

## CHAPTER 22

# PREDICTING SECOND LANGUAGE ACADEMIC SUCCESS IN ENGLISH USING THE PRISM MODEL

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### ABSTRACT

Many students in English-speaking contexts who are new to the English language have to acquire proficiency in the language, and at the same time learn a range of academic content, some of which is very unfamiliar. The Prism model defines factors that allow for predictions to be made regarding English learners' degree of second language acquisition in an academic context. In this chapter, the authors describe in detail the components and dimensions of the Prism model and describe several currently popular types of education programs for English language learners in the United States in terms of their degree of adherence to the model. Finally, we compare the predictions of the Prism model, using predicted rankings of relative program success, to the actual measured effectiveness of each program in producing varying degrees of English learners' achievement gap closure with mother tongue-English speakers.

### INTRODUCTION

The Prism model, first published in Collier (1995a, 1995b, 1995c) and expanded in Thomas and Collier (1997), was initially conceived in a dialogue with a group of Hispanic parents concerned about their children's education in the USA. The parents spoke of their passions and concerns, and several of the elements of the prism emerged as we jotted down issues on the chalkboard. Over the following year, these same issues continued to surface in the research on academic achievement in a second language (L2) context. The general categories initially identified by the Hispanic parents matched closely with emerging theories based on research in SLA (Ellis, 1994; Larsen-Freeman & Long, 1991; Wong-Fillmore, 1991). The Prism model also closely connects to other social science theories, such as Cummins' theories on negotiating identities and the interdependence of a student's first and second languages (Cummins, 2000). As we studied the lists of variables that we were examining in our research on the long-term academic achievement of students acquiring ESL in school, to organize the variables into major categories, the components of the Prism model began to take shape.

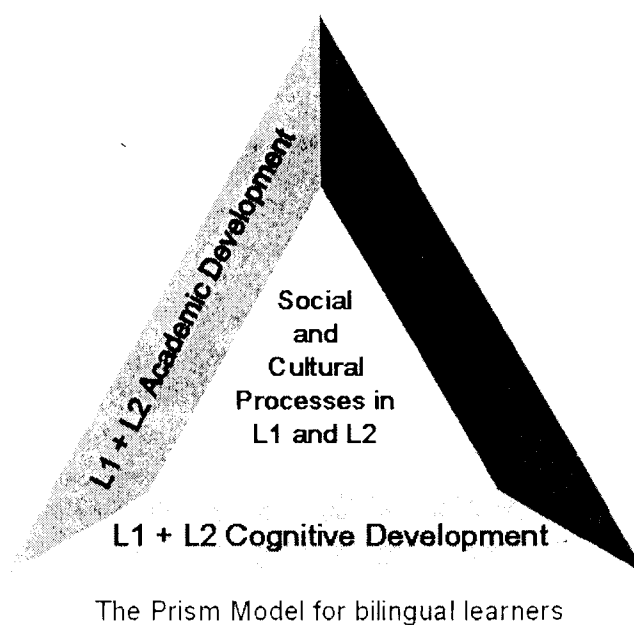
The research synthesis, upon which the Prism model is based, can be found in Collier (1995a, 1995b, 1995c) and Ovando et al. (2003). Overall, the Prism model defines major developmental processes that children experience during their school years that need to be supported at school for language acquisition and learning to take place. The model can be applied to mother tongue-English speakers learning an L2 as well as to students acquiring English as their L2. The model can be used to

predict the major school factors that help to close the academic achievement gap in L2, a current topic of considerable importance in English-speaking countries, as increasing numbers of children who do not know English arrive in schools.

### THE PRISM MODEL: LANGUAGE ACQUISITION FOR SCHOOL

The Prism model has four major components that drive language acquisition for school: sociocultural, linguistic, academic, and cognitive processes. To experience success in L2 academic contexts, L2 students who are not yet proficient in English need a school context that provides the same basic conditions and advantages that the English-speaking group experiences. This includes attention to the ongoing developmental processes that occur naturally for any child through the school years. For students from a language other than English home background, these interdependent processes—cognitive, academic, and linguistic development—must occur in a supportive sociocultural environment through both their first language (L1) and their L2 to enhance student learning.

The Prism model has eight dimensions, comprising these sociocultural, linguistic, academic, and cognitive processes in L1 and L2. This is illustrated in Figure 1.



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*Figure 1. Language acquisition for school*

As you examine this figure, which looks triangular on the flat surface of the page, visualize instead that you are looking down through a complex multi-dimensional prism, with the student in the center. Connected to the student's emotional responses to learning are the sociocultural processes that influence the learning process. Interconnected to this component are the other three major

interdependent and complex components—linguistic, academic, and cognitive processes. Each of these dimensions will be described in turn.

