A MIXED-METHODS STUDY TO UNDERSTAND THE PERCEPTIONS OF HIGH
SCHOOL LEADERS ABOUT ELL STUDENTS: THE CASE OF MATHEMATICS


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DISSERTATION


Submitted in partial satisfaction of
the requirements for the degree of


DOCTOR OF EDUCATION


in


EDUCATIONAL LEADERSHIP


at


CALIFORNIA STATE UNIVERSITY, SACRAMENTO


SPRING
2010

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A Dissertation


by


Milton Rosa


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SPRING 2010


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I certify that this student has met the requirements for format contained in the University
format manual, and that this dissertation is suitable for shelving in the Library and credit
is to be awarded for the dissertation.

_____, Graduate Coordinator _____
Carlos Nevarez                  Ed.D. Director                          Date

DEDICATION

This dissertation is dedicated to my father Aristeu *(In Memoriam)* who educated me and was my role model for becoming a world citizen. His absence is deeply felt at this moment of accomplishment. I thank God for the years I shared his presence and friendship. I miss you!

*Essa dissertação é dedicada ao meu pai Aristeu (In Memoriam) que me educou e serviu como exemplo para o cidadão mundial que me tornei. Sua ausência será profundamente sentida neste momento de realização. Agradeço a Deus pelos anos que pude compartilhar de sua presença e amizade. Saudades!*

This dissertation is also dedicated to my mother Helena who gave me life and helped me to become the responsible person I am. I offer her all my affection for her comprehension in understanding this important period of my life, which has taken me so far away from my family and my country.

*Essa dissertação também é dedicada a minha mãe Helena que me deu a vida e fez de mim um cidadão responsável. Ofereço a ela todo o meu carinho pela compreensão que teve ao entender esse importante período em minha vida, longe de minha família e de meu país.*

Finally, I dedicate this dissertation to my lifelong partner, husband, and very best friend, Daniel. Life and weekends have been put on hold for the last three years of our lives in order to achieve my goal of earning this doctorate degree. His undying and loving support helped me through this research process and continues until this day.

*Finalmente, essa dissertação é dedicada ao meu companheiro, esposo e melhor amigo, Daniel. Nos últimos três anos, a nossa vida e os finais de semana foram sacrificados para que eu pudesse atingir o meu gol em adquirir esse título de doutor. Seu infinito e dedicado apoio guiou-me através desse processo de pesquisa e continua até hoje.*

Milton Rosa

# ACKNOWLEDGMENTS

Many incredible people deserve more than just verbal recognition.

First, I would like to take this opportunity to express my heartfelt thanks and gratitude to Dr. Maria Mejorado, my dissertation chairperson, my adviser, and a truly great mentor and friend. She has given me consistently positive moral and academic support and encouragement all along the way. Her patience, leadership skills, wisdom, and warm and nurturing heart carried me through this difficult and challenging process. ¡Muchas Gracias!

I also would like to express my gratitude to the members of my dissertation committee, Dr. Robert Pritchard and Dr. José Cintrón for their kindness and great advice. You both have been such a great support throughout this journey as well. Thank you very much! ¡Muchas Gracias!

I also would like to thank all the other professors of the doctorate in educational leadership program. This research could not be completed without their knowledge and expertise in their educational fields. Thank you very much! ¡Muchas Gracias!

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Fields of Study

      Ethnomathematics, mathematical modeling, ethnomodeling, language acquisition, ELL students, and history of mathematics.

PREFACE

The researcher is a Brazilian mathematics teacher who for more than 10 years taught in public schools including middle, high school and a public technical-high school in Amparo, São Paulo, Brazil. In 1999, the researcher was selected as a foreign-exchange teacher by the California Department of Education to teach mathematics in one of the high schools in a suburban school district near Sacramento, California.

This dissertation began with the researcher's desire to capture and describe the perceptions of high school leaders concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB. It is the central goal of this dissertation to identify school leaders' perceptions in relation to ELL students and to determine how these perceptions are influenced by an understanding of the effects of the cultural background of ELL students on their academic performance in mathematics. Another important goal of this dissertation is to describe pedagogical approaches that high school leaders use in relation to their ELL populations and to develop a series of suggestions that may help high school leaders to successfully meet the needs of their ELL students.

*Dialectical perspective* was chosen by the researcher as the research paradigm for this mixed-method research. In this regard, the researcher applied both *pragmatism* and *transformative-emancipatory* paradigms to conduct this study. In the dialectical paradigm, the researcher combined deductive and inductive approaches by mixing both

qualitative and quantitative research methods. Another important aspect of this paradigm is that the researcher was able to place importance on the challenges faced by ethnic minority subgroups such as ELL students in mathematics standardized high-stakes tests.

The researcher chose to emphasize Culturally Relevant Education as a theoretical framework for this study. However, since Culturally Relevant Schools, Culturally Relevant Leadership, and Culturally Relevant Pedagogy are interrelated to Culturally Relevant Education, the findings of this study were also framed by applying these theoretical approaches as well. Ethnomathematics, the cultural aspects of mathematics, was also an important tool in this theoretical framework. It is through the ethnomathematics program that students are able to learn important mathematical concepts, which are taken from their own cultural contexts.

The purpose of chapter 1 is to summarize the topic under investigation and present the statement of the problem, the significance of the study, and research questions that guided this study. The overall framework of the study is outlined and its assumptions, delimitations, and limitations are explained and discussed. Finally, the appropriate definition of terms currently used in the field of the study is also introduced to the reader.

The purpose of chapter 2 is to present a review of relevant literature, which investigates the perceptions of school leaders in relation to their ELL population and how these perceptions influence their decision making process. The perceptions of school

leaders concerning to the effects of the cultural background of ELL students on standardized high-stakes testing is also presented. Chapter 2 includes a brief outline of the history of standardized high-stakes testing; a review of existing literature regarding Culturally Relevant Education, which currently serves as the standard; and research-based theoretical framework for culturally relevant schools. Finally, chapter 2 includes the discussion of culturally relevant leadership and pedagogy. A comprehensive review of the cultural aspects of mathematics through the study of ethnomathematics is an integral part of the literature analysis in this chapter.

The purpose of chapter 3 is to present and describe the methodology used for this study. The methodology, as outlined in this chapter, describes for the reader important components of this study, such as its purpose, research questions, theoretical framework, and the role of the researcher in this study. Chapter 3 also introduces the research paradigm and the research design, which is a mixed-methods research approach. The context of the study describes the population and the research sites that were selected for the study. Protection of human subjects and ethical issues are briefly discussed. Chapter 3 specifically outlines the process of the development of the data collection instruments. It also includes various stages of the data collection process and describes the components applied in data analysis as well as methods to assure the reliability and validity of the study.

The purpose of chapter 4 is to organize the presentation of the data analysis and

includes an overview of how the data is presented as well as the study's data analysis and the findings of the study. In this mixed-methods study, interviews were composed of 24 open-ended questions and the survey given to principals and vice-principals was composed of 30 four-points Likert scale questions with 10 open-ended questions. A descriptive univariate and bivariate analysis for quantitative findings as well as qualitative analysis for qualitative findings is presented. Themes that emerged from the qualitative data are also presented and discussed. Quantitative and qualitative data analysis and reporting for each of the five research questions and sub-questions are also included in this chapter.

The purpose of chapter 5 is to present a summary of the study, which includes a brief description of its purpose, a review of the research questions that guided the study, a synopsis of related literature, a description of the methodology, and the findings. The summary is followed by a discussion of the findings, which are presented through a structured review of answers from the five research questions as well from the five themes that emerged from the qualitative data. Chapter 5 also includes a discussion of the recommendations for transformational leadership practice and recommendation for further studies. The theoretical contribution of this study to the existing body of literature is also addressed in the implications section of this chapter. Finally, the researcher presents a brief conclusion of the study.

Appendices and references are also included in this dissertation. Appendices

contain copies of the research instruments such as interview and survey protocols, informed consent documents, and other documents that were necessary to the development of this study.

This study discusses the challenges faced by high school leaders in providing a learning environment that successfully maximizes the learning experiences of ELL students. In this context, this study focuses on the perceptions of principals and vice-principals concerning the challenges faced by ELL students in relation to standardized high-stakes tests. The goal is to determine how these perceptions are influenced by an understanding of the effects of the diverse cultural backgrounds of ELL students on their academic performance as well as to describe approaches that high school leaders may use to meet the needs of ELL students in their high schools.

In this regard, school leaders are able to learn about the challenges ELL students face in their achievement in mathematics as well as the future direction for pedagogical approaches used in the instruction of these students. It is the researcher's hope that this study adds to the existing body of the literature in relation to the perceptions of high school leaders concerning ELL students and provides useful information for decision-makers in the field of teaching English to speakers of other languages.

Abstract

of

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*Statement of Problem*

Research has shown that school leaders' understanding of high quality

mathematics instruction and their ideas about how to support it are significantly

influenced by their perceptions about the nature of mathematics, teaching, and learning

(Nelson, 1999; Spillane & Halverson, 1998; Spillane & Thompson, 1997). It has been

proposed that high school leaders' content knowledge in mathematics and their

perceptions about how it is both learned and effectively taught is critical to their

effectiveness as school leaders for the improvement of students' achievement, including

ELL students (Nelson & Sassi, 2005; Stein & D'Amico, 2000; Stein & Nelson, 2003). In

other words, according to Stein and Nelson (2003), school leaders' perceptions about the

teaching and learning of mathematics influence their decisions and actions because

subject matter is central to teaching, learning, and leadership.

A strong knowledge of mathematics is the cornerstone for a sound decision

making process (Nelson & Sassi, 2005; Stein & Nelson, 2003). From direct and daily

experiences, school leaders have realized that students' future success depends critically on the level of their mathematical, analytical, quantitative, procedural, and statistical skills and abilities that are developed from their learning experiences in mathematics (Nelson & Sassi, 2005; Stein & Nelson, 2003). Since mathematics will continue to be an important subject matter of the school curriculum, a better understanding of mathematical knowledge and its place in the development of human activities is increasingly necessary for school leaders and teachers. According to Stein and Nelson (2003) and Nelson and Sassi (2005), this kind of mathematical knowledge is necessary for the practice of instructional leadership that effectively links school leadership to teacher learning and student learning with subject matter at the core.

Thus, the purpose of this study is to capture and describe the perceptions of the school leadership concerning the challenges ELL students face in relation to their academic success in mathematics standardized high-stakes tests under NCLB in nine high schools in Alpha Unified School District (AUSD), a suburban school district near Sacramento, California. This is a mixed-methods study composed of interviews with open-ended questions and a survey that contains both Likert scale (quantitative data) and open-ended questions (qualitative data).

The goal of this study is to determine how school leaders' perceptions are influenced by an understanding of the effects of the ethnic cultural background of ELL students on academic performance in mathematics standardized high-stakes tests such as

the California High School Exit Exam (CAHSEE) and California Standard Tests (CST).

This research also seeks to describe the approaches that high school leaders use in relation to their ELL population. These approaches include promoting the use of best instructional practices, implementing fair assessments and using obtained results to improve instruction, developing strategies to increase teacher capacity and cooperation for the instruction of ELL students, and creating a culturally and linguistically relevant school. Finally, it is a goal of this study to develop a series of recommendations that may help high school leaders to successfully meet the needs of their ELL population.

*Sources of Data*

The data collection procedure chosen for this mixed-methods study was designed to use data collected through interviews, surveys, open-ended questions, and ELL students' performance on CST and CAHSEE as well as demographic data about ELL students, principals, and vice-principals.

*Collection of Qualitative Data*

Interviews with 24 open-ended questions were conducted with six principals of the nine high schools at AUSD. Each interview lasted 40-50 minutes. Principals were given an advance copy of the interview protocol. Responses to interview questions were used to identify relevant themes that emerged from the answers and to identify patterns

that existed across the responses of these principals and vice-principals.

Surveys were administered to 6 principals and 20 vice-principals in the same nine high schools at AUSD. Qualitative data of the survey were collected from 10 open-ended questions. These open-ended items allowed principals and vice-principals the opportunity to describe their answers in detail.

*Collection of Quantitative Data*

Using a 4-point Likert scale format, the principals and vice-principals responded to 30 items focusing on their perceptions about ELL students. Quantitative data was obtained from these items. The survey was designed to be completed within 20 and 30 minutes. Finally, ELL students' performance in the mathematics portion of the CST and CAHSEE were analyzed. School demographic data for ELL students, principals and vice-principals were also collected.

*Conclusions Reached*

The challenges of the new millennium and the increased accountability it demands requires a different kind of leadership that enables school leaders to serve their students more effectively. In addition to administrative knowledge and skills, Sergiovanni and Starrat (1998) affirmed that leadership development tends to be shaped by a set of "beliefs, opinion, values, and attitudes which provide a foundation of practice" (p. 133). This set of personal educational values and   beliefs that has become to be known as an

"educational platform" (p. 133), which guides school leaders' actions and decision-making.  In this context, Sergiovanni and Starrat (2001) stated, "educators carry on their work, make decisions, and plan instruction based on their educational platform" (p. 70).

Therefore, school leaders need to develop their educational platform and engage in reflection, both of which are essential to their leadership practice. Similarly, researchers have recognized that reflecting on or pondering an ideal, issue, perception, belief, or problem leads school leaders to an enhanced educational practice (Airasian & Gullickson, 1997; Kuhn, 1991). Since professional reflection constitutes a valued strategy for enhancing professional practice, school leaders must create opportunities to reflect upon their own leadership practice in order to understand, critique, and modify it. According to Airasian and Gullickson (1997), "reflection is a central process of constructing knowledge and developing professionally" (p. 219).

In addition, a deep understanding of both culture and its connection to mathematics is an important source of knowledge for school leaders to reflect upon in order to modify and transform their leadership practices. In this regard, if school leaders in this study are to facilitate successful learning opportunities for all students, they must know their students, their cultural roots, linguistic backgrounds, previous experiences, and their students' perceptions about the world. This also includes knowing ELL students' linguistic backgrounds and cultural values that may influence performance on standardized high-stakes assessments.

In this context, knowing each student's cultural and linguistic background is essential for providing successful learning opportunities for all students, including ELL students. Professional development about understanding their students' cultural and linguistic differences may help school leaders to facilitate, structure, and validate successful learning for students through a variety of strategies and practices that best fit their specific needs.

For ELL students to reach their full potential, instruction should be provided in ways that promote the acquisition of increasingly complex mathematical knowledge and language skills in a social climate that fosters collaboration and positive interactions among students, school leaders and teachers. Such classrooms are inclusive in their emphasis on high standards, expectations, and outcomes for all students (Lipman, 1995). Important features of such settings include high expectations, and exposure to academically rich curricula, materials, resources, and approaches that are culturally and linguistically relevant to the ELL students' needs in order to enhance mathematical learning and achievement. In addition to using effective methods and materials, school leaders and teachers need to possess cross-cultural communication skills and develop clear understandings of the culturally and linguistically diverse backgrounds of their students (Garcia & Dominquez, 1997).

In conclusion, school leaders and teachers who understand their students' linguistic and cultural differences strive for intentional variety in instruction, curriculum,

and assessments that lead to an improvement in the learning of mathematics. School leaders play a key role in encouraging and supporting appropriate professional development experiences and best pedagogical practices for themselves and for all teachers and students in their schools. In this regard, professional development that addresses students' linguistic and cultural differences is strongly recommended.

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INTRODUCTION

ELL students who cannot speak English need to be learning at such an accelerated rate compared to the average student. They are often to be found in *survival mode*, that is, overwhelmed with issues of culture and communication and just trying to get by in regards to the curriculum" (Principal School E).

Language minority education policy in the United States has undertaken a number of changes over the last hundred years. Changes to minority language education policy continue today through the No Child Left Behind Act (NCLB, 2001), a federal mandate to annually evaluate student performance based on statewide-standardized high-stakes tests. NCLB mandates that all students be provided a learning environment in which they are taught by licensed teachers who utilize research-based best practices in schools in order to make progress toward the success of every student in academic endeavors as measured in Annual Yearly Progress (AYP), which is primarily a measure of year-to-year student achievement in reading and mathematics. One of the requirements of NCLB is for each state to develop a baseline for students to achieve proficiency as measured in mathematics and reading scores. Each year, each state must recalibrate its baseline in gradual increments by setting a higher numerical standard that schools must attain so that ultimately, by the 2013-2014 school year, all (100%) students will achieve proficiency in reading and mathematics. However, for some segments of the United

States student population, this ideal is not being reached. This is the reality of students who are English language learners (ELL).

Standardized high-stakes tests such as the California High School Exit Exam (CAHSEE) and California Standardized Tests (CST) hold schools accountable for the academic achievement of all students. These tests also evaluate and assess recent immigrant students who have limited proficient in the English language. Currently, pressure to include both federal and state accountability systems to measure the performance of ELL students continues to grow.

According to DiCerbo (2008), ELL students who enter the U. S. public school system as high school students are challenged by the difficulties of learning a new language. Furthermore, they are simultaneously expected to master core discipline content and pass statewide high-stakes tests such as the high school exit exam, which is now required to receive a high school diploma. For the last two decades, high schools in California have faced these same challenges in serving the ELL population. The corresponding challenge for high school leaders is to provide a learning environment that successfully maximizes the learning experiences of ELL students and provides them access to opportunities for educational experiences that will enable them to have meaningful participation in a democratic society. In order to address these challenges, high school leaders must be effective.

Kise and Russel (2008) argued that *leadership effectiveness* is a process by which school leaders exert influence in order to accomplish objectives and direct others in a way that makes schools more cohesive and coherent. Yukl (1998) stated that leadership

effectiveness should be measured by a leader's contribution to the quality of group

processes and the extent to which schools or school districts successfully perform tasks

and meet goals. In other words, leadership effectiveness "should be measured in terms of

the degree to which a leader promotes: (a) the instrumental attitudes and behaviors for the

achievement of group activities, (b) the followers' satisfaction with the task and context

within which they operate, and (c) the followers' acceptance of leaders' influence"

(Mendonca & Kanungo, 2007, p. 30).

Ever since the very beginning of schooling in the United States, the relationship

between the quality of students' learning and the characteristics of successful and

effective school leaders has been debated. Many experts, educators, and researchers

(Ellett, 1996; Sergiovanni, 1987; Smith & Ellett, 2000) have claimed that the most

significant factors regarding effectiveness are the amount and the quality of *leadership*

*density* that exists in schools. According to Sergiovanni (2001), leadership density can be

understood as an enabling process that facilitates active involvement of other

organizational members in the leadership process: "the more people that are involved in

leadership roles and responsibilities, the more dense is leadership in the schools" (p. 112).

There is a tremendous need for effective leadership as well as an expanding

opportunity for school leaders to make a difference in their educational institutions. High

school leaders must make important policy decisions in the face of the time pressures,

politics, and socio-economic demands of the schools. Effective educational leadership is

a process by which school leaders influence their faculty, staff, and students to strive

willingly to achieve the school's mission, vision, and goals. Mitchell (1990) stated,

"Educational leadership is very much an art that is based on being more than acquisition of an organized body of knowledge and performance of a set of behaviors" (p.110). This means that effective educational leaders work to engage school faculty, all students, and community members in achieving the mission, vision, and goals of their school sites.

A main purpose of high school leadership is to define significant school change and instructional reform (Matthews & Crow, 2003). For example, Nelson and Sassi (2000) argued that leading instructional change and reform requires that high school leaders also understand the demands of current mathematics standards and assessment programs. They must have a clear vision of classroom instruction and pedagogical strategies that increase student learning in mathematics, especially for ELL students. High school leaders also need to comprehend reform teaching in order to know what to look for in mathematics classrooms. For example, school leaders' knowledge of content influences the way in which they observe teachers' practices (Nelson & Sassi, 2000), provide feedback to teachers (Nelson, Sassi, & Grant, 2001), and structure learning opportunities for faculty and students (Burch & Spillane, 2003).

In relation to reform teaching, Franco, Sztajn, and Ortigão (2007) stated that there is a definite need for school leaders and teachers to take into account the role of social issues and update their knowledge on how students learn. The results of their study support the notion that reform teaching improves mathematics performance for all students regardless of socioeconomic status. In their study, Franco, Sztajn, and Ortigão (2007) argued that reform teaching is empirically defined to include activities related to the implementation of high-demand tasks that foster the development of mathematics

concepts and understanding. According to the National Council of Teachers of Mathematics' (NTCM) Professional Teaching Standards (1991), reform teaching is a style of instruction that encourages students to communicate mathematical ideas; nurtures intellectual risk-taking by promoting conjecturing, problem solving, and investigation of mathematical ideas; and provides students with opportunities to deepen their mathematical understanding. Nelson and Sassi (2005) affirmed that high school leaders must understand the relationship between instructional leadership and knowledge of how mathematics is learned and taught. In other words, high schools leaders need to transform subject matter knowledge such as mathematics for the purpose of providing leadership for instructional reform, which includes elements from both learning and accountability views of leadership (Stein & Nelson, 2003) .

The principal and vice-principal's leadership plays a crucial role in determining the overall effectiveness of the school in order to meet the needs of all students sub-groups as defined by NCLB (2001). According to Hallinger (1992), the principal's role is to serve as the facilitator of staff and student learning, that is, principals are the leaders of their learning communities. Principals are also instructional leaders who teach, coach, and promote the professional development of their teachers. Moreover, Blase and Blase (1998) stated that the availability of the principals for staff members enhances motivation, self-esteem, sense of security, and morale. Principals must provide all teachers sufficient and specific opportunities to learn the pedagogy of language and culture in the teaching and learning of mathematics (Ball, 2003; Khisty & Chval, 2002) because principals play a key role as leaders who promote high-quality mathematics

instruction for all students. Principals as school leaders have a positive effect on professional development when they offer a vision of learning, support collaborative change, and discuss professional research with their teachers. Teachers who work in a stimulating and supportive environment can reach higher stages of professional development (Philips & Glickman, 1991).

On the other hand, vice-principals function as administrative and executive assistants to the principal and aid in the overall administration of the school (Marshal, 1992). They are primarily responsible for scheduling student classes as well as handling student discipline and attendance issues, social and recreational programs, and health and safety matters. On the other hand, Calabrese (1991) stated that vice-principals are playing a greater role as instructional leaders in ensuring the academic success of students by helping develop new curricula, evaluating teachers, and dealing with school-community relations, that is, responsibilities previously assumed solely by the principal (Marshal, 1992). Vice-principals may also counsel students on personal, educational, or vocational matters.

In this context, Crow, Matthews, and McCleary (1996) argued that the importance of effective leadership amongst principals and vice-principals has grown because they have to cope with the challenges faced by their ELL population. NCLB (2001) is drawing much-needed attention to the achievement gap of ELL students, especially in mathematics. For example, Stein and Nelson (2003) stated that high school leaders' understanding of mathematics instruction and ideas about how they can support it are significantly influenced by their own views about teaching, learning, and the nature of

mathematics. High school leaders need the opportunity to explore new ideas and concepts, to think critically about the nature of mathematics learning and teaching, and to reflect through the implications of these ideas for their own practices.

According to Stein and Nelson (2003), school leaders need to understand how students learn mathematical concepts as well as how teachers learn and teach mathematical content. High school leaders also need to know how to create positive conditions by building structures and using resources that help teachers learn deep content knowledge and associated pedagogical skills. Stein and Nelson (2003) advocated that school leaders must possess deep content knowledge in at least one academic area such as mathematics so that they may transfer that knowledge, or associate it, with other content areas.

Under NCLB (2001), each school district and school must show that the student body as a whole, as well as each subgroup, including ELL students, is meeting the same academic standards in mathematics. For example, a subgroup is made up of students who share certain characteristics such as economic disadvantage, color, disabilities, and limited English proficiency. However, these groups are not mutually exclusive, so, mathematics standardized test results for a student who is economically disadvantaged, Hispanic, and limited in English proficiency could be counted in three different subgroups. In order to make adequate yearly progress (AYP), each district and school must generally show that each subgroup has met the state proficiency goal in mathematics. In this regard, one of the challenges that high school leaders who serve ELL students are currently facing is to accurately assess these students as required by the law.

According to Austin (1978), the difference between high and low achieving schools is the impact high school leadership has in their respective educational communities. High school leaders' behaviors have a direct effect on the school's overall climate and instructional organization (Sergiovanni, 2001). In understanding their school cultures, high school leaders should be able to create, maintain, and change those cultures in order to reach the needs of all their students, including their ELL population. High school leaders need to develop a personal vision that can be incorporated into a shared vision among their learning communities (Matthews & Crow, 2003). They also need to use leadership practices such as motivation, cross-cultural communication, delegation, collaboration, decision-making, and conflict resolution to implement the shared vision in the school to improve the teaching of all students. Chapko and Buchko (2002) suggested that high school leaders should share a common vision, give themselves time to learn to communicate with parents and community, keep in touch with students, and be an effective team leader. However, this goal is a challenge for most high school leaders, especially for those in schools with a large percentage of ELL students who possess different levels of English language acquisition. In addition, Crow, Mathews, and McCleary (1996) affirmed that poverty and cultural issues make reaching this goal more challenging in providing a learning environment that successfully maximizes ELL students' learning experiences.

Statement of the Problem

Since many schools and school districts in the United States are facing the challenge of increasing ELL population, the demand for high school leaders who effectively manage and harness complex culturally diverse schools is growing rapidly. This trend is having a tremendous effect on high schools in California as the state ever-increasingly becomes more multicultural; success will come only to those school leaders who have the skills and understanding to respond appropriately to the challenges of working across cultures.

In this context, high school leaders must be accountable for the performance of ELL students on standardized high-stakes tests. They also have to identify key challenges that jeopardize ELL students' chances to excel academically. This is crucial when ELL students are expected to be proficient in high-stakes tests such as CAHSEE and standardized tests such as CST examinations. The corresponding challenges for high school leaders is to provide a learning environment that successfully maximizes the learning experiences for all students, including ELL students, and provides them access to opportunities for educational experiences that will enable them to have meaningful participation in a democratic society. In order to address these challenges, high school leaders must be effective. According to Kise and Russel (2008), leadership effectiveness is a process by which school leaders influence others to accomplish an objective and directs their schools in a way that makes them more cohesive and coherent.

Purpose of the Study

Research has shown that school leaders' understanding of high quality mathematics instruction and their ideas about how they can support it are significantly influenced by their perceptions about the nature of mathematics, teaching, and learning (Nelson, 1999; Spillane & Halverson, 1998; Spillane & Thompson, 1997). It has been proposed that high school leaders' content knowledge in mathematics and their perceptions about how it is learned and effectively taught is critical to their effectiveness as school leaders for the improvement of students' achievement, including ELL students (Nelson & Sassi, 2005; Stein & D'Amico, 2000; Stein & Nelson, 2003). In other words, according to Stein and Nelson (2003), school leaders' perceptions about the teaching and learning of mathematics influence their decisions and actions because subject matter is central to teaching, learning, and leadership.

A strong knowledge of mathematics is the cornerstone for a sound decision making process (Nelson & Sassi, 2005; Stein & Nelson, 2003). From direct and daily experiences, school leaders have realized that a students' future success depends crucially on their level of mathematical, analytical, quantitative, procedural, and statistical skills and abilities that are developed from their learning experiences with mathematics (Nelson & Sassi, 2005; Stein & Nelson, 2003). Since mathematics continues to be an important subject matter of the school curriculum, it may push school leaders to have a better understanding of mathematical knowledge and its place in the development of human activities. According to Stein and Nelson (2003) and Nelson and Sassi (2005), this kind of mathematical knowledge is necessary for the practice of instructional leadership that

effectively links school leadership to teacher learning and student learning with subject matter at the core.

Thus, the purpose of this study is to capture and describe the perceptions of the school leadership in nine high schools in Alpha Unified School District (AUSD), a suburban school district near Sacramento in California, specifically concerning the challenges faced by ELL students in relation to their academic success in mathematics standardized high-stakes tests under NCLB. This is a mixed-method study composed of interviews with open-ended questions (qualitative data) and a survey that contains both 4-point Likert scales (quantitative data) and open-ended questions (qualitative data).

The goal of this study is to determine how high school leaders' perceptions are influenced by an understanding of the effects of the ethnic cultural background of ELL students on academic performance in mathematics standardized high-stakes tests such as CAHSEE and CST. In addition, this research seeks to describe the approaches that high school leaders use in relation to their ELL population. These approaches promote the use of effective instructional practices, implement fair assessments to use results to improve instruction, develop strategies to increase teacher capacity and cooperation for the instruction of ELL students, and create a culturally and linguistically relevant school. Finally, it is a goal of this study to develop a series of recommendations for practice that may help high school leaders to successfully meet the specific needs of their ELL population.

Research Questions

The research questions underlying the investigation in this study are as follows:

1. What are the general perceptions of high school principals and vice-principals in relation to their ELL population?

    a) What is the relationship between their perceptions and their approaches to the schooling of ELL students?

2. What are the perceptions of high school principals and vice-principals as to the role of culture in the academic success of ELL students in their schools?

    a) What are their perceptions about ELL students' cultural background as challenges to academic performance on mathematics standardized high-stakes tests?

    b) How do school leaders use these perceptions to promote a school climate that helps ELL students to better perform on mathematics standardized high-stakes tests?

3. What is the relationship between the perceptions of school leaders concerning ELL students and their depth of understanding of the effects of the cultural background of ELL students on their academic performance in mathematics?

    a) What kind of ethnic cultural background knowledge do high school principals and vice-principals believe they possess to improve the academic performance of ELL students in mathematics? \

4. What are the high school principals and vice-principals perceptions of ELL students' performance on standardized high-stakes tests in mathematics?

a) How do they perceive the influence of their roles in closing the

achievement gap of ELL students in mathematics?

5. How do perceptions about ethnic cultural proficiency influence the opportunities

of high schools principals and vice principals to be reflective practitioners?

Theoretical Framework

The findings of this study were examined using Culturally Relevant Education

Theory. Since Culturally Relevant Schools, Culturally Relevant Leadership, Culturally

Relevant Pedagogy, and the Cultural Aspects of Ethnomathematics are interrelated to

Culturally Relevant Education (D'Ambrosio, 1990; Gay, 2000; Nuthall, 2005; Pai, 1990;

Ladson Billings, 1995), the findings of this study were also framed by applying these

theoretical approaches.

Culturally Relevant Education was developed out of concern for the serious

academic achievement gap experienced by low-income students, students of color, and

students from linguistically and culturally diverse environments (Gay, 2000; Nieto, 2000;

Novick, 1996). According to Gay (2000) and Kalyanpur (2003), Culturally Relevant

Education uses the cultural knowledge, prior experiences, frames of reference, and

learning styles of ethnically and linguistically diverse students to make learning more

relevant and effective with the objective to strengthen their connectedness with schools

and as consequence reduce behavior problems and enhance learning (Klotz, 2006).

In this regard, schools benefit from being culturally relevant by contextualizing

instruction and schooling practices while maintaining academic rigor and helping ELL

students to achieve their academic potential (Klotz, 2006, Ladson-Billings, 1995). In culturally relevant schools, school leaders, teachers, and staff members are able to recognize and build upon the strengths of students by applying instructional strategies that are culturally relevant. These professionals are also able to identify and remove obstacles that may have been inadvertently placed in the path of ELL students through their prior schooling (Nieto, 1999; Gay, 2000). In these schools, school leaders, teachers, and staff members such as counselors have high expectations for all students and hold them accountable to high standards (Cooper, 2002; Hill, Kawagley, & Barnhardt, 2003; Sheets, 1995; Waxman & Tellez, 2002). Klotz (2006) stated that in culturally relevant schools, the teaching and learning process must be relevant and meaningful to all students, specifically to students from different linguistic and cultural backgrounds.

Gay (2000) affirmed the need for culturally relevant leadership, which reflects the influence that culture has on the learning process. Accordingly, Nieto (1999) stated that culturally relevant leadership is one of the most important roles for contemporary school leaders because it is rooted in culturally relevant education theory, which is grounded in the beliefs that culturally and linguistically diverse students are able to excel in academic endeavors.

According to Ladson-Billings (1994), in order to achieve this goal, it is necessary to implement culturally relevant pedagogy into the school curriculum because it helps to develop students' intellectual, social, emotional, and political learning by using their cultural referents to impart knowledge, skills, and attitudes. Ogbu and Simons (1998) stated that a culturally relevant pedagogy provides ways for students to maintain cultural

identity while succeeding academically because it is a teaching methodology designed to fit school culture together with students' culture to form the basis for helping them to understand themselves and their peers, develop and structure social interactions, and conceptualize knowledge.

Ethnomathematics studies the cultural aspects of mathematics. It presents mathematical concepts of the school curriculum in a way in which concepts are related to the students' cultural backgrounds (D'Ambrosio, 1990), thereby enhancing students' abilities to make meaningful connections and deepening students' understandings of mathematics. In the context of culturally relevant pedagogy, there is a need to examine the embeddedness of mathematics in culture, drawing from a body of literature that takes on the ELL students' cultural root of knowledge production into the mathematics curriculum (D'Ambrosio, 1990; Rogoff, 2003; Vygotsky, 1978). Ethnomathematical approaches to mathematics curriculum and culturally relevant pedagogy are intended to make school mathematics more relevant and meaningful to ELL students and to promote the overall quality of their education.

Significance of the Study

There are many challenges that exist in educating ELL students in California's public education system. Cross-cultural communication is one of the most common challenges in which students, parents, school personnel, and school leaders must overcome. Cultural differences represent another challenge inhibiting the effectiveness of the educational process (Abella, Urrutia, & Shneyderman, 2005; Spinelli, 2008).

Accordingly, Ogbu (1992) affirmed that minority students whose cultural frames of reference are in opposition to the cultural frame of reference of United States mainstream culture have greater difficulty crossing cultural boundaries at school, thereby weakening the teaching-learning process. Laosa (2003) found similar results: differences in cultural beliefs and language were also challenges to effective parent-school interaction because such cultural discontinuities between home and school affect students' academic achievement. On the other hand, transformational school leaders must be committed to a process of continuous examination of their own perceptions and practices as well as their own personal decision making process in order to assure the success of ELL students in a supportive and culturally relevant school community (Scheurich & Skrla, 2003).

Unfortunately, Herrity and Glassman (1999) found that many school leaders are not prepared to deal with the challenges faced by ELL students and the complex issues concerning culturally relevant education. In this perspective, Gándara, Maxwell-Jolly and Rumberger (2008) stated, "many administrators lack the skills needed to provide support and guidance for teachers and programs for English Learners" (p. 13). The following is an excerpt from an interview by Gándara, Maxwell-Jolly and Driscoll (2005) with a teacher, in California:

> You talk to your principal… and there is an assumption that your administrator… understands about the whole picture of what a comprehensive ELL program is, and this isn't always the case. And, I don't even know if it's on anybody's horizon at the state (p. 14).

Further evidence of this phenomenon is presented by Gándara, Maxwell-Jolly and Rumberger (2008) who stated that the words of this teacher "echoed the view of many of her colleagues" (p. 13). Herrity and Glassman (1999) also argued that school leaders are not effectively trained to help their staff make appropriate decisions related to educational planning for ELL students. It is essential to determine the perceptions school leaders hold in regard to ELL students and to determine what factors could be linked to these perceptions, which may influence the school environment in order to meet the educational needs of ELL students. By gaining insights into these perceptions, the research findings of this study may provide valuable information regarding ways school leaders may better serve their ELL population and define pedagogical bridges that are necessary to better meet their needs.

Data gleaned from this study provide information about educational challenges by exploring the perceptions leaders hold about ELL students and the relationship between those perceptions and the support services that exists for these students. It is vital that effective high school leaders serving ELL students recognize the challenges and opportunities posed by the increasing cultural diversity in their educational institutions. In order to achieve this goal, school leaders have to become specialists who identify needs, develop effective programs, and provide leadership for constructively managing educational changes for ELL students (Hoo-Ballade, 2005; Reyes, 2006; Suttmiller & González, 2006).

In this regard, the role of such leaders is to be experts in intercultural relations because the demand for leaders who understand how to communicate and work with

multicultural and diverse groups of students is increasing exponentially (Kindler, 2002; Torres, 2001). Developing leadership skills in the field of intercultural relations requires much more than experiential contact alone. This process may be greatly enhanced by focused academic work that combines intercultural theory with an emphasis on practical applications (Reyes, 2006). This allows high school leaders to incorporate cross-cultural communication and a cultural proficiency approach into their leadership styles, behaviors and practices, allowing them to learn how to transform their schools into effective institutions that help ELL students to increase performance on standardized high-stakes tests.

For data on perception, it is important to first describe the knowledge that high school leaders already possess in relation to ELL students as well as their perceptions about the support systems that need to be in place for their academic achievement in mathematics. It is also important to know how high school leaders develop new understandings of their ELL population and how this helps them to reflect about their own professional practice as school leaders.

Definition of Terms

It is important to define the following terms relating to the topic of this study, which are used throughout this dissertation:

*Achievement Gap*

In the educational field, this refers to the disparity in academic performance between groups of students. Across the United States, a gap in academic achievement persists between minority and disadvantaged students and their White[1] counterparts. According to Viadero and Johnston (2000), the achievement gap is defined as "the disparities in school performance tied to race and ethnicity" (p. 1). Currently, this is one of the most pressing education-policy challenges faced by the United States.

*Academic Performance Index (API)*

API is the cornerstone of California's Public Schools Accountability Act of 1999. It measures the academic performance and growth of schools on a variety of academic measures. Using California Standardized Tests (CST) and the California High School Exit Exam (CAHSEE), California assigns each school and school district an API rating ranging from 200 to 1000 with a statewide API goal of 800 for all schools. Based on API scores, schools are assigned API growth targets. These performance metrics are also available for various student subgroups. Schools also receive two rankings, one comparing similar schools and another comparing all schools in the state (CDE, 2009). Although test results can be an indicator of students' performance in the classroom, these results do not completely explain the quality of schools. It is always necessary to look at

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[1]California Department of Education (2009) defines White student as a non-Hispanic person with origins in Europe, North Africa, or the Middle East, for example, England, Portugal, Egypt, and Iran.

more than one measure when judging school performance before making any final

determination.

