

Standardized High-stakes Tests for English Language Learners (ELL) in the United States: Literacy or Mathematical Content Assessments?

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Abstract

The number of English Language Learners (ELLs) students in schools is increasing while at the same time their lower academic performance in standardized high-stakes testing is often discussed in relation to the failure of educational system in the United States. Discussions concerning the fairness of high-stakes tests are necessary in order to assess the performance of ELL students as well as the use of adequate instructional and pedagogical strategies to help them to achieve academic proficiency among researchers and educators continue to be debated. These discussions are highly politicized and controversial.

Keywords: English Language Learners, Standardized High-stake tests, Mathematics, Assessments, Language Proficiency, Achievement gap.

Resumo

O número de alunos aprendizes da língua inglesa em escolas nos Estados Unidos está aumentando enquanto que, ao mesmo tempo, o baixo desempenho acadêmico desses alunos nos testes padronizados é frequentemente discutido em relação ao fracasso do sistema educacional desse país. As discussões referentes a equidade dos testes padronizados são necessárias, para que, possamos acessar o desempenho dos alunos aprendizes da língua inglesa bem como a utilização de materiais instrucionais adequados e estratégias pedagógicas que os auxiliem a alcançar a proficiência acadêmica. Essas discussões são altamente politizadas, controversas e continuam a serem debatidas entre os pesquisadores.

Palavras-chave: Aprendizes da língua inglesa, Testes padronizados, Conteúdo matemático, Avaliações, Proficiência linguística, Lacuna de Desempenho.

Introduction

The increasing number of English Language Learners (ELL) students and an often related lower academic performance on standardized high-stakes tests are more often than not discussed in relation to, or under the umbrella of *educational failure*. In this context, Rosa (2010) argued that transformational and culturally relevant leadership must be the main focus of school leaders in order to close achievement gaps that exist between ELL students and other student subgroups. It is only within the last 40 years that laws in the United States have been created that provide educational services to students whose native language is not English. Worthy, Rodriguez-Galindo, Assaf, Martinez, and Cuervo (2003) stated that according to the *Bilingual Education Act of 1968*, includes details as to how ELL students must meet the same challenging standards for academic performance expected of all students. This also includes meeting the state content standards in each academic area by developing systematic improvement and reform of educational programs serving ELL students in order to develop their English language skills.

In this regard, the No Child Left Behind Act – NCLB (2001) focuses attention on the academic achievement of 10,9 million ELL students in the United States. This represents 20,4% of 53,5

million students, from kindergarten to high school, in the 2007-2008 school year (U. S. Census Bureau, 2007); with 7,9 million of these students speaking Spanish at home, representing approximately 72,5% of ELL students. Hopstock and Stephenson (2003) stated that there were more than 350 different languages spoken among ELL students, with about 77% of them speaking Spanish. They also affirmed that the ten most common languages besides Spanish were Vietnamese, Hmong, Korean, Arabic, Haitian Creole, Cantonese, Tagalog, Russian, Navajo, and Khmer. According to this context, Gándara, Maxwell-Jolly, and Benavidez (2007) stated that ELL students must master English and disciplinary content material such as history, social studies, science, mathematics, and literature. Rosa (2010) argued that this is a daunting task for teachers because they often lack knowledge of pedagogical strategies and educational content materials that help them to teach basic language and specific content skills in each subject-matter.

ELL Students and Standardized High-Stakes Tests

Before 1960, tests were only used to evaluate individual students and curricula. Dramatic changes in assessments were made to monitor aggregate student achievement. Established in 1969, The

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National Assessment of Educational Progress (NAEP), administered the first accountability test (Stansfield, 1998) in the United States and today continues to conduct regular standardized tests, which assess what students in the United States are supposed to know and are able to perform in various subject areas such as reading, mathematics, science, writing, U.S. history, civics, geography, and the arts. Additionally, enactment of the *Elementary and Secondary Education Act (ESEA) of 1965* established the federal *Title I* compensatory education program (Hamilton, Stecher, Klein; 2002). The purpose of Title I was to ensure that all students have a fair, equal, and significant opportunity to obtain high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments (Rosa, 2010).