### ***Sociocultural Processes***

At the heart of the Prism model is the individual student acquiring a L2 in school. Central to that student's acquisition of language are all of the surrounding social and cultural processes occurring in everyday life within the student's past, present, and future, in all contexts—home, school, community, and the broader society. For example, sociocultural processes at work in SLA may include individual students' emotional responses to school such as self-esteem or anxiety or other affective factors. At school, the instructional environment in a classroom or administrative program structure may create social and psychological distance between groups. Community or regional social patterns such as prejudice and discrimination expressed towards groups or individuals in personal and professional contexts, as well as societal patterns such as the subordinate status of a minority group or acculturation versus assimilation forces at work can all influence students' achievement in school. These factors can negatively affect the student's response to the new language and learning through the L2, unless the student is in a very socioculturally supportive environment.

### ***Language Development***

Linguistic processes, a second component of the model, consist of the subconscious aspects of language development (an innate ability all humans possess for acquisition of oral language), as well as the metalinguistic, conscious, formal teaching of language in school, and the acquisition of the written system of language. This includes the acquisition of the oral and written systems of the student's first and second languages across all language domains, such as phonology (the pronunciation system), vocabulary, morphology and syntax (the grammar system), semantics (meaning), pragmatics (how language is used in a given context), discourse (stretches of language beyond a single sentence), and paralinguistics (nonverbal and other extralinguistic features). To assure cognitive and academic success in the L2, a student's L1 system, oral and written, must be developed to a high cognitive level at least throughout the elementary school years.

### ***Academic Development***

A third component of the model, academic development, includes all school work in language arts, mathematics, the sciences, social studies, and the fine arts for each grade level, K-12 and beyond. With each succeeding grade, academic work dramatically expands the vocabulary, sociolinguistic, and discourse dimensions of language to higher cognitive levels. Academic knowledge and conceptual development transfer from the L1 to the L2. Thus, it is most efficient to develop academic work through students' L1, while teaching the L2 during other periods of the school day or week through meaningful academic content that reinforces and expands on the knowledge developed but does not repeat the academic work in L1. In earlier decades in the USA teaching L2 was recommended as the first step and the teaching of academic content postponed. However, research has shown that

postponing or interrupting academic development while students work on acquiring the L2 is likely to lead to academic failure in the long-term. In an information-driven society that demands more knowledge processing with each succeeding year, English language learners cannot afford to lose time, especially when their English-speaking peers are steadily making one year's progress in one year's time.

### *Cognitive Development*

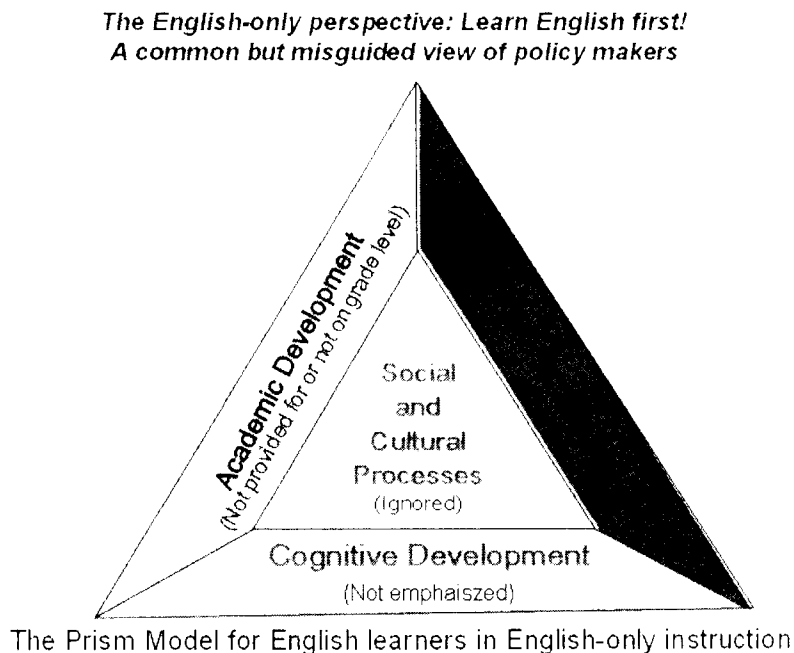
The fourth component of this model, the cognitive dimension, is a natural, subconscious process that occurs developmentally from birth to the end of schooling and beyond. An infant initially builds thought processes through interacting with loved ones in the language of the home. All parents (including those non-formally schooled) naturally stimulate children's L1 cognitive growth through daily interaction and family-based problem solving in the language the parents know best. Students bring 5-6 years of cognitive development in their L1 to their first day of school. This is a knowledge base, an important stepping stone to build on as cognitive development continues. It is extremely important that cognitive development continues through a child's L1 at least through the elementary school years. Extensive research has demonstrated that children who reach full cognitive development in two languages (generally reaching the threshold in their L1 by around age 11-12) enjoy cognitive advantages over monolinguals. Cognitive development was mostly neglected by L2 educators in the USA until the past decade. Language teaching curricula were simplified, structured, and sequenced during the 1970s, and when academic content was added to language lessons in the 1980s, academic content was watered down into cognitively simple tasks, often under the label of *basic skills*. Too often neglected was the crucial role of cognitive development in the L1. Now we know from the growing research base that educators must address linguistic, cognitive, and academic development equally through both first and second languages if they are to assure students' academic success in the L2. This is especially necessary if English language learners are ever to reach full parity in all curricular areas with L1 English speakers.