*Adequate Yearly Progress (AYP)*

AYP is a measure of year-to-year student achievement. The goal of No Child Left

Behind is for 100% of students to be proficient in reading, language arts, and

mathematics by 2014. According to NCLB (2001), standards for AYP are set to ensure

that each school and school district reach that goal. NCLB also requires states to measure

AYP for schools receiving Title I funds. If a school receiving Title I funding fails to meet

its AYP target for two or more consecutive years, the school is designated as in *need of*

*improvement* and faces specific consequences. States define minimum levels of

improvement as measured in standardized tests chosen by the state itself. With these

tests, AYP targets must be set for overall achievement and for subgroups of students,

including major ethnic and racial groups, economically disadvantaged students, limited

English proficient (LEP) students, and students with disabilities.

*California High School Exit Exam (CAHSEE)*

CAHSEE is an acronym for California High School Exit Exam, the now

mandatory test that must be passed by all high school students in California prior to

receiving a high school diploma. California state laws in 1999 first approved the

development of the CAHSEE over concern that many students were receiving high

school diplomas but did not have the skills necessary to succeed in higher education. The

first class to have the CAHSEE as a graduation requirement was the class of 2006. The

CAHSEE is a two-part exam covering English language arts and mathematics.

*California Standards Tests (CST)*

CSTs were developed by California educators and test developers specifically for

California. These tests measure progress toward California's state-adopted academic

content standards, which describe what students should know and be able to do in each

grade and subject tested. CSTs are designed to match the state's rigorous academic

content standards for each grade. Except for written sections, all questions are multiple-

choice.

*Cross-cultural Communication*

As a term, this is not limited solely to the learning of other languages and also

includes the understanding of how cultural patterns and core values influence the

communication process, even in situations where everyone speaks English. According to

Lynch and Hanson (2004), effective cross-cultural communicators respect students from

diverse cultures, make continued and genuine attempts to understand their perspectives

and welcome new learning experiences by approaching these students with flexible

attitudes and cross-cultural understanding.

*Cultural Proficiency*

This is an approach that helps schools to respond in healthy ways to diversity. Culturally proficient policies and practices enable schools to become inclusive in the way schools leaders, teachers, students, and the school community are served. Lindsey, Robbins, and Terrell (2003) asserted that administrators need to become culturally proficient in order to meet the needs of schools with a diverse population by using the policies and practices of the school and the values and behaviors of teachers, staff, and students with the objective of enabling them to interact effectively in a culturally diverse environment. Cultural proficiency reflects the way in which schools treat their school leaders, teachers, staff, students, and members of the school community by addressing issues of justice, inclusion, and diversity in schools.

*Culturally Relevant Education*

This is an educational system that values the cultural experiences and knowledge of all students regardless of whether they are represented by dominant or non-dominant cultural systems. It is also an educational system that empowers all students intellectually, socially, emotionally, and politically by using cultural referents to include student knowledge, skills, and attitudes within the pedagogical work in schools. The terms culturally responsive (Banks, 1995; Gay, 2000), culturally congruent (Mohatt & Erickson, 1981; Au & Kawakami, 1994), culturally appropriate (Au & Jordan, 1981), and culturally compatible (Jordan, 1985; Vogt, Jordan, & Tharp, 1987) as opposed to culturally relevant (Ladson-Billings, 1992, 1994) are often used. For example, Gay

(2000) preferred to use the term culturally responsive as opposed to relevant. However, the two terms can be used interchangeably.

In this study, the term *culturally relevant* is used, as it combines an examination of the cultural and socioeconomic influences on teaching and learning. As well, it includes knowledge along with a commitment to the challenging of social injustices and reflections upon educational challenges by identifying obvious and subtle individual, institutional, and cultural actions that perpetuate social structures.

*Culturally Relevant Leadership*

According to Scheurich and Skrla (2003), culturally relevant leaders for diversity need to mobilize faculty, staff, and members of the school community to openly study inequities among all students by demonstrating how standards, curriculum, and assessments can be used as levers for the identification and enhancement of students' cultural understanding and academic achievement. Culturally relevant leaders need to promote the purposeful and collaborative professional development of cultural proficiency for teachers, administrators, staff members, and parents in order to improve pedagogical and instructional practices that are in place in their schools and support collaboration among all school stakeholders.

*English Language Learners (ELL)*

English language learners (ELL) are students whose native language is not English. They are not yet proficient in the English language (CDE, 2009). ELL status is

determined by the IDEA Proficiency Test (IPT). A score of less than English Proficient on any subtest qualifies a student as ELL. School districts must document and determine accommodations each year, based on the individual needs and abilities of ELL students (U. S. Department of Education, 2008).

*Ethnomathematics*

The field of ethnomathematics links students' diverse ways of knowing and learning and culturally embedded knowledge with academic mathematics: it explores academic and culturally rich ways to provide more inclusive developmental programs for the diverse populations served at educational institutions (D'Ambrosio, 1990). Ethnomathematics is a program that includes curricular relevance and builds curricula around the local interests and culture of the learners (Rosa, 2005). Teaching mathematics through cultural relevance and personal experiences helps students to know more about reality, culture, society, environmental issues, and themselves by providing them with mathematics content and approaches, which enable them to successfully master academic mathematics. According to Rosa and Orey (2007a), an ethnomathematics approach to the curriculum is considered a pedagogical vehicle for achieving such a goal.

*Limited English Proficient (LEP)*

LEP students are students with limited English proficiency as measured by the California English Language Development Test (CELDT). They may not be able to speak, read, write or understand the English language at a level that permits them to fully

engage in learning academic subjects or interact effectively with members of the school community. Furthermore, this term holds a significant negative connotation: LEP students are seen as having a limitation or deficiency, and as such, the researcher's preference is to use the term English Language Learners (ELL). However, as a matter of data variable consistency, and in an effort to dispel confusion when citing the scholarship, this research may use both terms of ELL and LEP when referring to this student population.

*No Child Left Behind (NCLB)*

 *No Child Left Behind* (NCLB) is a federal law with mandates that affect each school and school district in the nation. On January 8, 2002, President Bush signed into law the No Child Left Behind Act of 2001. This law represents President Bush's educational reform plan and contains the most sweeping changes to the *Elementary and Secondary Education Act* since it was first enacted in 1965. It changed the federal government's role from kindergarten through grade 12 by asking schools in the United States to describe their own success in terms of what each student accomplishes (U. S. Department of Education, 2008). One of the basic reform principles of NCLB is a stronger accountability for results for all students.

*Perceptions*

 It is a process by which individuals organize and interpret the information they receive through the act of apprehending cognition and understanding by means of the

senses. Weiten (2002) and Tschannen-Moran and Woolfolk Hoy (2001) affirmed that perception is the process by which school leaders interpret and organize the received information through their senses by detecting and giving meaning to stimuli based on their own reality and existing knowledge. For the purpose of this study, perceptions include those observations made by high school leaders, in their settings, in relation to their ELL population.

*School Leaders*

The principal is commonly thought to be the school leader; however, for the purpose of this study, school leadership also includes vice-principals. According to Leithwood, Seashore Louis, Anderson, and Wahlstrom (2004), leadership is second only to teaching in its impact on student outcomes. In their opinion, principals and vice-principals play an essential role as school leaders.

*Standardized High-Stakes Tests*

Standardized tests are considered high-stakes tests when they are tied to negative consequences for failure, such as the risk of producing low school test scores or denying a diploma (Greene, Winters, & Forster, 2003). Common examples of high-stakes testing include standardized tests administered to measure school progress under NCLB, high school exit exams, and the use of test scores to determine whether or not a school will retain accreditation.

Assumptions

Assumptions, while being unverifiable or uncontrollable components of a study, are necessary premises for a study to be conducted. According to Polit and Hungler (1997), research assumptions are basic premises that are accepted on faith or assumed to be true, without scientific proof or verification. In other words, Leedy and Ormrod (2005) stated that assumptions serve as the basic foundation of any proposed research and constitute what the researcher takes for granted. Assumptions can be viewed as assertations that the researcher accepts as true without concrete proof.

In this regard, the following assumptions are made by the researcher in this study:

1. The participants willingly participated in responding to interview and survey questions.

2. The participants made a sincere effort to complete the assigned tasks.

3. The participants have provided honest responses to the interview and survey questions by answering them accurately.

4. Culturally Relevant Education is the appropriate theoretical framework for this study. In so doing, this framework is assumed to be an accurate reflection of the problem under study, as it both provides an adequate explanation of the substantive problem and justifies the instruments used for data collection.

5. The instrumentation used in this study, interviews with open-ended questions and surveys with 4 point-Likert scales questions and open-ended questions, are consistent with the study's theoretical framework, which is *Culturally Relevant Education*.

6. The data collection and data analysis procedures adequately captured core concepts of the research paradigm, which is the *Dialectical Perspective Paradigm*.

7. There is a consistency between theory and method, which helps to produce valid and reliable research results.

Delimitations and Scope

According to Mitchell and Marshall (1986) and Thomas, Nelson, and Silverman (2005), the delimitations of a study are those characteristics that limit its scope or define its boundaries. Moreover, they also stated that these delimitations are imposed by the researcher in order to narrow the scope of the study and to guide further research.

Therefore, the researcher limited the scope of this study to nine high schools in a suburban school district near Sacramento in California. The researcher also limited the scope of the population of this study by narrowing it to principals and vice-principals in these nine high schools.

Limitations

The limitations of a study are the methodological characteristics that set parameters on its application and interpretation. In other words, limitations are the constraints on generalizability, transferability, and utility of findings, which are the results of the devices of methodology that establish the study's validity (Mitchell & Marshall, 1986; Thomas, Nelson, & Silverman, 2005).

In accordance with this perspective, this study held some limitations as to the interpretation of the results and other issues that need to be considered when trying to transfer these analyses to broader issues of interest. This means that the findings of this study will be interpreted in the context of these limitations

First, since purposeful and criterion sampling was used in this study, this may not allow for generalizability or transferability outside of the sample under study (Patton, 2001). In this regard, Champion (2002) stated that the "downside of purposeful sampling is that the results of the study may be limited because of the critical attributes of the targeted group" (p. 63). Since purposeful sampling is a type of non-probability sampling, the criterion sampling used in this study does not depend upon the rationale of probability theory.

According to Taylor-Powell's (1998) point of view, by using a non-probability sample, the participants in this study may not represent the whole population because there was no expectation that each participant had an equal chance to be included in the sample. Since the sample did not intend to represent the population, findings should not be transferred to other populations. In this context, the researcher does not have sufficient knowledge about the sample to undertake probability sampling and does not know how many people make up the population under these circumstances. This means that the non-probability sampling was conducted without such knowledge about whether those included in the sample are representative of the overall population.

On the other hand, as pointed out by Streubert & Carpenter (1999), there is no need to randomly select individuals because manipulation and control are not the purpose

of this study. The focus of this study was on a limited number of participants, all of whom were strategically selected so that their in-depth information offered optimal insight in relation to high school leaders' perceptions concerning ELL students. According to Patton (1990), purposeful and criterion sampling is useful for identifying and understanding cases that are information rich because it can provide an important qualitative component to quantitative data of this study.

Second, since this study is limited to nine high schools in a suburban school district near Sacramento, California, findings may not be transferable to other high schools in the state. ELL students in the nine high schools in this school district may or may not have characteristics similar to ELL students in other high schools and school districts in the state. However, the diversity of this school district is similar to the level of diversity at many California public school districts, even if the ethnic groups are different.

Third, this study was conducted within the limitation of the data available, which were dependent on information provided by the California Department of Education and the selected school district to gather necessary data about ELL' performance data as well as principals, vice-principals, and ELL students' demographic data.

Fourth, since ELL students have varied levels of language proficiency, socio-economic status, expectations of schooling, content knowledge, and immigration status, they cannot be considered a monolithic group. Diverse factors influence the academic performance of ELL students. In this regard, factors such as parent educational level and socioeconomic status outweigh school factors in their influence on the ELL students'

achievement on standardized assessments (Abedi & Dietel, 2004). In this context, another limitation of this study is that factors such as socio-economic status, parental educational level, and immigration status of ELL students were not considered in trying to understand the perceptions of high school leaders concerning this kind of school population.

Finally, the study is limited to descriptions of high school leaders' perceptions in relation to ELL students' performance on standardized high-stakes tests. In this way, one-time interviews and one-time surveys may not provide the whole picture of the high school leaders' perceptions in relation to this issue. Consequently, participants' responses may not reflect all school leaders' perceptions in this school district or other school districts in California or in the United States.

Summary

This chapter outlines challenges for high school leaders in providing a learning environment that successfully maximizes learning experiences for their ELL population. In this context, this study focuses on the perceptions of school leaders, principals and vice-principals concerning the challenges faced by ELL students in relation to standardized high-stakes. The goal is to determine how these perceptions are influenced by an understanding of the effects of the diverse cultural backgrounds of ELL students on their academic performance in mathematics as well as to describe approaches that high school leaders may use to better meet the needs of their ELL students in their high schools.

It is the purpose of this chapter to summarize the topic investigated, present the statement of the problem, the significance of the study, and research questions that guide this study. The overall framework of the study is outlined and the assumptions, delimitation, and limitations are explained and discussed. Finally, a list of terms commonly used throughout this study is also presented.

Organization of the Remainder of Study

The following is an overview of the organization of the remainder of this study. The subsequent chapters in this dissertation are as follows.

Chapter 2 presents a review of relevant literature. This review investigates the perceptions of school leaders with regard to the effects of cultural background of ELL students on standardized testing and how these perceptions influence their decision making process. This chapter then moves to a brief outline of the history of standardized high-stakes testing as well as a review of existing literature regarding Culturally Relevant Education, which currently serves as the standard and research-based theoretical framework for culturally relevant schools. Finally, this chapter addresses leadership and pedagogy, with a comprehensive review of the cultural aspects of mathematics through the study of ethnomathematics as an integral part of this literature analysis.

Chapter 3 contains the methodology used for this study. Methodology, as outlined in this chapter, describes for the reader important components of this study such as its purpose, research questions, and theoretical framework. This chapter introduces the research paradigm as well as the research design, which is a mixed-method research. The

context of the study describes the population and the research sites that were selected to participate in the study. Protection of human subjects and ethical issues are briefly discussed. This chapter specifically outlines the process of the development of the data collection instruments. It also includes various stages of the data collection process and describes the components applied in data analysis as well as methods to assure the validity of the study.

Chapter 4 organizes the presentation of data analysis and includes an overview of how this data is presented as well as the study's data analysis and the findings of the study. This chapter also presents a descriptive univariate and bivariate analysis for quantitative findings as well as qualitative analysis for qualitative findings. Qualitative themes that emerged from the qualitative data are also presented and discussed in detail. Quantitative and qualitative data analysis and reporting for each of the five research questions and sub-questions are also included in this chapter.

Chapter 5 presents a summary of the study, which includes a brief description of its purpose, a review of the research questions that guided the study, a synopsis of related literature, a description of the methodology, and the findings. The summary is followed by a discussion of the findings, which are presented through a structured review of answers from the five research questions as well from the five themes that emerged from the qualitative data. This chapter also includes a discussion of the recommendations for transformational leadership practice and recommendation for further studies. The theoretical contribution of this study to the existing body of literature is also addressed in

the implications section of this chapter. Finally, the researcher presents a brief conclusion of the study.

Appendices and references are also included in this dissertation. Appendices contain copy of the research instruments such as interview and survey protocols, informed consent document, and other documents that were necessary to the development of this study.

Chapter 2

REVIEW OF RELATED LITERATURE

The education of ELL students is a difficult issue in that it is multidimensional. With all the complexities of ELL student life, the inability to speak English, to read English, coupled with an inability to understand mathematical terminology, may combine to create gaps in their educational experience" (Principal School E).

Introduction

Currently, the performance of students in the United States as compared to other developed countries is attracting increased attention. For example, Trends in International Mathematics and Science Study (TIMSS) provided reliable and timely data on the mathematics and science achievement levels of fourth graders and eighth graders students in the United States compared to that of students in other countries.

Gonzales, Williams, Jocelyn, Roey, Kastberg, and Brenwald (2008) stated that the TIMSS 2007 results showed that average mathematics scores were significantly higher than in the first international test in 1995. According to the report highlights from TIMMS 2007 of the National Center for Educational Statistics of the U.S. Department of Education (Gonzales et al, 2008), the average mathematics scores for both the United States' fourth- and eighth-graders were higher than the TIMSS scale average. In 2007, the average score of the United States' fourth-graders was 529 and the average score of the United States' eighth-graders was 508, compared with the TIMSS scale average of

500 at each grade level. Table 1 shows the average mathematics scores of fourth- and

eighth-grade students by country in 2007.

Table 1

Average Mathematics Scores of Fourth and Eighth Grade Students by Country in 2007

| Grade Four | | Grade Eight | |
|---|---|---|---|
| *Country* | *Average Score* | *Country* | *Average Score* |
| Hong Kong | 607 | Chinese Taipei | 598 |
| Singapore | 599 | Republic of Korea | 597 |
| Chinese Taipei | 576 | Hong Kong | 572 |
| Japan | 568 | Japan | 570 |
| Kazakhstan | 549 | Hungary | 517 |
| Russian Federation | 544 | England | 513 |
| England | 541 | Russian Federation | 512 |
| Latvia | 537 | *United States* | 508 |
| Netherlands | 535 | Lithuania | 506 |
| Lithuania | 530 | Czech Republic | 504 |
| *United States* | 529 | Slovenia | 501 |
| Germany | 525 | Armenia | 499 |
| Denmark | 523 | Australia | 496 |
| Australia | 516 | Sweden | 491 |
| Hungary | 510 | Malta | 488 |
| Italy | 507 | Scotland | 487 |
| Austria | 505 | Serbia | 486 |
| Sweden | 503 | Italy | 480 |

Source: National Center of Education Statistics (2009)

Within this context, Gonzales, et al (2008) reported that at grade four in the

United States, the average mathematics score was higher than those in 23 of the 35 other

countries; lower than those in 8 countries, of which all 8 were in Asia or Europe; and not

measurably different from the average scores in the remaining 4 countries. At grade

eight, the average United States' mathematics score was higher than those in 37 of the 47

other countries, lower than those in 5 countries, all of them located in Asia, and not

measurably different from the average scores in the other 5 countries. However, they also

argued that caution is needed in analyzing these results because while some of the United

States' results are encouraging, they are also relative: more developing countries

participated in the TIMSS 2007 than in previous test administrations. Figure 1 shows the

average of mathematics scores of the United States' fourth-grade students by

race/ethnicity in 2007.

Figure 1. TIMMS 2007 Average Mathematics Scores – Grade Four – United States
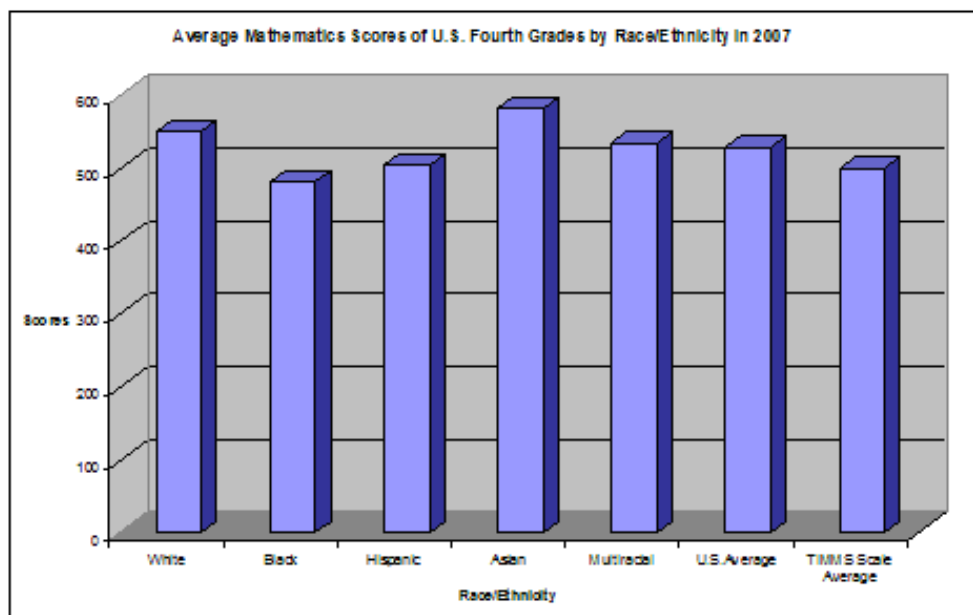


Source: National Center for Education Statistics, 2008

Figure 2 shows the average of mathematics scores of the United States' eighth-

grade students by race/ethnicity in 2007.

Figure 2. TIMMS 2007 Average Mathematics Scores – Grade Eight – United States



Average Mathematics Scores of U.S. Eighth Grade Students by Race/Ethnicity in 2007
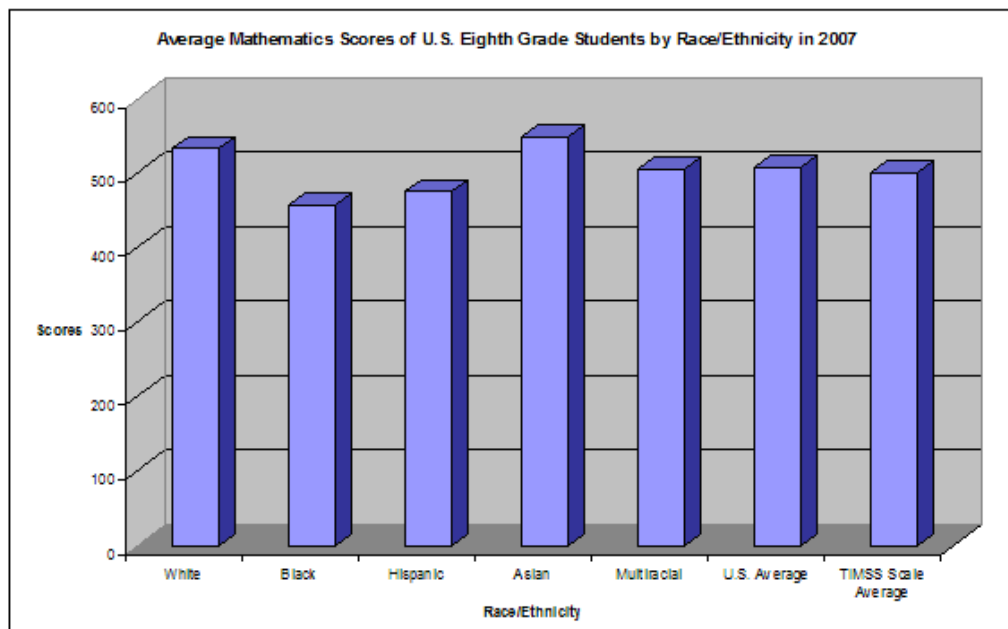
Source: National Center for Education Statistics, 2008

The findings from TIMMS 2007 also showed that while mathematics results are encouraging, there is still much work to be done and improvements to be made to the educational system of the United States. For example, according to González et al (2008), when data from students is broken down by race and ethnicity, some racial and ethinic groups are still scoring lower than whites in the United States.

According to this perspective, one of the challenges faced by the educational system in the United States is the growing number of students from racial, culturally and linguistically diverse backgrounds (Obiakor & Utley, 1997) coupled with the increasing number of ELL students with lower academic performance in standardized high-stakes testing. For example, Gándara, Maxwell-Jolly, and Benavídez (2008) affirmed that statewide measures of achievement indicated that English language learners in

Californian schools are not performing well. Gándara, Maxwell-Jolly, and Benavídez (2008) also stated that the performance of ELL students in mathematics is far below basic when compared to their English-speaking peers. Their findings suggested that compared to English language learners, almost twice as many English fluent students are passing the high school exit exam mathematics section and almost three times as many English fluent students are scoring at basic or above in Geometry.

Therefore, both ethnic and linguistic diversity draw increased attention by many educators and researchers as areas identified as having connections to failed educational systems. In this context, a sense of urgency to resolve this inability to effectively educate all students, including English language learners, has emerged. According to Valencia, Valenzuela, Sloan, and Foley (2001), the inability of the educational system to teach minority students, such as ELL, is of great concern because they are the fastest growing segment of the student population in the United States.

In particular, the role of high school leaders play is of vital importance for ELL students because this role influences the learning experience outcomes for these students as well as their transformation into active and empowered members of society (Fullan, 2001). Furthermore, if school leaders possess no prior or personal knowledge of the complex relations ELL student cultural backgrounds have to school performance and achievement, it is crucial that these leaders become sensitive to the multicultural needs of their students (August & Hakuta, 1997; Cummins, 2000). Furthermore, school leaders need to recognize and address any preconceived notions that they might have about culture, race, or ethnic background in order to grow as educators and culturally relevant

leaders. In this regard, Scheurich and Skrla (2003) stated, "a leader for equity and excellence understands that the most important issue in public education is creating schools that are both equitable and excellent" (p. 100).

<div align="center">Purpose of the Review of Related Literature</div>

The main purpose of this chapter is to provide a review of literature and research related to the focus of the study, to investigate the perceptions of high school leaders in relation to English language learners by examining the perceptions of high school leaders concerning ELL students' cultural background on mathematics standardized high-stake tests. The second purpose is to add to the body of knowledge regarding perceptions held by high school leaders who work with ELL population and the identification of factors that influence those perceptions.

The following review of literature explores relevant issues in regards to perceptions high school leaders possess in relation to their ELL students. In particular, characteristics of the changing student population found in today's educational system in the United States are presented. The review also presents research related to the achievement gap of English language learners on mathematics standardized high-stakes tests. The discussion continues with a review of literature regarding Culturally Relevant Education, which currently serves as the standard and research-based theoretical framework for culturally relevant schools, culturally relevant leadership, and culturally relevant pedagogy. Finally, a comprehensive review of the cultural aspects of mathematics through the study of ethnomathematics is part of this literature analysis.

Thus, the focus of the review of literature for this study is based on the following themes:

a) Perceptions and School Leaders' Roles Concerning ELL Students

- School Leaders' Perceptions and Critical Reflection

- Perceptions and School Leaders' Decision Making Processes

- School Leaders' Perceptions and the Educational Environment

b) ELL Students' Performance on Mathematics Standardized High-stakes Tests

- ELL Students

- ELL Students as a non-Monolithic Group

- Standardized High-Stakes Tests

- ELL Students and the Achievement Gap in Mathematics

- Possible Reasons for the ELL Students' Achievement Gap in Mathematics

c) Culturally Relevant Education

- Culturally Relevant Schools

- Culturally Relevant Leadership

- Culturally Relevant Pedagogy

d) Ethnomathematics: The Cultural Aspects of Mathematics

- Is Mathematics Acultural?

- What is Ethnomathematics?

- Mathematics in Sociocultural Contexts

- Informal and Academic Mathematics

- An Ethnomathematical Curriculum

Perceptions and the School Leaders' Roles Concerning ELL Students

It is widely accepted that good leadership is the cornerstone of good schools and that without the leadership of principals and vice-principals, efforts to raise students' achievement may not succeed (Calabrese, 2002). School leaders are seen as key agents in their schools because they are responsible for initiating change by raising the level of expectations for both teachers and students (Green, 2001; Heck, Larsen, & Marcoulides, 1990). According to Fink and Resnick (2001), school leaders are expected to be strong instructional leaders who have enough knowledge about instructional programs and posses a solid foundation of curriculum and teaching skills.

One of the central roles of leadership is to facilitate student goal attainment and achievement by establishing and maintaining an environment favorable to their performance. McCormick (2001) affirmed that "successful leadership involves using processes of social influence to organize, direct, and motivate the actions of others" (p. 28) and argued that this very aspect of leadership "requires persistent task-directed efforts, effective task strategies, and the artful application of various conceptual, technical, and interpersonal skills" (p. 28). In this regard, it is necessary for high school leaders to possess a strong sense of efficacy in order to sustain both a productive focus of attention as well as a persistence of effort, both of which are needed for students to

succeed (Wood & Bandura, 1989). In other words, school leaders with a strong sense of *self-efficacy* have been found to be persistent in pursuing these goals and, in this way, more flexible and willing to adapt strategies to meet students' cultural and linguistic backgrounds as well as contextual conditions. On the other hand, negative perceptions of the school environment as uncontrollable may have a debilitating influence on the abilities of school leaders to set goals and solve problems. According to Friedman (1997), these perceptions have been related to higher levels of burnout among leaders.

In their daily schoolwork, school leaders acquire a constant stream of data and massive amounts of information. Specifically, they receive data related to situations or events that usually involve teachers, students, and members of the school community. However, Zaleznik and Kets de Vries (1985) stated that some of this data may be processed without a reflective thought, leading school leaders to spontaneously expect and look forward to situations or events that conform to their personal characteristics and previous experiences that have been rewarded or punished in the past (Skinner, 1976). In so doing, schools become the reflection of its leadership due to leaders' incomplete, filtered, and highly stylized understanding of their schools' situations (Hambrick, 2001). Thus, further studies that provide opportunities for school leaders to process and reflect on these data are particularly important.

Taking into consideration the guidance and direction of schools, Hambrick (2001) stated that leaders make decisions based upon their experiences, values, motives, and biases, and that demographic characteristics such as ethnic and linguistic backgrounds,

education, and executive discretion could be factors in strategy selection and implementation of the reflective leadership and hence predict school performance.

However, a review of literature shows that there is a lack of research related to practical application of reflective leadership that provides school leaders with knowledge and experience outside the limitations of their previous experiences and personal characteristics (Sternberg, 2003). In this regard, reflective decisions as specifically applied to educational environment should be encouraged, and conceptual tools should be developed in order to counteract specific school leaders' biases and weaknesses (Hodgkinson, 2001).

According to VanTassel-Baska and Baska (2004), perceptions lead to conclusions, inferences and judgments that school leaders reach about any school situation, issue, or event, and as such, they are not directly observable and must be inferred. VanTassel-Baska and Baska (2004) also stated, "perceptions can be powerful drivers of behavior" (p. 7) because what is important is what people "perceive the situation to be" (p. 7). In other words, if school leaders are aware of the unique abilities of a particular group of students such as ELL, then they can make a positive difference by offering these students help, support, and encouragement.

Bandura (1997) stated that like all cognitive processes, perceptions are inferred from behavior. Both principal and vice-principals' behaviors are often influenced by their internal thoughts and perceptions, which are shaped by many factors, including other individuals in the school environment. For example, school leaders who have high performance expectations of a particular students' subgroup may perceive that this group

of students achieves at a higher performance rate. Conversely, school leaders who have low performance expectations of English language learners may perceive a lower performance rate among this group of students.

Similarly, McIntosh and Greenlaw (1990) affirmed that "a student's life can be significantly affected by school leaders who take the time to recognize achievements, provide solace for failures, and offer other challenges for the future" (p.6). Thus, the impact of school leaders upon the education of their ELL population may be substantial.

*School Leaders' Perceptions and Critical Reflection*

In the current educational system in the United States, school leaders are faced with the challenge of providing opportunities for ELL students to learn and perform at the same rate of achievement as mainstream students. August and Hakuta (1997) stated that school leadership is the key to the overall successful academic performance of English language learners. If school leaders are aware of the unique abilities of their ELL population, they may make a difference in their lives by offering them support and encouragement. According to Cárdenas and Cárdenas (1977), English language learners, for whom cultural backgrounds differ from students in the mainstream culture, frequently experience failure and frustration as a result of negative societal perceptions about their academic abilities, achievement, and successes, creating an environment of neglect and low expectation in relation to this student population.

Weiten (2002) and Tschannen-Moran and Woolfolk Hoy (2001) affirmed that perception is the process by which school leaders interpret and organize the information

received through their senses by detecting and giving meaning to stimuli based on their own reality and existing knowledge. McCormick (2001) also argued that school leaders' perceptions might help them to perform the cognitive and behavioral functions necessary to regulate group processes in relation to goal achievement. In other words, perceptions may serve as one tool that guides school leaders in order to provide different paths that ensure the academic success of English language learners. On the other hand, Bandura (1997) stated that school leaders might use their own perceptions as a judgment of their capabilities to structure a particular course of action in order to produce desired outcomes. This may inhibit the school leaders' "capababilities needed to succeed in particular achievement situations" (Bandura, 1997, p. 64), thus limiting the possibilities of success for a specific subgroup of students such as ELL.

Some studies (Bandura, 1986, Gist & Mitchell, 1992, McCormick, 2001) revealed that school leaders' perceptions have a significant impact on goal-setting, levels of aspiration, effort, adaptability and persistence. These perceptions affect the development of functional leadership strategies as well as the skillful execution of these strategies. School leaders may not feel equally effective in all situations. However, their sense of efficacy may not be transferred to other contexts, depending on their perceived similarities of the issues they are trying to understand, manipulate and solve. Therefore, in making an informed judgment, consideration of the elements of the issue at hand are required.

For example, Leithwood and Jantzi (2008) conducted a study to improve their understanding of the nature, causes and consequences of school leader efficacy, including

indirect influences on student learning. Specifically, this survey considered district contributions to school leader efficacy, whether school leaders' self-efficacy and collective efficacy responded to the same or different district conditions, and the effects of school leaders' efficacy on conditions in the school and the learning of students. Evidence for their study was provided by 96 principal and 2,764 teacher respondents to two separate surveys, along with students' achievement data in English and mathematics averaged over 3 years. Leithwood and Jantzi (2008) found that the collective efficacy of school leaders was an important link between district conditions and both the conditions found in schools and their effects on students' achievement. They also found that school leaders' sense of collective efficacy also had a strong, positive relationship with leadership practices. The results of their study suggested that school leaders are most likely to build confidence and a sense of collective efficacy by emphasizing the priority they attach to achievement and instruction, providing targeted and phased focus for school improvement efforts, and building cooperative working relationships with schools.

Similarly, Ahuja (2007) conducted a case study in which there is a description of the processes that contribute to excellence in classroom practices in urban schools. Ahuja (2007) also investigated school leaders and teachers' perceptions of the factors that influence their commitment to school success. Data were collected from semi-structured interviews and observations that described a school in which the leadership strives to develop human capability at all levels through empowerment and shared decision-making. The results of the study indicated that students' achievement is a collective responsibility, and strong instructional leadership is key for students' success in schools.

However, the findings also suggested that there is a need for future research, which carefully investigates the relationship of leadership's vision, including its creation and communication along with any actual changes in teaching and learning practices and school effectiveness.

An analysis of these studies demonstrates that effective school leadership for ELL students will not change unless school leaders recognize that they must engage in a process of critical reflection (Dantley, 1990). According to Dillard (1995), school leaders held subjective perceptions and understanding of their work with culturally and linguistically diverse students because their individual experiences impact both how diversity is viewed in their schools as well as to what degree these professionals will implement changes to improve schooling of their ELL population. The function of high school leaders is one of practice in which action leads to change and change only occurs through practice. In order to achieve this goal, Dillard (1995) suggested that it is necessary for school leaders to probe their own perceptions by engaging in critical reflection. Sharing this point of view, Dantley (1990), Reyes (2002) and Sergiovanni (1995) argued that school leaders must critically reflect on their schoolwork in order to avoid a thinking approach of mere complaining and to foster equity and social justice in their schools.

*Perceptions and the School Leaders' Decision Making Process*

School leaders make decisions based on how they perceive the world around them. Perception is a powerful influence on the decision making process because it

creates a context through which decisions are filtered (Rozin & Fallon, 1987). School

leaders' judgment may be used to describe the way in which a conclusion is reached

about how a specific problem has been perceived and includes decision making,

evaluation, and selection of an appropriate response to a stimulus (Myers, 1980;

Plessman, 1985; Weade & Gritzmacher, 1987; Zeisset, 1989). In this regard, perceptions

that are more accurate may provide a stronger base for the decision-making process.

Therefore, school leaders must have a deep understanding of their own perceptions,

leading them to develop skills that allow them to perceive school events, teachers, and

student behaviors more accurately in order to develop a better base for making decisions

in relation to issues faced by the school (London, 2001).

Some studies (Leithwood, Begley, & Cousins, 1994; Leithwood & Steinbach,

1995; McCormick, 2001; Sergiovanni, 1991) indicated that school leaders' decision-

making process is a direct consequence of what they think and how they perceive the

issues that they face in their school settings. In other words, school leaders bring their

own perceptions, opinions, and preferences to the decision making process and to their

leadership role. Thus, according to Lyons (2005), experiences and traditions may

influence how school leaders perceive the school environment, particularly when they

interact with different cultures, because their perceptions are rooted in the perceptible

features of the environment and are grounded in previous experiences. Lyons and

Murphy (1994) stated that to make effective decisions, school leaders must listen to and

understand teachers and members of the school community, and also perceive student

needs as well as the reasons for student behavior and achievement.

For example, Tate (2003) conducted a study to explore the ways in which effective elementary school principals used their listening skills in conversations with their teachers to better understand teaching situations, make decisions, and make sense of the daily operations of their schools. Additionally, Tate (2003) investigated perceptions about effective principals' listening skills in order to understand the influence that those listening skills have on teachers and their work. Subjects interviewed were six elementary school principals with reputations for excellence. Qualitative and quantitative research methods were used to explore the sense-making strategies of these school leaders. In so doing, full-time teachers who worked for the principals for a year or more completed a written Likert-style survey about their listening skills. Results fell into five major themes: perceptions of listening styles, listening as a way to build trust and relationships, keeping up with what was going on in the building, listening in order to make decisions, and the need for teachers to be listened to by their principals. The principals in the study expressed intense frustration at the fact that there simply were not enough hours in the day to do everything they needed to do.