The tests used in the accountability system in the United States are named high-stakes tests, which are intended to measure knowledge, skills, and abilities specified as seen in terms of high school graduation, grade retention, promotion, diplomas, completion, and professional certification and licensing (Haladyna, 2002). High-stakes testing refers to state and district competency exams administered to students as the sole measure employed to make critical decisions regarding students, teachers, and schools regardless of prior or future students' performance (Heubert, Hauser; 1999). Additionally, aggregate scores from high-stakes testing are used to determine whether specific schools are making sufficient yearly progress towards educating all of their students.

In this context, the rationale for including ELL students in high-stakes testing can be traced back to the *Elementary and Secondary Education Act (ESEA) Title I*, which required disaggregation of ELL students' performance for report purposes. Additional federal legislation, including *Goals 2000* and *Title I* of the *Improving Americas' School Act of 1994*, mandates the inclusion of all students in high-stakes assessments. Furthermore, these laws outlined requirements for including ELL students' performance in high-stakes standardized tests to be driven by the concept that they must have access to the same general curriculum as mainstream students.

In theory, if school leaders, educators, and students are held accountable for performance, then teaching and learning should improve. Universal participation in high-stakes testing should lead to increased access and participation in the general curriculum, in addition to encouraging better communication with parents about ELL students' academic progress. According to Rosa (2010), high-stakes testing should be an open process with

expectations, measurement guidelines and results used as indicators for future planning. This process should be geared toward gaining an understanding of the students' learning in order to make informed decisions about pedagogical interventions in the school curriculum (Sattler, 2001). In this perspective, Thurlow and Johnson (2005) argued that assessment results such as the California High School Exit Exam (CAHSEE) and the California Standardized Test (CST) should be used not only to measure students' progress but also to influence the content of the curriculum through the use of instructional and intervention strategies that improve the learning of all students.

According to this context, school systems are faced with overcoming language challenges as well as an emphasis on all students making Adequate Yearly Progress (AYP) as set forth by NCLB (2001). Through this federal legislation, in addition to other state and local district initiatives, assessments aimed at increasing accountability provide important information regarding how successful schools are including all students in standards-based education, how well students are achieving standards, and what needs to be improved upon for specific groups of students. In Rosa's (2010) point of view, this accountability system is defined in terms of AYP, a way to measure the improvement in achieving standards for all students and designated subgroups each year by requiring schools, schools districts, and the state as a whole to demonstrate their AYP in English and mathematics. As well, NCLB (2001) legislation states that targets for each student subgroup will increase yearly until they reach 100% in the 2013-14 school year.

The Fairness and Equity of High-stakes Assessments for ELL Students

Discussions concerning the fairness and equity related to high-stakes testing and assessment of ELL students as well as the use of adequate instructional and pedagogical strategies to help them to achieve proficiency vary among researchers and continue to grow. These discussions are also highly politicized and controversial (Coltrane, 2002). Thus, for the majority of ELL students, standardized high-stakes tests do not accurately demonstrate their academic achievement. For example, Gutiérrez (2007) argued that the strict focus given to the achievement gap in mathematics in these tests ignores broader notions of matheracy, mathematics literacy that students are able to use beyond mathematics classrooms.

According to Munõz (2002), standardized high-stakes tests place ELL students at an unfair

disadvantage and penalize them for their lack of English language proficiency, keeping them away from opportunities for advancement in school and in their future. The results of the study conducted by Rosa (2010) also acknowledge that these tests do not present fair assessments for ELL student performance. For example, Garcia and Gopal (2003) argued that inadequate measures of meaningful levels of achievement with CAHSEE results and subsequent legislative requirements are reinforcing educational inequities by assigning students to remedial instruction and special classes solely based on their test scores. In this regard, the American Educational Research Association (AERA, 1985) asserted that “for a non-native English speaker and for a speaker of some dialects of English, every test given in English becomes, in part, a language or literacy test” (p. 73).