### *Interdependence of the Four Components*

All of these four components—sociocultural, academic, cognitive, and linguistic—are interdependent. If one is developed to the neglect of another, this may be detrimental to a student's overall growth and future success. The academic, cognitive, and linguistic components must be viewed as natural developmental processes. For the child, adolescent, and young adult still attending formal schooling, development of any one of the three academic, cognitive, and linguistic components depends critically on the simultaneous development of the other two through both first and second languages. Also, sociocultural processes strongly influence students' access to cognitive, academic, and language development in both positive and negative ways. It is crucial that educators provide a socioculturally supportive school environment, allowing natural language, academic, and cognitive development to flourish in both L1 and L2.

## THE INSTRUCTIONAL SITUATION FOR THE ENGLISH LANGUAGE LEARNER IN AN ENGLISH-ONLY PROGRAM

Using all the components of the Prism model, we can apply this research knowledge base to the varying school programs provided for English language learners in the United States. This comparison will make clear where the school experience of English language learners is different from that of L1 English speakers, the source of achievement gaps. The common view of many education policy makers in English-speaking countries such as the USA, that students must learn English first, is portrayed in Figure 2.



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*Figure 2. Second language acquisition for school*

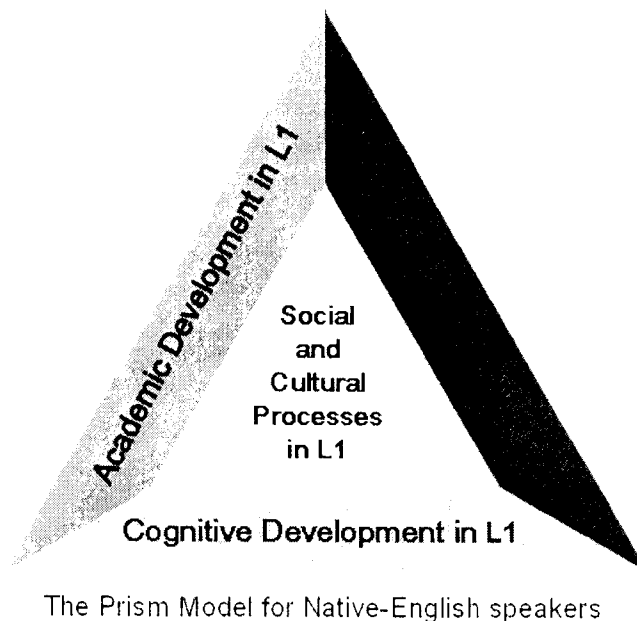
From a common-sense perspective, it would seem obvious that the first step anyone should take when entering a new country is to learn the language of that country. This may indeed be a wise decision for an adult immigrant who has been formally schooled and who has completed development in two of the prism components—cognitive and academic development—and lacks only one dimension of the linguistic component, acquisition of the L2, having already acquired the L1 to an adult level of proficiency. However, the school-aged child is in a very different situation. Developmental processes must continue without interruption through the school years in order for a child to reach the cognitive maturity of an adult.

Academic development must also continue without interruption for full adult mastery of the academic curriculum to occur. English is only one part of the learning process. When learning English is the first goal, during the period that this goal is the priority, the Prism model of language acquisition for school is reduced to mainly one dimension, development of one language (L2) and the other half of that

component is missing—the continuing development of L1. This has unhappy consequences for the student in three out of four of the Prism model's components.

Firstly, meaningful academic development is not provided for in the initial years, because the highest priority is learning English rather than academic content. In succeeding years, academic development is often not at grade level, because students studying entirely in the L2 have missed at least two years of academic work while acquiring a basic knowledge of the L2. Secondly, cognitive development is not emphasized in the L2 and is not provided for in the L1 at school. Students enter school having completed six years of cognitive development in their L1. These students must continue to develop cognitively at the same rate as do other mother tongue English-speaking students in their first language. Switching a student's language of instruction to all-English causes a cognitive slowdown for English language learners that can last for several years. During this period, the English mother tongue speakers continue to develop cognitively at normal rates but the English language learners fall behind in cognitive development and may never catch up to their continually advancing mother tongue English peers. Thirdly, in an English-only environment, sociocultural processes may be largely ignored or less well provided for, and thus, as students feel that they are not in a supportive environment, less learning takes place.

In contrast, from kindergarten on, mother tongue-English speakers are instructed in all their school subjects through their L1, the language in which they are cognitively developed appropriate to their age. Even those who choose to participate in a bilingual class do not fall behind in other school subjects while learning another language during the school years. Thus, for most English mother tongue speakers, all four dimensions of the Prism model are in place in L1, including schooling in a socioculturally supportive environment and continuous cognitive and linguistic development in L1.