Early studies highlighted that perceptions are influenced by peoples' experiences using information from other sources to provide meaning to different contexts (Lamberth, Rappaport, & Rappaport, 1978). These experiences affect what school leaders perceive as well as how they draw conclusions about those perceptions (Myers, 1980; Vogt & Holder, 1988; Weade & Gritzmacher, 1987). Each of the four functions (sensing, intuition, thinking, and feeling) involves school leaders' orientation toward themselves and the environment through the use of their perception and judgment (Myers &

McCaulley, 1985). In other words, for school leaders to function well in their leadership role they must develop or must have already developed a way to perceive stimuli and to make an adequate response to that perception in order to make a decision or judgment (Lamberth et al., 1978; McCaulley, 1980).

Thus, there is an increasing recognition that peoples' perceptions are often good indicators of the decisions they make (Bandura, 1986) and school leaders' perceptions affect both their beliefs and judgments. These in turn have an important influence on ELL students' performance on classroom activities, on achievement of the subject-matter content, and on performance on high-stakes tests. It is important to highlight that the manner in which ELL programs are administered also derives from the perceptions held by the professionals who lead them (Fang, 1996; Hativa & Goodyear, 2002).

*School Leaders' Perceptions and the Educational Environment*

This literature review demonstrates that school leaders have developed perceptions about the educational system, which profoundly influence how they perceive school events and phenomena. These perceptions are derived from previous behaviors, experiences, and ongoing encounters with different cultural, educational, political and social environments (Myers & McCaulley, 1985; Zeisset, 1989). These perceptions may also be derived from the many different relationships school leaders may have and from their own conceptualization about school norms and interactions by way of ethical, legal, linguistic, and cultural factors that are part of their value system.

Leavitt (1968) stated that these perceptions define how school leaders' senses lead them to perceive their educational environment. Leavitt (1968) also argued that based on their perceptions, school leaders select from their immediate environment those very senses they have found from previous experiences to be relevant to solve a certain school issue. For example, school leaders may consciously or subconsciously identify a student as being very similar to another student they have already judged to be low performing in standardized tests. This association may generate subconscious negative expectations or biases in their mind, which lead them to accept as relevant only evidence related to the student's incompetence to better perform on high-stakes tests. In other words, school leaders' expectations of performance are affected by earlier judgments, including their biases, which thus become part of their perceptions. On the other hand, Pashiardis (2001) stated that the effectiveness of school leadership is directly related to the school leaders' perceptions of their leadership skills. In other words, school leaders perform their duties based on their perceptions of themselves as leaders.

According to Rice, Von Eschenbach, and Noland (1988), school leaders bring their own perceptions of effective teaching to their leadership role. Thus, to obtain accurate perceptions, school leaders must focus on what they perceive to be relevant but must also recognize that their perceptions may cause them to filter out aspects of a situation that other individuals may perceive to be highly relevant. Rice, Von Eschenbach, and Noland (1988) also stated that school leaders must perceive their educational environment selectively and reflectively by consciously controlling their perceptions in order to avoid filtering out events that may later prove to be relevant and

important. School leaders must also process and evaluate past events through their relevance filters into their perceptual field to reach the final structuring of a conclusion, inference, or judgment in order to make appropriate decisions. This means that, in order to avoid the many problems associated with distorted perceptions, school leaders must consciously and reflectively withhold evaluative judgments while they try to obtain additional information that helps them to find the solutions for educational issues (Rice, Von Eschenbach, & Noland, 1988). This may present a challenge for the average school leader dealing with the multitude of decisions in their daily work.

For example, perceptions about significant differences in students' achievement frequently appear between groups of students of different races because students' performance is often compared among all the different student subgroups. One of the distorted perceptions about this issue was pointed out by Bainbridge and Lasley II (2000), who stated that a mistaken perception held by some high school leaders is that minority student achievement gap is related to skin color. In their opinion, this perception is a continuation of "self-perpetuation prejudice" (p. 50). In other words, there may be distortions introduced into the school leaders' perceptual processes, which depend on how their previous professional and personal experiences and attributes fit with the situation being perceived. Further evidence of this phenomenon resulted from a study conducted by Singham (1998), who argued that addressing the achievement gap needs to be approached socially, economically and psychologically because no single cause for these performance disparities has been determined and no legitimate concrete evidence has ever been found that characteristics such as race affect students' cognitive abilities.

According to Singham (2003), the achievement gap is disturbing because it suggests inequities in the educational system in the United States. It also illustrates that many students in the educational system are being left behind and are also more likely to come from different cultures, such as the ELL students.

Haar and Robicheau (2008) shared this perspective in two studies. The first study investigated how Minnesota school leaders are addressing cultural diversity and the challenges faced by English language learners. Haar and Robicheau (2008) collected data through an electronic survey sent to superintendents and school leaders, who were asked to identify their leadership position and describe their perceptions in relation to ELL students and their cultural needs. Superintendents and school leaders also had to describe school district efforts to address ELL students and cultural diversity issues. Finally, they were asked to describe the level of superintendent and school leader interest in attending training on ELL students and cultural diversity. The second study focused on experiences and perceptions of school leaders of color. The data collected through focus groups and individual interviews showed the school leaders' perspectives on the importance of having a person of color in a leadership position.

Results from the two studies indicated that there is a need for school leaders to reflect on their increasingly diverse student population and to develop a more inclusive and multicultural school environment. Recommendations for establishing such an environment include the implementation of a set of specific actions:

a) The elimination of stereotypes.

b) The implementation of teaching strategies to meet the learning needs of all students.

c) The acknowledgment of the different cultural backgrounds of students and how they enrich learning.

d) The use of the dynamics and influences of the family when addressing the students' achievement gap.

A review of related literature shows that there is a lack of research related to the perceptions of school leaders in the context of the pressure to improve ELL students' performance on standardized high-stakes tests. It also supports the need for studies that develop an understanding of the effects of these perceptions on instruction and test preparation activities. In so doing, it is also crucial to understand how school leaders behave and make decisions when faced with controversial issues such as testing practices, how they make use of test results, and how they understand the effects of standardized testing on their students, especially minority group of students.

The Performance of ELL Students on Mathematics Standardized High-stakes Tests

The increasing number of English language learners and their lower academic performance in standardized high-stakes testing are often discussed in relation to the failure of education in the United States compared to other developed countries in a global society (Gonzales et al, 2008).

Some studies show that transformational and culturally relevant leadership must be the main focus of high school leaders in order to close the achievement gap that exists

between ELL students and other school subgroups (Hoo-Ballade, 2005; Reyes, 2006;

Suttmiller & González, 2006). It is recurrently reported by the national and international

press that the United States, considered a major economic and political leader, is losing

the power of its intellectual capital (Gonzales et al, 2008). Ethnic and linguistic diversity

are now drawing more attention from the public in the United States as areas identified as

having connections with failing educational systems.

*English Language Learners (ELL)*

The student population of public schools in the United States has a changing face

from that which existed three decades ago (Fullan, 2001; Garcia, 2002). Globalization

and immigration have brought incredible cultural and linguistic diversity to the U.S.

school system. Minority students are the majority in many school districts and English

language learners can be found in all communities across the nation (Flanary & Terehoff,

2000; Samway & McKeon, 1999).

Accordingly, NCLB (2001) focuses attention on the academic achievement of

approximately 10.9 million ELL students from 5 to 17 years old who spoke a language

other than English in the U.S in the 2007-2008 school year (U. S. Census Bureau, 2007).

In this regard, the American Community Survey demonstrated that this group comprises

approximately 20.4% of the 53.5 million students from kindergarten to high school who

attended schools during that specific school year (U. S. Census Bureau, 2007). Also, 7.9

million of these students speak 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 ELL students speaking Spanish. "The ten most common languages besides Spanish were: Vietnamese, Hmong, Korean, Arabic, Haitian Creole, Cantonese, Tagalog, Russian, Navajo, and Khmer" (Hopstock & Stephenson, 2003, p. 3).

In the 2007-2008 school year, approximately 24.7% of California public school students were ELL, that is, approximately 1.55 million of the 6.28 million students enrolled in the California school system (California Department of Education [CDE], 2009a). In addition, 85.2% of California public school ELL students were Hispanic[2]. The most spoken languages by ELL students in California after Spanish were Vietnamese, Filipino or Tagalog, Cantonese, Hmong, Korean, Mandarin (Putonghua), Punjabi, Arabic, Armenian, Khmer (Cambodian), and Russian (CDE, 2009a). California ranks first in the nation in terms of ELL enrollment.

In the 2007-2008 school year, approximately 9.4% of Alpha Unified School District (AUSD) students were ELL: 4,455 of the 47,400. In addition, 52.6% of AUSD ELL students spoke Spanish. The most frequently spoken languages spoken by ELL students were Spanish, Russian, Ukrainian, Rumanian, and Farsi (CDE, 2009a). AUSD is a suburban school district near Sacramento, California.

However, it is only within the last 40 years that laws have been created to provide education to students whose native language is not English. According to Freeman, Freeman, and Mercury (2002) and Worthy, Rodriguez-Galindo, Assaf, Martinez, and

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[2]There is a general confusion and misunderstanding in relation to the use of the word *Hispanic*. Hispanic is used for students who primary language is Spanish. In this case, the use of this word excludes students from other countries in Latin America, including Brazil where the spoken language is Portuguese.

Cuervo (2003), the Bilingual Education Act of 1968 stated that English language learners

should meet rigorous academic standards, which includes details as to the fact that ELL

students must be educated to meet the same rigorous and challenging standards for

academic performance expected of all students. This also includes meeting the state

content standards in academic areas through the following actions:

a) Developing systematic improvement and reform of educational programs serving

limited English proficient students through the development and implementation

of exemplary bilingual education programs and special alternative instruction

programs.

b) Developing bilingual skills and multicultural understanding.

c) Developing the English language skills of ELL students and, to the extent

possible, the native language skills of such students.

d) Providing similar assistance to Native Americans with certain modifications

relative to the unique status of Native American languages under federal law.

e) Developing data collection and dissemination, research, materials development,

and technical assistance that are focused on school improvement for limited

English proficient students.

f) Developing programs that strengthen and improve the professional training of

educational personnel who work with limited English proficient students (Worthy

et al, 2003, p. 277).

The general public is now beginning to realize that the influx of ELL students in

the public school system in the United States is having a tremendous impact on the

educational system. The study conducted by Gutiérrez, Asato, Pacheco, Moll, Olson, and

Horng (2002) reflected a renewed focus on testing and the concurrent implementation of

reductive or narrowly defined programs. Gutiérrez et al (2002) discussed the effects of

new educational policies on English language learners and their school leaders and

teachers by presenting empirical evidence of the consequences of the new educational

reforms on ELL students in California. According to Gutiérrez et al (2002), a larger

number of poor immigrant Latino students received a substantially inequitable education

as compared to their peers because they were and are most likely to attend inferior,

under-resourced, and highly segregated schools that privilege reductive literacy and

matheracy[3] programs, test preparation, and English language instruction. Federal and

state governments continue to implement various reform initiatives that do not take into

the account theoretical and practical implications they have for students. Gutiérrez et al

(2002) described the effects of such reforms by arguing that "teachers were expected to

implement each new reform without the time and support to make sense of the reform in

their own local context or to understand the new reform in relation to previous reforms

and practices" (p. 333). These programs are often taught by teachers with little formal

preparation or experience in teaching, especially teaching English language learners.

Furthermore, Gutiérrez et al (2002) stated that because school funding and accountability

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[3]According to D'Ambrosio (2007), matheracy is the students' capability of drawing conclusions from data, inferring, and proposing hypotheses. It is a first step towards an intellectual posture, which is almost completely absent in the current school systems. Regrettably, problem solving, modeling and related projects are pedagogical activities rarely seen in mathematics classrooms. The main importance is centered on aspects of mathematics curricula that are tested on high-stakes tests, most notably numeracy and the manipulation of numbers and operations.

are currently driven by high-stakes standardized tests, students' lives, interests, ideas, and other resources do not currently guide curricular and instructional decisions, and this amalgam has resulted in "the most reductive learning environment possible" (p. 332).

NCLB (2001) has brought the educational gap concerning highly qualified teachers to the forefront of the national stage during the past few years. As a result, schools across the United States are now facing accountability issues. Bielenberg and Fillmore (2005) predicted, "By holding schools accountable for the academic progress of all categories of students, NCLB has the potential to create greater education equity" (p. 45). In like manner, Jiminez (2004) stated:

> Teachers need to assess students within three domains to ensure equality. The three domains are using traditional assessment, assessing students' knowledge of other literacy, and determining how students' perceive and respond to the process of learning a new language and culture. (p. 576).

Howe (1994) affirmed, "School staffs must also focus on the needs of language minority students and refrain from underestimating their capabilities" (p. 42). In this regard, Olen (2002) stated that there are challenges faced by language minority students at school as they experience what is referred to as *language shock*, which is a struggle to learn the English language. Olen (2002) also stated that another challenge that ELL students face in the current school system is to be accepted in a society that is not always willing to embrace diversity.

According to this perspective, Gándara, Maxwell-Jolly, and Benavídez (2007) affirmed that "secondary English Learners must master at least two basic bodies of

knowledge: English, more specifically the academic English of the classroom and of texts, and disciplinary content material such as history, social studies, science, mathematics, and literature" (p. 4). This is a daunting task for secondary teachers because they often lack knowledge of pedagogical strategies and educational content materials that help them to teach basic skills in each content area such as mathematics. Gándara et al (2007) affirmed that this is also a daunting task for school leaders because they have to create a school climate that helps ELL students to learn the appropriate rules of conduct in their new social environment as well as provide to these students access opportunities to a rigorous academic curriculum.

School systems are faced with overcoming cultural and language challenges as well as an emphasis on all students making adequate yearly progress (AYP) as set forth by NCLB (2001). Through the NCLB 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. 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.

For example, according to the California Department of Education (CDE, 2009b), in 2006 and 2007, 66% of all schools made AYP, and as a reflection of increased target, in 2008, only 52% of schools made AYP. Targets for ELA and mathematics have

increased for the 2007-08 school year since the 2004-05 school year. Figure 3 below

shows the percentage of ELL students proficient and above for AYP in English and

Mathematics, from 2002 to 2008, in the state of California.

Figure 3. Percentage of ELL Students Proficient and Above for AYP in English and

Mathematics, in California, from 2002 to 2008
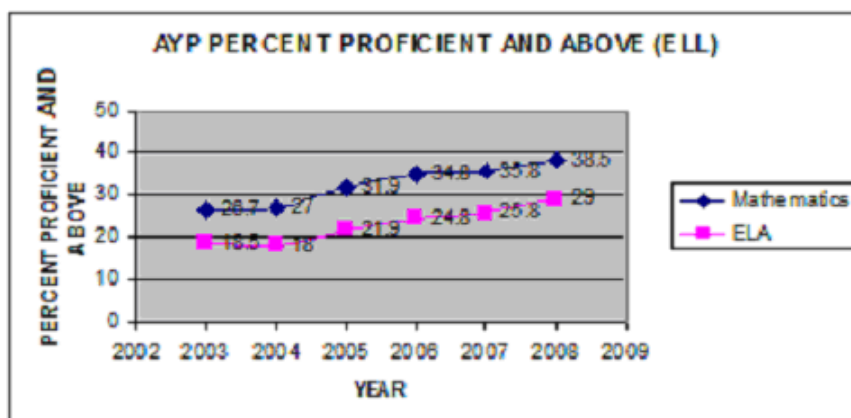


Source: California Department of Education, 2008 - State Report AYP

As well, NCLB legislation states that targets for each student subgroup will

increase yearly until they reach 100% in the 2013-14 school year (CDE, 2009b, U.S.

Department of Education, 2009). Table 2 summarizes the annual targets for AYP set by

the state of California in percentage from 2003 to 2008.

Table 2

Annual targets for AYP set by the state of California in percentage from 2003 to 2008

| Annual targets for AYP set by the State of California (%) | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Mathematics | 26.7 | 27.0 | 31.9 | 34.8 | 23.7 | 34.6 |
| ELA | 18.5 | 18.0 | 21.9 | 24.8 | 23.0 | 34.6 |

Source: California Department of Education, 2008

The state of California as a whole met all criteria for AYP in 2003 and 2004. However, the state did not make AYP in 2005 because ELL students missed the English Language Arts (ELA) target and special education students missed both ELA and mathematics targets. In 2006, the state as whole met all criteria for AYP. In 2007, the state did not make the AYP because special education students missed the ELA target. In 2008, the state did not meet the criteria for AYP because African-American students did not meet the mathematics target, ELL students did not meet the ELA target, and special education students did not meet both ELA and mathematics targets.

Students identified as ELL may represent more than one subgroup, as they might be identified simultaneously as economically disadvantaged, Latino, and in special education (CDE, 2009b). These goals have not only increased awareness but have also increased the pressure and accountability in all states, school districts, and schools. However, researchers such as Thomas and Collier (1997) have found that academic language takes five to seven years to develop and requires deliberate instruction. Thus, it

is important that school leaders and educators recognize that students who are ELL are still developing academic English proficiency while learning core content.

*ELL Students as a non- Monolithic Group*

Some ELL students bring experience in academic subjects in other languages to the classroom and need help translating that knowledge into English. Other students bring little academic preparation and come to the classroom years behind their peers. Some have a beginning knowledge of English, while others have almost none. The majority of students has some Spanish for a first language, but the rest speak any of 400 other languages (NCELA, 2007). Most ELL students were born in the United States, but close to half of ELL students in grades six through twelve are foreign born (Capps, Fix, Murray, Ost, Passel, & Herwontoro, 2005). Like other group of students, ELL students bring a range of individual experiences to school that may affect how quickly they learn the English language.

A study about the quality of education for English language learners in New York City conducted by the New York Immigration Coalition (NYIC, 2008) stated that ELL students nationwide face huge obstacles in achieving academic success. About two-thirds of students who have not learned English are living in poverty, compared to only one-third of English proficient students. The report further stated that ELL students who were not born in the United States face additional obstacles: not only must they learn a new language, but they must also adjust to a new country and school system while trying to catch up academically to meet graduation and promotion requirements. The findings of

the NYIC (2008) report also showed that ELL students are not a monolithic population: "They come from a variety of backgrounds with a diversity of skills and needs that will impact the type of programs and services they need" (p. 5). Thus, in planning ELL programs, it is important that schools compile and analyze the specific needs of elementary, middle, and high school ELL students.

A recent annual education report card produced by Education Week (2009) provided a comprehensive data-driven profile of the growing population of ELL students in the United States. The results of the report showed that the ELL population continues to grow, the national achievement gap in mathematics and English between ELL students and all public students is significant on both national and state standardized tests, and the policies targeting the education of ELL students vary dramatically from state to state. Finally, one of the highlights of the report confirmed previous findings that ELL students do not comprise a monolithic group of students because:

a) Approximately two-thirds of all ELL students are second or third generation native-born with at least one parent born in the United States or its territories.

b) Seventeen percent of ELL students are third-generation Americans with both parents born in the United States.

c) Sixty-eight percent of ELL students from the ages of 5 to 17 are Hispanic, fourteen percent are non-Hispanic Whites, and thirteen percent are of Asian or Pacific Islander descendent.

d) Mexico accounts for the majority of ELL youth born outside of the United States, which represents fifty-four percent of this population.

According to Freeman, Freeman, and Mercury (2002) and Short and Fitzsimmons (2007), it is possible to roughly determine three types of high school ELL students, which shows that they are not a monolithic group of students. While not every student falls neatly within one of the three types of high school ELL students, the categories may help school leaders to understand the different needs of this school population. These categories are briefly described below:

*1) Newcomers with Adequate Schooling*

These students have recently arrived to the United States and had an adequate educational experience in their home country. They may be considered at grade-level in content areas and need a shorter time in language development programs in order to help them move quickly into mainstream classes. However, they may still score low on standardized high-stakes tests given in English.

2) *ELL Students with Limited Formal Education*

These students can either be newcomers with limited educational experience in their home country or transnational ELL students who live and attend school for periods in both the United States and their home country. They can also be a large portion of the ELL students born in the United States. These students may be illiterate in English and/or have limited native language literacy. They need an intensive language development program, and typically, they need a long time in order to become literate in English. They have poor academic performance on standardized high-stakes tests.

*3) Long Term English Language Learners (ELL)*

These students have not been placed in consistent quality language development programs. However, they have received a variety of educational approaches such as English as a Second Language (ESL), English Language Development (ELD), and Specially Designed Academic Instruction in English (SDAIE) classes as well as bilingual and mainstream curricula due to school mobility and programmatic changes at their schools. It is also important to provide consistent, long-term, high quality language development programming for these students, especially for ELL students in special education program, because they need specialized integrated language and learning assistance. According to Freeman, Freeman, and Mercury (2002), some students may have adequate grades in the school core curriculum but have low scores on standardized high-stakes tests.

It is necessary to caution against an overly broad use of the term ELL. For many educators and researchers the term serves to paint a panoramic picture of second language acquirers that more often than not requires much more detail. This means that not all ELL students are the same. For example, a 10th grade ELL newly arrived from Russia with many years of formal education is very different from a 10th grader from a small town in Northern California educated in a rural high school with a bilingual home experience and undereducated parents. Both are classified as ELL but both bring different academic skills into the classroom based on the early schooling preparation they received (J. Cintrón, personal communication, email, August 20, 2009).

Gutiérrez (2008) argued that educators do not have a good understanding of ELL students' previous schooling experiences. From her point of view, without an adequate knowledge of these experiences, educators may be in danger of treating ELL students "as blank slates, ignoring potential new strategies, conceptual understandings, or unique algorithms that they could offer a U.S. mathematics classroom" (p. 361). It is necessary to develop an agenda that "focuses on advancement, on excellence, and on gains within marginalized communities" (Gutiérrez, 2008, p. 362) such as ELL students. In this regard, excellence means "high performance on standardized achievement tests and broader notions of mathematical literacy" (p. 362). According to D'Ambrosio (2003), mathematical literacy is a student's capacity to identify and understand the role that mathematics plays in the world in order to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that student's life as a constructive, concerned, critical, and reflective citizen. Over time, through excellence, ELL students may gain significant achievement growth. According to Gutiérrez (2000), it is necessary that educators be committed to equity in order to enhance students' advancement in mathematics even when they do not speak the ELL students' language. However, such equity depends on teachers' careful and explicit attention to the ways ELL students need to be helped to participate in the learning practices that occurs in mathematics classrooms (Boaler, 2002) as well as the teachers' social and cultural awareness and sensitivity (Gutiérrez, 1999).

Since ELL students are not part of a monolithic population, meeting the needs of each student is a challenging task. Instruction needs to be designed to help them to grow

in both academic content knowledge and English language skills. If these are not addressed together in a way that matches individual ELL student needs, then they are not appropriately served. This complexity has always been the case, but increased pressure from NCLB (2001) has put schools and school districts under the microscope.

*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. For example, the National Assessment of Educational Progress (NAEP), established in 1969, administered the first accountability test (Stansfield, 1998) and today continues to conduct periodically standardized assessments. These standardized tests assessed what students in the United States were supposed to know and were able to do 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.

Hamilton et al (2002) stated that a test-based accountability system became the core of educational reform. It has four interrelated components: goals, measures, targets, and incentives. The tests used in this accountability system are high-stakes tests intended

to measure the knowledge, skills, and abilities specified as important 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). Implications for federal and state funding obtained by local school districts are often inherent in the process. 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 general, high-stakes tests are used to:

a) Provide evidence of educational quality for public review.

b) Provide information for teachers to help them improve instructional practices.

c) Provide data for administrative schools leaders, teachers, parents, and students to monitor student progress.

d) Award cash bonuses to individual teachers, schools, and administrators.

e) Determine which schools enter and exit from mandatory school improvement programs.

f) Allow parents to transfer students from their home school to another school.

g) Make parents eligible for vouchers that can be used to pay for private schools.

h) Determine the success of private companies that manage public schools.

i) Evaluate the effectiveness of reform efforts or curriculum programs.

j) Judge whether students should be promoted from one grade to the next.

k) Place students into specialized educational programs such as remedial, gifted, or bilingual classes.

l) Determine whether students will receive high school diplomas (Hamilton et al, 2002).

The rationale for including English language learners 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 student 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 (Venn, 2004). 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 Venn (2004), high-stakes testing should be an open process with expectations, measurement guidelines and results used as indicators for future planning. The 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 other words,

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 (Thurlow & Johnson, 2005).

On the other hand, discussions concerning the fairness of high-stakes tests to assess the performance of English language learners 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, Menken, 2000). Thus, for the majority of ELL students, standardized high-stakes tests do not accurately demonstrate academic achievement. Even though Gutiérrez (2007) adopted the definition of achievement used in standardized high-stakes tests in her work with ELL students. She argued that the strict focus given to the achievement gap in mathematics in these tests ignores the broader notions of matheracy, mathematics literacy that students are able to use beyond mathematics classrooms. This means that students should use mathematics as "a tool to analyze and to solve problems of importance" (Gutiérrez, 2008, p. 360) in their own lives.

According to Lam (1995) and 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 from opportunities for advancement in school and in their future. 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.

*ELL Students and the Achievement Gap in Mathematics*

Accountability is one educational concept that has resurfaced in this decade. In

order to hold districts, schools, principals, vice-principals, and teachers accountable for

student academic achievement, standardized high-stakes assessments have been

mandated. To assure a fair assessment system for everyone and to hold schools and

school districts accountable for equal educational opportunity for all students, some

legislation such as NCLB requires achievement reporting by students' subgroups.

Subgroups reporting include English language learners, which have shown a substantial

test performance gap between students who are ELL and non-ELL.

However, until the past decade, it was a common practice to excuse ELL students

from taking standardized tests, and they were not included in the student population

assessed by high-stakes tests (Lara & August, 1996; Coltrane, 2002). According to

Stanfield and Rivera (2000), by the middle of 1990, few states were testing their ELL

students and 44 of 48 states with assessment programs exempted ELL students in one or

more standardized tests. Stanfield and Rivera (2000) also stated that 27 of 44 of these

states frequently excused these students from taking such exams. Montgomery, Roberts,

and Growe (2003) affirmed, "exemptions such as these were problematic for a few

reasons" (p. 4). One of these reasons was the lack of accountability on the achievement of

ELL students and issues of equity. In this regard, according to August & Hakuta (1997),

the result of this exclusion was that ELL did not benefit as much from educational reforms that mostly followed the implementation of high-stakes assessments.

As suggested by Abedi (2002), since the ELL population has increased in public schools, there has been a need to include this school population in large-scale standardized testing programs. Further evidence of this phenomenon resulted in the mandatory inclusion of ELL students in large-scale academic high-stakes tests in English through the reauthorization of the *Elementary and Secondary Education Act (ESEA) of 1965*. The enactment of the *Improving America's Schools Act (IASA) of 1994* mandated that ELL students be accountable to the same standards as monolingual students (Abedi, 2002; Butler & Stevens, 2001).

The American Educational Research Association (AERA) asserted, "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" (AERA, 1985, p. 73). From this perspective, during the last decade, some researchers have argued that high-stakes tests for ELL students may be considered English Language tests (Abedi, 2004; August & Hakuta, 1997; Baker, 1997; Crawford, 1999; Gonzalez & Melis, 2000; Hakuta & Mostafapour, 1996). They also stated that it is difficult to distinguish between language proficiency and academic competence in high-stakes tests assessments. 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) because it is unclear whether ELL students are being tested in English language proficiency or in their content knowledge such as mathematics.

Baca and Cervantes (1998) agreed with this perspective and argued that there is historical evidence that such assessments are misused with minority students. Baca and Cervantes (1998) also stated that there are numerous questions that policymakers have to pose about how to accurately assess the content knowledge of English language learners. Some studies (August & Hakuta, 1997; Figueroa & Hernández, 2000; Menken, 2000; Muñoz, 2002; Valdés & Figueroa, 1994) 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 stage of development for the second language, cultural biases, and the level of cultural competency that is necessary for ELL students to succeed on standardized tests.

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 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.

For example, in accordance to the California Department of Education (CDE, 2009b), 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, Howe (1994) stated that the growing presence of Latino students is a phenomenon that has dramatically affected many school systems because one out of 12 people who live in the United States trace their origins to Latin America. Howe (1994) also affirmed that "since 1980, the Latino population has increased at a rate five times that of non-Latino whites, African-Americans, and Asians combined" (p. 42). As stated by Genaro (2004), "In June 2003, the census bureau reported that Latinos are now the nation's largest minority group at 38.3 million people" (p. 96). From this perspective, as a consequence of the rapid increase of this kind of school population, school leaders and teachers nationwide are concerned about the gap in the academic achievement of English language learners.

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 proficiency level while approximately 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 the 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 non-ELL students (Goldenberg, 2008).

Therefore, some studies (Gray & Fleischman, 2005; Khisty, 2002; Peregoy & Boyle, 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. Gray and Fleischman (2005), Khisty, (2002), and Peregoy and Boyle (2005) argued that English language acquisition is the chief instructional goal for English language learners. Along this line, Peregoy and Boyle (2001) and Slavin and Cheung (2003) claimed that urgent development of English language skills enables 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, a number of studies (Cummins, 1989; Greene, 1997; Krashen, 1996; Willig, 1985; Thomas & Collier, 1997) 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 English-only 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-way[4] and two-way[5] developmental bilingual education. Thomas and Collier (1997) 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.

In this context, 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 afford school districts of 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, schools and 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.

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[4]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.

[5]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.

*Possible Reasons for the ELL Students' Achievement Gap in Mathematics*

Schools in the United States are currently experiencing rapid growth in ELL population. Many educational institutions seem unable to serve this population equitably. 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. In addition, many ELL students possess low first language literacy levels or other learning challenges that impede their full participation in school activities. Specifically, some of those challenges include ELL students' lack of prior exposure to a school environment, curriculum, and rudimentary understanding of the cultural context in 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 (Haynes, 2005). According to Fry (2008), one of the reasons for the ELL student achievement gap is a lack of English literacy skills, resulting in an inability to to filter mathematical knowledge, a language all its own, through a second language, English. This means that mathematics becomes, at least for ELL students, their third, or fourth language.

Delgado-Gaitan (1991) and Cowan, Donlan, and Newton (2005) addressed the role that first language literacy plays in second language acquisition, and often support the contention that literacy acquired in previous schooling is a requisite for the empowerment of ELL students. From 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 matheracy in their second language than students who are not yet literate. In this regard, some researchers (Cushner, McClelland & Safford 2003; Rueda & Windmueller, 2006) suggested that ELL students enter U. S. schools unprepared for certain curricular expectations. Bridging this gap 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.

According to Chamot and O'Malley (1994), 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 the English language. As a result, ELL students experience difficulties in learning mathematics that may have little to do with difficulties in processing mathematical ideas, concepts, and procedures (Perkins & Flores, 2002; Rosa & Orey, 2008) 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.

Studies on the assessment of ELL students (Abella, Urritia, & Shneyderman, 2005; Garcia & Gopal, 2003) have clearly demonstrated that the performance gaps for English language learners are partly due to the impact of language factors on standardized assessments. According to Abella et al (2005), these kinds of assessments are not always valid measures of ELL's content-area knowledge. ELL students are faced with the significant challenge of learning and being tested in a language in which they are not quite proficient. Further, Abella et al (2005) 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 California High School Exit Exam (CAHSEE) and the California English Language Development Test (CELDT), the California English proficiency test. They found that students with higher levels of English language proficiency were more likely to pass both sections English and Mathematics of the CAHSEE. Their study suggested 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. Their study showed that ELL students who passed the CAHSEE and CST scored significantly below White students.

The results of the 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. The findings of the study indicated that ELL students are much less likely than other students to score at or above proficiency levels in mathematics. Figure 4 provides the performance of ELL in the mathematics portion of the CAHSEE, in California, from 2001 to 2008, and offers further evidence of this phenomenon.

Figure 4: ELL student performance in the mathematics portion of the CAHSEE, in

California, from 2001 to 2008
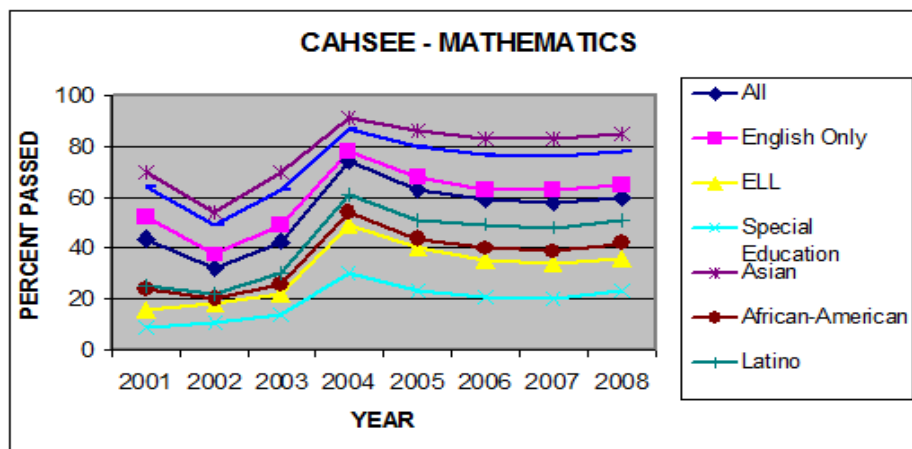


Source: CDE – DataQuest, 2008

Garcia and Gopal (2003) affirmed that high-stakes tests in California failed to

meet legislative objectives to increase achievement and close the student achievement

gap in mathematics. The findings of their study demonstrated that CAHSEE regulations

disadvantaged English language learners. Thus, they concluded that there is a mismatch

between high-stakes tests and second-language acquisition theories. Figures 5, 6, and 7

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 5. ELL student performance in Algebra 1 in high schools – CST, from 2004 to 2008
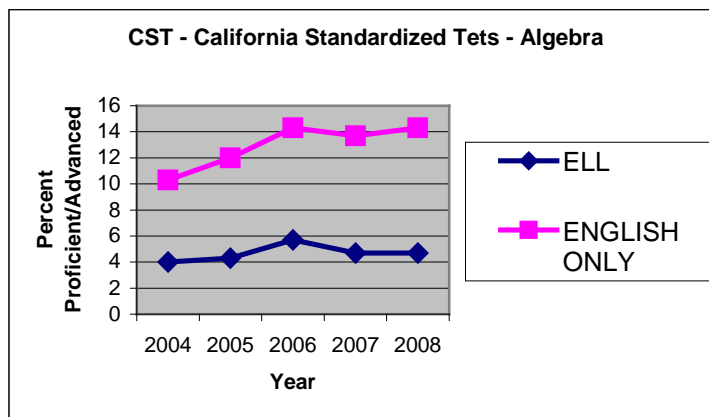


Source: CDE Star Test Results, 2009

Figure 6. ELL student performance in Geometry in high schools – CST, from 2004 to 2008
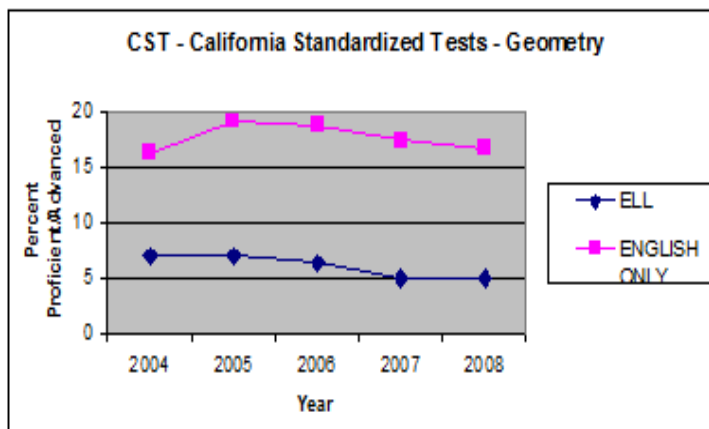


Source: CDE Star Tests Results, 2009

Figure 7. ELL student performance in Algebra 2 in high schools - CST, from 2004 to 2008
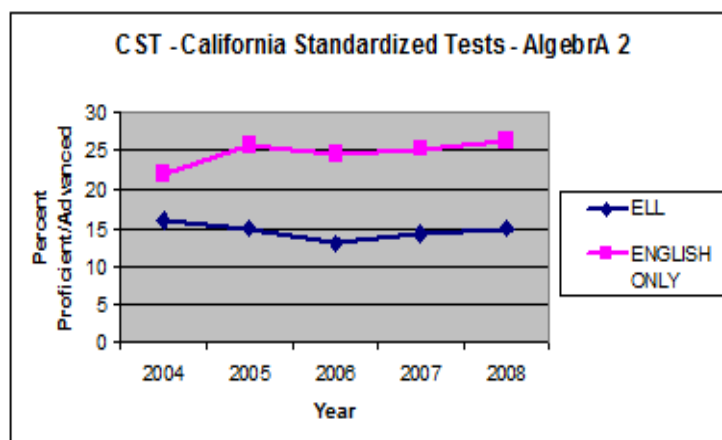


Source: CDE Star Tests Results, 2009

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 and valid outcomes for these students. A study conducted by Abella, Urritia, and Shneyderman, (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. Abella et al (2005) 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 also demonstrated that an underlying concern is that many ELL students require more than four years of learning the language to reach a minimum level of English proficiency. Oakeley and Urrabazo (2001) also demonstrated that the 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 students who have yet to reach a certain level of English language proficiency would not perform well on assessment measures of English, regardless of the subject matter being tested. Oakeley and Urrabazo (2001) argued that it is inappropriate to use achievement tests in English to measure English language learners' achievement unless they have established a certain level of English language proficiency. These three 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.

Cuevas (1984) stated that a possible reason for the ELL student achievement gap may be related to the application and contextualizaton of the mathematics because its vocabulary is technical in nature, narrowly defined, and not commonly used in students' daily settings. Krussel (1998) affirmed that language is an essential part of the mathematics construct because it is an indispensable tool in the learning of mathematics.