In this regard, Abedi (2004) affirmed that high-stakes tests for ELL students are in fact English Language tests because it is difficult, if not impossible to distinguish between language proficiency and academic competence when these assessments are used. Coltrane (2002) argued that “as beneficial as it may be to include ELL students in high-stakes tests, some complications arise concerning the validity and reliability of such tests for this group of learners” (p. 2). Since it cannot be clear whether ELL students are being tested in English language proficiency or in their content knowledge such as in mathematics, the data resulting from ELL student test scores must to be received with caution.

Baca and Cervantes (1998) agreed with this perspective and argued that there is historical evidence that such assessments are misused with ELL students. Muñoz (2002) indicated that discussions about the fairness of the assessment of ELL students on standardized tests as well as adequate instructional and pedagogical strategies vary widely and are frequently politicized and controversial. These are issues concerning stages of language development for the second language acquisition, cultural biases, and the level of cultural competency that is necessary for ELL students to succeed on standardized tests. The results of the study conducted by Abella, Urritia, and Shneyderman (2005) demonstrated that the performance gaps for ELL students are partly due to the impact of language factors on standardized assessments. They found out that these assessments are not always valid measures of ELL students’ content-area knowledge because they are faced with the significant challenge of learning and being tested in a language in which they are not quite proficient. Further, these authors stated that complicating matters for these students is the fact

that limited English proficiency can lead to lower academic performance in mathematics and reading, particularly when academic performance is measured by instruments written in the English language.

A study conducted by Garcia and Gopal (2003) demonstrated how ELL students who passed the CAHSEE and CST scored significantly below in comparison to White students. The results of this study also provided further evidence that many ELL students at higher levels of English language acquisition were unable to pass the CAHSEE and perform at a proficient level on standardized state tests. Their findings indicate that ELL students are much less likely than other students to score at or above proficient levels in mathematics by demonstrating that data gleaned from high-stakes tests showed that schools in California failed to meet legislative objectives to increase achievement and close the student achievement gap in mathematics. In this regard, Garcia and Gopal (2003) concluded that standardized high-state tests regulations disadvantaged English language learners as well as that there is a mismatch between high-stakes tests and second-language acquisition theories.

Rosa (2010) affirmed that the gaps in performance of ELL students are partly due to the impact of language on standardized mathematics assessments, since most mathematics curricular activities and assessments rely heavily on the English language as the basis for instruction. For example, most of the challenges faced by ELL students with mathematics achievement are linked to language problems. The analysis of the results of the qualitative and quantitative data in this study showed that standardized assessments severely underestimate the abilities of ELL students.

ELL Students and the Achievement Gap on Mathematics

English language learners often fall behind their peers in mathematics classroom achievement levels. In this regard, Fry (2008) stated that in the five states with large ELL population, the proportion of ELL students scoring at or above the proficient level on state mathematics tests is often below the proportion of Black students scoring at or above the proficient level. In Fry’s (2008) point of view, “ELL students are much less likely than White students to score at or above the proficiency level in mathematics” (p. III) on the standardized tests used in elementary and middle schools. In agreement with this perspective, Gutiérrez (2008) stated that discrepancies in scores on standardized tests mirror disparities in opportunities and life

chances that students from different backgrounds experience in their daily lives.

According to the California Department of Education (CDE, 2009), in 2008, California's Standardized Test (CST) results indicated that approximately 89% of all students tested in grades 9-11 scored below proficiency in Algebra I. In this same year, approximately 98% of all ELL students in these same grades scored below proficiency level in Algebra I. In 2008, 40% of all students in California failed the mathematics portion of the CAHSEE while 64% of all ELL students did not pass the mathematics portion of the CAHSEE. A passing score required on the CAHSEE is a tool used in California State's accountability report, as a necessary component for students to receive a high school diploma.

