary, we have found that the amount and quality of L1 support in the school program is the most powerful predictor of the long-term success of language minority students (Collier & Thomas, 2009; Thomas & Collier, 2002).

### **Analyses of State-wide Data**

We have recently completed several studies analyzing all school data from the state of North Carolina, at the request of the NC Department of Public Instruction (Thomas & Collier, 2009, 2014; Thomas, Collier & Collier, 2010). The focus of the research questions was to compare the achievement levels of students attending two-way dual language classes (English learners and native English speakers) to those in the mainstream monolingual curriculum, by examining all subgroups by ethnicity, socioeconomic status, and exceptionality (qualifying for special education services). It is the goal of the state to have at least one dual language school in every school district, and they are getting closer each year to achieving that goal, with over 120 dual language programs in all regions of the state as of 2016. This initiative was begun by the NC Department of Public Instruction and the NC state school board. The majority of the two-way dual language classes are taught in Spanish and English, with a few schools implementing programs in English and Cherokee, French, German, Greek, Japanese, or Mandarin Chinese. They have developed these programs for Grades K-8.

In these NC analyses, the large number of students of each ethnic group was sufficient to be able to examine separately the achievement of English learners, LM-not-ELs, Hispanics, African Americans, Caucasian Americans, as well as students of low income background, and students with special education needs (such as learning disabilities, autism, physically

handicapping conditions) attending dual language classes, comparing each of these to peers of the same category not in dual language classes. The results we found to be astounding. In each case, all of these groups attending dual language classes outperformed their peers not in dual language. But the unusual finding for us was the high achievement of the African American dual language students of low income who by middle school were two grades ahead of their African American peers of low income not in dual language. In interviews these students stated that they were proud to be in the program. They developed metalinguistic awareness of the differences between their community variety of English and standard English, and some of the teachers reported that they acquired native-like pronunciation of Spanish at a faster pace than other students. The findings imply that second language teaching strategies for dual language classes assist all students, both English learners and native English speakers, because in every lesson the teacher must provide many varied clues to meaning (scaffolding), because there are always second language learners in every class. The students with special needs were likewise doing far better in the dual language classes than their peers not in dual language, a finding similar to those reported by other researchers (Bruck, 1982; Genesee, 1987; Genesee, Paradis & Crago, 2004; Lindholm-Leary & Genesee, 2010; Lindholm-Leary & Howard, 2008). We can summarize from these findings that it does not harm any category of students to attend dual language classes, and all categories of students typically do better than their peers not in dual language.

### **Implications for School System Reform**

Our goal in our professional life's work has been to have a substantial impact on school policies, assisting the school districts to examine social justice issues for students who are doing less well in school. Our research has brought major change to the school districts we have worked with, and through our work with policy makers at local, state, and national levels around the U.S., we have seen school systems begin to transform their policies, based on their own research findings. Research-based practices lead to school decision-making that challenges established patterns. During most of the 20<sup>th</sup> century, U.S. schools had adopted the societal pattern of encouraging monolingualism in English. That practice is now changing dramatically as dual language education is becoming a popular choice for native English speaking parents. School administrators who hear about and observe dual language classes in a neighboring school district want to be the leaders who bring this innovation to their schools (Collier & Thomas, 2012, 2014). Language minority parents are beginning to request that their children be schooled in the two languages of their community. New immigrant families are often the most skeptical, but in our school district research sites LM parent advocacy groups have often organized to help explain to the new arrivals why this program works so well for their children to acquire better English and do better in school (Collier & Thomas, 2013, 2014; Thomas & Collier, 2012).

Even at the state level, this innovation is spreading. The latest indicator is the rapid growth in state biliteracy seals being developed, now approved in at least 22 states. The first one was approved in California in 2011, so in only six years, many states are choosing to acknowledge the importance of developing bilingualism during the school years. This allows students who attend dual language classes in grades K-12 to apply for the seal, certifying that they are proficient bilinguals in English and another language. Bilingualism/multilingualism is an idea whose time has come to the U.S., joining the rest of the very multilingual globe.