Furthermore, Abedi and Lord (2001) and Solano-Flores and Trumbull (2003) argued that ELL students are not successful at solving word problems because they are unfamiliar with mathematical vocabulary. Abedi and Lord (2001) reported that 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. D'Ambrosio (1990), Chamot and O'Malley (1994), Orey (2000), and Rosa and Orey (2008) argued that 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. In other words, 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).

For example, Midobuche (2001), Perkins and Flores (2002), and Rosa and Orey (2008) demonstrated that mathematical division problems are solved with different algorithms in different cultures. In this regard, mathematics problems are solved according to the mathematical knowledge of specific cultural groups, and the interpretation of the mathematics questions are also bound socioculturally (Solano-FIores & Trumbull, 2003; Stanley & Spafford, 2002). In addition to the way problem solving is approached differently based on cultural differences, it is dificult for ELL students to solve mathematical problems if they are not familiar with the cultural context of the mainstream society (Rosa & Orey, 2008). Some studies (Abedi, 2004; Abedi, Hofstetter, & Lord, 2004; Abedi & Lord, 2001; Brenner, 1998; Solano-Flores & 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.

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 mathematical cultural 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.

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. On the other hand, Crawford (1999) and Cummins (2000) argued that ELL students' years of education in U. S. schools do not have significance when discussed in isolation from the instructional languages, first language proficiency, and behavioral and attitudinal variables influencing ELL students' learning experiences. According to Coltrane (2002) and Hakuta, Goto-Butler, and Witt (2000), the conflicts over 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 diversity as it influences instruction. Culturally 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: tracked. Wheelock (1992) stated, "Tracking involves the categorizing of students according to particular measures of intelligence into distinct groups for purposes of teaching and learning" (p. 6). In other words, tracking is a traditional educational practice that groups students of similar abilities and achievement levels together into homogeneous groups. However, this practice has created many problems to minority students because most of them are assigned to lower level courses in which they advance much more slowly than their counterparts who are assigned to higher levels courses. In Wheelock's (1992) perspective, these differences may have been real but not profound in the earlier grades and gradually become broader gaps in achievement, attitude, and self-esteem.

A decade later, Rumberger and Rodriguez (2002), defined tracking as the policy of separating low-achievers from high achievers for single classes or courses of study. This process has been found to over-represent minority students including English Language Learners Special populations in low achievement tracks. According to Oakes (1992), ELL students are among the student groups most often tracked. Furthermore, tracking is not only a temporary placement: it becomes a permanent graduation pathway. In this perspective, Krashen (1993) indicated that often, ELL students with learning disabilities are often identified as students with special needs because their language

challenges are frequently confused with learning problems. In this regard, Harry and

Klingner (2006) stated that ELL students are statistically overrepresented in Special

Education programs.

Culturally Relevant Education

Major demographic shifts in the United States have led to increasing numbers of

culturally, linguistically, and socio-economically diverse students in the educational

system (Bazron, Osher, & Fleischman, 2005). At the same time, the passage of NCLB

(2001) and the resulting requirement for all schools to report disaggregated data have

brought increased attention to achievement gaps that have persisted for years between

English language learners and their mainstream peers (Gándara, Maxwell-Jolly, &

Rumberger, 2008). According to a wide range of educational indicators including grades,

significant inequities continue to exist for ELL student scores on standardized tests,

dropout rates, graduation rates, and enrollment in higher education (Education Trust,

2004; Gándara; Maxwell-Jolly; & Benavídez, 2007; Viadero & Johnston, 2000).

One possible explanation for these gaps may be that disparities in achievement

stem in part from a lack of fit between traditional schools, in which practice is derived

almost exclusively from Western cultures, and the home cultures of ELL students

(Cummins, 1986; D'Ambrosio, 1990; Delpit, 1995; Ladson-Billings, 1995). According to

this perspective, students whose cultural backgrounds are rooted in a Western way of

thinking may have an innate educational advantage as compared to students from other

cultural backgrounds. In this regard, culturally and linguistically diverse students are

required to learn through cultural ways of thinking and practices other than their own (Hollins, 1996).

This cultural mismatch is often a result of widely divergent worldviews about fundamental concepts such as human nature, natural and educational environments, and social relationships (D'Ambrosio, 1997; Sowers, 2004). Related to this argument, D'Ambrosio (1999) stated that an educational system rooted in the dominant culture is inherently biased. In D'Ambrosio's (1999) point of view, if one set of cultural beliefs is considered to be right, then the values of other cultural groups may be treated as less valid, and students from those groups may be perceived as culturally deficient (Collier & Hoover, 1987; Klingner, Artiles & Barletta, 2006; Trueba, 1988).

In the field of education, the cultural deficiency[6] model is used to explain differences in achievement that exist among students from different racial and ethnic groups (Katz, 1985). According to Sue and Sue (1990), students' achievement gap is based on environmental factors, lifestyles, and values of ethnic minorities as the basis for *cultural deprivation.*

In this context, Ridley (1995) stated that cultural deprivation highlights the inferiority of a culture while Atkinson, Morten, and Sue (1993) emphasized it as the

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[6]The original definition of cultural deficit is found in Passow's Education in Depressed Areas (1963), especially those chapters written by Goldberg and Deutsch. According to the National Commission on Excellence in Education [NCEE] (1983), Ralph (1989), and Pallas, Natriello, and McDill (1989), the cultural deficit approach reappeared in the 1980s with the concept of *students at risk*.

absence[7] of a specific culture: students may feel alienated not only from their school environments but from themselves as well. This means that the deficit model acts as if some students do not have a sense of their own culture. Sue, Bernier, Durran, Feinberg, Pedersen, Smith, and Vasquez-Nuttal (1982) argued that cultural deprivation is used to impose white middle-class values in an attempt to link poor school performance, as well as low self-esteem and motivation, to problems with homes, families, traditions, and cultural values (Trueba & Bartolomé, 1997; Valencia 1991). These deficient cultural values include present versus future time orientation, immediate instead of deferred gratification, an emphasis on cooperation rather than competition, and the placing of less value on education and upward mobility (Carter & Segura, 1979).

It is important to note that this model labels the internal social structure of minority families and students as *deficient*. Such perceived deficiency is caused by large, disorganized, female-headed families; Spanish or non-standard English spoken in the home; and patriarchal or matriarchal family structures (Trueba & Bartolomé, 1997). Proponents of this model contend that minority cultural values, as transmitted through the family, are dysfunctional and therefore cause low educational and occupational attainment (Valencia, 1991). Furthermore, Carter and Segura (1979) argued that since parents of minority students fail to *assimilate* and *embrace* the educational values of the

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[7]Keddie (1973) argued, "It is not clear of what culture these families and their children can be deprived, since no group can be deprived of its own culture. It appears therefore that the term becomes a euphemism for saying that working-class and ethnic groups have cultures which are at least dissonant with, if not inferior to, the 'mainstream' culture of the society at large" (p. 8). According to Keddie (1973), if sociologists focus their attention on the supposed deficiencies of students, in terms of cultural deprivation, they may fail to notice the shortcomings of schools.

dominant culture and continue to transmit or socialize their children with values that inhibit educational mobility, they are to blame if low educational attainment continues into succeeding generations. Carter and Segura (1979) also stated that in the cultural deficit model, members of minority cultures and students are described as failing to attain the levels of socioeconomic and academic status obtained by the majority culture due to the disadvantages and failures within the minority cultures themselves. This argument leaves little if any responsibility for the dominant culture and its failure to be more inclusive.

Most of the criticism concerning the cultural deficit model in education is related to the promotion of cultural stereotyping that contributes to unproductive efforts to show minority or low income students' home or school settings as the source of lower achievement. If school leaders and teachers assume a univocal view of culture as a universally valid ideal roughly equivalent to the condition of being civilized, then it is hard to determine how the label of culturally deficient adds to the common-sense notion of uneducated students and how cultural deficiency could be a cause of school failure (Kretovics & Nussel, 1994). In practice, the deficit model is applied in schools to students of color and minority students by school leaders and teachers who are professionally trained in educational programs that utilize an individualistic and cultural deficit explanation of low educational attainment of minority students (Persell, 1977). The cultural deficit model remains the *hidden theory of choice* that many school leaders and teachers apply in their professional meetings and settings when the topic of minority educational inequality is discussed (McWhorter, 2000).

In this educational environment, many school leaders and teachers struggle to connect with a diverse student population whose cultural backgrounds are distinctly different from their own (Baptiste, 1998; Marion, 2002). Thus, it is necessary that school leaders, teachers, and staff members embrace the relevance of culture as a means of helping all students reach high standards in a culturally relevant educational environment. In other words, by adopting a culturally relevant education framework, school leaders may be able to address issues of educational inequity and confront institutional bias and discrimination (Snowden & Gorton 2002, Norton, 2005). In so doing, school leaders may be able to avoid some of the consequences of the cultural deficit model such as higher rates of indiscipline and suspension among minority students (Leone & Achilles, 2006; McFadden, 1992; Raffaele Mendez & Knoff, 2003). In order to reach this goal, students' culture, native language, and cultural dialects must be valued and used as assets in their learning and as a vehicle for their learning process rather than deficits.

According to Darling-Hammond (1997), Rogoff (1990), and Wang, Dapretto, Hariri, Sigman, and Bookheimer (1994), the educational system must be relevant to the emotional, psychological and educational needs of all students and for minority students, such as ELL, in particular. They argued that there is a link between students' cognitive performance and their cultural environmental context, and they recommended that the development and implementation of a culturally relevant educational system is one of the best approaches to ameliorate the minority student achievement gap.

For example, the main purpose of the study conducted by Maddahian (2004) was to gather evidence regarding the existence of a Culturally Relevant and Responsive

Educational program (CRRE) in a large school district in California. According to

Maddahian (2004), the CRRE conceptual framework presented a comprehensive model

dealing with all aspects of instruction and education. Maddahian (2004) examined the

prevalence of an instructional program based on a CRRE framework working with a

random sample of 40 schools, which were selected for observation and data collection.

The random sample used in the study included 16 elementary schools, 12 middle schools,

and 3 high schools. A team of fifteen trained data collectors observed teachers and

classroom environments, documenting evidence of culturally relevant instruction through

detailed field notes and direct classroom observation. The extent to which classroom

instruction exhibited the use of clear standards, teaching multicultural content, and

paying attention to diversity and poverty issues was minimal and there was almost no

evidence of multicultural content to deliver instruction, especially in secondary

mathematics classes. At the same time, there was no parental presence in the classroom

other than for discussions of disciplinary issues or the lack or low level of their children'

progress. This environment allowed Maddahian (2004) to conclude that community

presence was exceedingly rare, with few instances of involvement by the community in

the schools. Finally, Maddahian (2004) concluded that the implementation of CREE is a

complex and challenging endeavor faced by schools.

Therefore, it is essential for the current educational system to respect and value

students' cultural backgrounds and to apply instructional strategies where ELL students

may benefit from their previous experiences and learning styles. In other words, school

leaders and teachers need to possess a sociocultural awareness to be able to both

understand their students' needs and build a school cultural climate in which all students learn and achieve (Maddahian & Bird, 2004). In a culturally relevant educational system, the values of previous experiences and cultural backgrounds of all students are understood and have a prominent place in the teaching-learning process.

Klotz (2006) defined *culturally relevant educational system* as an educational system "that honors, respects, and values diversity in theory and in practice and where teaching and learning are made relevant and meaningful to students of various cultures" (p. 11). This is an educational system that educates all students by incorporating their diverse emotional, social, cognitive, and cultural experiences into a successful teaching-learning environment. In this regard, Maddahian and Bird (2004) stated that in order to create a culturally relevant educational system, it is paramount for school leaders to set goals for students' success: this educational system is grounded in the belief that culturally and linguistically diverse students can and do excel in their academic endeavors.

Culturally relevant education instills ethics of care, respect, and responsibility in the "professionals who serve culturally and linguistically diverse students" (Klingner, Artiles, Kozleski, Harry, Zion, Tate, Duran, & Riley, 2005, p. 8) such as school leaders, teachers, and staff. In this context, Klingner et al (2005) affirmed that the transformative goal of culturally relevant schools must be present in all of their activities, thereby facilitating the development of the culture of the schools that are primarily concerned with deliberative and participatory discourse practices (Gay, 2000; Ladson-Billings, 1995). In other words, culturally relevant schools create and implement spaces for school

leaders and teachers' reflection, inquiry, and mutual support around issues of cultural difference. These spaces encourage school leaders and teachers to understand and respect individual differences and strive for high educational standards and levels of achievement for all students (Beauboeuf-Lafontant, 1999; Villegas, 1991).

However, according to Gay (2000), if schools want to accomplish the goals of culturally relevant education, then school leaders need to work collaboratively with teachers, staff members, educators, parents, and the members of the school community in order to close the achievement gap of its students. In this context, Gay (2000) argued that it is crucial for school leaders to work to improve success rates for all students, with emphasis on ELL students, by addressing their cultural and academic needs into the pedagogical work that occurs in educational settings.

*Culturally Relevant Schools*

Schools across the United States have worked to identify and meet the academic deficiencies and social problems prevalent in all subgroups of their students' population, especially ELL students. However, despite their constant efforts, English language learners, on average, continue to register lower achievement on standardized high-stakes tests (Gándara; Maxwell-Jolly; & Benavídez, 2007). The time has come to look at both the students and the public school system itself for the sources of the problems faced by ELL students. Indeed, some of these problems may be cultural at their very core, stemming from a dissonance between the cultures of ELL communities and the public school system (D'Ambrosio, 2006; Rosa & Orey, 2007a).

The report of the National Association of State Boards of Education (NASBE, 2002) discussed the importance of culturally relevant schools. The report described the effects of the growing diversity among students in schools in the United States, the challenges and opportunities this diversity presents, and the need to teach all students to high standards while providing a common set of core values. NASBE (2002) urged for state policy makers to counter intolerance and inequity in the education system through culturally relevant pedagogical practices.

According to Gay (2000), Nuthall (2005), Pai (1990), and Ladson-Billings (1995), in culturally relevant schools, all students receive instruction through pedagogical actions that engage them intellectually by taking into account the pedagogical decisions affecting them most. This is especially important for those who have been traditionally marginalized by the school system, such as the ELL population. Klotz (2006) affirmed that "the benefits of culturally competent schools are numerous and include preventing academic failure, reducing drop-out rates, and engaging students and their families in the school community" (p. 11). Culturally relevant schools are grounded in the beliefs that culturally and linguistically diverse students are able to excel academically when their culture, language, heritage, and experiences are valued and used to facilitate their learning and development when provided access to high quality teachers, programs, and resources (Gay, 2000; Nieto, 1999; Valenzuela, 1999).

For example, Lipka and McCarty (1994) conducted two case studies in which they described the transformation of the culture of schooling of two schools, one in Alaska and the other one in Arizona. Data were drawn from more than a decade of

ethnographic and action-oriented research at Rough Rock Demonstration School, on the

Navajo Nation in northeastern Arizona, and in 10 Yup'ik community schools in

southwestern Alaska. By coming together in native teacher study groups, Navajo and

Yup'ik teachers and elders found creative ways in which to use their culture, knowledge,

and language in the elaboration of curriculum and pedagogical activities. These teacher

groups have created zones of safety in which resistance to conventional practices could

be expressed and innovative approaches to schooling could be investigated and practiced.

The work of these teacher groups had theoretical implications for community-based

teacher preparation. Factors influencing development of these groups and their ability to

effect change were discussed along with the challenges of transferring their cultural

creations to the wider institutions of schooling.

In this perspective, the "goals for culturally competent schools are to establish

settings where all students are made to feel welcome; are engaged in learning; and are

included in the full range of activities, curricula, and services" (Klotz, 2006, p.11).

Previously, Lindsey, Robbins, and Terrell (2003) contend that one of the most important

objectives of culturally relevant schools is to promote inclusiveness and institutionalize

teaching-learning processes that allow for opportunities to learn about differences in

order to respond appropriately to those differences.

According to Burns, Keyes, and Kusimo (2005), in culturally relevant schools, all

students, regardless of ethnicity or socioeconomic status, have an opportunity to learn to

high standards. Students are also encouraged to learn by building and acquiring their

knowledge in multiple dimensional pedagogical activities that are based on interests, experiences, knowledge, and skills that they bring daily to classrooms.

For example, as part of a larger study of system-wide educational reform in rural Alaska, Barnhardt (1999) conducted a case study that examined recent efforts by the people of Quinhagak to integrate Yup'ik language, values, and beliefs into school practices and policies. Quinhagak is a Yup'ik Eskimo community of 550 people on the southwest coast of Alaska and 64 of all residents in this community can communicate in both Yup'ik and English. The K–12 school enrolls about 140 students. A brief history of the community and its schools can be drawn from the experiences of an elder and her descendants.

The Quinhagak community leadership team developed an Alaska Onward to Excellence (AOTE) action plan that encompassed 10 statements of values and beliefs, a mission statement, and a student-learning goal of communicating more effectively in Yup'ik. The team also decided to study the community involvement in schooling decisions and the contribution of Yup'ik proficiency to overall students' achievement. Barnhardt (1999) gathered information on school organization; elementary and secondary facilities, personnel, and curriculum; special education and discipline programs; parent and community involvement; and assessment. Barnhardt (1999) also provided final comments that summarized factors contributing to community choices for its school, factors enabling the school to implement new and self-determined educational priorities and challenges to narrowing the school-community gap and increasing students' achievement.

In culturally relevant schools, school leaders and staff members such as counselors and teachers hold students to high standards and have high expectations for all of them (Cooper, 2002; Hill, Kawagley, & Barnhardt, 2003; Sheets, 1995; Waxman & Tellez, 2002). Sharing this perspective, Klotz (2006) stated that culturally relevant schools are generally defined as schools that honor, respect, and value diversity. In these schools, the teaching-learning process is relevant and meaningful to all students, specifically to students from various cultures. In culturally relevant schools, students' problems are examined within the context of environmental factors, including prior educational experiences, instruction, second language acquisition, and culture (Beauboeuf-Lafontant, 1999; Ladson-Billings, 1995; Villegas, 1991).

According to Elmore (2000) and Spillane, Halverson, and Diamond (2001), the learning environment propitiated by culturally relevant schools allows learning to become the central galvanizing theme for the school community. As a result, the mobility of the school leaders does not intervene with the work of the community, which remains strong and relevant to the changing needs of the families of the school community and students who attend the school.

*Culturally Relevant Leadership*

Demands on school leaders in the public school system in the United States have escalated in response to changing demographics and pressures for high levels of student achievement. School cultural, linguistic and economic diversity requires school leaders to

create communities that support learning and improve the achievement of all its members.

Farmer and Higham (2007) stated that school leaders are called to act on their commitment to culturally relevant pedagogy in the service of just, humane, and equitable school communities by collaborating with families and other community stakeholders. Culturally relevant school leaders recognize that culture means far more than recognizing racial and ethnic differences. Lindsey, Robbins, and Terrell (2003) suggested that school leaders must always be willing to be in a state of learning in order to demonstrate an understanding of various cultures and be able to respond effectively to issues of culture and diversity in order to facilitate student learning. In this regard, Davis (2002) argued that school leaders have to respond to diverse community interests and needs and mobilize community resources in order to demonstrate and promote ethical standards of democracy, equity, diversity, and excellence as well as promote communication among diverse groups. However, for this to happen, it is necessary to develop a school-wide commitment to cultural relevancy and reciprocity in order to guide school leaders. According to Davis (2002), there are many implications for school leaders when it comes to addressing the needs of underserved populations: the public needs assurance that schools are able to serve their diverse and highly complex communities and expects culturally relevant leadership from its school leadership.

An emphasis on the need for culturally relevant leaders reflects the influence culture has on the learning process. For example, Wibbeke (2009) argued that there is a need for school leaders to be *culturally self-aware* because this aspect of leadership is

critical in leading culturally diverse school contexts. Thus, in addition to leadership skills, school leaders need to acquire cultural intelligence. According to Wibbeke (2009), it is necessary for school leaders to learn about how other cultures define and exert leadership so they themselves can gain and maintain cultural proficiency.

Challenges faced by school leaders in managing multiple and simultaneous cultural identities in diverse school contexts are enormous. In highly diverse contexts, school leaders must consider how concepts of care, communication, consciousness, change, and capability both interact and vary from culture to culture when leaders perceive diverse students' cultural backgrounds through their own (Wibbeke, 2009). In addition, culturally relevant school leaders must clearly exemplify a culturally relevant approach in their schools and model positive interactions and communications with parents and members of the school community (Danridge, Edwards, & Pleasants, 2000). Therefore, it is crucial that school leaders develop an understanding and mastery of these vital intercultural competencies.

For example, a study conducted by Agbo (2002) focused specifically upon how the cultural roles of administrators of native students translate into strategies that allow them to learn more effectively. Agbo (2002) reviewed the Mohawk Education Curriculum Development Project, which was developed though collaboration between administrators, public school teachers, and members of the school community to elaborate a culturally relevant standards-based curriculum that addressed problems of high dropout rates and underachievement of Mohawk students. Agbo (2002) also recommended the implementation of cultural standards for teachers and administrators in

addition to standards for parent-teacher communication. The main focus of Agbo's (2002) study was to look at how to enhance indigenous students' achievement through culturally relevant pedagogy.

According to Wibbeke (2009), learning how to interact in other cultures takes enormous effort. For a culturally relevant school leader, operating between cultures is a dynamic interaction that requires a deeper cultural understanding about different cultural groups (D'Ambrosio, 1990). When school leaders do not have a common frame of reference, misunderstandings, conflict, and problems with productivity tend to arise. In other words, cultural influences are an important factor when considering the development of culturally relevant leaders.

Growe, Schmersahl, Perry, and Henry (2001) affirmed, "At the acceptance level, administrators acknowledge the origins of their own ethnocentric views and attain impartiality in their perception of other cultures" (p. 7). Similarly, Slater, Boone, Alvarez, Topete, Iturbe, and Base (2006) affirmed, "Cultural values are strong predictors of leadership behavior" (p. 158): personal conditioning and bias, when coupled with firmly established institutional traditions, limit the development of culturally relevant leaders. Such factors inevitably influence the climate of schools.

On the other hand, culturally relevant school leaders lead best by focusing attention and action on difficult questions while enduring problems faced by their schools. In so doing, Davis (2002) argued that school leaders need to be culturally proficient in order to deal with the realities of oppression and to work with other stakeholders in order to eliminate oppression from their schools. However, in order to do

so, they need to find their voice, develop their political understanding, and add advocacy to their leadership practices. Farmer and Higham (2007) affirmed that the development of culturally relevant leaders "is premised upon egalitarian principles that transcend individual cultural norms" (p. 2). The core principles of culturally relevant leadership are sensitive to cultural nuances in communication processes, deliberate and sequential processes, appreciation of one's own cultural biases, and cultural responsiveness in education.

Davis (2002) defined culturally relevant leadership as a "process in which communities create systems that support democratic education" (p. 5). Sharing this point of view, Grillo and Dace (2006) affirmed that culturally relevant leadership involves a set of leadership behaviors that demonstrate that school leaders possess knowledge, understanding, affirmation, and appreciation of the various characteristics of a particular cultural community. In addition, Nieto (1999) stated that culturally relevant leadership is one of the most important roles for contemporary high school leaders because it is rooted in a culturally relevant educational system grounded in the beliefs that culturally and linguistically diverse students are able to excel in academic endeavors. Valenzuela (1999) affirmed that this context favors student achievement. Culture, language, heritage, and experiences are valued and used to facilitate student learning and development through access to high quality teachers, programs, and resources.

In culturally relevant leadership, school leaders' values and leadership styles shape the school climate for learning and achievement by addressing cultural issues within both a given school context and the external organizations such as school districts

and governmental agencies (Gay, 2000). They do this because they expect an inclusive

learning environment in which an appreciation of diversity is the best way to educate all

students. This means that culturally relevant school leaders must be capable of motivating

and energizing an increasingly heterogeneous student body in their schools in order to

avoid *cultural dissonance*[8] (Ybarra, 2001), which is a disconnection between student

cultural background and the corresponding thought processes of students in the

classrooms' learning environment. In other words, cultural changes that occur in the

school system are often unexpected, unexplained, and not understandable due to various

types of cultural dynamics. Therefore, school leaders and teachers need to help students

to negotiate the cultural exchanges that inhibit their behavioral adaptation. Thus, Ybarra

(2001) stated that the concept of cultural dissonance highlights issues of cultural

differences in ways of thinking between many minority groups and academia that

contribute to the tensions encountered between minority students and teachers as well as

school leaders. Shields, Larocque, and Oberg (2002) stated:

> Wise school leaders will learn to create psychological spaces for genuine
>
> exploration of difference; they will initiate conversation where problems and
>
> challenges may be identified and discussed; and they will create a climate in
>
> which staff and students feel safe in clarifying their assumptions to deal with
>
> cultural dissonance (p. 130).

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[8]Allan (2002) described cultural dissonance as a sense of discord, disharmony, and
conflict experienced by students in the midst of change in their cultural environment.

In many educational systems, English language learners often experience a sense of cultural dissonance, making them vulnerable to educational disadvantages. Thus, cultural dissonance may have a profound and negative effect on their personal development and academic achievement (Ybarra, 2001). Since culturally relevant leadership styles are rooted in the belief that students can learn and that every student has intrinsic cultural value, culturally relevant school leaders need to challenge students to their fullest potential because high expectations in their schools are the norm (Fullan, 2001). However, Ybarra (2001) argued that culturally relevant school leaders must find ways to avoid the consequences of cultural dissonance, that is, the tendency of students' abandonment of their inherent cultural values to adopt those of the school culture in order to achieve academic success.

According to Gordon and Yowell (1999), in order to minimize the effects of cultural dissonance, schools may need to review aspects of both the formal and informal curricula. Gordon and Yowell (1999) also pointed out that merely providing culturally relevant materials does not eliminate cultural dissonance: learning contexts must also allow for differences in the values, knowledge, skills, and learning styles that students bring to the classroom. In so doing, Klotz (2006) argued that culturally relevant school leaders need to:

> [Encourage and facilitate] understanding and respect for individual differences and strive for high educational standards and levels of achievement for all students. Students' problems are examined within the context of environmental

factors, including prior educational experiences, instruction, second language
acquisition, and culture (p.13).

Wibbeke (2009) stated that in order for school leaders to be optimally culturally relevant in reducing the disproportionate representation of culturally and linguistically diverse students, it is imperative that they become knowledgeable both about the nuanced factors that influence students' opportunities to learn in general education as well as about the cultural proficiency approach.

In this regard, Davis (2002) stated that school leaders must implement ways that foster democratic education by eliminating oppression and discrimination from schools. In order to do so, school leaders must implement an action agenda that focuses on supporting diverse faculty and students by encouraging pedagogical practices and assessments that incorporate multicultural and culturally relevant perspectives into the curriculum. This helps to develop an intentionally inclusive school community that promotes social justice. Overall, culturally relevant school leaders need to empower teachers and students to succeed in school regardless of many of the educational constraints students face.

Culturally relevant school leaders lead their teachers and staff in *courageous conversations* that are necessary to face issues related to students' achievement (Singleton, 2005), including that of English language learners. In other words, with a culturally relevant and standardized research-based instruction coupled with a data-driven plan, school leaders and educators should have the courage and skills to facilitate honest conversations about the belief systems that have kept their expectations for student

achievement low and have prevented them from serving students needs. This means directly addressing the data and developing an expectation that students achieve at high levels through systems and processes that are culturally relevant, standards-based, and data-driven.

However, Scheurich and Skrla (2003) stated that if instruction and assessments are to be culturally relevant, standards-based and data-driven hiring practices and professional development must follow the same culturally relevant and pedagogical pattern. It is therefore necessary to develop a standardized practice to hire individuals for all levels who have experience in increasing the achievement levels of struggling student populations. Furthermore, professional development around culturally relevant pedagogy needs to be continuous and differentiated for the various levels of implementation that exist among staff in the school settings (Scheurich & Skrla, 2003). In other words, school leaders at all levels require a knowledge and an understanding of professional development design, the change process, research findings, data-supported decision making, and an array of leadership and communication skills and processes that facilitate the development of a culturally relevant leadership style.

Culturally relevant school leaders make sure that the conglomeration of different programs and policies they enact make sense when implemented simultaneously (Bryk, Sebring, Kerbow, Rollow, & Easton, 1998). School leaders give high priority to quality instructional time in class without interruptions. Teachers are assigned to classrooms in equitable ways, ensuring that all students have access to the most effective teachers and the support they need to succeed academically (Fullan, 2002). They also consider

alternatives to suspension and put into practice disciplinary policies that are proactive, such as in-house counseling support for anger management and other emotional and behavioral needs, positive reinforcement systems and behavioral supports, and increased relationship building with students and their families (Townsend, 2000).

Because culturally relevant school leaders are relational leaders, they must be given support and be trained to initiate and sustain a school wide commitment that guarantees the full inclusion of all students in school activities. Culturally relevant leadership is considered a relational and ethical process when school leaders lead the school community to work together to accomplish positive changes. This suggests that if given support, all stakeholders will work hard toward resolving differences among the members of the school community, finding a common direction, and building a shared vision to improve schools. In this regard, leadership is culturally relevant and inclusive when members of the school community understand, value, and actively engage diversity in views, approaches, styles, and aspects of individuality such as culture that add multiple perspectives to a group's activity (Komives, Lucas, & McMahon, 2007). Because school leaders attend to values and personal beliefs as well as intellectual percepts in matters of culturally relevant leadership, culturally relevant school leaders are also considered moral leaders (Sergiovanni, 1992). Burns (1978) referred to moral leadership within the concept of transformational leadership because the relationship between the leader and the staff must be genuine. In other words, moral leaders' behaviors must be consistent and aligned with the needs and values of their followers. Other characteristics of moral leaders include those of assuming responsibility for their actions and commitments made to their

followers, keeping promises made by personally leading the change, and understanding that alternatives exist and having a willingness to switch direction if needed.

Howard-Hamilton (2000) stated, "A multiculturally competent professional understands the need to be open to lifelong learning on diversity issues" (p.68). This means that culturally relevant school leaders understand and comprehend the range, behaviors and attitudes necessary for multicultural competence (Pope & Reynolds, 1997). That is, if they possess multicultural and culturally relevant knowledge, skills, and awareness as part of their belief systems, then school programs will be implemented to help English language learners succeed (Howard-Hamilton, 2000).

School leaders in linguistically diverse schools need to work to refine their educational programs: ELL student achievement only occurs when school leaders maintain literacy and matheracy of all students as high priorities, motivating all teachers to participate in the improvement of the pedagogy of the schools (Goldenberg & Sullivan, 1994; Olson, 1992). As culturally relevant school leaders, they also have to provide supervision in order to move their faculty forward to best meet the needs of their ELL population by implementing best practices such as culturally relevant pedagogy. Thus, Demmert (2001) and Hollins (1996) stated that culturally relevant school leaders need to work with the school community to develop and provide adequate professional development opportunities for teachers so that they can learn about students' culture. School leaders also need to ensure that teachers are culturally competent to develop an appropriate curriculum for English language learners.

School leaders and their communities must share responsibility for gaps in students' achievement that create chasms in opportunity. This means that leadership requires actions grounded in a deep understanding of school leaders' own culture and of the ways culture shapes their perceptions, influences their behavior, and affects their learning (Skrla & Scheurich, 2003). Culturally relevant leadership involves the process of confrontation of the contemporary effects of the dynamics of power and privilege on students and schools: culturally relevant leadership calls for the necessity of viewing the benefits of cultural variation as well as the challenges in working across cultural boundaries.

Fullan (2002) stated that culturally relevant school leaders must lead change efforts as agents who transform the teaching and learning culture of their schools. However, it is important to note that school leaders operate within a larger culture: the culture of the school district, which must respond to state and federal mandates and policies (Bridgeland & Duane, 1987). How school leaders respond to these mandates and policies affects their impact on students' achievement. Thus, the role of culturally relevant school leaders is challenging and complex because school leaders have to acquire the knowledge, skills, abilities, competencies, and attributes that constitute their cultural competence (Fullan, 2002). In so doing, school leaders need time to reflect on their own leadership practice in order to understand the cultural dynamics that occur in their schools. For many, this is a very daunting standard of excellence, which few school leaders are able to fully embrace, related to the value of diversity in their schools as well as the preservation of the cultural dignity of their students. According to Fullan (2002),

culturally relevant leadership enables principals and vice-principals to create an inclusive and instructionally powerful learning environment in their schools.

*Culturally Relevant Pedagogy*

Scholars have developed a theory of culturally relevant pedagogy: this pedagogy examines the teaching-learning process within a more critical paradigm by making a more explicit connection between students' home culture and school subject matter (Gay, 2000; Ladson-Billings, 1995). In this regard, Gay (2000) stated, "Culturally responsive teaching can be defined as using cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant and effective for them" (p. 29).

Culturally relevant pedagogy builds upon research in educational anthropology that examines cultural congruence between home and school (Ladson-Billings, 1994). Cultural congruence indicates school leaders and teachers' respect for the culture of their students. According to Zeichner (1996), in order for school leaders and teachers to implement the principle of cultural congruence, they must have knowledge of and respect for the various cultural background, traditions, and languages of students in their schools.

School leaders need a base of general sociocultural knowledge about child and adolescent development; second language acquisition; and the ways in which socioeconomic circumstances, language, and culture shape students' school performance (Zeichner, 1996). Finally, school leaders and teachers should develop a clear sense of their own ethnic and cultural identities in order to be able to understand and appreciate

those of their students. Zeichner (1996) stated that this will help school leaders to understand how their own cultural biases may influence their judgments about students' performance and obstruct students' ability to learn.

A culturally relevant pedagogy focuses on the need for teachers to understand and value the diverse cultures of their students and allows them to explicitly address their understanding of it in the classroom. According to Moll, Amanti, and Gonzalez (1992), teachers also need to teach subject matter in a culturally appropriate manner that is situated within students' *funds of knowledge*[9] they bring to school. In this regard, students need to be educated within an understanding of the historical legacy of racism in society and its current impact upon education (Ladson-Billings, 1995).

The understandings and processes of culturally relevant pedagogy underscore students' connections to their home culture and provide ways for school leaders and teachers to support cultural connections in school and then use them to scaffold students' learning (Gay, 2000). These features of culturally relevant pedagogy assist educators in developing greater specificity in the knowledge needed for school leaders to provide their schools with culturally relevant leadership.

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[9]Moll, Amanti, Neff, and Gonzalez (1992) stated that funds of knowledge refer "to the historically accumulated and culturally developed bodies of knowledge and skills essential for household or individual functioning and well-being" (p. 133). This means that when teachers shed their role as teacher and expert and instead take on a new role as a learner, they can come to know students and their families in new and distinct ways. With this new knowledge, teachers may be able to see that the households of their students contain rich cultural and cognitive resources. These resources can and should be used in classrooms in order to provide culturally responsive and meaningful lessons to tap students' interest and prior knowledge.

Culturally relevant pedagogy is a teaching style that validates and incorporates students' cultural background, ethnic history, and current societal interests into teachers' daily instruction. It addresses students' socio-emotional needs and uses ethnically and culturally diverse materials for its pedagogical action in classrooms (Banks, 1991; Gay, 2000; Scheurich & Skrla, 2003). In this perspective, Ladson-Billings (1994) stated that culturally relevant pedagogy is an educational approach that empowers students intellectually, socially, emotionally, and politically by the making use of cultural and historical references to convey knowledge, impart academic skills, and change students' attitudes towards academic instruction.

Some researchers have taken their studies a step further into the development of culturally relevant pedagogy by integrating the culture of different racial and ethnic groups of students into the overall curriculum and academic program (Gay, 2000; Howard, 2003; Klug & Whitfield, 2003; Ladson-Billings, 1994; Townsend, 2002). In like manner, Scheurich and Skrla (2003) argued that the basic premise of culturally relevant pedagogy "is that teachers should teach using philosophies and methods that respect, value, and use positively the strengths of students' home cultures, contexts, and languages" (p.48).

Richards, Brown, and Forde (2000) affirmed that culturally relevant pedagogy delineates and promotes the achievement for all students because effective teaching and learning take place in an environment that is culturally supported and learner-centered whereby the strengths students bring to school are identified, nurtured, and utilized to promote their achievement. Some studies of culturally relevant environments (Banks,

1991; Gay, 2000, Ladson-Billings, 1994) showed that the academic achievement of students who come from culturally and linguistically diverse backgrounds improve if school leaders and teachers ensure that classroom instruction is conducted in a manner that is relevant to students' home and the culture of their community.

For example, Moll, Amanti, Neff, and Gonzalez (1992) studied ethnic minority students in Mexican communities in Tucson, Arizona as a means to empower students and support their academic achievement. Moll et al (1992) examined the effects of teachers as co-learners, that is, learning students' home culture, practicing reciprocal teaching, and in turn connecting to the culture of the students in order to improve their academic achievement. Further evidence of this phenomenon resulted from a study conducted by Lipka and Adams (2001), which clearly addressed the application of culturally relevant pedagogy. The purpose of their quasi-experimental study was to determine the effectiveness of a culturally based unit of instruction on mathematics that dealt with the learning of perimeter and area by sixth grade students. Lipka and Adams (2001) examined two independent variables: treatment versus control condition as well as urban versus rural settings. A group 97 percent comprised of Yup'ik students from both the rural and urban schools was assigned to either the treatment or control group by randomly assigning teachers and their intact classes to one or the other condition. From this population, four subgroups were created, consisting of five classes and 109 students in the urban-treatment group, three classes and 71 students in the urban-control group, four classes and 51 students in the rural-treatment group, and 27 students in the rural-control group. The outcome measure was a locally constructed achievement test on

mathematical concepts of perimeter and area. Lipka and Adams (2001) applied both pretest and posttest versions, which consisted of 17 multiple choices and constructed response items. For the purposes of data analysis, students' scores on the pretest and posttest were converted into percentages measuring percent correct. A series of $t$ tests were conducted on the pretest scores, and it was found that there were no differences between the treatment and control groups across urban-rural divides. However, there was a significant difference between urban and rural across treatment-control, in favor of the urban group. Gain in scores, in percentage, was used for primary analysis, and it was found that the percentage gain score for the treatment groups, across rural and urban, was significant favoring the treatment group over the control. The percentage gain for the rural-treatment group exceeded the percentage gain for the rural-control group. Lipka and Adams' (2001) conclusion were in favor of the effectiveness of the culturally relevant based curriculum treatment as implemented in their study.