According to Howe (1994), when compared to other students, ELL Latino students enter and leave school earlier and are less likely to complete high school as well as enter or complete college. Furthermore, this author stated that because one out of 12 people who live in the United States currently trace their origins to Latin America, the growing presence of Latino students is a phenomenon that has dramatically affected many school systems. Since 1980, the Latino population has increased at a rate five times that of the non-Latino population such as Whites, African-Americans, and Asians combined (Howe, 1994). In June 2003, "the census bureau reported that Latinos are now the nation's largest minority group at 38,3 million people" (Genaro, 2004, p. 96). From this perspective, and as a consequence of the rapid increase of this unique school demographic, school leaders and teachers nationwide are concerned about the gap in the academic achievement of English language learners students.

Thompson, DiCerbo, Mahoney, and MacSwan (2002) presented a comprehensive summary of scaled-score achievement means and trajectories for California's ELL and non-ELL population for the 1998-2000 school year. Their analyses indicated that although scores rose overall, the achievement gap between ELL and non-ELL students, with few exceptions, did not appear to narrow. Evidence of this gap is also provided by the Nation's Report Card in 2007, which informs the public about the academic achievement of elementary and secondary students in the United States. Report cards communicate the findings of the National Assessment of Educational Progress (NAEP), a continuing, periodic, and nationally representative measure of the students' achievement in various subject matters such as science, writing, reading, and mathematics. The National Assessment of Educational Progress

(NAEP, 2007) reported that approximately 48% of non-ELL students in fourth grade scored at or above the proficiency level while approximately only 14% of fourth-grade ELL students scored at proficiency level. The gap among eighth-graders in mathematics was similar: approximately 41% of non-ELL students in 8th grade scored at or above proficiency level in mathematics while only approximately 8% of ELL students scored at the same level of proficiency. According to this report, fourth-grade ELL students scored 36 points below non-ELL students in reading. The gap among eighth-graders, in reading, was even larger because ELL students scored 42 points below the score of non-ELL students.

Therefore, Gray and Fleischman (2005) support that it is necessary for schools to promote strategies such as sheltered English immersion, Specially Designed Academic Instruction in English (SDAIE), and English as a Second Language (ESL) programs in order to emphasize instruction predominately, if not entirely, in English. Along this line, Slavin and Cheung (2003) claimed that urgent development of English language skills enables all students to fully participate in the instructional programs and classroom activities of the entire school with approaches such as thematic study, which illustrates how ELL students use oral and written language for learning academic material.

On the other hand, the results of the study conducted by Krashen (1996) have shown that bilingual education is more effective with ELL students. Well-designed bilingual programs help ELL students to acquire more academic English skills than all-English programs because the use of a native language in instructing has beneficial influences in students' learning processes. Thus, efforts to eliminate the use of the native language in instruction harm ELL students by denying them access to the beneficial approaches of bilingual education. For example, Willig (1985) affirmed that bilingual education programs that support the minority language used by students produce higher performance in achievement tests throughout the curriculum with advantages in reading, language skills, mathematics, and overall achievement in standardized testing. Thomas and Collier (1997) stated that quality, long term, and enriching bilingual programs use teaching approaches such as one-way¹ and two-way² developmental bilingual education. They also affirmed that when these approaches are implemented to their full potential, they give English language learners the grade-level cognitive and academic development needed so that they can be both academically successful and

sustain their success as they reach their high school years.

For example, it is necessary to analyze *California Initiative Proposition 227* (1998), the referendum that sought to eliminate bilingual education in California. It is important to highlight that the passage of this proposition did not relieve schools and school districts of any of their obligation to comply with federal civil rights requirements, which grant school districts federal funds considerable freedom in selecting instructional approaches and programs as long as they effectively address the educational needs of their ELL population. In so doing, school districts in California and in other states must comply with applicable state laws in a way that does not contradict federal legal requirements. At any rate, it is still important to follow whether students with limited English proficiency are provided realistic opportunities to succeed academically, consistent with federal civil rights requirements.