### HOW ACADEMIC PROGRESS IS MEASURED FOR BOTH MOTHER TONGUE AND SECOND LANGUAGE SPEAKERS OF ENGLISH

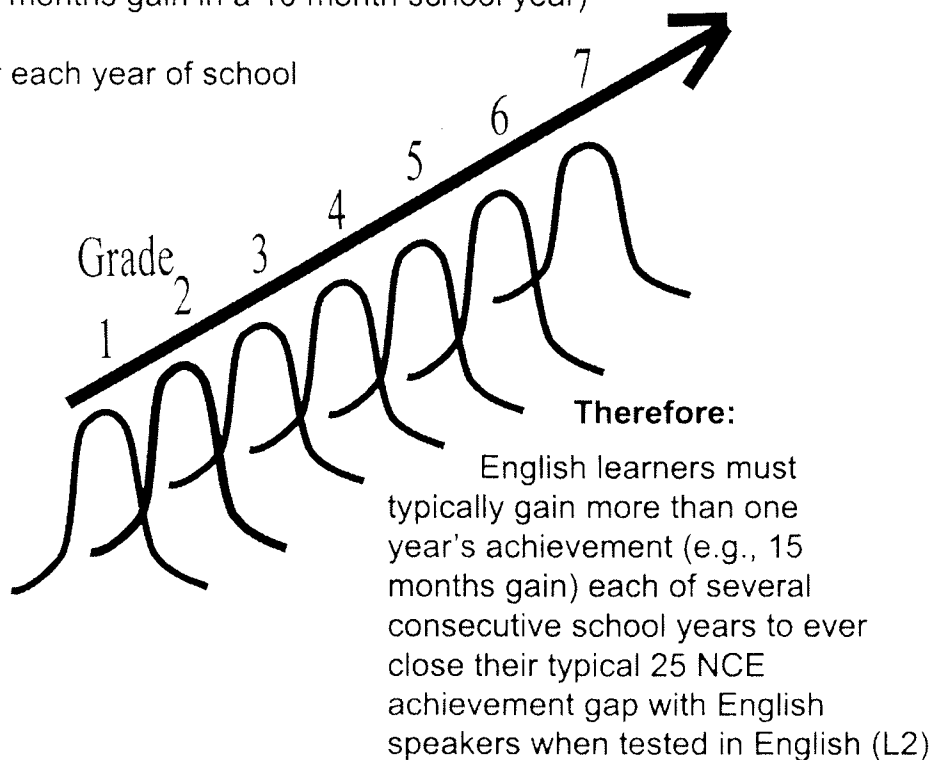
Typical mother tongue speakers of English in the USA make 10 months' progress in school achievement for each 10-month school year. This performance defines the 50th percentile or *normal curve equivalent* (NCE—an equal-interval percentile) on standardized norm-referenced tests and the average score on criterion-referenced tests as the students progress from grade to grade. Likewise, on a state or school district performance assessment, the standards developed for each grade level are also based on typical performance of groups of mother tongue English speakers on these tests. These tests measure continuous linguistic, cognitive, and academic growth in English, and the tests change weekly, monthly, and yearly to reflect that growth. It is on these school tests administered in English that English language learners are unrealistically expected to be able to demonstrate miraculous growth. Policy makers assume that non-English-proficient students should somehow be able to leap from the 1st percentile or NCE to the 50th (as compared to mother tongue speakers of English) in one to two years. During this period, mother tongue speakers continue to make 10 months' progress over a period of 10 months. Yet, if English learners are being taught only in English, a language they do not yet understand, they need at least two to three years to reach a high enough level of proficiency in L2 to attempt to keep up with the pace of the mother tongue-English speaker in school. For example, students in one group who are not yet proficient in English might study English intensively, and by the end of their first two years, make an enormous leap from the 1st to the 20th NCE when the students first take a standardized test in English reading, English language arts, and mathematics. To score at the level of the typical mother tongue-English speaker (50th percentile or NCE) in all school subjects, these English language learners must then continue to make *more* than one year's progress in one year and do so for several consecutive years to close the initial gap of 25-30 NCEs. Figure 4 visually illustrates this point.

For English language learners, progress at the typical rate of mother tongue-English speakers means only maintaining the initial large gap, not closing it, as the mother tongue-English speakers continue to make additional progress in all Prism components with each passing year. If English language learners make less than typical mother tongue-English speaker progress (e.g., English language learners might make 6 months' progress in one 10-month school year while typical mother tongue speakers make 10 months' progress), the initial large achievement gap will widen even further.