In line with this perspective, Little (1993) recommended that in order to promote the academic achievement of students, it is necessary to establish and implement culturally relevant pedagogy through the use of connection between culture and curriculum as well as connection between home and school. Furthermore, in order to establish and implement a culturally relevant pedagogy, reforms must occur in the overall organization of the school. These reforms include the administrative structure and the ways it relates to diversity by adequately using physical space in planning schools and arranging classrooms. Reforms also include school policies, procedures, and practices that influence the delivery of services to students from diverse cultural backgrounds as

well as the involvement of the community within the school, including the institutional approach to community involvement in which families and communities are expected to find ways to become involved in the school.

For example, Kawagley, and Barnhardt (1999) conducted a case study in which they examined the school improvement process undertaken in Yupiit School District (YSD), which consists of three Yupiaq villages in southwest Alaska that joined in 1984 to form the Yupiit Nation in order to run their own schools. In 1992, a district-level leadership team, trained in the Alaska Onward to Excellence school improvement process, called the first community wide meeting to discuss the values and beliefs that should be passed on to the next generation. The district team then compiled community values and beliefs, drew up a draft mission statement, and listed tentative goals for students. After extensive community feedback, the YSD school board adopted the following students' goals: knowledge of Yup'ik values, culture, and subsistence skills; preparation for work and further education; respect and positive attitudes toward life, learning, and community; development as law-abiding citizens; and ability to communicate in Yup'ik and English languages. Local leadership teams then identified the goal of greatest concern in each community and developed specific actions to advance that goal. Kawagley and Barnhardt (1999) stated that by the end of the third year of the process, results included improved student attendance, increased parent and elder participation in the school community, provision of curricular training, and closer school-community cooperation. Through this curriculum, everyone in the school community

becomes a teacher, every place is a potential classroom, and every activity constitutes a learning opportunity.

In a similar study, Agbo (2001) conducted participatory research at Potsdam, New York with the Mohawk Nation by involving communities in discussion groups to establish the needs for bicultural education for students. Participants discussed the use of Mohawk culture as the arena for curriculum development as well as for the development of Mohawk cultural standards and teacher training in Mohawk culture. Agbo (2001) concluded that learning-teaching environments of Native American students must foster self-esteem, reflect increased academic standards, and provide access to cultural resources, particularly at the local community level.

Irvine and Armento (2001) suggested that culturally relevant pedagogy allows teachers to provide and use meaningful learning materials, create classroom environments that include cultures, customs, and traditions that are different from their own, and include lessons that assist students in making meaningful connections between their daily experiences and school-related activities. In other words, participating in culturally relevant teaching essentially means that teachers create a bridge between students' home and school lives, while they still meet the expectations of the school district, state, and federal curricular requirements. The purpose of this instructional pedagogy is to utilize student cultural and linguistic backgrounds, knowledge, and experiences to inform teacher lesson planning, methodology, and pedagogy. Ogbu (1992) stated that a culturally relevant pedagogy provides a way for students to maintain their cultural identity while succeeding academically. In other words, it is important for

teachers to contextualize instruction and schooling by applying culturally relevant pedagogy in their pedagogical practices as well as by embodying relevance and rigor to the educational process.

Boykin (1994) stated that caring, communication, curriculum, instruction, and standards-based instruction are the five components of culturally relevant pedagogy. They are all equally essential to the effective instruction of students from different cultures.

*1. Caring*

In accordance with Boykin (1994), Gay (2000) stated that caring is one of the most important aspects of culturally relevant pedagogy for the pedagogical work with students from diverse ethnic backgrounds. This work is manifested in the form of teacher attitudes, expectations and behaviors about students' human values and point of views, intellectual capability, performance, and responsibilities. Feeling cared for and accepted allows students to feel safe and break down barriers to taking necessary risks in the learning environment. In this perspective, Boykin (1994) affirmed that caring must be genuine with the purpose of forming a strong relationship between teachers and students. Cooper (2002), Gay (2000), Ginsberg and Wlodkowski (2000), Ladson-Billings (1994), Sheets (1995), Tharp (1982), and Waxman and Tellez (2002) stated that a climate of caring and respect for the value of student cultures is fostered in the school and classroom.

The research on resiliency shows that a nurturing environment provides a secure base for students to develop confidence, competence, feelings of autonomy, and safety. According to Benard (2004) and Strand and Peacock (2002), in schools where there is caring, trust, and support, students have higher attendance, higher performance, and a lower rate of suspensions. Banks and Banks (1995) pointed out that teachers need to be aware of how students see their interactions with them, and the extent to which students see them as caring professionals. Teachers can reflect upon whether students find their classes meaningful and whether there are gaps between what they are teaching and what students are learning.

### 2. Communication

How school leaders and teachers relate with families as well as how instruction is communicated and delivered to the students influences the outcomes of their learning process (Bryk & Schneider, 2002; Henderson & Mapp, 2002). The way school leaders, teachers, and members of the school community communicate to each other is a reflection of the overall cultures that they each come from and thereby influences student academic performance. The delivery of the curriculum is one of the most important pedagogical actions for the success of students because it is relevant to how students use and apply information acquired in each subject matter. The communication of instruction is extremely important and widely misunderstood.

Saville-Troike (1989) stated that there is a correlation between the form and content of a language and the belief values and needs present in the culture of its

members. It is widely known and accepted that the way school leaders, teachers, and students communicate is a reflection of the culture that they come from, and therefore it may influence students' academic performance and achievement. Understanding and valuing the differences in cultural communication styles can only be acquired and used in environments in which student cultures are understood and respected and where trust is a foundation for positive relationships. However, the etiquette of communication and societal norms varies across cultures. Ortiz (1998) stated that differences in appropriate eye contact, male and female relationships, and physical space may lead school leaders and teachers to incorrectly interpret students' behavior.

In so doing, it is crucial that school staff build trust and partnerships with families, especially with families marginalized by schools in the past (Cooper, 2002; Demmert, 2001; Sosa, 1997). The most successful efforts are those in which schools reach out to families and to the community as a whole and fully involve them in making decisions that will affect their children' future in school. It is crucial to actively invite families to the school, visit families in their communities, solicit their input, take their concerns seriously, and treat them with respect in order to develop trust in a culturally relevant manner (Trumbull, Rothstein-Fisch, Greenfield, & Quiroz, 2001; Young, 1998).

### 3. Curriculum

Teachers need to make use of culturally diverse curriculum content and pedagogical tools in the classroom. Effective teaching and learning for ethnically diverse students may be expedited by using instructional materials that are standards-based and

recognize the contributions that people of diverse ethnic groups have made to the current bank of knowledge.

When students see people who look and live like the people of their culture, both current and historical, interest is fostered and motivation for students to believe they can achieve is provided. That achievement is not only expected but also valued because in a culturally relevant pedagogy, curriculum bridges academic learning to students' prior understanding, knowledge, native language, and values (Conrad, Gong, Sipp, & Wright, 2004; Ginsberg & Wlodkowski, 2000; Ladson-Billings, 1994; Powers, Potthoff, Bearinger, & Resnick, 2003; Waxman & Tellez, 2002). This perspective into the school curriculum allows for teachers to learn from and about their students' culture, language, and learning styles in order to make instruction more meaningful in and relevant to their students' lives (Apthorp, D'Amato, & Richardson, 2003; Lee, 2003; Lipka, 2002).

For example, Demmert and Towner (2003) have examined research based on Native education and thereby found six critical elements of culturally relevant education, which suggested an impact on academic achievement of Native-American students. These critical elements are the recognition and use of Native languages, the implementation of a pedagogy that uses traditional cultural characteristics, the application of teaching strategies and curriculum that are congruent with traditional culture and traditional ways of knowing, strong Native community participation in education, and knowledge and use of political mores of the community.

According to Banks and Banks (1995), a culturally relevant curriculum addresses issues of impoverishment and social injustice as well as activities that engage students in

their pedagogical schoolwork. This curriculum develops critical reflection so that students can be engaged in a truly authentic democracy. Banks and Banks (1995) stated that this aspect of culturally relevant pedagogy fosters student responsibility for the good of the whole and prepares them to be global citizens.

### *4. Instruction*

Gay (2000) argued that the incorporation of specific aspects of the cultural systems of different ethnic groups into instructional processes has positive impacts on student achievement. In other words, the focus of instruction should be on the modifications of the curriculum that impact students' performance on standardized high-stakes tests and school activities (Marzano, 2001). According to Gay (2000), student achievement improves when teaching protocols and procedures are synchronized with the mental schemata, participation styles, work habits, thinking styles, and experiential frames of reference of diverse ethnic groups.

It is crucial for high school leaders and teachers to recognize that the ways students perceive the world interact with one another, and learning approach, among other things, is deeply influenced by such factors as race and ethnicity, social class, and language. This understanding enables teachers to apply pedagogical practices that allow them to cross the cultural boundaries separating them from their students. In this context, Tierney (1993) suggests a *border pedagogy* to help students negotiate back and forth between cultures by teaching them cultural *savvy* by which they can succeed in the predominate culture while at the same time, honoring and supporting their own cultural

roots and traditions. According to Giroux and McLaren (1994), border pedagogy works to decolonize and revitalize learning and teaching to promote social justice for all students. It particularly engages students in multiple references that constitute different cultural codes, experiences, and languages in order to help them construct their own knowledge through sociocultural negotiation. It also teaches students to develop the skills of thinking critically and debating power, meaning, and identity by encouraging tolerance, ethical sophistication, and openness.

According to Gay (2000) and Marzano (2001), it is crucial to incorporate specific aspects of the cultural systems of different ethnic groups into instructional processes because they have positive impacts on student achievement. The focus is on the pedagogical and instructional work teachers do that has the most impact upon student achievement. In so doing, Gay (2000) stated that student achievement improves when protocols and procedures of teaching are synchronized with student mental schemata, participation styles, work habits, thinking styles and experiential frames of reference from their own cultures. However, if a certain pedagogical approach is not effective, educators must be flexible enough to work collaboratively and strategically to adjust their instructional practices so that they can be able to meet the needs of their students.

Culture, native language, and cultural dialects must be valued and used as assets in learning and as vehicles for learning rather than deficits. Texts can be chosen so that students make connections with their own life experiences. Activities may include student families in order to relate familial knowledge to classroom activities (Moll, Amanti, Neff, & Gonzalez, 1992). For example, recent efforts to provide culturally

congruent science instruction have shown that when cultural and linguistic background knowledge is used, students increase their science achievement test scores (Lee, 2003). Because they are not always clearly visible, the cultural obstacles that public schools present to English language learners can be difficult to identify. Yet, these cultural obstacles may have a significant influence in determining the success of these students if instructional and pedagogical practices are not adequately implemented. In accordance with this point of view, Viadero (1996) described the clash between school and home cultures by stating, "Two distinct cultures are bumping up against one another, forming an invisible wall that stands in the way of learning and communication" (p. 42).

### 5. Standards-based Instruction

According to the American Federation of Teachers (AFT, 1983), the infusion of culturally relevant aspects of learning into a strong standards-based instruction and an appropriate assessment process is necessary for the production of reliable data to be used in order to improve academic instruction. Culturally relevant pedagogy, which includes having high expectations for learning, is related to student success. The infusion of culturally relevant aspects of learning into standards-based instruction already coupled with continuous assessments that produce data used to improve that instruction is one of the elements of culturally relevant standards-based instruction. According to Rosa and Orey (2007a), this infusion helps to increase student achievement. In this regard, the members of the American Federation of Teachers (AFT, 1983) stated that it is necessary for states to set high and rigorous standards for all students. States also need to do what is

necessary to make sure that all students have an opportunity to achieve high standards by addressing both equity and excellence concerns to assure that no student is left behind.

Currently, standards-based instruction is at the forefront of education reform because it presents a way to ensure that all students are exposed to challenging curricula and are prepared to contribute positively to an increasingly complex and globalized world. Krueger and Sutton (2001) stated that standards-based instruction focuses on detailed descriptions of expected understandings and learning targets. In their point of view, standard-based instruction engages teachers in raising the expectations for all students and promotes the use of multiple assessment strategies, which allow students to reach proficient levels at different times and in a variety of way. This requires teachers to differentiate instruction in order to meet the readiness levels, learning profiles, and interests of students.

Gay (2000), Howard (2001), and Ladson-Billings (1994) stated that culturally relevant teaching increases student achievement, promotes curiosity, and encourages the development of their creativity because it meets the academic and social needs of culturally and linguistically diverse students as well as being beneficial to the school community. According to Ladson-Billings (2001), culturally relevant teaching is the "kind of teaching that is designed not merely to fit the school culture to the students' culture but also to use student culture as the basis for helping students understand themselves and others, structure interactions, and conceptualize knowledge" (p. 314). In other words, it is important to recognize students' cultures as resources for learning in school settings in order to meet their needs. In this regard, interactions between

communities and schools, particularly students and teachers, are major determinants of the quality of education.

Ethnomathematics: The Cultural Aspects of Mathematics

An important change in mathematical instruction needs to take place in order to accommodate continuous and ongoing change in the demographics of students in mathematics classrooms. It is necessary to integrate a culturally relevant curriculum into the existing mathematics curriculum. According to Torres-Velasquez and Lobo (2004), this perspective is an essential component of culturally relevant education because it proposes that teachers contextualize mathematics learning by relating mathematical content to students' real-life experiences.

The guidelines of the National Council of Teacher of Mathematics (NCTM, 1991) highlighted the importance of building connections between mathematics and students' personal lives and cultures. In accordance with this approach, Rosa and Orey (2006) affirmed, "When practical or culturally-based problems are examined in a proper social context, the practical mathematics of social groups is not trivial because they reflect themes that are profoundly linked to the daily lives of students" (p. 34). Culturally relevant mathematical pedagogy should focus on the role of mathematics in a sociocultural context that involves the ideas and concepts associated with ethnomathematics, using an ethnomathematical perspective for solving problems (Rosa & Orey, 2008).

*Is Mathematics Acultural?*

Mathematics was for a long time regarded as a neutral and culturally-free discipline removed from social values (Bishop, 1993; D'Ambrosio, 1990), and it was always taught in schools as a culturally free subject that involved learning supposedly universally accepted facts, concepts, and contents. In other words, Western or academic mathematics consists of a body of knowledge of facts, algorithms, axioms, and theorems. In this regard, Rosa and Orey (2006) argued that the ethnomathematics program was developed "to confront the taboos that mathematics is a field of study that is universal and acculturated" (p. 20).

Educators such as D'Ambrosio (1990), Joseph (2000), and Powell and Frankenstein (1997) argued that the pervasive view of mathematics as Eurocentric and value-free misrepresents the evolution of modern mathematics. This perception is also reinforced by students' experiences of the way mathematics is taught in schools. Brown, Cooney, and Jones (1990) suggested that the teachers' view of mathematics is transmitted to the students in their instruction, and this fact helps to shape students' views about the nature of mathematics. Even though the universality of mathematical truths is not in question, it is only in the last two decades that the view of mathematics as culture free has been challenged (Bishop, 1988; D'Ambrosio, 1985; Rosa & Orey, 2006).

According to Bishop, Hart, Lerman, and Nunes (1993), "There is no sense in regarding mathematics learning as abstract and culture free" (p. 1) because the learning process is never abstract and context free, that is, learning cannot be free of societal influence. Numerous studies (Bandeira & Lucena, 2004; Carraher, 1991; Chieus, 2004;

Gerdes, 1994; Harris, 1991; Nunes, 1992) that examined mathematics in a variety of contexts confirm this assertion.

Researchers, philosophers, educators, scholars, and mathematicians (D'Ambrosio, 1985; Fasheh, 1997; Moses & Cobb, 2001; Nasir & Cobb, 2007; Orey, 2000) argued that it is worth noting that the contextualization of mathematics has been described as the identification of mathematical practices developed in different cultural groups. In this perspective, if mathematics is considered as a cultural construct, then it is a product of cultural development (Powell & Frankenstein, 1997; Rios, 2000; Rosa & Orey, 2007b; Zaslavsky, 1997). In other words, this claim of mathematics as a cultural construct contradicts the claims that modern mathematics is universal, objective, and culturally neutral. This very important issue leads to the development and inquiries of culturally relevant pedagogy of mathematics (Nasir, Hand, & Taylor, 2008).

*What is Ethnomathematics?*

The term ethnomathematics was coined by D'Ambrosio (1985) to describe the mathematical practices of identifiable cultural groups and may be regarded as the study of mathematical ideas found in any culture. D'Ambrosio (1990) defined ethnomathematics in the following way:

> The prefix *ethno* is today accepted as a very broad term that refers to the social-cultural context and therefore includes language, jargon, and codes of behavior, myths, and symbols. The derivation of *mathema* is difficult, but tends to mean to explain, to know, to understand, and to do activities such as ciphering, measuring,

classifying, inferring, and modeling. The suffix *tics* is derived from *techné*, and has the same root as technique (p. 81).

In other words, *ethno* refers to members of a group within a cultural environment identified by their cultural traditions, codes, symbols, myths, and specific ways used to reason and to infer (Rosa & Orey, 2007a). *Mathema* means to explain and understand the world in order to transcend, manage and cope with reality so that the members of cultural groups can survive and thrive, and *tics* refer to techniques such as counting, ordering, sorting, measuring, weighing, ciphering, classifying, inferring, and modeling. Rosa and Orey (2003) stated that the *mathema* develops the *tics* within the context of *ethnos* because it consists of daily problems people face, larger problems of humanity, and endeavors of humans to create a meaningful world. According to D'Ambrosio (2001), the search for solutions for specific problems that help the development of mathematics are always imbedded in a cultural context: in order to understand how mathematics (tic*s*) is created, it is necessary to understand the problems (mathema) that precipitate it. D' Ambrosio (1993) argued that it is necessary to understand those problems (mathema) by considering the cultural context (ethnos) that drives them.

D'Ambrosio (2001) stated that the mission of the ethnomathematics program is to acknowledge that there are different ways of doing mathematics by considering the appropriation of the academic mathematical knowledge developed by different sectors of the society as well as by considering different modes in which different cultures negotiate their mathematical practices. Barton (1996) stated that in this conception, ethnomathematics is a program that investigates the ways in which different cultural

groups comprehend, articulate, and apply concepts and practices that can be identified as mathematical practices.

Moreover, ethnomathematics may be described as a way in which people from a particular culture use mathematical ideas and concepts for dealing with quantitative, relational, and spatial aspects of their lives (Barton, 1996; Borba, 1997). This way of viewing mathematics validates and affirms all people's experience of mathematics because it demonstrates that mathematical thinking is inherent to their lives. Further evidence of this assertion is given by Orey (2000), who stated, "The paradigm that diverse cultures use or work within evolves out of unique interactions between their language, culture and environment" (p. 248). Within this context, D'Ambrosio (1990) argued that in an ethnomathematical perspective, mathematical thinking is developed in different cultures according to common problems that are encountered within a cultural context. In D'Ambrosio's (1993) perspective, in order to solve specific problems, *ad hoc*[10] solutions are created, generalized methods are developed from those solutions to solve similar problems, and theories are developed from these generalized methods. In the context of ethnomathematics, many cultural differentiated groups *know* mathematics in ways that are quite different from academic mathematics as taught in schools (D'Ambrosio, 1990). The tendency has been to consider these *ad hoc* mathematical practices as non-systematic and non-theoretical. In contrast, the study of ethnomathematics underlies a structure of inquiry into ad hoc mathematical practices by

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[10]Ad hoc is a Latin expression that means *for this purpose*. It generally means a solution designed for a specific problem or task, non-generalizable, and which cannot be adapted to other purposes.

considering how these practices and problem-solving techniques can be developed into methods and theories. Since different types of problems are common in different cultures, the kinds of solutions, methods, and theories that are developed may differ from culture to culture. In this regard, D'Ambrosio (1993) stated that what is recognized as a problem and a solution in one culture may have no meaning at all in another culture.

Mathematics is identified in cultural activities in traditional and non-traditional societies (D'Ambrosio, 1985; Dowling, 1991; Orey, 2000; Rosa & Orey, 2007a). This means that ethnomathematics refers to mathematical concepts embedded in cultural practices and recognizes that all cultures and all people develop unique methods and sophisticated explications to understand and to transform their own realities (D'Ambrosio, 1990; Orey, 2000; Rosa, 2007). It also recognizes that the accumulated methods of these cultures are engaged in a constant, dynamic, and natural process of evolution and growth. D'Ambrosio (1990) stated that ethnomathematics has come to mean the study of how people within various cultural groups develop techniques to explain and understand their world in response to problems, struggles, and endeavors of human survival. This includes material needs as well as art and spirituality through the use of the development of artifacts; objects created by members of a specific cultural group that inherently give cultural clues about the culture of its creator and users. Rosa and Orey (2008) stated that this perspective "provides an important opportunity for educators to link current events and the importance of these artifacts in the context of ethnomathematics, history, and culture" (p. 33).

Another presupposition of ethnomathematics is that it validates all forms of mathematical explaining and understanding formulated and accumulated by different cultural groups (D'Ambrosio, 1993). This knowledge is regarded as part of an evolutionary process of change that is part of the same cultural dynamism as each cultural group comes into contact with each other one (Zaslavsky, 1996). A study of the different ways in which peoples resolve problems and the practical algorithms upon which they base these mathematical perspectives becomes relevant for any real comprehension of the concepts and the practices in the mathematics that they have developed over time (D'Ambrosio, 2006). Ethnomathematics refers to forms of mathematics that vary as a consequence of being embedded in cultural activities whose purpose is other than doing mathematics. In this perspective, Orey (2000) affirmed, "Ethnomathematics might be characterized as a tool to act in the world" (p.250) and as such, it provides insights into the social role of academic mathematics.

*Mathematics in Sociocultural Contexts*

The learning of mathematics has always been associated with the schooling process: that is, it was thought that mathematical concepts and skills were acquired only if individuals went to school. However, the analysis of students' mathematical knowledge has led educators and researchers to conclude that mathematical knowledge is also acquired outside of the structured systems of mathematics learning such as schools (Bandeira & Lucena, 2004; Duarte, 2004; Knijnik, 1993; Nunes, 1992; Rios, 2000). Mathematics in a social context refers to the use of mathematical skills outside of schools

and the acquisition of mathematical skills other than from schools. Some examples are found in the context of dairy farmers (Schribner, 1984); candy vendors (Saxe, 1988); carpet layers (Masingila, 1993); and everyday activities outside of school (Carraher, 1991), at work (Harris, 1991), in the street, (Nunes, 1992) as well as folk mathematics (Maier, 1991).

Some studies on mathematics (Bandeira, 2004; Lancy, 1983; Lean, 1994; Saxe, 1982) in a cultural context focused on school mathematics and the effect of cultural factors on teaching and learning academic mathematics. They also identified cultural mathematics and its acquisition in a traditional cultural setting. For example, Lean (1994) studied several indigenous counting systems in Polynesian and Melanesian countries in the Oceania region. Lean's (1994) findings showed that every distinct language has a unique counting system. In this perspective, Ellerton and Clarkson (1996) stated that counting systems are a part of language and that language is a part of culture.

Similarly, fourteen years earlier, Saxe (1982) reported the development of counting among Oksapmin students of Papua New Guinea and studied the use of a unique system of counting by using body parts. Subsequently, it was found that the introduction of money had a negative effect on Oksapmin students' counting systems. Because of the use of money, the Oksapmin people had developed new ways of counting, which meant new ways of doing mathematics. In another study, Lancy (1983) examined students' cultural backgrounds as well as the patterns of cognitive development and the acquisition of mathematical knowledge by indigenous students in school settings. In so doing, Lancy (1983) was able to identify specific mathematical ideas and practices of

students' culture such as number systems, classification, and games. Lancy (1983) also found that these cultural approaches were used to develop appropriate curricula that suited the need of the students.

Mathematical knowledge results from social interactions in which relevant ideas, facts, concepts, principles, and skills are acquired as a result of cultural context (Bauersfeld, 1980; Bishop, 1988; Dossey, 1992; Lave, Smith & Butler, 1988; Schoenfeld, 1989). According to Schoenfeld (1989), the nature of mathematics perceived by the students is a result of an intricate interaction of cognitive and social factors existing in the context of schooling. Schoenfeld (1992) argued that mathematics learning involves a notion of socialization, that is, enculturation, which is rooted in the beliefs and values of cultural groups.

Rosa and Orey (2007a) stated that mathematics education may also be considered as a socialization process rather than just an instructional process. According to Stigler and Baraness (1988), mathematics is not a universal formal domain of knowledge; it is an assemblage of culturally constructed symbolic representations and procedures that facilitate the manipulation of these representations. Students develop representations and procedures into their cognitive systems, a process that occurs in the context of socially constructed activities (Rosa & Orey, 2008). In other words, mathematical skills that students learn in schools are not logically constructed based on abstract cognitive structures but rather forged out of a combination of previously acquired knowledge and skills and new cultural inputs. Therefore, mathematics arose out of the needs of organized

society: it cannot be divorced from the activities and practices developed by people in a globalized society (D'Ambrosio, 1990).

*Informal and Academic Mathematics*

Carraher (1991) argued that mathematics practices existing out-of-school are shown by students who develop the understanding of numbers before they come to school (Piaget, 1952; Hughes, 1986). Bishop (1993) affirmed that informal mathematics is "an organized, systematic, mathematics education activity carried on outside the framework of the formal system" (p.15). In Bishop's (1993) point of view, there is a contrast between mathematical knowledge gained academically and mathematical knowledge gained informally. For example, Bandeira and Lucena (2004) investigated mathematical ideas and practices acquired by the members of a community of vegetable farmers in the Northeast region of Brazil. They studied the mathematical concepts that farmers used to harvest, produce, and commercialize vegetables, finding that the specific mathematical knowledge produced by farmers differed from the mathematical knowledge acquired in academic settings.

As a follow-up to a study, which investigated school failure, Carraher (1991) studied young street vendors in the Northeast of Brazil in order to find out about their knowledge of street mathematics such as algorithms when compared to academic school computations. Carraher (1991) found that there were differences in the success rates across the two settings. The results of this study showed that vendors were more successful in correctly solving street contexts and verbal problems but were not so

successful in solving traditional and academic computation problems. The procedures for solutions were also different from those taught at school. On the other hand, Nunes (1992) affirmed that even though some of these concepts were acquired without schooling, schooling played an important role in accelerating the learning of these concepts, in particular, inverse proportion and word problems.

Carraher, Carraher, and Schleiman (1985) suggested that some important mathematical concepts are developed outside of school without specific instructions because these concepts and procedures would appear to arise through an individual's social interactions in everyday activities such as commerce and production of goods. Based on Nunes' (1992) research with Brazilian vendors and Lave's (1988) research with adults in the United States, they concluded that mathematics that is used outside of the school is a process of *modeling* rather than a mere process of manipulation of numbers. In this regard, Orey (2000) stated that the application of "ethnomathematical techniques and the tools of mathematical modeling allows us to see a different reality and give us insight into science done in a different way" (p. 250). Rosa and Orey (2007b) agreed with both D' Ambrosio (1993) and Bassanezzi (2002) when they affirmed that the pedagogical approach that connects the cultural aspects of mathematics with its academic aspects is named *ethnomodeling*.

In order to solve problems, students need to understand alternative mathematical systems and they also need to be able to understand more about the role that mathematics plays in a societal context (Orey, 2000; Rosa & Orey, 2007a). This aspect promotes a better understanding of mathematical systems through the use of mathematical modeling,

a process of translation and elaboration of problems and questions taken from systems that are part of the students' reality (D'Ambrosio, 1993; Eglash, 1997; Rosa & Orey, 2007b). As early as 1993, D'Ambrosio defined a system as a part of reality. In other words, a system is a set of items taken from students' reality. The study of a system considers the study of all its components and the relationship between them. Mathematical modeling is a pedagogical strategy used to motivate students to work on mathematics content and helps them to construct bridges between the mathematics of school and the mathematical concepts they use in their own reality.

For example, D'Ambrosio (2002) commented about an ethnomathematical example that naturally comes across as having a mathematical modeling methodology. In the 1989-1990 school year, a group of Brazilian teachers studied the cultivation of vines that were brought to Southern Brazil by Italian immigrants in the early twentieth century. This was investigated because the cultivation of wines is linked with the culture of the people in that region in Brazil. Both Bassanezi (2002) and D'Ambrosio (2002) believed that this wine case study is an excellent example of the connection between ethnomathematics and mathematical modeling through ethnomodeling (Rosa & Orey, 2007a).

Educators and teachers should search for problems taken from students' real lives that can then be used, through the application of culturally relevant activities, so that students can take a position, whether sociocultural, political, environmental, or economical, on the system under study. According to Rosa (2000), the main objective of this pedagogical approach is to rehearse the established mathematical context that allows

students to see the world as consisting of opportunities to employ mathematical knowledge and helps them to make sense of any given situation.

*An Ethnomathematics Curriculum*

Classrooms and learning environments cannot be isolated from the communities in which they are embedded. Classrooms are part of a community with defined cultural practices. In this perspective, Borba (1993) stated that classrooms might be considered environments that facilitate pedagogical practices, which are developed by using an ethnomathematical approach.

When students come to school, they bring with them values, norms, and concepts that they have acquired in their sociocultural environments. According to Bishop (1994), some of these concepts are mathematical in nature. However, mathematical concepts of the school curriculum are presented in a way that may not be directly related to the cultural backgrounds of students. It has been hypothesized that low attainment in mathematics could be due to a lack of cultural consonance in the curriculum (Bakalevu, 1998). Moreover, there is evidence from research (Bishop, 1988; Boaler, 1993; Eglash, 1997; Rosa & Orey, 2007a, Zaslavsky, 1996) that including cultural aspects in the curriculum has long-term benefits for mathematics learners: that is, cultural aspects contribute to a recognition of mathematics as part of daily life, enhancing the ability to make meaningful connections and deepening the understanding of mathematics. In this regard, Chieus (2004) stated that the pedagogical work towards an ethnomathematics perspective allows for a broader analysis of the school context in which pedagogical

practices transcend the classroom environment because these practices embrace the sociocultural context of the students. Damazio (2004) agreed with this perspective by suggesting that pedagogical elements necessary to develop the mathematics curriculum are found in the school community. This means that the field of ethnomathematics presents tangible possibilities for educational initiatives that introduce mathematical ideas via rich and constraint-filled problems that engage students in doing mathematics and aid them in developing the mathematical reasoning and problem-solving abilities used by expert problem solvers.

In D'Ambrosio's (1990) point of view, it is important to recognize that ethnomathematics is a research program that guides educational pedagogical practices. However, according to Monteiro, Orey, and Domite (2004), it is necessary to point out that the incorporation of the objectives of the ethnomathematics program as pedagogical practice in the school curricula and its operationalization and transmission in the field of education is a recent field of study that is still developing its own identity in the pedagogical arena.

In the context of culturally relevant pedagogy, there is a need to examine the embeddedness of mathematics in culture, drawing from a body of literature that takes on the cultural nature of knowledge production into the mathematics curriculum (D'Ambrosio, 1990; Rogoff, 2003; Vygotsky, 1978). Mathematics as part of the school curriculum must reinforce and value the cultural knowledge of students rather than ignore or negate it: a culturally relevant curriculum should fully integrate ELL students' cultural mathematics knowledge. Rosa and Orey (2007a) argued that this mathematics curriculum

must be grounded in a constructivist approach to learning and seek to change the way mathematics teachers construct their learning environments by producing teachers who are able to facilitate a mathematics learning environment grounded in real life experiences and to support students in the social construction of mathematics.

The trend towards ethnomathematical approaches to mathematics curriculum and pedagogy reflects a comprehensive development in mathematics education. Ethnomathematical approaches are intended to make school mathematics more relevant and meaningful to students and to promote the overall quality of education. Some researchers have implored that a more culturally sensitive view of mathematics be incorporated into the school curriculum (Adam, 2002; D'Ambrosio, 1985; Zaslavsky, 1991). For example, Powell and Frankenstein (1997) proposed the elaboration of a mathematics curriculum that is based on students' knowledge, which allows teachers to have more freedom and creativity to choose academic mathematical topics to be covered in the lessons. They suggested that through dialogue with students, teachers could apply mathematical themes that help them to elaborate the mathematics curriculum: teachers can engage students in the critical analysis of the dominant culture as well as the analysis of their own culture through an ethnomathematical perspective. In this context, Knijnik (1996) and Sebastiani Ferreira (1997) stated that it is necessary to investigate the conceptions, traditions, and mathematical practices of a particular social group such as ELL students with the intention of incorporating these concepts into the mathematics curriculum. Knijnik (1993) also stated that the development of a mathematics curriculum

that involves the relationship between academic mathematics and ethnomathematical knowledge contributes to the process of social change.

Further, Adam, Alangui, and Barton (2003) and Rosa and Orey (2003) stated that a culturally relevant mathematics curriculum based on an ethnomathematical perspective infuses the students' cultural backgrounds in the learning environment in a holistic manner. One possibility for an ethnomathematical curriculum may be labeled as mathematics in a meaningful context, in which students are given opportunities to relate their new learning experiences to knowledge and skills they have previously learned (Adam, Alangui, & Barton, 2003; Bandeira & Lucena, 2004). In this regard, it is particularly important that the mathematical instruction of ELL students acknowledge cultural backgrounds and experiences in the learning of mathematics.

This mathematical approach is presented as a cultural response to students' needs by making connections between their cultural background and mathematics (Rosa, 2005). This approach supports the view that "mathematics … is conceived as a cultural product which has developed as a result of various activities" (Bishop, 1988, p. 182). The objective of this perspective is to make mathematics more relevant to students because every culture is assumed to have mathematical responses with valid content for a mathematics classroom. A classroom using this type of ethnomathematical curriculum would be full of examples that draw on the students' own experiences and on experiences that are common in their cultural environments. These examples would be vehicles for communicating mathematical ideas, which themselves would remain relatively unchanged. In so doing, ethnomathematics aims to draw from the students' cultural

experiences and practices of the individual learners, the communities, and the society at large. This means that ethnomathematics uses these cultural experiences as vehicles to not only make mathematics learning more meaningful, but, more importantly, to provide students with the insights of mathematical knowledge as embedded in their social and cultural environments (Rosa & Orey, 2008).

Another possibility sees an ethnomathematical curriculum as an integration of the mathematical concepts and practices originating in the students' culture with those of conventional and formal academic mathematics (Lipka, 1998). In this approach, the ethnomathematical curriculum takes students' culture and uses it explicitly to integrate these outside experiences into the conventional mathematics curriculum. In such a classroom environment, students build on what they know as well as on the experiences they have from their cultural environments (González, Moll, & Amanti, 2005). These experiences are then used as neither motivation nor as introduction but instead as part of an understanding how mathematical ideas are developed and how they are built into systems, formulated, and applied in various ways within the culture.

González et al. (2005) stated that this mathematical knowledge is related to conventional mathematics in such a way that the underlying mathematical ideas are fully understood and the power and utility of conventional methods are appreciated. Lipka (1998) stated that links are made to familiar practices and concepts by realizing and understanding the need for mathematical characteristics such as accuracy and formal reasoning in both academic mathematics and in real-life situations. According to Bandeira and Lucena (2004), mathematical curriculum conceived in an

ethnomathematical perspective helps to develop mathematical concepts and practices that originate in students' culture by linking them to academic mathematics. The understanding of conventional mathematics then feeds back and contributes to a broader understanding of culturally based mathematical principles. The work of Lipka (2002) in Alaska is an example of this type of approach to curriculum innovation. It is assumed that a curriculum of this nature motivates students to recognize mathematics as part of everyday life and enhances students' abilities to make meaningful mathematical connections by deepening their understanding of all forms of mathematics (Adam, 2002; Barton, 1996; Boaler, 1993). For example, Duarte (2004) investigated the uniqueness of mathematical knowledge produced by workers in the home construction industry through a study of mathematical ideas and practices that develop in construction sites. Duarte (2004) reflected on the mathematical knowledge possessed by members of this working class in order to both academically legitimate their knowledge and determine the pedagogical and curricular implications that are inferred in the process of producing this kind of knowledge.

The objective of developing an ethnomathematical curriculum model for classrooms is to assist students to become aware of how people mathematize and think mathematically in their culture, to use this awareness to learn about formal mathematics, and to increase the ability to mathematize in any context in the future (Duarte, 2004; Rios, 200). This ethnomathematical curriculum leads to the development of a sequence of instructional cultural activities enabling students to become aware of potential practices in mathematics in their culture so that they are able to understand the nature,

development, and origins of academic mathematics (Rosa & Orey, 2007a). Students also value and appreciate their own previous mathematical knowledge, which allows them to understand and experience cultural activities from a mathematical point of view, thereby allowing them to make the link between school mathematics and their real world and daily lives (Knijnik, 1993; Orey & Rosa, 2004; Rios, 2000).

According to Rosa and Orey (2003), students understand the nature of mathematics as they become aware of the mathematics in their own culture. With awareness, students see mathematics as a human activity rather than as just a set of symbols, numbers, and figures presented only at school. Cultural mathematical practices can be related to conventional mathematical systems and vice versa through mathematical thinking. In this regard, Monteiro, Orey, and Domite (2004) argued that mathematical thinking involves symbolizing, generalizing, abstracting, and making logical connections, which can be facilitated by seeing mathematics in various cultural contexts and learning mathematics through practical examples and investigations. According to Rosa & Orey (2006), one possible bridge is to know how the connections between academic mathematics and the real world are realized by both the teachers and students. This includes the examples teachers use in their instruction and the characteristics of informal and academic mathematics they choose to explore in classroom activities.