Possible Reasons for ELL Student Achievement Gap in Mathematics

As mentioned above, United States public schools are currently experiencing accelerated growth in their ELL population. At the same time, many educational institutions seem unable to equitably serve this population. Although the ELL population is not a homogeneous group of students, mutual social delineators such as poverty and class discrimination contribute to struggles that a great number of ELL students encounter in their schooling in the United States. Many ELL students possess low first language literacy levels or other learning challenges that impede their full participation in school activities (Rosa, 2010). Specifically, some of those challenges include a lack of prior exposure to a school environment, curriculum, and a rudimentary understanding of the cultural context from which mathematics knowledge is constructed. More importantly, ELL students lack English literacy skills vital not only for comprehending mathematical material but also for acculturation and socialization in the dominant culture. One of the reasons for the ELL student achievement gap is a lack of English literacy skills, resulting in an inability to filter mathematical knowledge, a language all its own, through a second language, which is English (Fry, 2008). What this means is that mathematics often becomes, at least for ELL students, a third, or fourth language.

Cowan, Donlan, and Newton (2005) addressed the role that first language literacy plays

in second language acquisition, and often supports the contention that literacy acquired in previous schooling is a requisite for the empowerment of ELL students. In their point of view, ELL students who previously attended schools in their own countries are already literate in their first language, allowing them to have a much greater chance of quickly developing literacy and math literacy in their second language than students who are not yet literate. ELL students face an extra challenge: as they attempt to acquire cognitively demanding and highly abstract mathematical ideas and concepts, at the same time, they are still learning the skills to acquire English language (Chamot, O'Malley, 1994). ELL students experience difficulties in learning mathematics that may have little to do with difficulties in processing mathematical ideas, concepts, and procedures due to the fact that they come from different cultures, speak languages other than English as their primary language, and have different ways of developing their cognitive processing skills (Perkins, Flores, 2002; Rosa, Orey, 2008).

Performance gaps for English language learners are partly due to the impact of language factors on standardized assessments (Abella, Urritia, Shneyderman, 2005; Garcia, Gopal, 2003). According to these authors, the standardized assessments are not valid measures of ELL students' content-area knowledge. Once again, this unique school population is faced with a significant challenge of learning and being tested in a language in which they are not quite proficient. Further, they stated that complicating matters for these students is the fact that limited English proficiency can lead to lower academic performance in mathematics and reading, particularly when academic performance is measured by instruments written in the English language.

For example, in a quantitative study, Garcia and Gopal (2003) analyzed raw scores of approximately 5,100 ninth grade students on the California Standards Test in English Language Arts and scaled scores analysis on the CAHSEE and the California English Language Development Test (CELDT), the California English proficiency test. Unsurprisingly, they demonstrated that, after two years of implementation, the California's high-stakes tests failed to increase and close the achievement between ELL students and their counterparts. Figure 1 provides the performance of ELL students in the mathematics portion of the CAHSEE, in California, from 2001 to 2008, and offers further evidence of this phenomenon.

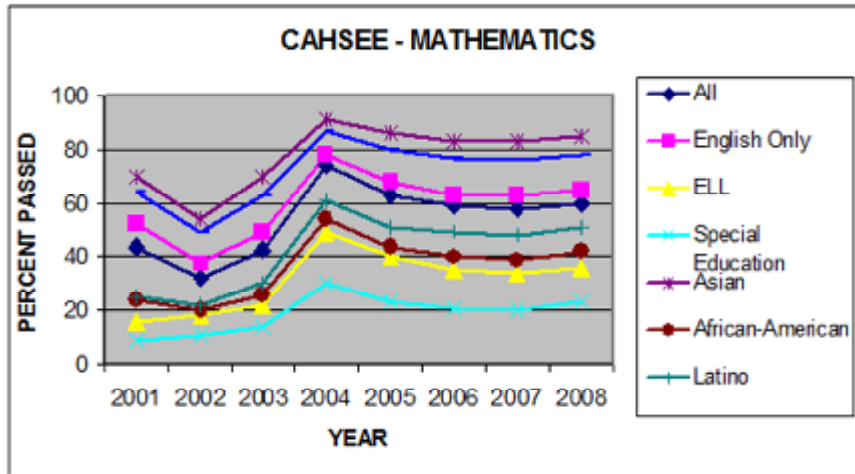


Figure 1: ELL student performance in the mathematics portion of the CAHSEE, in California, from 2001 to 2008
 Source: California Department of Education (CDE) – DataQuest, 2009

The results of this study also provided further evidence that many ELL students at higher levels of English language acquisition were unable to pass the CAHSEE and perform at a proficient level on standardized state tests.