We encourage researchers in applied linguistics and education to work closely with school districts, listening to educators and students and their families, and then collaboratively designing studies that answer the concerns of education policy makers, teachers, and the

communities that they serve. We also encourage doctoral students who have had experience in dual language school contexts to move into higher education positions where they can assist the process of training qualified bilingual professionals for teaching and administrative positions in K-12 schools, since the greatest current challenge for dual language schools is finding qualified bilingual personnel. Professors in education, linguistics, and foreign language departments must work together to create innovative courses that prepare teachers and school leaders for teaching coursework across the curriculum (math, science, social studies, language arts, K-16) in at least two languages.

This article has provided a brief summary of all of our collaborative professional research and writing. For more details on our research findings, refer to our publications; the links to most of our publications can be found on our website, [www.thomasandcollier.com](http://www.thomasandcollier.com). Our latest book series available at [www.dlenm.org](http://www.dlenm.org) provides an overview of our research findings and implications for schools: *Educating English Learners for a Transformed World* (2009, Spanish edition 2013), *Dual Language Education for a Transformed World* (2012, Spanish edition in press 2017), *Creating Dual Language Schools for a Transformed World: Administrators Speak* (2014), *Why Dual Language Schooling? The Research Rationale* (in press, 2017), *Transforming Secondary Education: Middle and High School Dual Language Programs* (to be published in 2018).

## References

- Baker, C. (2011). *Foundations of bilingual education and bilingualism* (5<sup>th</sup> ed.). Bristol, UK: Multilingual Matters.
- Baker, C., & Prys-Jones, S. (1998). *Encyclopedia of bilingualism and bilingual education*. Bristol, UK: Multilingual Matters.
- Bruck, M. (1982). Language disabled children: Performance in an additive bilingual education program. *Applied Psycholinguistics*, 3, 45-60.
- Christian, D., & Genesee, F. (Eds.). (2001). *Bilingual education*. Alexandria, VA: Teachers of English to Speakers of Other Languages.
- Collier, V.P. (1987). Age and rate of acquisition of second language for academic purposes. *TESOL Quarterly*, 21, 617-641.
- Collier, V.P. (1988). *The effect of age on acquisition of a second language for school*. Washington, DC: National Clearinghouse for English Language Acquisition.
- Collier, V.P. (1989). How long? A synthesis of research on academic achievement in second language. *TESOL Quarterly*, 23, 509-531.
- Collier, V.P. (1992a). A synthesis of studies examining long-term language minority student data on academic achievement. *Bilingual Research Journal*, 16(1-2), 187-212.
- Collier, V.P. (1992b). The Canadian bilingual immersion debate: A synthesis of research findings. *Studies in Second Language Acquisition*, 14, 87-97.
- Collier, V.P. (1995a). *Acquiring a second language for school*. Washington, DC: National Clearinghouse for English Language Acquisition.
- Collier, V.P. (1995b). *Promoting academic success for ESL students: Understanding second language acquisition for school*. Elizabeth, NJ: New Jersey Teachers of English to Speakers of Other Languages-Bilingual Educators.
- Collier, V.P. (1995c). Second language acquisition for school: Academic, cognitive, sociocultural, and linguistic processes. In J.E. Alatis et al. (Eds.), *Georgetown University Round Table on Languages and Linguistics 1995* (pp. 311-327). Washington, DC: Georgetown University Press.
- Collier, V.P., & Thomas, W.P. (1989). How quickly can immigrants become proficient in school English? *Journal of Educational Issues of Language Minority Students*, 5, 26-38.
- Collier, V.P., & Thomas, W.P. (2002). Reforming education policies for English learners means better schools for all. *The State Education Standard*, 3(1), 30-36. (The journal of the