A culturally relevant curriculum, when based upon principles of ethnomathematics, brings a broader understanding about the importance of mathematics to pedagogical activities developed in the mathematics classrooms (Borba, 1993). Most

mathematics curricula focus on the mastery of skills, accumulation of facts, rules, and algorithms that are necessary for official examinations. Since the curriculum is experienced as mathematical content (Begg, 1994), most students leave school thinking that mathematics is something to be done only at school and that it has no relevance to their lives. According to Monteiro and Nacaratto (2004), an ethnomathematical culturally relevant curriculum introduces an understanding about mathematics as part of mathematics education. Rosa and Orey (2003) stated that when students understand the nature of mathematics, they acquire tools to better comprehend the relevance of mathematics in the various aspects of their everyday lives.

Rosa and Orey (2003) argued that an ethnomathematics curriculum offers students, especially minority students, the motivation to perceive mathematics as an important cultural tool that facilitates their mathematical learning. They also affirmed that the establishment of cultural connections is a fundamental aspect in the development of new strategies to the process of teaching and learning mathematics because it allows students to perceive mathematics as a significant part of their own cultural identity. Some studies (Hankes, 1998; Hale-Benson, 1994, Warschauer, 1999) demonstrated that the use ethnomathematics in the school curricula is an effective tool that improves the learning of mathematics by minority students.

This curriculum focuses on mathematics as a process rather than as a collection of facts, and it is based on the idea that mathematics is a human creation that emerges as people attempt to understand the world. Therefore, mathematics is seen as a process and as a human activity, rather than just as a set of academic content (D'Ambrosio, 2000).

This implies that an ethnomathematical curriculum is not just about the application of relevant contexts in learning and teaching mathematics, but is also about generating formal mathematics from cultural ideas (Gerdes, 1993). Thus, formal mathematics is better understood, appreciated, and made more meaningful to its learners.

In this curriculum, teachers must analyze the role of what Borba (1990) referred to as students' *ethnoknowledge* in the mathematics classroom. Ethnoknowledge is acquired by students in the pedagogical action process of learning mathematics in a culturally relevant educational system. In this process, the discussion between teachers and students about the efficiency and relevance of mathematics in different contexts should permeate instructional activities. The ethnoknowledge that students develop must be compared to their academic mathematical knowledge. In this process, the role of teachers is to help students to develop a critical view of the world by using mathematics.

Teachers also need to develop a different approach to mathematics instruction that empowers students to understand mathematical power more critically by considering the effects of culture on mathematical knowledge and work with their students to uncover the distorted and hidden history of mathematical knowledge. According to Rosa (2000), this methodology is essential in developing the curricular practice of ethnomathematics and culturally relevant education: through the investigation of the cultural aspects of mathematics and an elaboration upon mathematics curricula that considers the contributions of people from other cultures, students' knowledge of mathematics becomes enabled and enriched.

Summary

This review of literature investigates the perceptions of school leaders regarding ELL students by discussing how these same perceptions influence their decision-making processes. This chapter also includes the perceptions of school leaders concerning the influence of the linguistic and cultural background of ELL students on standardized assessments. A brief outline of the history of standardized high-stakes testing and a review of existing literature regarding Culturally Relevant Education, which currently serves as the standard and research-based theoretical framework for culturally relevant schools, leadership and pedagogy is also presented in this chapter. Finally, a comprehensive review of the cultural aspects of mathematics through the study of ethnomathematics is an integral part of this literature analysis. It is important to highlight that this review of literature supports the conclusion that there is a growing concern about and awareness of the need to fully understand diversity in United States public schools. Furthermore, there is a necessity to offer an educational system that meets the needs of all learners, especially ELL students.

Chapter 3

METHODOLOGY

Not every student is behind and not every culture devalues mathematics. It depends on

the individual student and their educational background both from home and academic

standpoints (Principal School D).

Introduction

This chapter depicts principles of research and outlines methodology that was

used to conduct this mixed-methods (QUAN + QUAL)[11] study. As a methodology, this

study involves philosophical assumptions that guide the direction of the collection and

analysis of data as well as the mixing of qualitative and quantitative approaches in many

phases of this research process (Creswell & Plano Clark, 2007). In this regard, this

chapter addresses the purpose of the study, research paradigm, theoretical framework,

and research questions as well as the study's research design.

This study focuses on collecting, analyzing, and mixing both qualitative and

quantitative data as a method (Creswell & Plano Clark, 2007). In so doing, this study is

composed of interviews with open-ended questions and a survey that contains both Likert

scale questions (quantitative data) and open-ended questions (qualitative data). There is

also a description of the population and the research sites that were selected to participate

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[11]Creswell and Plato Clark (2007) stated that the notation QUAN + QUAL "indicates that
both quantitative and qualitative methods were used at the same time during the research,
and both have equal emphasis in the study" (p. 41).

in this study. Protection of human subjects and ethical issues are addressed. This chapter also includes components that specifically describe the procedures applied in data collection and data analysis as well as methods that assure the validity of the study.

A central premise of this study is that the combination of qualitative and quantitative approaches "provides a better understanding of the research questions of this study than either approach alone" (Creswell & Plano Clark, 2007).

## Purpose of the Study

The purpose of this study is to capture and describe the perceptions of high school leaders concerning the challenges faced by ELL students in relation to success in mathematics standardized high-stakes assessments.

This study has the following goals:

1. Identify school leaders' perceptions in relation to ELL students.

2. Determine how these perceptions are influenced by an understanding of the effects of the cultural background of ELL students upon academic performance in mathematics.

3. Describe pedagogical approaches that high school leaders use in relation to their ELL students.

4. Develop a series of suggestions and strategies that may help high school leaders to successfully meet the needs of their ELL students.

Research Paradigm

A paradigm provides a conceptual framework for seeing and making sense of research. Burrell and Morgan (1979) argued, "To be located in a particular paradigm is to view the world in a particular way" (p. 24). Patton (1990) has termed paradigm a "world view" (p. 37). The significance of paradigms is that they shape how researchers perceive the world around them: within the research process, the beliefs a researcher holds can reflect the way research is designed, how data is both collected and analyzed, and how research results are presented. According to Patton (1990), for researchers, it is important to recognize one's own paradigm because it allows one to identify one's role in the research process, determine the course of any research project, and distinguish other perspectives.

Educational research is essentially concerned with exploring and understanding social phenomena that are educational in nature. According to Dash (1993), this form of research deals with educational questions that can be investigated in a satisfactory manner; the methods, which enable such satisfactory investigation; and the utility of results emanating from such an investigation. Theoretical research questions in education emerge from different conceptions and interpretations of social reality, different paradigms have been evolved to determine the criteria according to which one would select and define problems for inquiry. In this regard, Kuhn (1962) characterized a paradigm as an integrated cluster of substantive concepts, variables and problems that are attached to corresponding methodological approaches and tools that are used in the research process.

During the past century, different paradigms have emerged due to the remarkable changes in social sciences research. Generally, there are now five commonly used research paradigms used in the verification of theoretical propositions. The following is a brief description of each of the five paradigms.

### 1. Positivism and Postpositivism

Positivist and postpositivist assumptions represent the traditional form of research. This worldview is sometimes called the scientific method. In the scientific method, the accepted approach to research by postpositivists, an individual begins with a theory, collects data that either supports or refutes the theory, and then makes necessary revisions before additional tests are made. Postpositivism represents the thinking after positivism, challenging the traditional notion of the absolute truth of knowledge and recognizing that researchers cannot be positive about their claims of knowledge when studying the behavior and actions of people. Both positivism and postpositivism are paradigms often associated with the quantitative research method (Tashakkori & Teddlie, 2009).

### 2. Constructivism

Constructivists hold the assumption that individuals seek an understanding of the world in which they work and live. Individuals develop subjective meanings of their experiences and meanings directed toward certain objects and situations. These meanings are varied and multiple, leading researchers to look for the complexity of views rather

than narrowing meanings into a few select categories. The goal of research here is to rely

as much as possible on the participants' views of the situation being studied. The

questions become broad and general so that the participants may construct the meaning of

a situation, typically forged in discussions or interactions with other individuals.

Researchers also recognize that their own backgrounds shape their interpretations, and

they position themselves in the research to acknowledge how interpretation flows from

their personal, cultural, and historical experiences. The researcher's intent is to make

sense of and interpret the meanings others have about the world. Constructivism is a

paradigm typically associated with the qualitative research method (Creswell & Plano

Clark, 2007; Tashakkori & Teddlie, 2009).

*3. Advocacy and Participatory*

An advocacy and participatory worldview holds that research inquiries need to be

intertwined with politics and a political agenda. Thus, research here contains an action

agenda for reform that may change the lives of the participants, the institutions in which

individuals work or live, and the researcher's life. Moreover, specific issues need to be

addressed that speak to important social issues of the day such as empowerment,

inequality, oppression, domination, suppression, and alienation. Researchers often begin

with one of these issues as the focal point of the study. Researchers also assume that the

inquiry will proceed collaboratively in order to not further marginalize participants. In

this sense, participants may help design questions, collect data, analyze information, or

reap the rewards of the research. Advocacy research provides a voice for these

participants, raising their consciousness or advancing an agenda for change to improve their lives, which becomes a united voice for reform and change. Tashakkori and Teddlie (2009) gave the denomination *transformative-emancipatory* to this paradigm. The advocacy and participatory paradigm is more often associated with a qualitative research method than with a quantitative research method (Creswell & Plano Clark, 2007).

*4. Pragmatism*

Pragmatism as a worldview arises out of actions, situations, and consequences rather than antecedent conditions such as those in postpositivism. There is a specific concern with applications, that is, what works as well as a solution to problems (Patton, 1990). Instead of focusing on methods, researchers emphasize the research problem and use all approaches available to understand the problem. As a philosophical underpinning for mixed methods studies, its importance is in focusing attention upon a research problem in social science research and then using pluralistic approaches to derive knowledge about that problem. Pragmatism is typically associated with mixed-methods research (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2009).

According to Creswell and Plano Clark (2007) and Tashakkori and Teddlie (2009), pragmatism embraces features associated with both positivism-postpositivism and constructivism worldviews. However, Tashakkori and Teddlie (2009) stated that both pragmatism and transformative-emancipatory paradigms reject "the dogmatic either-or choice between constructivism and postpositivism and the search for practical answers to questions that intrigue the investigator" (Tashakkori & Teddlie, 2009, p. 86).

*5. Dialectical Perspective*

Researchers may also use one paradigm or multiple paradigms as a "dialectical perspective" (Creswell & Plano Clark, 2007, p. 27) in order to best fit the worldview of their mixed-methods study. Greene and Caracelli (2003) argued that different paradigms give rise to contradictory ideas and contested arguments. According to Creswell and Plano Clark (2007), "these contradictions, tensions, and oppositions reflect different ways of knowing about and valuing the social world" (p. 27).

The research paradigm chosen for this mixed-methods research is that of dialectical perspective. In other words, the researcher applied both pragmatism and transformative-emancipatory paradigms to conduct this study. In applying the pragmatism paradigm, the researcher combined deductive and inductive approaches by mixing both qualitative and quantitative research methods, which involve different forms of data collection and analysis. According to Mertens (2003), one of the most important characteristics of the transformative-emancipatory paradigm is to place importance on the challenges faced by ethnic minority subgroups such as ELL students. Furthermore, Tashakkori and Teddlie (2009) argued that transformative-emancipatory researchers may "use any research method that produces results that promote greater social justice" (p. 87) for marginalized groups.

Theoretical Framework

The findings of this study were examined by using Culturally Relevant Education Theory. Since Culturally Relevant Schools, Culturally Relevant Leadership, Culturally

Relevant Pedagogy, and the Cultural Aspects of Ethnomathematics are interrelated to Culturally Relevant Education (D'Ambrosio, 1990; Gay, 2000; Nuthall, 2005; Pai, 1990; Ladson Billings, 1995), the findings of this study were also framed by applying these theoretical approaches.

## Role of the Researcher

When defining their role in a study, researchers must be cognizant of responsibilities contingent upon the place and time of the study as well as the integrity of the study itself (Stake, 1995). In other words, a structured research approach allows researchers to reflect upon the study process.

Stake (1995) portrayed the researchers' role as multidimensional. In this regard, researchers may assume the role of an investigator, advocate, evaluator, biographer, and interpreter. According to this view, researchers deliberately or intuitively make role choices in their research.

Scheurich (1994) remarked that researchers' historical and political positions, ethnicity, gender, religion, and environmental points of view interact and influence as well as limit and constrain the production of knowledge. In other words, researchers determine, to a large extent, the issues and problems they want to study.

It is also important to note that according to Yin (1989), the role of researcher includes later self-examinations that influence the researchers' self-assessment and reflections, including the ability to ask questions, interpret answers, and maintain an openness and non-biased attitude to others' ideologies, perceptions, beliefs, and attitudes.

In addition, Yin (1989) argued that researchers must be extremely knowledgeable on the theoretical, pedagogical, and policy-oriented aspects of the problems being studied.

Creswell and Plano Clark (2007) argued, "The researcher should review the basics of quantitative and qualitative, as both will be included in the mixed-methods study" (p.35). In this regard, in the qualitative approach, researcher plays the role of an inquirer: they need to "identify how their experiences and backgrounds shape the interpretation they make through the code and theme development process" (p. 31). In the quantitative approach, researchers play the role of an investigator: they remain in the background and take actions to reduce the bias and enact procedures to reduce threats to the validity of the study (Creswell & Plano Clark, 2007). According to the perspective of this study, the role of this researcher includes that of an interviewer, interpreter, analyst, investigator, and inquirer. These roles were unfolded throughout the course of this study.

<div align="center">Positionality of the Researcher</div>

Since the researcher cannot separate himself as a person from himself as a researcher, and since he, as a person, brings bias to the study, what the researcher must deal with is how to control his own bias so that it does not interfere in such a way that data may be compromised. In this regard, Creswell (1998) argued that "… researchers approach their studies with a certain worldview that guides their inquires" (p. 74).

The researcher relied upon his academic and professional experiences to contribute to a comprehensive view of high school leaders' perceptions in relation to their English Language Learner (ELL) population. With academic post-graduate and

professional experience as an ELL educator, the researcher had witnessed the evolution of the challenges faced by high school leaders in relation to the growing population of ELL students at their school sites. The researcher's experience includes teaching mathematics to speakers of other languages, providing ELL professional development to BTSA (Beginning Teacher Support and Assessment) teachers, and offering mathematics workshops and seminars in congresses and conferences in the United States, Brazil, and Uruguay incorporating ELL students, mathematics, and ethnomathematics.

In undertaking this research, the researcher acknowledged that his personal experiences as an ELL mathematics teacher inspired his decision to research the topic of understanding the perceptions of high school leaders in relation to ELL students in their schools. In this regard, the motivation for topic selection resulted from a combination of both experiences and expertise of the researcher on the selected topic (White, 2000). The researcher's perspectives and beliefs about this research, the methodologies he chose, and the questions he asked have been built on his prior knowledge, experience, and expertise in the educational environment of ELL students.

Because of the researcher's background as a mathematics teacher and an ethnomathematics researcher and author, and because of his work in the field of ELL education, the researcher may be experientially biased when he advocates for the incorporation of cultural relevant education and ethnomathematics approaches in the mathematics curriculum for the ELL population. In this regard, the researcher believes that the use of these two pedagogical approaches is a way to empower students

intellectually, socially, emotionally, and politically by using cultural referents to impart their knowledge, skills, and attitudes in the pedagogical work in schools.

In so doing, the researcher feels that it is necessary to disclose to the reader what led him to study for this particular topic. His own views, perceptions, and experiences as an ELL teacher are a part of this research. The researcher believes that it is important to declare his assumptions and values in order to help the readers to evaluate the findings of this study. The contextual nature of this study is important in that this research interest came out of the researcher's own experiences as an ELL mathematics teacher for English language learners who are struggling with achievement in the mathematics mainstream classrooms and as a colleague to frustrated mainstream mathematics teachers who are struggling with designing instruction for ELL students.

Currently, the researcher is a mathematics teacher in an ELL program at a public high school. He is a proponent and advocate of assuring appropriate educational programs, curriculum access, and opportunities to include culturally relevant pedagogy and ethnomathematics to the mathematics curriculum for ELL students.

It is also important to point out that the researcher has been involved for more than 10 years with the school district in which the study takes place. The decision to choose the school district in which the researcher has been professionally involved to conduct his research is based on the notion of "situational understanding" (Kumaravadivelu, 2001, p. 538). In this regard, the researcher must be sensitive to a particular group of high school leaders pursuing a particular set of goals for a particular group of students within a particular school embedded in a particular sociocultural

context. Keeping this in mind, the researcher is at an advantage, since he has a holistic interpretation of his district's context and its ELL population.

On the other hand, many of the researcher's biases may come from his own lack of experience and understanding about the complex nature of high school leadership. This includes dealing with broader school issues, working professionally with a wide group of staff, school community members and the school board, as well as accepting the role politics plays in the context of their schools.

Another issue to consider is that the researcher is an insider-researcher. According to Bonner and Tolhurst (2002), by the researcher's pursuit as an insider-researcher, the researcher realizes that his choice for the context of the study may be criticized by other researchers because the researcher may be seen as an advocate rather than as a legitimate researcher. Along this line, Kanuha (2000) stated that "for each of the ways that being an insider researcher enhances the depth and breadth of understanding to a population that may not be accessible to a nonnative scientist, questions about objectivity, reflexivity, and authenticity of a research project are raised" (p. 444). According to this context, scholars may argue that by removing researchers from their own research context might reduce these criticisms. However, it is this researcher's belief that it is naïve to assume that minimal exposure to the context would automatically reduce or eliminate bias, since, from a constructionist point of view, bias may never be completely eliminated.

The researcher believes that his inside-researcher position helps him to minimize the power differential between the researcher and participants so that the researcher is

able to gain an in-depth understanding of participants' understanding of the problem stated in this study.

Research Questions

The research questions underlying the investigation in this study are as follows:

1. What are the general perceptions of high school principals and vice-principals in relation to their ELL population?

    a) What is the relationship between these school leaders' perceptions and their approaches to the schooling of ELL students?

2. What are the perceptions of high school principals and vice-principals as to the role of culture in the academic success of ELL students in their schools?

    a) What are these school leaders' perceptions about ELL students' cultural background as challenges to academic performance on mathematics standardized high-stakes tests?

    b) How do they use these perceptions to promote a school climate that helps ELL students to better perform on mathematics standardized high-stakes tests?

3. What is the relationship between the perceptions of school leaders concerning ELL students and their depth of understanding of the effects of the cultural background of ELL students on their academic performance in mathematics?

a) What kind of ethnic cultural background knowledge do high school

principals and vice-principals believe they possess to improve the academic

performance of ELL students in mathematics?

4. What are the high school principals and vice-principals perceptions of ELL

students' performance on standardized high-stakes tests in mathematics?

a) How do they perceive the influence of their roles in closing the

achievement gap of ELL students in mathematics?

5. How do perceptions about ethnic cultural proficiency influence the opportunities of

high schools principals and vice principals to be reflective practitioners?

Research Design

This study combined quantitative and qualitative methods (QUAN + QUAL) in

order to capitalize on the strengths of each approach. Greene, Caracelli, and Graham

(1989) and Creswell (2002) stated that a mixed-methods design provides a more

comprehensive answer to the research questions of the study. They also argued that a

research design that integrates different methods is more likely to produce better results

in terms of quality and scope. According to Gay and Airasian (2003), the mixed-methods

design goes beyond the limitations of a single approach because it integrates both

quantitative and qualitative research methods.

In the last two decades, much debate has occurred on the usefulness of combining

qualitative and quantitative research methodologies in the same study (Creswell, 2003;

Curlette, 2006). The debate between the two approaches is frequently viewed as a contest

between innovative and socially responsible versus conservative methods and

sophisticated techniques versus mere common sense (Stewart & Shields, 2001). While

many researchers remain entrenched between quantitative and qualitative research

methods, others advocate that these two methods are complementary (Johnson & Turner,

2003; Taskakkori & Teddlie, 1998; Thomas, 2003). Curlette (2006) argued that "beliefs

from the qualitative aspect of a mixed methods research design can be combined with

data from the quantitative side of the research to reach a belief statement about the

existence of a finding from the qualitative study" (p. 345). In Curlette's (2006) point of

view, data collected by applying qualitative techniques can be used to support

conclusions reached by performing tests on quantitative data and vice-versa. In this

regard, Frechtling, Sharp, and Westat (1997) stated that it is beneficial to the researcher

to use a mixed-method study combining the two approaches in order to sharpen the

understanding of the research findings. Hanson, Creswell, Plano-Clark, Petska, and

Creswell (2005) stated that the use of "both forms of data allow researchers to

simultaneously generalize results from a sample to a population and to gain a deeper

understanding of the phenomena of interest" (p. 224). This means that researchers are

able to generalize from the sample to a population, which is one of the aspects of the

quantitative research process, which is done by a quantitative researcher.

On the other hand, these generalizations can be further supported and enhanced

through *thick descriptions*[12] of some aspects of the data, which is an approach that is

normally taken by qualitative researchers. According to Denzin (1978), thick description

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[12]The term *thick description* was introduced by the philosopher Ryle (1971) and was
made popular by the anthropologist Geertz (1973).

refs to a detailed description of a phenomenon that includes the researcher's

interpretation in addition to the observed processes and context. It also provides a

thorough accounting of the methods and procedures followed during and after data

collection. However, Creswell (2003) stated that mixed-method researchers have to be

knowledgeable in both qualitative and quantitative designs and the understanding of both

approaches generally requires more time and effort on the part of the researcher.

The QUAN + QUAL approach simultaneously occurred in all stages of this study,

such as formulation of research questions, elaboration of the research design, data

collection and data analysis procedures, and interpretation and discussion of the findings.

*The Triangulation Design*

Creswell and Plato Clark (2007) affirmed that triangulation is one of the four

types of mixed-methods research design[13]. According to Mertler and Charles (2008), in

this method, both quantitative and qualitative data are collected and given equal

emphasis, which allows the researcher to combine the strengths of each form of data.

Earlier, Patton (2001) advocated for the use of triangulation by stating that triangulation

strengthens a study by combining different methods, which includes both quantitative and

qualitative research approaches.

The rationale behind this design is that the researcher values equally the two

forms of data and treats them as such. Data is thereby *merged,* and the results of analyses

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[13]The other three types of mixed-methods design are Embedded, Explanatory, and
Exploratory.

are used simultaneously to understand the research questions through the comparison of findings from the quantitative and qualitative analysis.

Cresswell & Plano Clark (2007) stated that during interpretation, this design helps the researcher "to directly compare and contrast quantitative statistical results with qualitative findings" (p. 62) in order to elaborate valid and well-substantiated conclusions about the problem under study. Figure 8 shows the Data Transformation Model of the Triangulation Design used in this study.

Figure 8. Data Transformation Model of the Triangulation Design
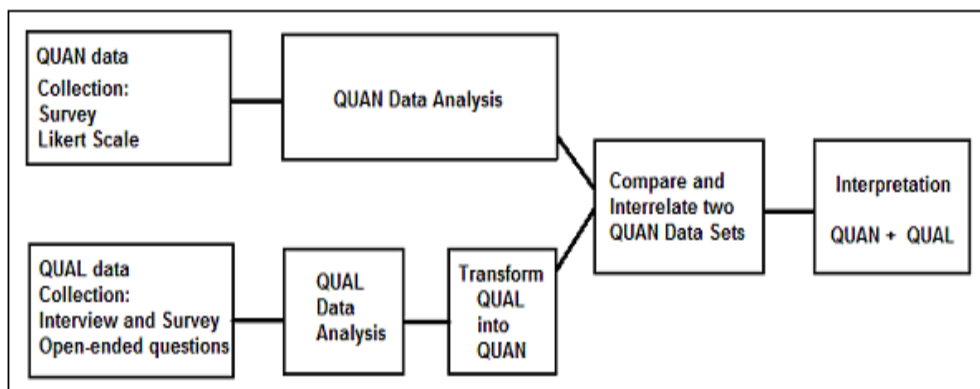


Source: Triangulation Design (Creswell & Plato, 2007, p. 63)

On the other hand, the researcher also used data transformation in which qualitative data was transformed into quantitative data. According to Creswell and Plano Clark (2007), this allowed the researcher to mix the data during the analysis stage in order to facilitate the comparison, interrelation, and further analysis of the two sets of data.

Context of the Study

The population of this study was comprised of principals and vice-principals in nine high schools in a suburban school district near Sacramento, California. In this study, this school district is named Alpha Unified School District (AUSD).

*The Ethnic Diversity Index (EDI)*

The Ed-Data (CDE, 2009c) has developed an Ethnic Diversity Index (EDI) that reflects the degree of ethnic variety within a school or school district. For several reasons, including the fact that every ethnic group constitutes a minority (or less than 50%) of Californian students, EdSource, one of the Ed-Data partners, has developed the EDI that indicates how *diverse* the student body is in terms of ethnicity only.

More specifically, the index reflects how evenly distributed these students are among seven ethnic categories[14] reported to the California Department of Education: the more evenly distributed the student body, the higher the index. According to CDE (2009c), a school that had exactly one-seventh of its students in each of the seven categories would have an EDI of 100, and a school where all of the students are of the same ethnicity would have an index of zero. No school has an index of 100, although a few schools have diversity indices of zero. Currently the highest EDI for a school is 78. It is important to highlight that EDI does show an important characteristic about a school's or district's student population by taking into account, for example, how many ethnic

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[14]According to the California Department of Education (2009c), the seven categories are American Indian,   Asian, Pacific Islander, Filipino, Hispanic/Latino, African American, and White.

groups are part of the school community, something not easily evident without the index (CDE, 2009c).

*Alpha Unified School District (AUSD)*

In the 2007-2008 school year, approximately 9.4% of Alpha Unified School District (AUSD) students were ELL. This means that 4,455 of the 47,400 students were ELL. In addition, 52.6% of AUSD ELL students spoke Spanish. The most spoken languages in AUSD are Spanish, Russian, Ukrainian, Rumanian, and Farsi (CDE, 2009a). Currently, AUSD's EDI is 37.

*Population*

High school leaders consisting of 9 principals and 25 vice-principals in AUSD composed the population selected for this study.

*Participants*

Six principals and 20 vice-principals in AUSD agreed to participate in this study.

*Criteria for Selecting Participants*

*Purposeful sampling,* a non-random method of sampling whereby the researcher selects *information-rich* cases for study, has been selected as the sampling method in this study,. Information-rich cases are those that allow the researcher to learn a great deal about issues of central importance to the purpose of this study (Patton, 1990).

The purpose of this study is to capture and describe the perceptions of high school leaders in AUSD concerning challenges faced by ELL students and their success in standardized high-stakes tests under NCLB. In this regard, purposeful sampling allows the researcher to come to a stronger understanding about the results from this study by focusing in depth on understanding these perceptions. Patton (2001) stated that it is better to focus on a small number of carefully selected participants rather than gather standardized information from a large and statistically significant sample. In this regard, Patton (1990) stated that:

> In-depth information from a small number of people can be very valuable, especially if the cases are information-rich. What should happen is that purposeful samples be judged based on the purpose and rationale of each study and the sampling strategy used to achieve the study's purpose. The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size. (p. 184-185).

Ritchie, Lewis, and Elam (2003) recommended purposeful sampling because its "… particular features or characteristics, which will enable detailed exploration and understanding of the central theme or puzzles which the researcher wishes to study" (p. 78).

In the process of sampling selection, the researcher also applied *criterion sampling*, a specific type of purposeful sampling, in order to select the subjects for this study. In so doing, criterion sampling involved the selection of subjects who met the predetermined criterion of importance predetermined by the researcher (Patton, 2001). In this study, the applied criterion was the selection of high school principals and vice-principals in AUSD.

According to Patton (2001), criterion sampling is useful for identifying and understanding perceptions that are information-rich and which provide an important qualitative component to the quantitative data by identifying themes that have emerged from the interviews and surveys. Patton (1990) also stated that the purposeful and criterion methods of sampling are strong approaches that assure the quality of the study.

*Research Sites*

It is important to note that during the 2007-2008 school year, according to the California Department of Education (CDE, 2009a), the percentage of ELL students in the nine high schools of the AUSD selected for this study ranged from 0.7% to 22.3%. In this same school year, 618 of the 13,188 students enrolled in these nine high schools were ELL, representing 4.7% of the total of the high school student population. For ELL students, the most spoken languages in these high schools were Spanish, Russian, Ukrainian, Rumanian, Farsi, Korean, Punjab, Hmong, and Filipino. The Spanish language was spoken by 46.5% of ELL students. Table 3 below reports the demographic

information for each high school in AUSD, during the 2007-2008 school year (CDE, 2009a).

Table 3

Demographic Information for Each High School in AUSD during 2007-2008 School Year

| School | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| Enrollment | 1,226 | 1,696 | 745 | 851 | 1,661 | 1,690 | 1,716 | 1,837 | 1,766 |
| White | 70.6% | 72.6% | 31.8% | 55.5% | 57.5% | 83.1% | 74.5% | 81.3% | 76.4% |
| Hispanic | 16.9% | 14.1% | 35.6% | 24.7% | 13.6% | 8.6% | 9.1% | 7.9% | 10.9% |
| African- American | 4.7% | 4.9% | 23.4% | 11.4% | 8.8% | 2.2% | 5.7% | 1.6% | 5.9% |
| Asian | 2.3% | 4.7% | 4.7% | 4.1% | 15.4% | 2.4% | 7.6% | 4.6% | 2.3% |
| American- Indian | 2.2% | 1.7% | 1.6% | 1.5% | 1.9% | 2.0% | 0.9% | 2.2% | 2.3% |
| Filipino | 1.8% | 1.8% | 1.6% | 1.5% | 1.3% | 0.9% | 1.4% | 1.9% | 1.0% |
| Pacific- Islander | 1.1% | 1.1% | 1.3% | 1.3% | 0.8% | 0.6% | 0.5% | 0.4% | 0.9% |
| Multiple Responses or No Responses | 0.4% | 0.2% | 0.1% | 0.0% | 0.7% | 0.2% | 0.3% | 0.1% | 0.2% |
| ELL | 2.3% | 1.5% | 20.8% | 22.3% | 9.8% | 1.0% | 0.9% | 0.7% | 0.7% |
| Free/Reduced Price Meal | 32.9% | 18.5% | 83.4% | 57.6% | 35.0% | 16.0% | 13.3% | 10.6% | 20.4% |
| EDI | 32.0 | 31.0 | 59.0 | 47.0 | 47.0 | 19.0 | 29.0 | 21.0 | 27.0 |

Source: California Department of Education (2009a)

In order to better understand the context of this study, a brief description of the demographics (CDE, 2009a) for each high school in AUSD is given as follows:

*School A*

Student enrollment during the 2007-2008 school year was 1,226, with 70.6% White, 16.9% Hispanic, 4.7% African-American, 2.3% Asian, 2.2% American-Indian, 1.8% Filipino, 1.1% Pacific Islander, and 0.4% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 2.3% of students were ELL, and 32.9% of students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Russian, and Ukrainian. The school's EDI was 32.

*School B*

Student enrollment during the 2007-2008 school year was 1,696, with 72.6% White, 14.0% Hispanic, 4.9% African-American, 4.7% Asian, 1.7% American-Indian, 1.4% Filipino, 0.5% Pacific Islander, and 0.2% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 1.5% of the students were ELL, and 18.5% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish and Russian. The school's EDI was 31.

*School C*

Student enrollment during the 2007-2008 school-year was 745, with 31.7% White, 35.6% Hispanic, 23.4% African-American, 4.7% Asian, 1.6% Filipino, 1.6% American-Indian, 1.3% Pacific Islander, and 0.1% students who decided to give multiple

responses or did not respond to the question about ethnicity. In this same school year, 20.8% of the students were ELL, and 83.4% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Russian, Filipino, Hmong, and Punjab. The school's EDI was 59.

*School D*

Student enrollment during the 2007-2008 school year was 851, with 55.5% White, 24.7% Hispanic, 11.4% African-American, 4.1% Asian, 1.5% American-Indian, 1.5% Filipino, and 1.3% Pacific Islander. In this same school year, 22.3% of the students were ELL, and 57.6% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Russian, Ukrainian, Farsi, and Rumanian. The school's EDI was 47.

*School E*

Student enrollment during the 2007-2008 school year was 1,661, with 57.5% White, 15.4% Asian, 13.6% Hispanic, 8.8% African-American, 4.7% Asian, 1.9% American-Indian, 1.3% Filipino, 0.8% Pacific Islander, and 0.7% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 9.8% of the students were ELL, and 35% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Russian, Ukrainian, Farsi, and Rumanian. The school's EDI was 47.

*School F*

Student enrollment during the 2007-2008 school year was 1,690, with 83.1% White, 8.6% Hispanic, 2.4% Asian, 2.2% African-American, 2.0% American-Indian, 0.9% Filipino, 0.6% Pacific Islander, and 0.2% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 1.0% of the students were ELL, and 16.0% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Ukrainian, Korean, and Rumanian. The school's EDI was 19.

*School G*

Student enrollment during the 2007-2008 school year was 1,716, with 74.5% White, 9.1% Hispanic, 7.6% Asian, 5.7% African-American, 1.4% Filipino, 0.9% American-Indian, 0.5% Pacific Islander, and 0.3% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 0.9% of the students were ELL, and 13.3% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish and Korean. The school's EDI was 29.

*School H*

Student enrollment during the 2007-2008 school year was 1,837, with 81.3% White, 7.9% Hispanic, 4.6% Asian, 2.2% American Indian, 1.9% Filipino, 1.6% African-American, 0.4% Pacific Islander, and 0.1% students who decided to give multiple

responses or did not respond to the question about ethnicity. In this same school year, 0.7% of the students were ELL, and 10.6% of the students received free/reduced price meals. The languages most spoken by ELL students were Farsi and Spanish. The school's EDI was 21.

*School I*

Student enrollment during the 2007-2008 school year was 1,766, with 76.4% White, 10.9% Hispanic, 5.9% African-American, 2.3% American-Indian, 2.3% Asian, 1.0% Filipino, 0.9% Pacific Islander, and 0.2% students who decided to give multiple responses or did not respond to the question about ethnicity. In this same school year, 0.7% of the students were ELL, and 20.4% of the students received free/reduced price meals. The languages most spoken by ELL students were Spanish, Russian, and Rumanian. The school's EDI was 27.

Protection of Human Subjects and Ethical Issues

Before the beginning of data collection, the school district that participated in this study gave permission to this researcher (Appendix A). This permission officially allowed the research to conduct the study in nine high schools in the selected school district. The researcher followed the guidelines recommended by the Committee for the Protection of Human Subjects at California State University (Appendix B). According to the committee, there are no ethical issues and no risk for human subjects participating in this study.

This study involved only high school principals and vice-principals in nine high schools in a suburban school district near Sacramento, California, who agreed to participate by signing the informed consent document after receiving a letter of invitation. Honesty of information, results, and confidentially was maintained throughout the course of this study. Total anonymity of participants and school sites were protected by using of coding and pseudonyms in the collection and maintenance of the records. The participants were told that their names were not used in the research report. According to Patton (1990), participants' identities are kept confidential to protect them from harm or punitive action.

<center>Reciprocity</center>

Some researchers (Creswell, 1998; Hammel, Carpenter, & Dyck, 2000; Patton, 1990) affirmed that there should be reciprocity in what participants give and what they receive from participation in a research project. Creswell and Plano Clark (2007) affirmed that reciprocity should fit within the constraints of research and personal ethics and within the framework of maintaining the researcher's role as an investigator.

According to Creswell (1998), the term reciprocity is defined as something that is returned to participants of a study in exchange for the information collected from them. Hammel, Carpenter, and Dyck (2000) agreed with this perspective when they stated that one aspect that is central to the research process is the issue of reciprocity, "which implies give and take, a mutual negotiation of meaning and power in the research process" (p. 116). Along this line, Patton (1990) argued that researchers should explain to

participants about the reasons for their participation in a research process as well as receive feedback on research results because this is a form of recognition and gratitude to participants for their cooperation in the study.

The researcher was indebted to participants for sharing their experiences, which allowed the researcher to answer the research questions. In so doing, the researcher in this study thanked the participants for their participation in this study by providing them with a gift certificate to Starbucks coffee. In addition, a summary of the compiled results was also provided to each participant as well as to the members of the School District Board of Education.

## Instrumentation

Research instruments are testing devices that are used for measuring a given phenomenon. These instruments are made up of questionnaires, interviews, and surveys, which are a set of research tools and protocols that serve as a guideline for data collection.

The following instruments were developed in order to collect data for this study:

a) Semi-structured interview protocol with open-ended questions (Appendix C).

b) A survey that contains both 4-point Likert scales (quantitative data) and open-ended questions (qualitative data) (Appendix D).

Each category of the interview and survey is linked to a specific research question. The items of the interview and survey were divided into six main categories:

1. Background information.

2. High school leaders' general perceptions in relation to ELL students.

3. The role of culture in the academic success of ELL students.

4. The effects of ELL students' cultural background on their academic performance in mathematics.

5. ELL students' performance on mathematics standardized high-stakes tests.

6. The role of school leaders as reflective practitioners.

The survey also had an extra category named open-ended response in which each response was linked to a specific category that was linked to a specific research question.

*Interview*

Educational research typically uses interviews to collect data that are not readily observable, such as the interests, values, and inner experiences of the participants (Gall, Gall, & Borg, 2007). In this regard, McCracken (1988) stated that interviews are among the most challenging and rewarding forms of measurement in research because they seek to describe the meanings of central themes that are part of the life of the participants. In other words, interviews are particularly useful for getting the story behind a participant's experiences. According to Kvale (1996), the main task in interviewing is to understand the meaning of the responses of the interviewees, which allows the interviewer to pursue in-depth information around the topic under study.