Figures 2, 3, and 4 provide evidence of this fact by showing the gap between the performance of ELL students and their English only counterparts in Algebra 1, Geometry, and Algebra 2.

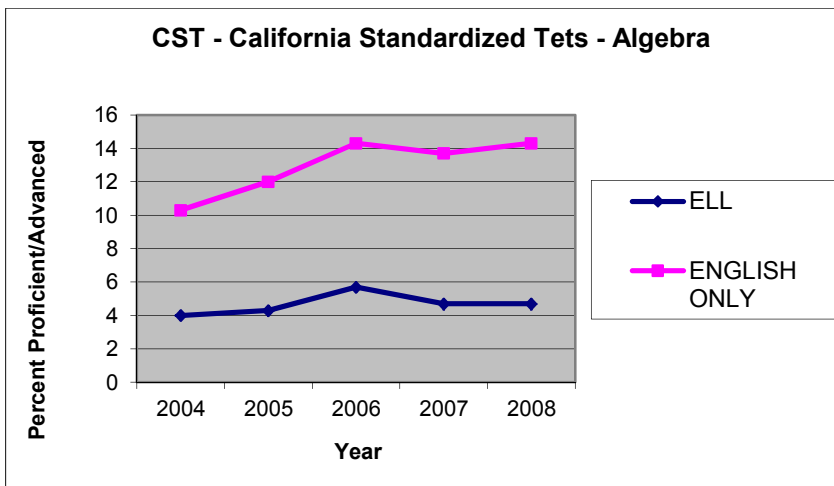


Figure 2: ELL student performance in Algebra 1 in high schools – CST, from 2004 to 2008
 Source: CDE Star Test Results, 2009

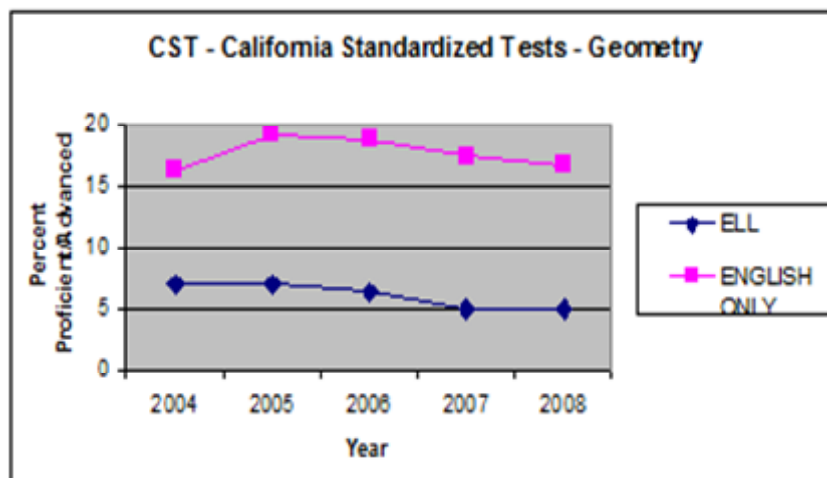


Figure 3: ELL student performance in Geometry in high schools – CST, from 2004 to 2008
Source: CDE Star Tests Results, 2009