- National Association of State Boards of Education, Alexandria, Virginia).
- Collier, V.P., & Thomas, W.P. (2004). The astounding effectiveness of dual language education for all. *NABE Journal of Research and Practice*, 2(1), 1-20.
- Collier, V.P., & Thomas, W.P. (2007). Predicting second language academic success in English using the Prism Model. In J. Cummins & C. Davison (Eds.), *International handbook of English language teaching, Part 1* (pp. 333-348). New York: Springer.
- Collier, V.P., & Thomas, W.P. (2009). *Educating English learners for a transformed world*. Albuquerque, NM: Dual Language Education of New Mexico-Fuente Press. Print and electronic editions.
- Collier, V.P., & Thomas, W.P. (2012). What really works for English language learners: Research-based practices for principals. In G. Theoharis & J. Brooks (Eds.), *What every principal needs to know to create equitable and excellent schools* (pp. 155-173). New York: Teachers College Press.
- Collier, V.P., & Thomas, W.P. (2013). *La educación de los estudiantes de inglés para un mundo en constante transformación*. Albuquerque, NM: Dual Language Education of New Mexico-Fuente Press. Electronic edition.
- Collier, V.P., & Thomas, W. P. (2014). *Creating dual language schools for a transformed world: Administrators speak*. Albuquerque, NM: Dual Language Education of New Mexico-Fuente Press. Print and electronic editions.
- Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In California State Department of Education (Ed.), *Schooling and language minority students: A theoretical framework*. Los Angeles: California State University; Evaluation, Dissemination, and Assessment Center.
- Cummins, J. (1991). Interdependence of first- and second-language proficiency in bilingual children. In E. Bialystok (Ed.), *Language processing in bilingual children* (pp. 70-89). Cambridge: Cambridge University Press.
- Cummins, J. (2000). *Language, power and pedagogy: Bilingual children in the crossfire*. Bristol, UK: Multilingual Matters.
- Cummins, J., & Hornberger, N.H. (Eds.). (2008). *Encyclopedia of Language and Education. Vol. 5, Bilingual Education* (2<sup>nd</sup> ed.). New York: Springer.
- Dolson, D. (1985). Bilingualism and scholastic performance: The literature revisited. *NABE Journal*, 10(1), 1-35. (ERIC Document Reproduction Service No. EJ 367 966 or ED 291 257)

- Dutcher, N. (2001). *The use of first and second languages in education: A review of international experience* (2<sup>nd</sup> ed.). Washington, DC: Center for Applied Linguistics.
- Echevarria, J., Vogt, M.E., & Short, D. (2017). *Making content comprehensible for English language learners: The SIOP model* (5<sup>th</sup> ed.). Boston: Pearson.
- Ellis, R. (1985). *Understanding second language acquisition*. Oxford: Oxford University Press.
- Ellis, R. (1994). *The study of second language acquisition*. Oxford: Oxford University Press.
- García, O., Skutnabb-Kangas, T., & Torres-Guzmán, M. (Eds.). (2006). *Imagining multilingual schools: Languages in education and globalization*. Bristol, UK: Multilingual Matters.
- Genesee, F. (1987). *Learning through two languages: Studies of immersion and bilingual education*. New York: Newbury House.
- Genesee, F., Paradis, J., & Crago, M.B. (2004). *Dual language development and disorders: A handbook on bilingualism and second language learning*. Baltimore: Paul H. Brookes Publishing.
- Greene, J. (1998). *A meta-analysis of the effectiveness of bilingual education*. Austin, TX: Tomas Rivera Policy Institute, University of Texas-Austin.
- Grosjean, F. (1982). *Life with two languages: An introduction to bilingualism*. Cambridge, MA: Harvard University Press.
- Helot, C., & de Mejia, A. (2008). *Forging multilingual spaces: Integrated perspectives on majority and minority bilingual education*. Bristol, UK: Multilingual Matters.
- Krashen, S., & Biber, D. (1988). *On course: Bilingual education's success in California*. Sacramento, CA: California Association for Bilingual Education.
- Lambert, W.E. (1975). Culture and language as factors in learning and education. In A. Wolfgang (Ed.), *Education of immigrant students*. Toronto: Ontario Institute for Studies in Education.
- Larsen-Freeman, D., & Long, M. (1991). *An introduction to second language acquisition research*. New York: Longman.
- Lindholm-Leary, K. (2001). *Dual language education*. Bristol, UK: Multilingual Matters.
- Lindholm-Leary, K., & Borsato, G. (2006). Academic achievement. In F. Genesee, K. Lindholm-Leary, W. Saunders, & D. Christian (Eds.), *Educating English language learners: A synthesis of research evidence* (pp. 176-222). New York: Cambridge University Press.