To illustrate further, if a group of English language learners experiences an initial 3-year gap in achievement assessed in English (math, science, social studies, language arts, reading, writing), they must make an average of about 1 ½ years' progress in the next 6 consecutive years (for a total of 9 years' progress in 6 years—a 30-NCE gain, from the 20th to the 50th NCE) to reach the same long-term performance level that a typical mother tongue-English speaker reaches by making 1 year's progress in 1 year for each of the 6 years (for a total of 6 years' progress in 6 years—a zero-NCE gain, staying at the 50th NCE). This is a difficult task indeed, even for an English language learner who has received excellent formal schooling before entering USA schools and whose achievement is on grade level for his/her

Typical native-English speakers (50th percentile or NCE)  
make one year of achievement gain during each school year  
(10 months gain in a 10 month school year)

For each year of school



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Figure 4. An important understanding

age when tested in his/her mother tongue. Still more daunting is the task of the English learner whose schooling has been interrupted by social or economic upheaval or warfare. Learning English while keeping up with mother tongue speakers' progress in other school subjects *and* while making up the material lost to interrupted or non-existent schooling in the student's country of origin is a truly formidable undertaking.

It is for these reasons that peer-equivalent grade-level bilingual schooling is essential to these students' long-term academic success. While the student is making the gains needed with each succeeding year to close the gap in performance on the tests in English, that bilingual student is not falling behind in cognitive and academic development. Once the bilingual students' average achievement reaches the 50th percentile or NCE (the average achievement level of mother tongue-English speakers) on school tests in English, the cognitive and academic work in L1 has kept these students on grade level and they sustain grade-level performance in English even as the academic work gets increasingly complex with each succeeding year in middle and high school.

Furthermore, L1 language development at school is deeply interrelated with cognitive development. Children who stop cognitive development in L1 before they have reached the final Piagetian stage of formal operations (somewhere around puberty) run the risk of suffering negative consequences as measured by school



tests. Many studies indicate that if students do not reach a certain threshold in their L1, they may experience cognitive difficulties in the L2. Furthermore, developing cognitively and linguistically in L1 at least throughout the elementary school years provides a knowledge base that transfers from L1 to L2. When schooling is provided in both L1 and L2, both languages are the vehicle for strong cognitive and academic development. Linguistically, deep structure in L1 transfers to L2. Literacy skills transfer from L1 to L2 even when L1 is a non-Roman-alphabet language and L2 is English. Cognitive processes developed in L1 transfer to L2 (Ovando, Collier, & Combs, 2003).

Thus, the simplistic notion that all we need to do is to teach English language learners the English language does not address the needs of the school-age child. Furthermore, when we teach only the English language, we are literally slowing down a child's cognitive and academic growth (as well as ignoring the sociocultural aspects of learning), and that child may never catch up to the constantly advancing mother tongue-English speaker.

### PREDICTIONS ON PROGRAM EFFECTIVENESS USING THE PRISM MODEL

In our series of longitudinal research studies (Thomas & Collier, 1997, 2002) conducted from 1985 to the present in 23 school districts in 15 states of the United States, we have collected data on English language learners' academic achievement across grades K-12. With each study, we have added to our understanding of what happens to these students across time and which school program and student background variables have the most influence on their academic success. We have examined the wide variety of USA school services provided for English learners and have been able to identify characteristics of school programs that distinguish one program from another. Figure 5 provides an overview of major program models developed for English language learners in the USA and their distinguishing characteristics based on the components of the Prism model.

The major types of programs for English language learners in the USA are illustrated on a continuum from left to right, from those programs with the least amount of support for the eight Prism dimensions to those programs with the most complete support for all of the Prism dimensions. For example, in the far left column is the program developed in response to Proposition 227 of California, as described in the referendum passed by voters in 1998. This program has to date demonstrated the least amount of success in closing the achievement gap, with the achievement gap between English language learners and mother tongue-English speakers remaining constant or even slightly widening during the first three years of its implementation. In the far right column is *two-way enrichment dual language education* (also called *bilingual immersion*), the program with the broadest coverage of the Prism dimensions. In the remainder of this chapter, we will examine the features of each program for its adherence to the four components of the Prism model in both L1 and L2. Finally, we will use large-scale data-based research findings to compare English language learners' progress over time in school systems where each of the different program types has been well implemented, as measured by fidelity to the definition of the program model. In other words, we will answer