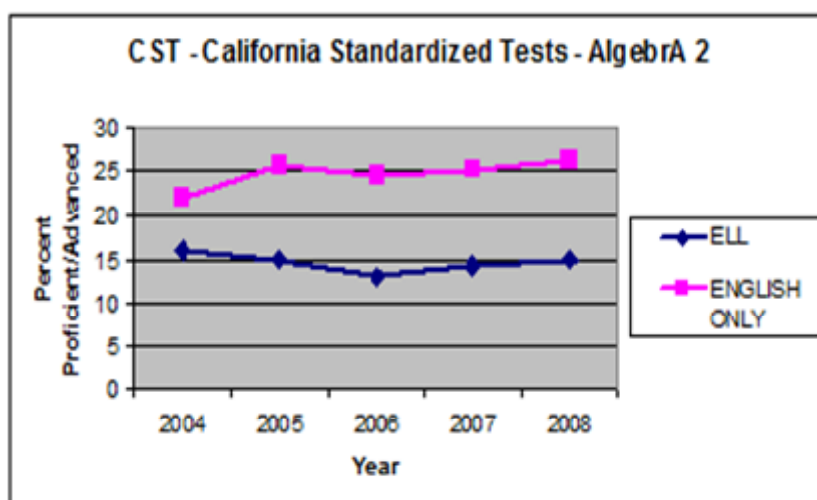


Figure 4: ELL student performance in Algebra 2 in high schools: CST, from 2004 to 2008
Source: CDE Star Tests Results, 2009

Research on the performance of English language learners on standardized high-stakes tests clearly indicates that assessments developed for native speakers of English may not provide reliable or valid outcomes for these students. A study conducted by Abella et al (2005) with 1,700 ELL and former ELL students in grades four and ten used an English language SAT-9 achievement test and an Aprenda-2 Spanish-language achievement test. The goal of the study was to compare and contrast the performances of fourth and tenth grades ELL students in both types of achievement tests. The results of their study demonstrated that, regardless of the ELL students' level of home-language literacy; they answered more items correctly on a home-language mathematics test compared to a similar English-language mathematics test. They also found that, due to language and cultural challenges, former ELL

students are frequently unable to demonstrate their content-area knowledge in high-stakes standardized tests.

Previous evidence of this phenomenon is given by a study conducted by Oakeley and Urrabazo (2001) which showed a relationship between English language proficiency and student achievement. Their study demonstrated that an underlying concern is that many ELL students need more than four years of learning the language to reach a minimum level of English proficiency. English proficiency level of ELL students could predict students' performance on state measures such as the high-stakes standardized tests. Their research indicated that English language learners who have yet to reach a certain level of language proficiency would not perform well on assessment measures of English, regardless of the subject matter being tested. They also argued that it is inappropriate to use achievement tests in English to

measure ELL students' achievement unless they have established a certain level of English language proficiency. These studies showed that ELL students perform poorly on content-based assessments mainly because they may not understand the language of test items, which is a language unrelated to the content being assessed. According to Abedi and Lord (2001), ELL students achieved slightly higher scores on a modified mathematics test written using simpler language with less complex structure. They also concluded that the ELL students' performance on mathematics was diminished by their language skills. According to Cuevas (1984), mathematical vocabulary is technical in nature, narrowly defined, and not commonly used in students' daily settings. In this perspective, Krussel (1998) affirmed that language is an essential part of the mathematics construct because it is an indispensable tool in the learning of mathematics.

Cuevas (1984) stated that another possible reason for ELL students' achievement gap may be related to the application and contextualization of the mathematical content. Mathematical ideas and procedures are culturally bound because the members of different cultural groups use different approaches to solve problems and use mathematical symbols differently (D'Ambrosio, 1990; Rosa, Orey, 2008). Different cultures solve mathematical division problems are solved with different algorithms (Midobuche, 2001; Perkins, Flores, 2002; Rosa, Orey, 2008). This means that mathematics problems are solved according to the mathematical knowledge of specific cultural groups, and the interpretation of the mathematics questions are also socioculturally bound (Solano-Flores, Trumbull, 2003). In addition to the way problem solving is approached differently based on cultural differences, it is difficult for ELL students to solve mathematical problems if they are not familiar with the cultural context of the mainstream society (Rosa, 2010).