Semi-structured interviews are considered the most effective form of interviews for the type of study conducted in this research (Patton, 1990). In so doing, the interview questions were designed to elicit a broad range of detailed responses, lending depth to the information that principals furnished in their interview. In this approach, Lincoln and Guba (1985) recommended that interview questions be asked in an open-ended fashion to ensure neutrality, to avoid leading the participants, and to "minimize the imposition of predetermined responses when gathering data" (Patton, 1990, p. 295).

*Interview Guide*

According to Patton (2001), an interview guide approach provides elements to be covered during the interview. The interviewer was allowed to "build a conversation" (p. 283) with the participants regarding issues specific to the topic under study but within a predetermined framework, which is the *interview protocol* (Appendix C). The purpose of probes in the interview protocol was to enable participants being interviewed to be as informative as possible in their responses. These were neutral prompts, which encouraged additional information but did not suggest specific answers.

In this study, the interview guide approach allowed for an efficient and comprehensive interviewing of the participants regarding specific issues concerning ELL students. The interview protocol contained a list of issues that was addressed by each participant, which allowed other topics to emerge that were specific to each participant (Patton, 1990).

*Survey*

According to Fowler (2001), survey is one of the most important forms of measurement in research. Sapsford (2006) stated that one of the main benefits of a survey is its flexiblility because it may deal with different types of data. In this regard, Thomas (2003) affirmed, "surveys are useful in revealing the current status of a target variable within a particular entity" (p. 44).

In this study, a survey was elaborated using both 4-point Likert scales and open-ended questions (Appendix E).

*Likert Scale*

A Likert Scale asks participants to respond to a series of statements that are based on a limited range of possible answers. Trochim and Donnelly (2007) stated that in a Likert scale, participants are asked to rate each of their responses on a 1 to 5 scale, in which 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree. They also stated that there are different possibilities for the response scales such as 1 to 7 and 1 to 9, which are odd-numbered scales that have middle value, which may be labeled as neutral or undecided. On the other hand, Trochim and Donnelly (2007) stated that:

> It is also possible to use a forced-choice response scale with an even number of responses and no middle neutral or undecided choice. In this situation, respondents are forced to decide whether they lean more toward the "agree" or "disagree" end of the scale for each item (p. 137).

In this study, high schools principals and vice-principals were asked to respond to a series of statements related to each research question by indicating whether they:

a)  4 - Strongly Agree (SA)

b)  3 - Agree (A)

c)  2 - Disagree (D)

d)  1 - Strongly Disagree (SD)

The 4-point Likert scale survey elaborated for this study had no center point for response. The participants had to declare that they were in agreement or disagreement with each item of this instrument.

*Open-ended Questions*

Open-ended questions are questions to which there is not one definite answer. They give participants an opportunity to respond in their own words and in detail. According to Fink (1995), open-ended questions seek to explore the qualitative, in-depth aspects of a particular topic, and participants' responses may be very useful because they often yield quotable material. However, Fink (1995) stated that the drawback to open-ended questions is that the responses are more difficult to catalogue and interpret.

The survey instrument (Appendix D) in this study also included open-ended questions in which principals and vice-principals were able to add their own narrative perceptions in relation to their ELL population.

Data Collection Procedures

The data collection procedure chosen for this study was designed to use data collected through interviews, surveys, open-ended questions, and ELL students' performance on CST and CAHSEE as well as demographic data regarding ELL students, principals, and vice-principals.

*Data Collection Timeline*

The data was collected in nine AUSD high schools from September 28 to October 30 of the 2009-2010 school year.

*General Procedures*

The email addresses of principals and vice-principals were obtained from each high school in the study through each school's respective website on the internet. Emails were checked for accuracy with the high school coordinator in the school district. The interviews were conducted in a time previously scheduled and in a place previously determined by the principals. The online surveys were delivered to the principals and vice-principals by using their school district email addresses.

Letters of invitation for principals (Appendix E) and vice-principals (Appendix F) and introductory emails for principals (Appendix G) and vice-principals (Appendix H) were followed up with mailed letters to principals and vice-principals (Appendix I) that were sent to them to inform about the nature of the study. These mailed letters also described the key purpose of the interview and survey and provided principals and vice-

principals with specific information on how the interview and survey data were used, who had access to the data, and whom they could contact for further questions. An informed consent document for each principal (Appendix J) and vice-principals (Appendix K) were attached to this letter. These consent forms had to be signed by principals and vice-principals who wanted to participate in the study. The principals and vice-principals who decided to participate in the study returned the signed letter to the researcher.

An interview (Appendix D) was conducted with principals, who agreed to participate in the study, and a survey instrument (Appendix E) was administered to principals and vice-principals who agreed to participate in the study. An email reminder (Appendix L) was sent to respondents who had not completed the survey after the first week and two days before the survey was set to end.

*Collection of Qualitative Data*

Interviews with 24 open-ended questions were conducted with the six principals of the six high schools in AUSD in a time previously scheduled and in a place previously determined by each principal. Principals were given an advance copy of the interview protocol. Each interview lasted roughly 30-40 minutes. Responses to interview questions were used to identify relevant themes that emerged from the answers and to identify patterns that may exist across responses from principals and vice-principals.

The online survey was distributed to the six principals and 20 vice-principals in the same nine high schools and in the same school district. Qualitative data from the

survey were collected through 10 open-ended questions. In their responses to these open-ended items, principals and vice-principals had an opportunity to answer in detail.

*Collection of Quantitative Data*

Using a 4-point Likert scales format, principals and vice-principals responded to 30 questions focusing on their perceptions in relation to ELL students. Quantitative data of the survey were obtained from these items. The survey was designed for participants to take between 15 and 20 minutes, and surveying occurred only once for each participant. Finally, ELL students' performance data in the mathematics portion of the CST and CAHSEE were collected. School demographic data for ELL students, principals, and vice-principals were also collected.

Data Analysis Procedures

In this particular study, qualitative data analysis consisted of an examination of principals' answers to open-ended interview questions as well as principals and vice-principals' responses to open-ended survey questions. Quantitative data analysis consisted of examining the principals' and vice-principals' answers to the 4-point Likert scales survey questions. It also included English language learners' performance data and demographic data on principals, vice-principals, and ELL students.

According to Cresswell and Plano Clark (2007), one of the procedures for mixed-methods data analysis is related to "concurrent data analysis" (p. 136), in which both qualitative and quantitative data are merged because they are analyzed separately. They

also stated that this kind of data analysis "generally involves the concurrent, but separate, collection and analysis of quantitative and qualitative data so that the researcher may best understand the research problem" (p. 62).

Triangulation design is one of the approaches used for concurrent data analysis, and it was used for the data analysis in this study. Figure 9 shows the concurrent data analysis procedure for a mixed-methods study.

Figure 9. Concurrent Data Analysis
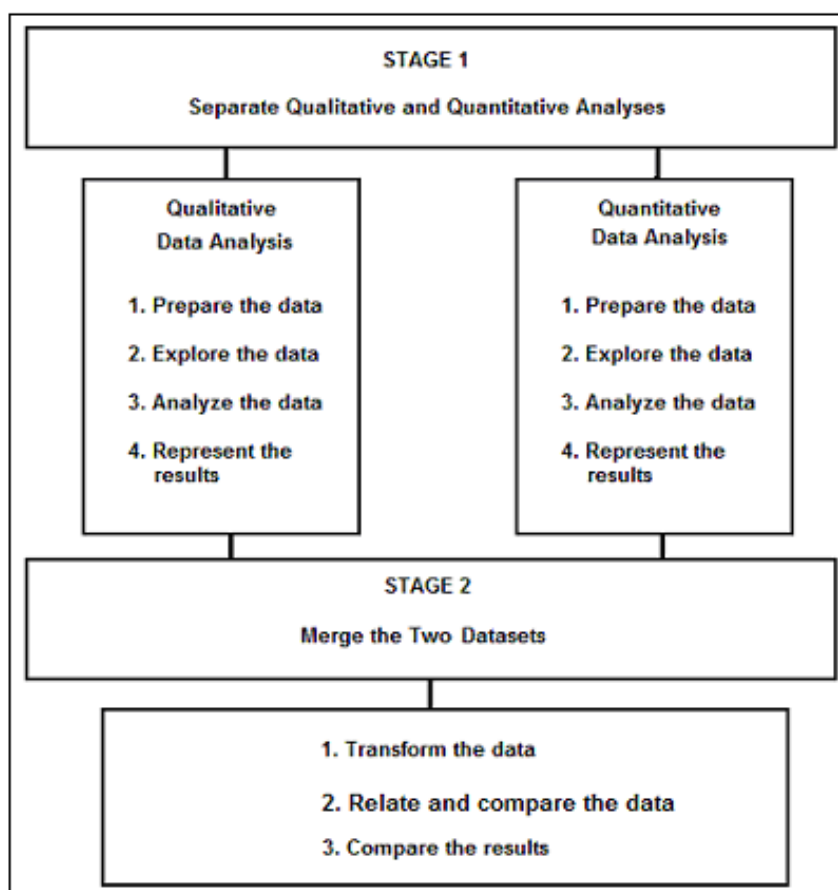


Source: Diagram Adapted from Cresswell and Plano Clark, 2007, p. 127

The intent of the triangulation design was to gather both quantitative and qualitative data at the same time and to integrate the two forms of data in order to have a better understanding of the research questions being asked. This design typically gives equal priority to quantitative and qualitative data and analysis, involves concurrent or simultaneous collection of data, and integrates both quantitative and qualitative data in the results, interpretation, and conclusion phase (Creswell & Plano Clark, 2007).

In so doing, in Stage 1, the researcher conducted separate initial data analysis for each of the qualitative and quantitative databases (Cresswell &Plano Clark, 2007), which included coding, theme development, and the interrelationship of analysis of qualitative data and descriptive analysis of quantitative data. In Stage 2, the researcher merged the two sets of data and used triangulation design in order to allow for a complete picture of the study. The researcher transformed the data by merging qualitative data into quantitative data. The transformation of data included counting codes and counting themes by using the procedure described by Cresswell and Plano Clark (2007, p. 138):

1. Qualitative data were analyzed for codes and themes.

2. The number of occurrences of codes and themes were counted and computed.

3. These numbers were entered on SPSS (Statistical Package of the Social Sciences) to generate data reports.

4. A table, which is a matrix with data transformation, was generated to portray the results in order to compare *quantitized*[15] qualitative data with the quantitative data.

In this study, data interpretation involved explaining the patterns and trends uncovered during the data analysis process. It involved constructing a logical scientific argument to explain the data collected. In this regard, scientific interpretations were descriptions, comments, and suggestions related to what the data of this study mean, which were based on a foundation of scientific knowledge and the individual researcher's expertise. When researchers interpret the data in their study, they draw on their own personal and collective knowledge to construct one or more plausible explanations for the data. As with any human endeavor, the researcher can make mistakes, yet the majority of researchers usually present interpretations of the findings that they feel are most reasonable and supported by the data (Maruyama & Deno, 1992).

*Method of Data Analysis of Qualitative Data*

Understanding the perceptions of principals and vice-principals in relation to ELL population was paramount to the goals of this study. The multiple perspectives from the participants were imperative in understanding the stated problem. Thus, the principals' open-ended interview questions and principals' and vice-principals' open-ended survey questions provided a better understanding of the context of their leadership in order for

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[15]Quantitizing means to convert qualitative data found in the study into quantitative data. For example, it is necessary to count qualitative codes or themes that are found in text data.

the researcher to understand what underlies their behavior and actions (Seidman, 1991). In so doing, the qualitative portion of this study was designed to investigate and describe how the perceptions of principals and vice-principals may influence the performance of ELL students on standardized high-stakes tests in the AUSD high schools.

The data analysis of this study occurred with data collection as recommended by Merriam (1998) and Cresswell (2003). In so doing, qualitative data analysis of this study involved the following steps:

Step 1: Prepare and organize data for analysis.

Step 2: Read through data for trends and patterns.

Step 3: Code data based on similar categories and topics.

Step 4: Describe the people, settings, and categories.

Step 5: Represent the themes and findings in a narrative passage.

Step 6: Interpret the data.

The researcher prepared and organized the data for analysis. According to Trochim and Donnelly (2007), data preparation and organization enable the researcher to assess what types of themes emerge from collected data. Patton (2001) stated that data preparation and organization result in categories and themes that are aligned with the research questions so it is retrievable during the intensive analysis that follow data collection. The process of preparation and organization of the data in a rigorous and standardized way helped to secure the validity of the results of this study. In this context, consistency is very important in this process because it helps to shape the data into

information. In this regard, the research questions for this mixed-methods study provided a framework to prepare and organize the data.

Interviews were audiotaped and transcribed. Spradley (1979) stated that audiotapes must be transcribed in order to paraphrase common patterns and experiences. The open-ended survey questions were preliminarily analyzed, which involved reading the responses so that the researcher could consider the contribution they made to the study overall. Quotations were selected from the six interview transcriptions and from the 10 open-ended survey questions to support or illustrate the emerged themes. The summation of these generative themes was developed into a draft of the findings. This draft was analyzed and re-read several times in order for the researcher to synthesize even further interpretations and clarifications of the themes.

*Inductive Analysis*

Inductive analysis proceeds from the specific to the general. Understandings are generated by starting with specific elements and finding connections among them. To argue inductively is to begin with particular pieces of evidence and then pull them together into a meaningful whole. Inductive data analysis is "a search for patterns of meaningful data so the general statements about phenomena under investigation can be made" (Hatch 2002, p. 161).

In this study, the researcher used inductive analysis for both open-ended interview questions and open-ended survey questions. In this regard, the researcher read the data looking for trends and patterns in order to identify themes to better understand the data

within the confines of a thematic analysis. Next, the researcher coded the data using a

numbering system based on similar categories and topics that emerged from the data as

they aligned with the research questions. Each topic addressed in the data had a number

assigned to it. After coding the data, the researcher spent some time describing the nine

high-school settings, the six principals who agreed to participate in the study, themes that

emerged from qualitative data, and categories that surfaced in the data analysis. Next, the

researcher classified all data related to the thematic pattern and related sub-themes.

According to Taylor and Bogdan (1998), sub-themes emerge from "conversation topics,

vocabulary, recurring activities, meanings, feelings…" (p. 131). Following the coding,

descriptions, and categorizing, the researcher represented findings by way of a narrative.

A narrative analysis of the data collected painted a portrait of the perceptions of the high

school leaders in relation to ELL students. This included direct citations from participants

and a comparison of results from the study, literature review, and theories on this topic

(Cresswell, 2003). Finally, the researcher derived thematic categories that emerged from

the qualitative data, which were consistent with the literature review in order to describe

the topic under study. This helped the researcher to explain the meaning of the

information that was gathered in order to increase knowledge about the perceptions of

high school leaders concerning ELL students. In order to assure the readers'

understanding of the transferability of the results, thick description was also used in the

data analysis.

*Method of Data Analysis of Quantitative Data*

Quantitative data analysis of this study involved two major steps:

1. Data preparation in which data was logged, checked for accuracy, and entered into the computer using SPSS, which is designed to analyze, display, and transform data (Trochim & Donnelly, 2007).

2. Data organization was developed and documented into a database structure that integrates the various measures present in the data (Trochim & Donnelly, 2007).

In this study, descriptive univariate and bivariate statistics and graphical analysis, which describe basic features of the analyzed data, were used to examine the quantitative aspects of the data (Trochim & Donnelly, 2007). According to Gay & Airasian (2003), the use of descriptive data analysis for answering questions about how participants view issues within a given reality helps readers to have an idea of the typical values in the data and how these vary. In order to do this researchers summarize the data, so that readers can construct a mental picture of the relationship between the data and the phenomena under study.

Surveys are the primary source for data collection of this nature. In so doing, the results from the 4-point Likert scale questions of the survey were analyzed using SPSS software. Frequencies of distribution such as frequency tables (Trochim & Donnelly, 2007) were used to describe multiple variables such as standardized test scores and demographic data. The central tendency of a distribution "is an estimate of the center of a distribution of value" (Trochim & Donnelly, 2007, p. 266) used to determine and describe the median of sets of values of the data that require this approach. Ranges,

which are measures of dispersion in a frequency distribution (Trochim & Donnelly, 2007) were also used to describe the variability of data values.

*Representing the Data*

Trochim and Donnelly (2007) stated that the use of graphic displays is "particularly valuable in making the logic of mixed-method design explicit" (p. 183). In this perspective, Tufte (2006) affirmed, "Most techniques for displaying evidence are inherently multimodal, bringing verbal, visual, and quantitative elements together" (p. 83). In so doing, the researcher used a variety of charts, line graphs, and figures to represent quantitative data analysis graphically. In this regard, Tufte (2006) stated, "statistical graphics and maps are visual-numerical fields labeled with words and framed by numbers" (p.83). The researcher also used tables to report results related to the research questions. According to Creswell and Plato Clark (2007), "These visual forms depict the trends and distributions of the data" (p. 135) and allow readers to better understand the quantitative results of the study in a summarized form.

In this study, the researcher also presented the qualitative findings of the data through visuals such as figures and tables that represent the results of different themes. Tables and figures were well organized with a clear and detailed title. In other words, tables show "the physical layout of the setting in which the research took place" (Creswell & Plato Clark, 2007, p. 133). The researcher believes that these visual representations help the readers to understand the summarization of the quantitative and qualitative data results.

Bivariate Descriptive Statistics

A frequent goal in data analysis is to efficiently describe and measure the strength of relationships between variables (Muijs, 2004). In this regard, bivariate descriptive statistics describes such relationships.

*Correlation*

The *correlation coefficient* is a simple descriptive statistic that measures the strength of the linear relationship between two variables. The value of the correlation coefficient *r* ranges from -1 for a perfect negative correlation, to +1 for a perfect positive correlation. The degree of association between two variables is described by the coefficient of correlation, which indicates the strength of this association. In this study, in order to determine existing relationships between two variables, the researcher used the Spearman's rho correlation coefficient because the purpose of this study is not to predict the dependent variable from the independent variable (Muijs, 2004). In so doing, the Spearman Correlation coefficient was used because the data in this study are nonparametric, that is, its interpretation does not depend on the population fitting any parametrized distributions. This means that the quantitative data in this study had a ranking but no numerical interpretation. The researcher also preferred to used nonparametric statistics because there is no generalization of the results of this study to a larger population.

*Interpreting Spearman's Correlation Coefficient*

The usefulness of the correlation depends on its size and significance (Muijs, 2004). If *r* reliably differs from 0.00, the *r*-value is statistically significant, that is, does not result from a chance occurrence, implying that if the same variables were measured on another set of similar subjects, a similar *r*-value would result. If *r* achieves significance, it is possible to conclude that the relationship between the two variables was not due to chance.

According to Muijs (2004), the size of any correlation generally evaluates as follows:

Table 4

Correlation Value and Interpretation

| Correlation Value | Interpretation |
| --- | --- |
| 0.00 to 0.10 | Weak |
| 0.11 to 0.29 | Low |
| 0.30 to 0.59 | Modest |
| 0.60 to 0.79 | Moderate |
| 0.80 to 0.89 | Strong |
| 0.90 to 1.00 | Very Strong |

On the other hand, it is important to state that correlation does not imply causation. In this regard, just because one variable relates to another variable does not mean that changes in one cause changes in the other. In other words, other variables may be acting on one or both of the related variables and affect them in the same direction. Cause-and-effect may be present, but correlation does not prove cause. In this study, the

researcher was not interested in verifying if the occurrence of one variable caused or

increased the occurrence of the other variable. The researcher was only interested in

determining the strength of the correlation between the variables.

*Coefficient of Determination ($r^2$)*

The relationship between two variables can be represented by the overlap of two

circles representing each variable as in Figure 10. If the circles do not overlap, no

relationship exists. The area of overlap represents the amount of variance in the

dependent (*y*-variable) than can be explained by the independent (*x*-variable). The area of

overlap, called the percent common variance, calculates as $r^2 \bullet 100$.

Figure 10. Example of the coefficient of determination (percent common variance

$r^2$ x100)



Y-variable Explained → ← X-variable Explain

Area of overlap, $r^2 \bullet 100$ (percent common variance)
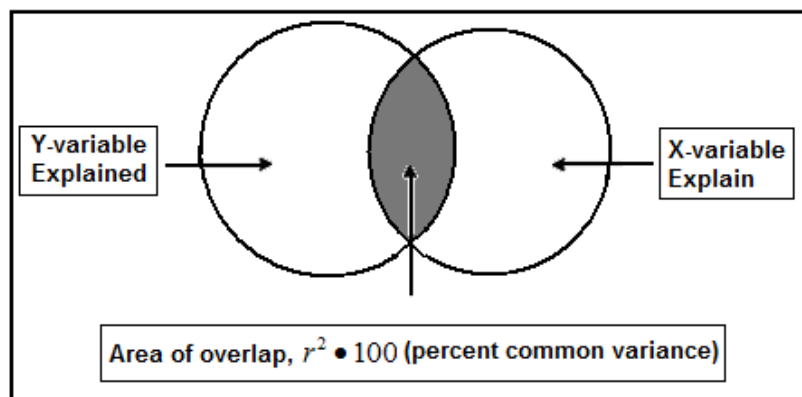
In this regard, if variable *y* = there is a relationship between mathematics and

culture, and variable *x* = mathematics is a universal language and its procedures are the

same in all culture, are correlated = 0.778. They have 60.53% common variance, $(0.778)^2$ $x$ $100 = 60.53\%$, which indicates that 60.53% of the variability in the $y$-variable can be explained by variance in the $x$-variable. The remaining 39.47% of the variance in $y$ remains unexplained. This unexplained variance indicates the error if $y$ is predicted from $x$. For example, in this study, the variable: mathematics is a universal language and its procedures are the same in all cultures and the variable: the cultural background of ELL students does not influence their performance in mathematics standardized high-stakes are related about $r = 0.788$, ($r^2 = 62.1\%$ common variance). This indicates that 62.1% of both variables come from common factors and the remaining 37.9% remains unexplained by this correlation.

*The Triangulation Procedure*

In order to describe AUSD high school leaders' perceptions of ELL students, it was necessary to both conduct interviews with open-ended questions and administer surveys with 4-point Likert scales and open-ended questions (Trochim & Donnelly, 2007). These instruments provided sources for the triangulation of the data that allowed the researcher to get valid findings and results about the topic under study.

The triangulation of these three sources allowed the researcher to assure that the data collected from each source were relevant to the same questions. The researcher then examined whether the perceptions of high school leaders reflected ELL students' performance on standardized high-stakes tests. The researcher also examined if these perceptions were predictive of the support provided for ELL students and resulting ELL

students' academic achievement. Then, the researcher compared the results of quantitative and qualitative data in order to verify whether they yield similar results.

Once data on perception were analyzed, they showed the perceptions of principals and vice-principals in regards to this issue. The next step was to look at the achievement data in order to further ascertain whether the perceptions of these leaders reflected how they perceive the achievement of ELL students in relation to standardized high-stakes tests. In other words, this analysis demonstrated whether ELL students are more successful in environments where educational leaders have sophisticated, well developed, and culturally grounded perceptions about their needs. In this regard, the triangulation of data helped to determine what kind of support ELL students need in order to improve their performance on standardized mathematics assessments by providing evidence of data sources rather than solely through the perceptions of high school leaders on this issue. This analysis helped to further define the cultural and linguistic needs and issues that were used to determine which type of strategies and pedagogical practices would best work for ELL students.

## Reliability and Validity

Researchers use a variety of instruments such as surveys and interviews with a consideration of related literature. As emphasized by De Vos (1998), reliability is the extent to which independent administration of the same instrument yields the same results under comparable conditions. In the area where human motivation, perceptions, attitudes, feelings and actions are measured, both interviews and surveys may be very effective (De

Vos, 1998). Whereas reliability is regarded to be the main requirement for the data-gathering instrument, validity is considered the main criterion by which the quality of the instrument is measured. Validity is the extent to which a specific measurement provides data that relate to the commonly accepted meaning of a particular concept (Babbie, 1995).

Uys and Basson (1991) defined validity as the degree to which an instrument measures what it is supposed to be measuring. According to White (2002), validity simply means that the researcher's conclusion is true and that it corresponds to actual lived reality. Babbie (1995) referred to validity as the extent to which an empirical measure adequately reflects the meaning of the problem under consideration. In this study, validity and reliability were enhanced because a variety of data collection instruments were used. Data were broken down into separate parts, closely examined, compared for similarities and differences, and questions were asked about the phenomena as reflected in the data.

*Reliability*

Reliability refers to a measure of the stability or consistency of an assessment instrument (Krathwohl, 1998). In this particular study, the survey instrument completed by principals and vice-principals served as the assessment instrument. Gay and Airasian (2003) defined reliability as "the degree to which a test consistently measures whatever it is measuring" (p. 141). In other words, reliability is used to gauge whether the same results can be obtained if this study was to be replicated.

In this study, the researcher assessed the degree to which the survey possessed internal consistency, which investigated the reliability of individual questions across the parts of this specific assessment instrument. According to Huck (2000), reliability is defined as the consistency across the parts of the instrument, that is, consistency across individual questions of the survey instrument.

### *Reliability Estimation Using a Split-half Methodology*

Because the pilot test for the survey in this study was not administered, the researcher established the degree of internal reliability of the survey instrument through the application of *split-half reliability methodology*[16]. According to Bryman and Cramer (2005), when the researcher applies "split-half reliability, items are divided into two groups and the relationship between the respondents' scores for the two halves are computed" (p. 77). In other words, split half reliability is determined by correlating a sub-score obtained by adding up the first half of the survey items with a sub-score determined by adding the remaining items.

The scores for each half of the survey are compared to one another. If the survey is consistent, it leads the researcher to believe that it is most likely measuring the same thing. This means that the split-half design in effect creates two comparable survey

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[16]The split-half methodology that estimates the reliability of an assessment is not to be confused with validity in which the researcher is interested in verifying if the instrument measures what it is supposed to measure. According to Gay and Airasian (2003), validity is the most important characteristic a measuring instrument can possess because it "is concerned with the appropriateness of the interpretations made from the test scores" (p. 133).

administrations because the items are split into two surveys that are equivalent in content and difficulty, which assumes that the survey is homogenous in content and difficulty.

In this context, Rudner (2004) stated that split-half reliability can be based on odd versus even numbered items, randomly selecting items, or manually balancing content and difficulty. Once the test is split, reliability is estimated as the correlation of two separate tests with an adjustment for the test length. Other things being equal, the longer the test, the more reliable it will be when reliability concerns internal consistency. This happens because the sample of behavior is larger.

In this study, the reliability of the survey was determined by correlating both its odd and even portions. It was assumed that the two portions of the survey were equally worded and the words and reading difficulty were as similar as possible in both its versions. This information served as a guideline to calculate the correlation between both halves of the survey by using the *Pearson Product Moment Correlation Coefficient*, which is a statistical measure of the degree of correlation between the two halves of the survey instrument. In mathematics and, in particular, statistics, the Pearson Product Moment Correlation Coefficient is a measure of how well a linear equation describes the relation between two variables $X$ and $Y$ measured on the same object, that is, between the halves of the survey. Pelosi, Sandifer, and Sekaran (2001) stated that correlation coefficients range from -1 to 1, with larger values indicating high relationships. A value of 1 shows that a linear equation describes the relationship perfectly and positively, with all data points lying on the same line and with $y$ increasing with $x$. A score of -1 shows that all data points lie on a single line but that $y$ increases as $x$ decreases. A value of zero

shows that the use of this linear model is inappropriate because there is no linear relationship between the variables. In this study, the *Pearson Product Moment Correlation Coefficient* was 0.966. This means that the correlation between both halves of the survey is 96.6%, which according to Pelosi, Sandifer, and Sekaran (2001), is considered reliable because it demonstrates an excellent correlation between both parts of the survey instrument.

However, the split-half method holds a limitation because reliability of the instrument is based on just half the items of the survey, not on the items of the total survey. The restriction of the number of items may lead to the underestimation of the reliability of the instrument. This means that split-half correlation must be adjusted for survey length. In so doing, the researcher also used the *Spearman-Brown* split-half reliability coefficient, which is a form of the split-halves reliability measure used to correct a correlation between the two-halves of the survey. When applied, it involves doubling the two halves to the full number of items, thus giving a reliability estimate for the number of items in the original test. This formula predicts what the full-survey reliability would be, based on half-test correlations. As with the *Pearson Product Moment Correlation Coefficient*, the values of the *Spearman-Brown* formula range from -1 to 1. According to Pellegrini, Symons, and Hoch (2004), a perfect positive correlation means that the two halves of the survey are perfectly concordant, while a perfect negative correlation means that the two halves of the survey are perfectly measuring opposite dimensions of the construct.

Garson (2009) stated that a common rule of thumb for the *Spearman-Brown* split-half reliability coefficient is 0.80 or higher for adequate reliability and 0.90 or higher for good reliability while Pellegrini, Symons, and Hoch (2004) argued that "a less than perfect correlation coefficient might be 0.65" (p. 153). In this study, the Spearman-Brown coefficient was 0.983, which means that the survey has a strong reliability because it has a 98.3% reliability score. Table 5 reports the reliability statistics of the survey instrument.

Table 5

The Reliability Statistics of the Survey: Pearson and Spearman-Brown Correlation Coefficients

| | | Reliability statistics | |
|---|---|---|---|
| **Pearson Product-Moment Correlation Coefficient** | Part 1 | Value | 0.970 |
| | | Number of Odd Items | 15 |
| | Part 2 | Value | 0.967 |
| | | Number of Even Items | 15 |
| | Original Survey | Total Number of Items | 30 |
| | | Correlation Between Parts | 0.966 |
| **Spearman-Brown Correlation Coefficient** | | Reliability for the 30 items of the original survey | 0.983 |

It is also important to highlight that in both coefficients; a correlation coefficient was closer to 1 and indicates that the survey is considered to be internally reliable based on both Pearson Product Moment Correlation Coefficient and Spearman-Brown coefficients.

*Reliability Estimation Using Cronbach's Alpha Coefficient*

In addition to the *Split-half Methodology*, the researcher also established the degree of internal consistency of survey instrument used in this study through the application of a coefficient alpha, known as Cronbach's Alpha (Huck, 2000). The survey was considered reliable based on its reliability coefficient, which is 0.984. In other words, the survey has a 98.4% reliability score. Table 6 reports the Cronbach's Alpha Correlation Coefficient for the survey instrument in this study.

Table 6

Reliability Statistics: Cronbach's Alpha Correlation Coefficient

| Reliability Statistics | |
| --- | --- |
| Cronbach's Alpha | Number of Items |
| 0.984 | 30 |

*Reliability in Online Surveys*

An important method for checking the sufficiency of data is described by Martin and Bateson (1986), as *split-half analysis of consistency,* which is a useful tool for online survey investigators and researchers. In this regard, data is divided randomly into two halves, which are then analyzed separately. If both sets of data clearly generate the same conclusions, then sufficient data is claimed to have been collected. True split-half analysis involves calculating the correlation between the two data sets. According to Martin and Bateson (1986), if the correlation coefficient is sufficiently high, that is, greater than 0.7, then the collected data is reliable. Since the correlation coefficient of the

split-half analysis of consistency is 0.983, the data collected in the online survey is considered extremely reliable (Martin & Bateson, 1986).

*Consistent Responses*

According to Fowler (2002), survey question reliability is defined as answers corresponding to what was intended to be measured. Therefore, the survey instrument was specifically designed to provide consistent responses by the school leaders who find themselves in comparable administrative positions and to maximize the relationship between the answers recorded and what this researcher wanted to measure. In this regard, the same survey was presented to each school leader; therefore, different responses to the survey questions may not be the result of different stimuli, rather a result of differences between school leaders themselves.

*Validity*

Precautions were taken to ensure that the study conformed to the accepted practices of scholarly research. Issues of qualitative methods involving triangulation, credibility, and transferability were appropriately handled in order to ensure the validity of the study.

*Triangulation*

Guba and Lincoln (1989) argued that one proven strategy to triangulate data is the use of different methods of data collection. Another strategy to triangulate data is the use

of different sources for data collection (Cohen & Manion, 1986; Denzin, 1978; O'

Donoghue & Punch, 2003; Trochim & Donnelly, 2007). In this study, both interviews

with open-ended questions and surveys with both 4-point Likert scale questions and

open-ended questions served as data collection.

O' Donoghue and Punch (2003) stated, "Triangulation is a method of cross-

checking data from multiple sources to search for regularities in the research data" (p.78).

In this regard, Gall, Gall, and Borg (2007) stated that qualitative inquiry uses

triangulation to address the accuracy of data because its purpose in qualitative resource is

to increase the credibility and transferability of results. According to Mathison (1988),

triangulation is typically a strategy for improving the validity and reliability of the study.

Following Cresswell (2004), the researcher used triangulation in order to ensure validity

and reduce the risk of biased and limiting conclusions of this study by using different

sources for data collection.

*Credibility*

This study was designed to maximize the accuracy of identifying and describing

the perceptions of high school leaders in relation to ELL students. The technique that was

chosen to enhance the credibility of this study was triangulation. Triangulation involved

gathering data from different sources in order to minimize and understand any differences

by the principals and vice-principals as well as gathering data at multiple sites, nine high

schools in AUSD, in order to minimize and understand any differences that might be

introduced by the participants in each of the school settings. In this study, greater

credibility is apparent in the findings to the extent that the results from both qualitative

and quantitative data converged and indicated the same results (Mertler & Charles, 2008).

*Transferability*

Transferability describes the process of applying the results of research in one

situation to other similar situations. Readers note the specifics of the research situation

and compare them to the specifics of an environment or situation with which they are

familiar. To do this effectively, readers need to know as much as possible about the

original research situation in order to determine whether it is similar to their own.

Therefore, researchers must supply a highly detailed description of their research

methodology. According to Lincoln and Guba (1985), researchers must offer a detailed

description of their methods in order to help readers to draw their own conclusions.

In this study, data were collected and analyzed as part of an effort to provide

readers with sufficient information about the methodology of this study so that they may

be able to make their own judgments and draw their own conclusions about its

transferability. However, the researcher does not claim that the results of this study apply

to other situations. Readers need to look at their own situation and decide about the

relevance of these results to other situations.

Summary

The methodology, as outlined here, describes for the readers important

components of this study, such as its purpose, research questions, and theoretical

framework. This chapter introduces the research paradigm as well as the research design, which is a mixed-method research. The context of the study describes the population and the research sites that were selected to participate in the study. Protection of human subjects and ethical issues are discussed. This chapter specifically outlines the process of the development of the data collection instruments, which includes interview and survey guides. This chapter also includes various stages of the data collection process and describes the components applied in data analysis as well as methods to ensure the reliability and validity of the study.

Chapter 4

DATA ANALYSIS, FINDINGS, RESULTS, AND INTERPRETATIONS

It seems to be everyone is looking for that magic, there is no magic, I think everyone is

looking for that strategy that will help bring ELL students through" (Principal School D).

Introduction

This chapter presents results of the data analyzed from surveys disseminated and

interviews conducted. Interviews were composed of 24 open-ended questions, while

surveys were composed of 30 Likert scale questions and 10 open-ended questions. The

researcher developed both the interview and survey instruments. A detailed discussion

about the response rate, data analysis, findings, results, and interpretation of the

quantitative and qualitative data for each of the five research questions of this study is

also included in this chapter.

The purpose of this mixed-methods study was to capture and describe the

perceptions of high school leadership in the Alpha Unified School District concerning the

challenges faced by ELL students in relation to their success on standardized high-stakes

tests under NCLB. The goal of this research was to describe how school leaders'

perceptions are influenced by an understanding of the effects of ELL students' cultural

backgrounds on their academic performance in mathematics. This study also described

the approaches these school leaders used to improve the achievement of their ELL

population. Finally, it was a goal of this study to develop a series of suggestions and strategies to help high school leaders in their pedagogical work with ELL students.

Patton suggested that researchers use mixed-methods study because "they need to know and use a variety of methods to be responsive to the nuances of particular empirical questions and the idiosyncrasies of specific stakeholder needs" (2002, p. 585). In this context, a mixed-methods approach was used in this study to "build on the synergy and strength that exists between quantitative and qualitative research methods in order to understand a phenomenon more fully than is possible using either quantitative or qualitative methods alone" (Gay, Miles and Airasian, 2006, p. 490).

## Research Questions

The following research questions provided the guidelines for the investigation of the principals' and vice-principals' perceptions regarding ELL students in this study:

1. What are the general perceptions of high school principals and vice-principals in relation to their ELL population?

    a) What is the relationship between these leaders' perceptions and their approaches to the schooling of ELL students?

2. What are the perceptions of high school principals and vice-principals as to the role of culture in the academic success of ELL students in their schools?

    a) What are these leaders' perceptions about ELL students' cultural background as challenges to academic performance on mathematics standardized high-stakes tests?

     c) How do they use these perceptions to promote a school climate that helps

       ELL students to better perform on mathematics standardized high-stakes

       tests?

3. What is the relationship between the perceptions of school leaders concerning ELL

   students and their depth of understanding of the effects of the cultural background

   of ELL students on their academic performance in mathematics?

     a) What kind of ethnic cultural background knowledge do high school

     principals and vice-principals believe they possess to improve the academic

     performance of ELL students in mathematics?

4. What are the high school principals and vice-principals perceptions of ELL

   students' performance on standardized high-stakes tests in mathematics?

     a) How do they perceive the influence of their roles in closing the

     achievement gap of ELL students in mathematics?

5. How do perceptions about ethnic cultural proficiency influence the opportunities of

   high schools principals and vice principals to be reflective practitioners?