While in these programs → students receive:	REMEDIAL					ENRICHMENT	
	As in law	As well implemented				As well implemented	
	Proposition 227 in California	ESL Pullout	ESL Taught Through Content	TBE* with Traditional Teaching	TBE* with Current Teaching	One-way DL/DBE** -one group taught in two languages	Two-way DL/DBE** -two groups taught in their two languages
Cognitive Emphasis	None	Little	Some	Some	Moderate	Strong	Strong
Academic Emphasis (in all school subjects)	None	None	Yes	Yes	Yes	Yes	Yes
Linguistic Emphasis L1=primary language, L2=English	Only Social English (only in L2)	Only Social English (only in L2)	Academic English (only in L2)	Develops Partial L1 + L2 Academic Proficiency	Develops Partial L1 + L2 Academic Proficiency	Develops Full L1 + L2 Academic Proficiency	Develops Full L1 + L2 Academic Proficiency
Sociocultural Emphasis C1=1st culture C2=2nd culture	None	Little	Some	Some	Moderate	Strong C1+C2	Strong C1+C2
Program Length	Transitory 1 year	Short-term 1-2 years	Short-term 2-3 years	Short-term 2-3 years	Intermediate 3-4 years	Sustained 6-12 years	Sustained 6-12 years
Native Language Academic Support	None	None	None	Some	Moderate	Strong	Strong
Exposure to English Speakers	No	Yes	Yes	No	Yes Half-day	Yes Half-day	Yes All day
Extra Instructional Cost	High (extra teachers needed)	High (extra teachers needed)	High (extra teachers needed)	Small-to-moderate (special curriculum)	Small-to-moderate (special curriculum)	Least expensive: Standard mainstream curriculum	Least expensive: Standard mainstream curriculum
Percent of Achievement Gap With Native-English Speakers Closed by End of Schooling (based on data-analytic research)	Unresearched longitudinally but no evidence of gap closure by ELLs since 1998 start	None final average scores at 11 <sup>th</sup> national percentile -max is 18th	Less than 50% final average scores at 22nd national percentile - max is 32nd	Less than 50% final average scores at 24th national percentile	More than 50% final average scores at 32nd national percentile (but 90-10 TBE at 45 <sup>th</sup> percentile)	100% of gap fully closed by end of school -- average scores at or above 50th national percentile	100% of gap fully closed by end of school -- average scores above 50th national percentile

\* TBE stands for *transitional bilingual education*

\*\* DL/DBE stands for *dual language/ developmental bilingual education*

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Figure 5. Summary of characteristics and effectiveness of common U.S. programs for English learners

the question of how well students do in school in their L2 depending upon the particular school program in which they are placed when they first arrive in the school system with no English proficiency. This will illustrate the predictive power of the Prism model by demonstrating a direct relationship between each program's coverage of the Prism dimensions and the degree of educational effectiveness for that program.

***One Year Intensive English Only***

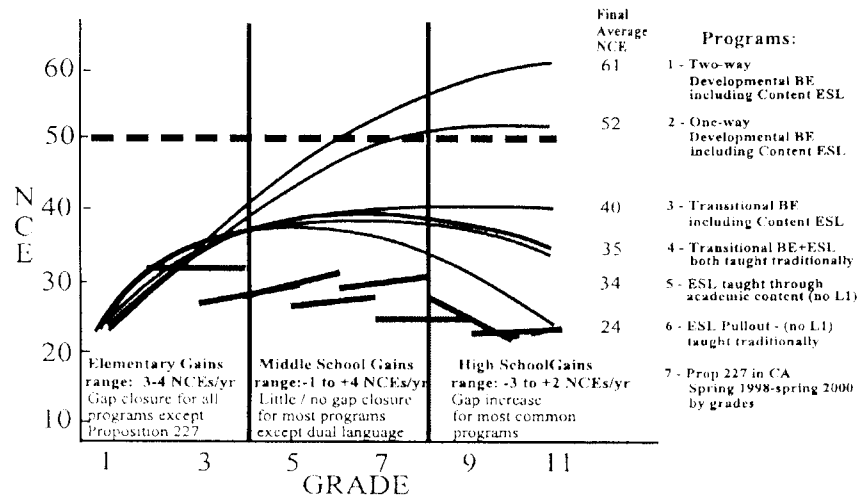
Proposition 227, approved by California voters through a referendum in 1998, specifies that students not proficient in English should be placed in a one-year program to learn intensive English. This plan segregates the students in a classroom separate from the English mainstream and does not address how the students are to be given access to the rest of the curriculum—math, science, and social studies. The strongest principle stated in the referendum is that students are not to be instructed using their L1—only English instruction is allowed. Following passage of the referendum, few schools in California chose to deny students access to the curriculum, but many felt obligated to follow the principal purpose of the referendum to eliminate bilingual instruction. Only in schools where parents requested waivers have students been given continuing instruction through both L1 and L2. Some schools chose to continue or develop two-way dual language programs as another alternative to the referendum, a program supported by English-speaking parents who choose for their children to participate in the bilingual classes. As a result of the referendum, only approximately 15% of English learners in California continue to be taught through both L1 and L2.

The program mandated in Proposition 227 provides the least support for the eight dimensions of the Prism model as represented in the English-only Prism presented in Figure 2. Sociocultural support is not addressed in this program—the teachers are expected to teach only in English and respond to the students only in English. In these intensive English classes, a bicultural curriculum that would address some of the emotional/affective side of learning is not encouraged. Cognitive development is not addressed in the language of the referendum. Since students are to be taught exclusively in English in a segregated context where they do not have access to mother tongue English-speaking peers, there is little stimulus for cognitive development which best occurs in interactions with same-aged peers in the L2 or through age-appropriate problem-solving tasks done in L1. Since the students are denied use of their L1 in school, little cognitive development is stimulated in this one-year program. Even academic development is ignored, with heavy emphasis on English development rather than teaching English through meaningful academic content. Finally, the referendum clearly dictates that all instruction will be in English, so students in this program are denied access to academic, cognitive, and linguistic development through their mother tongue. This eliminates half of the Prism dimensions—all four dimensions developed through L1.