The results of the studies conducted by Abedi (2004) and Solano-Flores and Trumbull (2003) have demonstrated that English language learners are not performing well in mathematics because of their struggle with the problem-solving techniques and strategies of mathematics that deals with linguistically and cultural aspects of the mainstream culture. Further, Rosa and Orey (2008) and Solano-Flores and Trumbull (2003) argued that ELL students are not successful at solving word problems because they are unfamiliar with mathematics vocabulary. According to Perkins and Flores (2002) and Rosa and Orey (2008), ELL students may perform poorly on the standardized high-stakes tests because they may not understand

the mathematical processes due to their unique mathematical, cultural and background. In this regard, when compared to mainstream students, ELL students are disadvantaged in the mathematical learning process because of language deficiency, cultural dissonance, and inappropriate and inadequate instruction that do not meet their specific needs. This means that ELL students must learn "to use English in socially and culturally appropriate ways" in order to be successful in school and in the workplace (Tesol, 1997, p. 9).

Another possible reason for the achievement gap of ELL students may be related to interruptions in formal schooling background in students' home countries or in the United States. Seufert (1999) stated that, oftentimes, ELL students' experience in formal education in their native countries was nonexistent or severely interrupted due to poverty, economic reasons, war, political conflicts, religious persecutions, and ethnic discriminations. Cummins (2000) argued that ELL students' years of education in the schools in the United States do not have significance when discussed in isolation from the instructional languages, first language proficiency, and behavioral and attitudinal variables influencing ELL students' learning experience. According to Coltrane (2002), the conflicts about the effects of years of education in the United States are partially due to the lack of administration of standardized high-stakes tests among ELL students in the past, a subject which requires more empirical research in the future.

Finally, Paulu (1995) suggested that schools are not always inclined to support cultural and linguistic diversity as it influences instruction. Minorities, as well as culturally, or linguistically diverse students may experience alienation and even anger if they are perceived to possess lower than desired academic capabilities or are placed in remedial programs with little opportunity to rejoin their peers. This context allows Rosa (2010) to affirm that bridging the gap between ELL and non-ELL students poses tremendous challenges for school leaders in schools struggling to address human diversity in education as well as to accelerate the progress of ELL students.

Final Considerations

Research on the performance of ELLs on standardized high-stakes tests, in the United States, clearly indicates that assessments developed for non-native speakers of English may not provide reliable and valid outcomes for these students. In this regard, many ELL students perform poorly on content-based assessments because they may not understand the language of test items, which is a

language unrelated to the content being assessed. In other words, ELL students who have yet to reach a certain level of English language proficiency do not perform well on assessment measures of English, regardless of the subject matter being tested. In this context, it is inappropriate to use standardized tests in English to measure ELL students' achievement unless they have established a certain level of English language proficiency.

For ELL students to reach their full potential, instruction should be provided in ways that promotes the acquisition of increasingly complex mathematical knowledge and language skills in a social climate that fosters collaboration and positive interactions among students and teachers. Such classrooms are inclusive in their emphasis on high standards, high expectations, and outcomes for all students. Important features of such settings include exposure to academically rich curricula, materials, resources, and approaches that are linguistically and culturally relevant to the ELL students' needs in order to enhance their mathematical learning and achievement. In addition to using effective methods and materials, educators and teachers need to possess cross-cultural communication skills and develop clear understandings of the culturally and linguistically diverse backgrounds of their students.

It is necessary to be acutely aware of the academic challenges faced by ELL students due to the numerous linguistic barriers they must surmount in order to experience academic achievement. Researchers and educators must be encouraged and supported in providing educational settings that strengthen the achievement of ELL students, who face limited English proficiency as well as cognitive, cultural, and linguistic demands.

Notas:

- 1 One-way bilingual programs consist of native Spanish speaking students who are provided instruction in both the native language and English. One-way bilingual program strives to promote bilingualism and biliteracy grade level academic achievement, positive cross-cultural attitudes and behaviors in all students.
- 2 Two-way bilingual programs integrate native Spanish speaking students and native English speaking students, providing instruction in both the native language and English. Two-way bilingual programs strive to promote bilingualism and biliteracy, grade level academic achievement, positive cross-cultural attitudes and behaviors in all students.

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