- Lindholm-Leary, K., & Genesee, F. (2010). Alternative educational programs for English learners. In *Improving Education for English Learners: Research-based approaches* (pp. 323-382). Sacramento, CA: California Department of Education.
- Lindholm-Leary, K., & Howard, E. (2008). Language and academic achievement in two-way immersion programs. In T. Fortune & D. Tedick (Eds.), *Pathways to bilingualism: Evolving perspectives on immersion education*. Bristol, UK: Multilingual Matters.
- May, S., & Hill, R. (2005). Maori-medium education: Current issues and challenges. *International Journal of Bilingual Education and Bilingualism*, 8(5), 377-403.
- Meier, K.J., & Stewart, J. (1991). *The politics of Hispanic education: Un paso pa'lante y dos pa'tras*. Albany, NY: State University of New York Press.
- National Center for Education Statistics. (2016). Racial/ethnic enrollment in public schools. Washington, DC: U.S. Department of Education. [https://nces.ed.gov/programs/coe/indicator\\_cge.asp](https://nces.ed.gov/programs/coe/indicator_cge.asp)
- Ovando, C.J., Collier, V.P., & Combs, M.C. (2003). *Bilingual and ESL classrooms: Teaching in multicultural contexts* (3<sup>rd</sup> ed.). New York: McGraw-Hill.
- Ramírez, J.D.(1992). Executive summary. *Bilingual Research Journal*, 16(1-2), 1-62.
- Rolstad, K., Mahoney, K., & Glass, G.V. (2005). The big picture: A meta-analysis of program effectiveness research on English language learners. *Educational Policy*, 19(4), 572-594.
- Skuttnabb-Kangas, T., Phillipson, R., Mohanty, A.K., & Panda, M. (Eds.). (2009). *Social justice through multilingual education*. Bristol, UK: Multilingual Matters.
- Thomas, W.P. (1992). An analysis of the research methodology of the Ramírez study. *Bilingual Research Journal*, 16(1-2), 213-245.
- Thomas, W.P., & Collier, V.P. (1997). *School effectiveness for language minority students*. Washington, DC: National Clearinghouse for English Language Acquisition.
- Thomas, W.P., & Collier, V.P. (2002). *A national study of school effectiveness for language minority students' long-term academic achievement*. Santa Cruz, CA: Center for Research on Education, Diversity and Excellence, University of California-Santa Cruz.
- Thomas, W.P., & Collier, V.P. (2009). *English learners in North Carolina, 2009*. Fairfax, VA: George Mason University. A research report provided to the North Carolina Department of Public Instruction.
- Thomas, W.P., & Collier, V.P. (2012). *Dual language education for a transformed world*. Albuquerque, NM, Dual Language Education of New Mexico-Fuente Press. Print and electronic editions. Spanish edition in press (2017).

- Thomas, W.P., & Collier, V.P. (2014). *English learners in North Carolina dual language programs: Year 3 of this study: School Year 2009-2010*. Fairfax, VA: George Mason University. A research report provided to the North Carolina Department of Public Instruction.
- Thomas, W.P., Collier, V.P., & Abbott, M. (1993). Academic achievement through Japanese, Spanish, or French: The first two years of partial immersion. *Modern Language Journal*, 77, 170-179.
- Thomas, W.P., Collier, V.P., & Collier, K. (2010). *English learners in North Carolina, 2010*. Fairfax, VA: George Mason University. A research report provided to the North Carolina Department of Public Instruction.
- Troike, R. (1978). Research evidence for the effectiveness of bilingual education. *National Association for Bilingual Education Journal*, 3, 13-24. (ERIC Document Reproduction Service No. ED 159 900)
- Tucker, R. (1999). A global perspective on bilingualism and bilingual education. *ERIC Digest*. ERIC Clearinghouse on Languages and Linguistics, Center for Applied Linguistics.
- Willig, A.C. (1985). A meta-analysis of selected studies on the effectiveness of bilingual education. *Review of Educational Research* 55(3), 269-317. (ERIC Document Reproduction No. EJ 324 690)
- Wong Fillmore, L. (1991). Second language learning in children: A model of language learning in social context. In E. Bialystok (Ed.), *Language processing in bilingual children* (pp. 49-69). Cambridge: Cambridge University Press.