The Prism model predicts that bilingual learners receiving accelerated learning through their two languages develop socioculturally, linguistically, cognitively, and academically through each language—eight dimensions in all. In contrast, Proposition 227 supports students in only one dimension, i.e. acquiring the English language and only for one year. This is extremely minimal support. Our analyses (see Figure 6) as well as other researchers' studies have found that English learners in this program have not made any progress towards closing the achievement gap and the gap has widened in the secondary years. Thus, this program has resulted in the lowest achievement for English learners of any program in the USA (Parrish, et al. 2002; Thompson et al., 2002).

(Results aggregated from a series of a longitudinal studies of well-implemented, mature programs in five school districts in California from 1998-2000)

- Program 1: Two-way developmental bilingual education (BE), including Content ESL  
 Program 2: One-way developmental BE, including ESL taught through academic content  
 Program 3: Transitional BE, including ESL taught through academic content  
 Program 4: Transitional BE, including ESL, both taught traditionally  
 Program 5: ESL taught through academic content using current approaches with no L1 use  
 Program 6: ESL pullout - taught traditionally  
 Program 7: Proposition 227 in California (sequential 2-year cohorts, spring 1998 - spring 2000)



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Figure 6. English learners' long-term K-12 achievement in normal curve equivalents (NCEs) on standardized tests in English reading compared across seven program models

### ***ESL Pullout or ESL Taught as a Subject at Secondary Level***

This most commonly encountered program for English learners in the USA places these students in a mainstream class in the elementary school, with an ESL resource teacher pulling the English learners out of their classrooms to focus on ESL lessons for generally one or two hours per day. At middle and high school level, English learners are assigned to ESL as one of their subjects for one or two classes per day, and the ESL teacher is mainly responsible for teaching the structure of the English language. Examining the Prism model dimensions, this model again provides minimal support for students. While with the ESL teacher, there is little time for focus on cognitive development. Academic subjects are not taught by the ESL teacher, and no support for development of academic skills through students' first language is provided. Program length is minimal, generally one to two years. As with Proposition 227, one Prism dimension is being developed during the ESL support time—the English language. A second Prism dimension, sociocultural support, may be addressed while students are with the ESL teacher but that is for a minimal amount of time. Our research findings across numerous school districts in the USA indicate that the average achievement levels of high school graduates who were initially placed in ESL pullout programs is the 11th percentile (24th NCE), not high enough achievement to continue in higher education, and this is the program with the largest number of high school dropouts (Thomas & Collier, 1997). Little or no long-term gap closure is associated with ESL pullout.

### ***ESL Taught through Academic Content, also called Sheltered Instruction***

Taking ESL instruction one step further by adding academic content to the responsibilities of the ESL teacher, or an ESL teacher teaming with a content teacher, adds two significant Prism components—academic and cognitive development in L2. All the instruction is still in English in this program, and thus four Prism dimensions are missing (sociocultural, linguistic, cognitive, and academic development through the first language). At least during English instruction, students are accelerating their growth through lessons that teach English through meaningful academic content, and the ESL classes are more cognitively complex, an important dimension that is missing from ESL pullout and Proposition 227 support services. In ESL content classes, as in ESL pullout, sociocultural support is provided: The teachers understand the SLA process, and aspects of bicultural curricular learning may be incorporated into these ESL classes. ESL content classes are usually provided for at least one more year than ESL pullout support so that both the Prism dimensions supported by the ESL content teacher are extended and the students' achievements are accelerated for one more year before students move into the mainstream for the full school day. English language learners need acceleration to achieve gap closure. While mother tongue-English speakers are making 10 months' progress with each school year, English language learners, who initially perform low on curricular tests in English, must make more than 10 months' progress for many years in a row to eventually catch up to the constantly advancing mother tongue-English speakers on grade level. We have found in our research studies that English language learners who received a quality ESL content program can close half of the achievement gap, graduating high school in the 22nd national percentile (34th NCE) (Thomas & Collier, 1997, 2002). Addressing half of the Prism model dimensions raises students' achievement levels significantly, but represents only half of the way to grade-level achievement, and these ESL graduates remain in the bottom quartile of student achievement across the USA.

### ***Transitional Bilingual Education***

Transitional bilingual education is, like ESL pullout, a commonly encountered program in the USA for the states with very large numbers of English language learners of one language background such as Spanish speakers. Among the various types of bilingual programs, transitional bilingual schooling is the program most often supported by state funding, when state legislation for bilingual instruction has been provided. This type of bilingual schooling is a remedial model designed to move students into all-English instruction as soon as possible with only two to three years of some instructional support through students' L1 combined with a portion of time in ESL content instruction. This program significantly increases the number of Prism dimensions addressed within the short duration of the program. Academic, cognitive, and linguistic development are provided through both L1 and L2 in a socioculturally supportive environment, with all of the eight dimensions addressed when the classes are well implemented.

However, transitional bilingual classes are typically self-contained, separate from the mainstream, and often perceived by mother tongue English-speaking peers as remedial, meant for students who have "problems." The same is true of separate ESL classes. The low social status of students in the program can lead to subtle but

powerful influences on English language learners' achievement. This in turn affects the sociocultural processes in learning, lessening the effectiveness of this component. Even when bilingual/bicultural teachers are warm, caring and supportive emotionally and cross-culturally, students become increasingly aware of their low social status within the whole school community. Another Prism dimension that may be reduced in less effective transitional bilingual classes is the amount and type of L1 support. We have found that the classes that provide for very little L1, shifting into mostly L2 instruction within the first two years, lead to lower academic achievement in L2.

This raises an additional factor that must be taken into account in the Prism model. The number of Prism dimensions covered by a program is one aspect of the model, but length of the program also strongly influences student achievement. So the Prism dimensions must be implemented for a sufficient time to have a sustained effect on student achievement. Even when all eight dimensions of the model are addressed in transitional bilingual classes, after three years of support, students have only closed half of the achievement gap in their L2 (similar to the achievement levels of students attending ESL content). They may be on grade level in their L1 but not yet on grade level in their L2. In our latest research (Thomas & Collier, 2002), we found that once students leave their special support program and move into the mainstream, they no longer continue to close the achievement gap, but at their best, make one year's progress in each remaining year of school. Thus, students in the best implemented transitional bilingual programs by the end of high school were able to reach the 32nd percentile (40th NCE) in their English achievement, higher than ESL content but still not at the typical 50th percentile performance of mother tongue-English speakers (Thomas & Collier, 1997, 2002).

### ***One-way and Two-way Dual Language Education***

To avoid the negative social perceptions of transitional bilingual education, USA schools that have worked on enriching their bilingual programs are increasingly using the term *dual language education* to refer to an enrichment model of bilingual schooling. While these programs were the least common model a decade ago, they are rapidly increasing in number as educators discover the power of these programs to raise academic achievement for all students who choose to enroll. Dual language education is the curricular mainstream, taught through two languages. Students are educated together throughout the day in cognitively challenging, grade-level academic content in interactive, discovery-learning classes. Alternating between the two languages takes place not by translation but by subject or thematic unit or instructional time, so that after several years students become academically proficient in both languages of instruction, able to do academic work on grade level in either language. In this model, English learners can close the gap fully in their L2, reaching high attainment at or above the 50th percentile (grade-level achievement) in both L1 and L2 by middle school years and graduating above grade level by the end of high school (see Figure 6, Thomas & Collier, 1997, 2002).

*One-way* refers to one language group being schooled through two languages, while *two-way* refers to two language groups being schooled through their two languages. Two-way classes include mother tongue-English speakers who have chosen to be schooled bilingually, and their achievement is also typically at or above grade level when enrolled in these classes (Lindholm-Leary, 2001; Thomas &

Collier, 2002). Thus, all of the eight Prism dimensions are fully covered in the dual language program, for both English learners and mother tongue-English speakers. In two-way bilingual classes, the English learners are not segregated in a remedial program, but instead they are respected and valued as peer teachers when the instruction is in their home language, and they are given support by their peers to acquire full academic proficiency in English, their L2, across the curriculum. The dual language teachers support both groups socioculturally through a bilingual/bicultural curriculum and provide a context for students to develop cognitively, linguistically, and academically through both languages, for at least six years during the elementary school years (Grades PK-5). Increasingly, the middle schools and high schools that serve these students are developing coursework to continue the academic challenge in both languages.

### CONCLUSIONS

We have examined several major types of programs for English learners in terms of the number of Prism model components and dimensions addressed, their degree of coverage of the factors included in the Prism model dimensions, and the length of time that each program operates. As a result, we predicted a ranking for each program, from lowest to highest in terms of the amount of achievement gap closure produced by each.

We also conducted research in school districts around the country from 1991 to 2002, following the longitudinal progress of English learners in each program type. Before comparing programs, we were careful to ascertain that each school district had fully and faithfully implemented the programs to the greatest extent possible so that implementation factors would be controlled, yielding a more valid comparison of program effects. In addition, our program descriptions specified initial conditions of student achievement, described specific program features and strategies, and linked these program descriptions to measured achievement and gap closure outcomes for each program. Finally, we evaluated each program type over a sufficiently long period of time to allow typically small program effect sizes, ranging from 0 to .25 (0-5 NCEs) per year, to accumulate to levels detectable by measures of practical and statistical significance.

The results of our program comparisons over time indicate that the long-term achievement of English learners in each program is indeed directly related to the 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. Clearly, the Prism model can be used as a template for programmatic design, so that programs fully addressing the Prism components and dimensions, and that are sustained long enough, can be expected to produce full achievement gap closure.

As the next step in the refinement of the Prism model, we intend to further develop the Prism model to allow multiple regression-based predictions of long-term achievement of English learners, based on weights determined by observations of program characteristics in school classrooms. In this way, we will continue to investigate the potential for each program type to produce some degree of gap closure, and we will further improve the basis for our program recommendations based on the Prism components and dimensions.

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