## Data Collection

Data were collected from September 28, 2009 to October 30, 2009 in the Alpha

Unified School District. Interviews were conducted with six high school principals.

Interviews were conducted from September 28, 2009 to October 19, 2009. The duration

of each interview was approximately 35 minutes. Principals were given a copy of the

interview protocol in advance. On September 29, 2009, the online survey instrument was

distributed electronically to nine principals and 25 vice-principals in the same nine high schools within the same school district. High school leaders were able to respond to the survey between September 28, 2009 and October 12, 2009. According to survey data, it took each principal and vice-principal between 15 to 20 minutes to answer all 40 questions in this instrument.

The interview data collection then continued in the form of 6 interviews from the population of 9 principals. Survey data collection resulted in the acquisition of 26 surveys from a population of 34 high school leaders. Interviews and survey respondents were asked to answer questions about the challenges faced by ELL students in relation to their academic success on mathematics standardized high-stakes tests under NCLB. They were also asked to respond to questions about the connections between culture and mathematics and how these connections may influence the performance of ELL students on standardized high-stakes tests.

In this context, interview and survey questions were grouped into six categories that were related to each research question.

The first category was entitled *General High School Leaders' Perceptions in Relation to ELL Students* and elicited responses about these perceptions. The researcher's intention was to examine general perceptions that principals and vice-principals held in relation to ELL students and their schooling experience by investigating principals' and vice-principals' perceptions about ELL students, including leaders' knowledge about culture, and high school leaders' awareness of the challenge of identifying the needs of ELL students. The researcher's purpose was to examine the degree to which principals

and vice-principals embrace the principle of affirming the cultural and linguistic background of their ELL students, their knowledge base, and their perceptions about these issues.

The second category was entitled *The Role of Culture and Language in the Academic Success of ELL Students,* which specifically addressed issues concerning the connections between culture and language in the academic achievement of ELL students. This category embraced the belief that language and culture may influence the performance of ELL students on standardized high-stakes tests. It also embraces the belief that principals and vice-principals need to have a clear awareness and understanding of the diversity of their student population in order to help ELL students in their achievement on standardized tests in mathematics.

The third category was entitled *The Effects of ELL Students' Cultural Backgrounds on their Academic Performance in Mathematics*. Questions in this category were designed to examine the knowledge-base of principals and vice-principals regarding ELL students' cultural and linguistic differences as they relate to the challenges faced by these students in their academic performance on standardized high-stakes tests, especially in mathematics. The researcher's intention was to examine if principals and vice-principals acknowledge the influences culture and language have on the academic performance of their ELL students on standardized high-stakes tests in mathematics.

The fourth category was entitled *ELL Students' Performance on Mathematics Standardized High-stakes Tests*. This category was more action and goal oriented and required principals and vice-principals to commit to actively involve students from

linguistically and diverse backgrounds in all aspects of the educational setting by providing them with the appropriate educational programs to meet their needs. The researcher's intention was to examine the principals and vice-principals' commitment to ELL students' inclusion in their schools. According to Cohen (1990), this schooling aspect is essential for the academic success of such students in schools.

The fifth category was entitled *School Leaders as Reflective Practitioners*. This category addressed questions that required school leaders to think about their own educational values and perspectives in relation to their ELL population. The researcher's intention was to examine how principals and vice-principals perceive ELL students through a process of reflection and action within the context of actual school experience concerning ELL students.

The sixth category was entitled *Background Information.* It examined the principals' and vice-principals' personal and professional background experiences in relation to ELL students and the teaching and learning of mathematics. These questions examined areas such as participation in workshops that addressed the specific needs of this kind of student population. This category included questions about their ethnicity and the length of time as a high school leader. The researcher's intention was to investigate if principals and vice-principals have had any personal or professional training that might predispose or sensitize them to the needs and challenges of their ELL population.

Response Rates

An important issue in survey-based research is how to obtain satisfactory response rates. Response rate is defined as the result of dividing the number of people who were interviewed or surveyed by the total number of people in the sample who were eligible to participate but declined to participate in the study. According to Atrostic and Burt (1999), response rates appear to be declining overall since the 1990s. Further evidence of this phenomenon is given by the results of studies conducted by Schuldt and Totten (1994) and Sheehan (2001), which demonstrated that response rates of email surveys had continuously decreased since 1986[17]. Schuldt and Totten (1994) analyzed 31 studies over a fifteen-year period and found that the average response rate for electronic surveys was only 36%. Still, sufficient response rates are important for surveys.

There is a challenge in survey research in regards to representative sampling, which may affect the generalized conclusions towards of the study (Nguyen, 2007). The reason that lower response rates are problematic is, of course, that people who do not respond may well be different from those who do. Low response rates therefore can create sampling bias.

According to Nguyen (2007), the lower the rate, the greater the risk of such bias, which means that a high survey response rate helps to ensure that the survey results are representative of the survey population. In this regard, in order to collect successful responses, researchers must take into consideration the audience, the quantity of online surveys in circulation, and the potential for surveys reported as spam. These factors may

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[17]According to Kiesler and Sproull (1986), in 1986, Sproull published the results from the first e-mail survey in Public Opinion Quarterly.

result in lower respondent interest and acceptance of survey invitations. However, Nguyen (2007) argued, "it is not necessarily true that *representativeness* increases whenever response rates increase" (p.11). In this perspective, Visser, Krosnick, Marquette, and Curtin (1996) challenged the assumption that representativeness increases with an increased response rate.

Brehm (1993) stated that the response rate for face-to-face interview surveys less than 70% and higher than 60% might lead to an adequate generalizability of studies' results. In a survey of a population that aims to describe knowledge, perceptions, or behaviors, a 60% response rate might be acceptable (Gay & Airasian, 2003), any data is better than no data, so there is no reason to reject a 60% response rate by itself. Years earlier, after reexamining 14 studies to compare early returns with total returns, Berdie (1989) concluded that "As long as response rates exceed 50% to 60%, resources used to promote response rate beyond that level are usually better spent in other ways" (p. 63).

Kiesler and Sproull (1986) and Parker (1992) stated that the average response rate for email and online surveys is about 65%. Some studies suggest that a 50% response rate is usually considered adequate (Gay & Airasian, 2003; Rea & Parker, 1992), though some authors suggest that a 60% response rate is considered to be very good (Fowler, 1984; Nguyen, 2007) and a 70% response rate is considered to be recommended and acceptable (Babbie, 1990; Rea & Parker, 1992). On the other hand, DeVaus (1996) suggested that good sampling and survey design should lead to an 80% response rate and 90% response rate would be excellent.

Mertens (2005) argued that a response rate of 70% has been recommended as acceptable. However, this recommendation is based on the assumption that respondents and non-respondents are similar (Mertens, 2005). According to Birdie's (1989) point of view, if the assumption holds that respondents and non-respondents are similar, then the effective size[18] is zero, which means that a 50% response rate or higher is acceptable because it usually yields results that closely approximate the entire sample. Birdie's (1989) study showed that differences between respondents and non-respondents are trivial. In other words, if the number of cases in the unsuccessful contacts were so small that their influence on the results is practically unnoticeable, then the effect of any response bias upon survey-based decision-making would be negligible. In this regard, Becker, Dottavio and Mengak (1987) suggested that a high response rate is less important when conducting surveys of homogeneous populations. If a researcher has data showing that the responses from a random sample of initial non-respondents are very similar to those of initial respondents, this may increase the credibility of results of a survey with a response rate lower than desirable. However, Nguyen (2007) argued that the higher the response rate, the more secure the reader would feel that the results are representative of the population being studied.

In another point of view, Kwak and Radler (2002) affirmed that the average response rate for web-based surveys is only 27% while Hamilton (2003) stated that the

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[18]In statistics, an effect size is a measure of the strength of the relationship between two variables in a statistical population, or a sample-based estimate of that quantity. An effect size calculated from data is a descriptive statistic that conveys the estimated magnitude of a relationship without making any statement about whether the apparent relationship in the data reflects a true relationship in the population.

average response rate for this kind of survey is 41% if the sample size is less 1000

participants. However, if the sample size is more than 1000 participants, then the

response rate of the survey is 32%. Gillham (2000) stated, "A response rate of 30% has to

be seen as fairly satisfactory, and more than 50 percent is good" (p. 14). According to

Faught, Green, and Whitten (2004), the average online survey response rate of 34% is

considered an excellent rate of return. However, they stated that a response rate over 50%

is regarded as very good while, currently, response rates between 20% and 30% may be

more typical. In this regard, Sue and Ritter (2007) argued that the response rates for email

and online surveys range from 24% to 76%.

In this context, Rubin and Babbie (2009) stated that response rates are only

research guides. In their opinion, there is no statistical basis to determine acceptable

responses rates because studies about the average response rate for interview, online,

email, and web-based survey are limited in number. Currently, one of the problems

associated with response rates is that it does not appear that they are based on empirical

investigation. Neither is there a strong review of literature in other areas to guide the

research procedures and understanding of survey researches.

*Response Rate for the Interview*

Out of the nine principals originally contacted, six of them agreed to be

interviewed. The interview protocol was emailed along with the consent form to each

principal. The response rate for the interview was 66.7%, which is considered a good

response rate because, according to the previous discussion, it leads to an adequate

generalizability of studies' results (Berdie, 1989; Brehm, 1993; Gay & Airasian, 2003;

Nguyen, 2007). Table 7 reports the principals' interview response rate.

Table 7

Principal' Interview's Response Rate

| School | Principal | Agreed to Participate | Response Rate |
|--------|-----------|----------------------|---------------|
| A | 1 | No | 0% |
| B | 1 | Yes | 100% |
| C | 1 | Yes | 100% |
| D | 1 | Yes | 100% |
| E | 1 | Yes | 100% |
| F | 1 | No | 0% |
| G | 1 | Yes | 100% |
| H | 1 | Yes | 100% |
| I | 1 | No | 0% |
| Total | 9 | 6 | 66.67% |

*Response Rate for the Survey*

On September 29, 2009, an online survey was sent electronically to nine

principals and 25 vice-principals in the nine high schools in the AUSD through their

school district email addresses. By the end of that week, 16 surveys had been completed

and returned for a response rate of 47.06%. A follow-up email was sent on October 04,

2009 asking non-respondents for their assistance in completing the survey, and on

October 09, 2009, 22 surveys had been completed and returned for a response rate of

64.71%. The researcher then sent a second follow-up email to non-respondents on

October 10, 2009. As a result of the initial email and the two subsequent follow-up

contacts, by the end date for completing the survey, October 12, 2009, a total of 26

principals and vice-principals had completed and returned the survey for a total response

rate of 76.47%. Table 8 reports the response rates for the survey in each high school site.

Table 8

Surveys' Response Rate: High School Sites

| School | Population | Principal | Agreed to Participate | Vice Principal | Agreed to Participate | Response Rate |
|--------|-----------|-----------|----------------------|----------------|----------------------|---------------|
| A | 3 | 1 | 0 | 2 | 2 | 66.67% |
| B | 4 | 1 | 1 | 3 | 3 | 100% |
| C | 4 | 1 | 1 | 3 | 3 | 100% |
| D | 3 | 1 | 1 | 2 | 2 | 100% |
| E | 4 | 1 | 1 | 3 | 2 | 75% |
| F | 4 | 1 | 0 | 3 | 2 | 50% |
| G | 4 | 1 | 1 | 3 | 3 | 100% |
| H | 4 | 1 | 1 | 3 | 1 | 50% |
| I | 4 | 1 | 0 | 3 | 2 | 50% |
| Total | 34 | 9 | 6 | 25 | 20 | 76.47% |

The response rate of 76.47% for the survey fell within the guidelines suggested by

the literature related to survey response rate (Birdie, 1989; Fowler, 1984; Gay &

Airasian, 2003; Gillham, 2000; Kiesler & Sproull, 1986; Parker, 1992), which considers a

response rate of 70% recommended and acceptable.

Finally, according to Birdie (1989) and Mertens (2005), since respondents and non-respondents are part of a similar population, this study yields results that closely approximate the entire population, which increases the credibility of its results.

*Confidence Interval and Confidence Level*

Statistics based on samples of a population are subject to sampling error. Sampling error refers to random variation that occurs because only a subset of the entire population is sampled and used to estimate findings for the entire population. In general, sampling error gets larger when a sample is small. Statistical sampling theory is used to compute a confidence interval to provide an estimate of the potential discrepancy between the true and observed rates.

In this context, understanding the potential size of that discrepancy may provide information about how to interpret the observed statistical measure. Technically speaking, a 95% confidence level indicates confidence interval in which the range of values would fall 95% of the time if researchers were to calculate the rate from an infinite number of samples of the same size and drawn from the same population. In other words, confidence interval is a range of values within which the true value of the rate is expected to occur. In this context, confidence level is related to the level of significance $\alpha$. A 95% confidence level corresponds to $\alpha = 0.05$, which means that there is one chance in twenty that the true population proportion falls outside the given confidence interval.

In this study, the confidence interval for a population of 34 and a sample size of 26, with a response rate of 76.47% was ±14.26 at a confidence level of 95%. Based on

this return rate, the 95% confidence level indicates that if the survey was to be conducted 100 more times, 95 out of 100 trials would yield results that lie in a confidence interval from 62.21% to 90.73% of the current results reported for this sample of high school leaders.

In other words, the confidence level of this study represents how often the percentage of the population who would pick an answer lies within the confidence interval. When the researcher put the confidence level and the confidence interval together, it is possible to affirm that the researcher is 95% sure that the true percentage of the population is between 62.21% and 90.73%. In this study, the researcher can be 95% certain that the whole population of answers would follow within that range.

## Non-participants

A brief discussion must be given regarding the school leaders who chose not to participate in the study since non-participants, even a small number of them, do shape a study's results to a certain degree. Three principals and five vice-principals did not respond the surveys for a non-response rate of 23.53%. In addition, 2 surveys were not completed. This means that 28 surveys were started and 26 of them were completed, which corresponds to a completion rate of 92.86%.

Three out of nine principals did not want to participate in the interview process for a non-response rate of 33.33%. Two principals stated that they were not available to participate in the study. Another principal was not interested in participating in the research and did not respond the researcher's several contact attempts through emails.

Five vice-principals did not want to participate in the study for a non-response rate of 20%. Of the five non-respondents, one principal was not interested in participating in the study, another principal agreed to participate in the study, but did not respond to the survey, and three principals did not respond to the researcher's inquiries about their participation in the study. In this study, the non-participant rate was 33.33% for the interview and 23.53% for the online survey. Based on the literature concerning this issue, the overall response rates of these instruments are adequate and acceptable because the interview and survey results are representative of the study's population.

*Possible Reasons for Non-participation in the Study*

There are some likely reasons for why the three principals and five vice-principals chose not to participate in this study. Since these school leaders needed to have time available to participate in the interview and complete the survey, some may simply not have had the necessary time to complete the task. For example, when trying to schedule an interview, one principal stated:

> This is just not a good time to meet with me. We have additional students, staff, and are operating a new computer system so this beginning of the school year is very hectic. In so doing, I am unable to meet with you.

Another principal stated, "Sorry. But I am not available to work with you at this time." Along the same line, another principal stated:

My plate is full this year already with an emphasis upon some specific Strategic

Plan action steps and specific WASC[19] action plans that are consuming any

available time after dealing with Zangle[20], Central Enrollment, staffing, facility

and other issues.

Other reasons for why the leaders declined to participate in the interview and

survey may have been because they were asked to answer questions about the

connections between mathematics and culture and about the performance of ELL

students in relation to standardized high-stakes mathematics tests. While school leaders

were not required to understand these connections, some of them may have felt they

could not effectively participate if they had to answer questions related to these issues.

For example, one principal affirmed, "When it comes to mathematics strategies and ELL

issues, I have little to offer."

Of course, some school leaders may simply have been uninterested in the study.

For example, one vice-principal stated, "I'm not interested in participating. I will send the

consent form packet back to you." Others may have been intimidated by the consent

form.

Finally, it is possible that some high school leaders who have a small ELL

population in their schools chose not to participate because the research study focused on

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[19]WASC accreditation certifies to other educational institutions and to the general public that an institution meets or exceeds established standards and is achieving its own stated objectives.
[20]Zangle is a rich, full-featured student information system that covers all aspects of student management, including enrollment, scheduling, attendance, mark reporting, transcripts, behavior, etc.

something to which they felt they could not contribute. For example, one of the principals

stated, "Looking at what you are interested in researching, I do not really have anything

to offer. My school has historically had a small ELL population so we have not addressed

these issues, particularly in mathematics." From this perspective, some high school

leaders may think that since the ELL population of their schools is small it is not

significant in relation to standardized high-stakes tests. They may also think that the

findings of this study do not contribute to their understanding of the challenges they face

daily.


## Descriptive Univariate Statistics

In this study, descriptive statistics was used to describe the basic features of the

survey data in quantitative terms. It also provided summaries about the sample and the

measures collected during the data collection window. Together with graphics analysis,

descriptive statistics formed the basis of the quantitative analysis of data of this study and

it helped the researcher to simplify large amounts of data in a sensible way by reducing

the data into a simpler summary. In other words, the use of descriptive statistics helped

the researcher to summarize the study's collection of data in a clear and understandable

way. This means that the primary goal of using descriptive statistics in this study was to

describe quantitative data through the use of numbers by graphically representing this

information in a comprehensible manner.

Survey's Quantitative Data

The survey was distributed to a total of 34 high school leaders in nine high schools within the same school district. Subjects invited to participate included 9 principals (26.47%) and 25 vice-principals (73.53%). The subjects who agreed to participate in this study included 6 principals (23.08%) and 20 vice-principals (76.92%). This means that of the 34 school leaders who were invited to participate in this study, 26 completed and returned their surveys. The survey response rate was 76.47%. Table 9 reports the survey response rate.

Table 9

Survey Response Rate: Principals and Vice-Principals

|  | Population | Participants | Non-Participants | Response Rate |
|---|---|---|---|---|
| Principals | 09 | 06 | 03 | 66.67 % |
| Vice-Principals | 25 | 20 | 05 | 80.00% |
| Total | 34 | 26 | 08 | 76.47% |

*Background Information*

Of the 6 principal respondents, 4 (66.67%) were male and 2 (33.33%) were female (33.33%). The gender of principals is reported in Table 10.

Table 10

Principals' Gender

| Gender | Male | Female |
|---|---|---|
| Principals | 4 | 2 |
| Percentage | 66.67% | 33.33% |

Of the 20 vice-principal respondents, 10 (50%) were male and 10 (50%) were female. The gender of vice-principals is reported in table 11.

Table 11

Vice-Principals' Gender

| Gender | Male | Female |
|---|---|---|
| Vice-Principals | 10 | 10 |
| Percentage | 50% | 50% |

Of the 26 participants, 20 (76.92%) participants reported that their ethnicity is White, 2 (7.69%) reported that their ethnicity is African-American, 2 (7.69%) reported that their ethnicity is Hispanic/Latino; 1 (3.85%) reported their ethnicity as multicultural, and 1 (3.85%) did not respond the question. Table 12 reports the ethnicity of principals and vice-principals.

Table 12

Ethnicity of Principals and Vice-Principals

| Ethnicity | White | African-American | Hispanic Latino | Multicultural | No-Response |
|---|---|---|---|---|---|
| Total | 20 | 02 | 02 | 01 | 01 |
| Percentage | 76.92% | 7.69% | 7.69% | 3.85% | 3.85% |

However, the actual responses for the question about cultural label or ethnicity were White, 5 (25%); Caucasian, 7 (35%); Anglo-Irish, 1 (5%); European, 1 (5%); Scottish, 1 (5%); Armenian, 1 (5%); and American, 4 (20%). For the purpose of categorization, these respondents were included under the category of White. Table 13 reports the category of ethnicity of White.

Table 13

Ethnicity of White

| Ethnicity | White | Caucasian | Anglo-Irish | European | Scottish | Armenian | American |
|---|---|---|---|---|---|---|---|
| Total (%) | 5 | 7 | 1 | 1 | 1 | 1 | 4 |
| | 25% | 35% | 5% | 5% | 5% | 5% | 20% |

Of 6 principals, 5 (83.33%) reported that their ethnicity is White. The other ethnicity reported by the principal is African-American, 1 (16.67%). Figure 11 shows the ethnicity for principals only.

Figure 11. Principals' Ethnicity
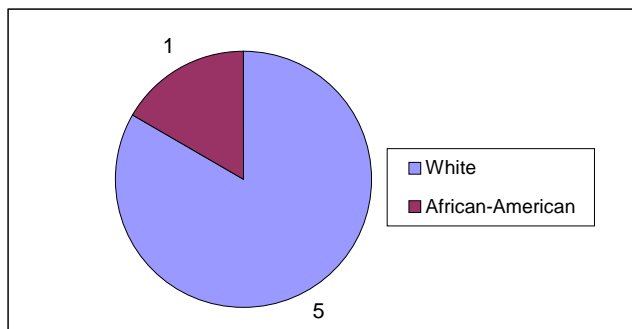


Table 14 shows the demographic information from the California Department of Education (2009a) for ELL students from the nine high schools in AUSD for the school year 2007-2008.

Table 14

Ethnicity of ELL Students in the Nine High Schools in AUSD

| Ethnicity | White | Hispanic Latino | African American | Asian | American Indian | Filipino | Pacific Islander | No Response |
|---|---|---|---|---|---|---|---|---|
| Percentage | 67.0 | 15.7 | 7.6 | 5.2 | 1.8 | 1.5 | 1.0 | 0.2 |

The ethnicity of school leaders and ELL students in the nine high schools at AUSD is reported by Table 15.

Table 15

Comparison between the Percentage of ELL Students and School Leaders in the Nine

Schools in AUSD

| Ethnicity | White | Hispanic Latino | African American | Asian | American Indian | Filipino | Pacific Islander | No Response |
|---|---|---|---|---|---|---|---|---|
| ELL Students | 67.00% | 15.70% | 7.60% | 5.20% | 1.80% | 1.50% | 1.00% | 0.20% |
| School Leaders | 76.92% | 7.69% | 7.69% | 0.00% | 0.00% | 0.00% | 0.00% | 3.85% |

The quantitative data show a large discrepancy between the ethnicity of ELL

students and the ethnicity of school leaders in the nine high schools in AUSD. For

example, the number of Hispanic/Latino students is twice as large as the number of

Hispanic/Latino school leaders. In this context, even though the nine high schools in

AUSD have a diverse student body that mirrors the community, much work still remains

to be done in the school district in order to develop and promote diversity of its staff by

being sufficiently sensitive to diversity issues.

School administration experience varies among principals and it ranges from 2 to

11 years of principalship experience. Figure 12 shows the school administration

experience of principals.

Figure 12. School Administration Experience: Principals



**School Administration Experience**

(Bar chart. Y-axis: Years of Experience, 0 to 12. X-axis: Schools (Principals). Bars: H = 2, E = 5, D = 6, B = 7, G = 8, C = 11.)
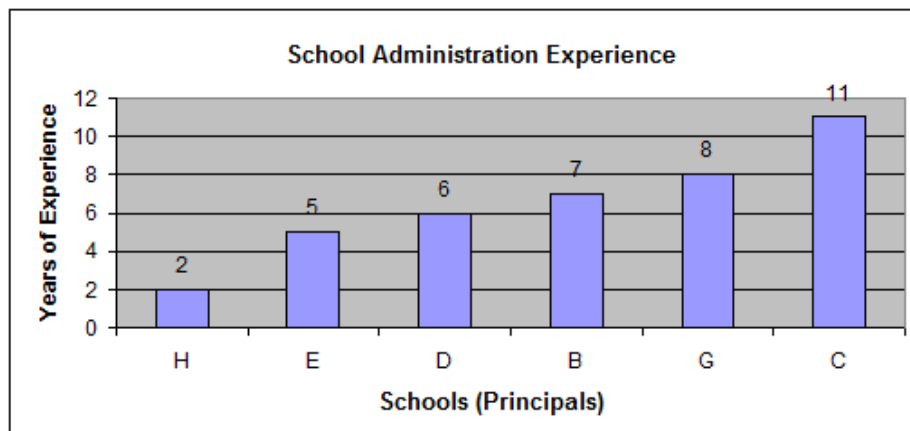
School administration experience for vice-principals ranges from 2 to 15 years of service. Of the 20 vice-principals in this study, 4 (20%) reported between 10 years of school administration experience, 4 (20%) reported between 3 years of school administration experience, 2 (10%) reported 11 years of school administration, 3 (15%) reported 2 years of school administration experience, 6 (30%) reported a school administration experience such as 1 (5%) with 4 years; 1 (5%) with 5 years; 1 (5%) with 6 years; 1 (5%) with 13 years; 1 (5%) with 14 years; and 1 (5%) with 15 years. One (5%) vice-principal did not answer the question. Figure 13 shows the school administration experience of vice-principals.

Figure 13. School Administration Experience: Vice-Principals
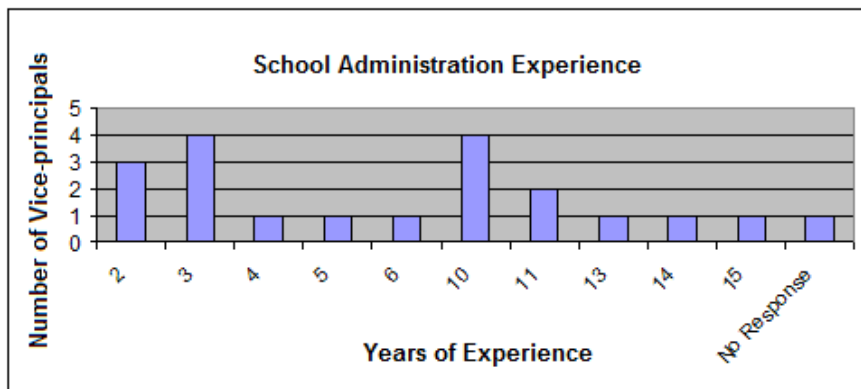


Data Analysis

D'Ambrosio (1990) argued that culture and mathematical learning are connected in important ways. In this regard, early life experiences and the values of a person's culture may affect both the expectations and the processes of the learning of mathematics. It is therefore possible to assume that students who share the same cultural background may also share common ways of learning mathematics. In this respect, it was the researcher's intention to examine whether principals and vice-principals believe that students' cultural backgrounds influenced their learning in mathematics. The data show that of 26 school leaders, 7 (26.92%) strongly disagree, 9 (34.62%) disagree while 8 (30.77%) agree and 2 (7.69%) strongly agree with this assertion. This means that 16 (61.54%) out of 26 (100%) school leaders do not believe that students' background influenced their learning of mathematics. Figure 14 reports the impact of school leaders' cultural background in their learning of mathematics.

Figure 14. Responses to the question "I believe that my cultural background influenced my learning in mathematics"
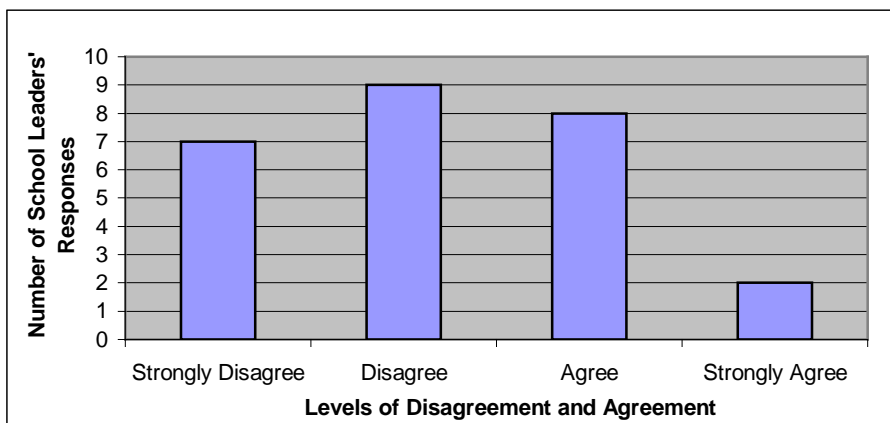


According to Dossey (1992), mathematicians do not agree on the nature of mathematics. One of the primary issues is whether mathematics is *external* or *internal* to the person. This argument is pertinent to the relationship of culture and mathematics in that internalists see connections between mathematics and culture while externalists see mathematics as free from culture (Dossey, 1992). In this study, according to the data, 16 (61.54%) school leaders possess an externalist view of mathematics, which means that they perceive mathematics as culture-free while 10 school leaders possess an internalist view of mathematics, which means that they perceive mathematics as a cultural product.

It was also the researcher's intention to verify if school leaders were knowledgeable about the various cultural groups represented among students in their schools. The more school leaders know about their ELL students' languages and cultural backgrounds, the better they will be able to interpret ELL students' behavior and attempts at communication (Scheurich & Skrla, 2003).

The data show that of 26 school leaders, 3 (11.54%) disagree, 19 (73.08%) agree, and 3 (11.54%) strongly agree that they knowledgeable about the various cultural groups represented among the students in their schools. One data was missing since 1 (3.84%) school leader did not respond the question. Figure 15 reports school leaders' knowledge about the various cultural groups represented among the students in their schools.

Figure 15. Responses to the question "I am knowledgeable about the various cultural groups represented among students in my school"
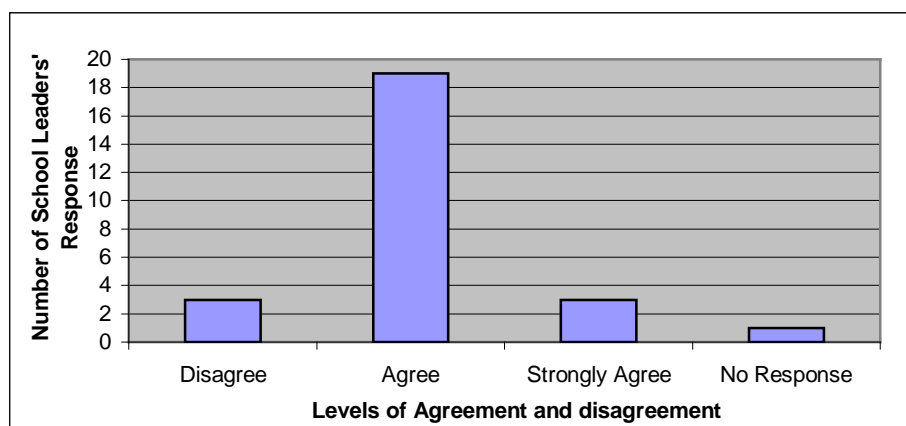


Knowledge of students' cultural backgrounds helps school leaders to examine their own administrative practices and become more sensitive in order to provide diverse learning experiences that result in an improvement of instruction for all students by improving instructional pedagogies, methodologies, and practices for ELL students (Scheurich & Skrla, 2003). When ELL recognize that school leaders take students' cultural background and language seriously enough to learn about it, they feel that their culture and language are valued and respected, which motivates them to fully participate

in the learning process. Of 26 school leaders, 22 (84.62%) stated that they know about different student's cultural background in their schools.

<div align="center">Qualitative Analysis</div>

In this study, there were two sources of qualitative data, 24 principals' open-ended interview questions and 10 principals' and vice-principals' open-ended survey questions. These sources provided detailed information about the perceptions of high school leaders in relation to their ELL students' population.

*Principals' Interviews*

The six interview participants have been given pseudonyms and are described in greater detail below.

*Principal School B*

Principal of school B identifies himself as a White male, although his mother is Native American. He has been a principal twice, with a gap of 4 years between assignments. He taught high school English for 11 years before becoming an administrator. His first administration position was as a high school vice-principal, but two years later, he became a principal of a continuation high school. He served there for four years until he moved to the Sacramento area and became an assistant principal in the RJUHS district for six years. He is now in his third year as principal of ECHS. The sum

of his school experience is 11 years teaching English, 8 years as a vice principal and 7 years as a principal.

As a teacher with increasing management duties, he perceived the principalship as being basically operations oriented. When he got his Masters degree and administrative credential, many of the courses supported this perception. Moreover, when he worked as a vice principal, the bulk of the job was operational, so it was a bit of a shock when he stepped into the office of the principal to discover that the job is more systems-oriented and strategic in its function.

He believes that realizing that the expectations of a principal were different from those of a co-administrator was a slow and daunting process. For example, when he first became a principal, they were preparing as a staff for registering students at the beginning of the school year. He came with many ideas of how to improve the registration process; his staff had to assure him that they had a process in place and did not need him to interfere. At the same time, parents who had been in his office as vice-principal with issues about fairness in disciplinary practices were now in his office to discuss four-year plans and graduation requirements for their children. Teachers, who had been concerned that he wrote fair evaluations for them when he was a VP now wanted to discuss things like standards-based curriculum, pacing, common assessment and other big picture items related to their department or subject area. He had to stop thinking about the details of how the school operates from day to day and begin thinking about the direction the school was moving as a learning institution, about how to get all students, teachers,

staff, parents, the district administration, and the community moving in unison toward the same objectives.

He grew up in California during a time when all elementary school children were required to learn Spanish. In his opinion, it was not very good instruction. He took French in middle school to try something new and German during high school and college for the cultural difference. He also obtained his CLAD when he first began teaching in California, which included 12 units of language study where he again began to learn Spanish. However, his best instruction was through having to interact with a 100% Hispanic population in the Central Valley at KCU. He learned Spanish by daily interaction with parents who did not speak English well. Unfortunately, he did not have the opportunity to travel abroad. He stated that he received professional development training such as diversity and multicultural courses. He also went through CLAD training 15 years ago and enrolled in a refresher SDAIE course three years ago.

When he first got into administration, he moved from a school district that was predominantly White and English speaking to a school district that was predominantly Hispanic and Spanish speaking where most students were comfortably bilingual in Spanish and English. He was the one who only spoke English, and he had to go through a significant cultural and linguistic adaptation period to function well in his job. An interesting phenomenon that he observed in a school that was largely bicultural was the assimilation of new ELL students into the school by other students who understood the necessity to grasp both cultures and languages for students' success.

*Principal School C*

The principal of school C identifies herself as an African-American. Before she became a principal, she was vice-principal at MLHS for six years and vice-principal and dean at YBHS for 14 years. She has been a principal for the last 11 years. Before she took the position as principal, she thought that some of the challenges of being a principal were meeting the state standards, increasing enrollment, and changing the community's perceptions about her school.

In her opinion, these perceptions did not change. She believes that society still views diversity as inferior and students of poverty as second-class citizens. She did not study languages other than English. She did have an opportunity to travel abroad. She was in Japan for 10 days as a part of a sister-school exchange when she was vice-principal at MLHS. This was 13 years ago.

She participated in diversity and multicultural courses, although not specifically for ELL students. She has taken workshops to address the specific needs of ELL students: Cultural Proficiency, Multicultural Education, and SEED (Seeking Educational Equity and Diversity), a workshop that focuses on issues of equity, multicultural education, and conversations about one's own experiences.

When she started her administrative profession, she faced unexpected challenges concerning the education of ELL students. Some of these challenges were a focus on ongoing professional development for staff and the ability to address the needs of ELL students by offering differentiating instruction.

*Principal School D*

The principal of school D identifies himself as a Caucasian male. He began his teaching career as a non-credentialed music teacher with a degree in business management at a private school. He liked this work so much that he wanted to work in a public school and decided to get a credential. Because of his business degree, he obtained a business credential as well. He started teaching business, computers, technology, finance, and music courses. While he was working, he earned his Masters' degree in education.

He was a vice principal at EGHS for two years and then he was a vice principal at MLHS for five years. He was also a vice principal at AMS for 5 years and now he is a principal at SJHS. He has been principal for the last 6 years. His school experience includes one year at SJHS, 5 years at AMD, 5 years at MLHS, 2 years at FHS, 6 years total at FHS as a teacher and school administrator.

Before he came to his present position, he knew that his new job as a high-school principal would be a big change from being at a middle school. However, some of the bigness of the projects at his new school took him by surprise, "there is a lot going on here." In this regard, as a high-school principal, he wondered about budgeting challenges as well as how much contact there would be with parents.

In his opinion, one never knows what to expect in a new position like a principalship, and his perceptions about being a principal have changed over time. As a teacher, he thought that he knew what a vice principal did until he became a vice-principal himself, and as a vice-principal he thought that he knew what a principal did

until he became principal. Things are always changing and as he changes from school to school, he has different personalities to deal with, different teaching staff, different students, different norms, and different cultures at each school.

He also stated that as a high-school principal, he deals mostly with adults. As a vice-principal, he dealt mostly with the students, discipline problems, and testing issues. He believes that vice-principals are bogged down with discipline, enforcing rules, supervision, which consumes a lot of time. However, he also believes that vice-principals are considered instructional leaders.

He participated in multicultural and diversity trainings when he was teaching at THS. Students there speak 56 languages. As a result, when the school district offered, he participated in the Language Development Specialist (LDS) training. According to him, these workshops helped him at that time. However, he has not been able to put as much as he would like into practice. Nonetheless, it did help him to gain some insight about these issues and helped him as a teacher to understand some of the different pedagogical approaches he should been using with his students.

He believes that one of the challenges he faced when he became a principal was to make sure the teachers had the training and knowledge they needed to work with ELL students. He also believes that CLAD strategies are good teaching for all students.

He also stated that he studied French for three years but he believes that he should have taken Spanish. He did not have the opportunity to travel abroad but he would like to travel in his free time.

*Principal School E*

The principal E considers himself Caucasian. His father's side is Italian and his mother is English. He became a teacher in 1991 and taught social science from 1991 to 1993 at a K-8 school. In 1993, he came to MLHS as a physical education teacher and taught PE from 1993 to 1999, after which he was assigned as a vice-principal at EHS from 1999 to 2004. From 2004 to 2005, he was at BVHS as a vice-principal. His first job as a principal was in 2005 at MVHS. This is his first year as a principal at MLHS. He has been a principal for the last 5 years.

He thought that the challenges of becoming a principal were those of developing a focus for the school. His initial perceptions were that he would have to rally people in order to run the school and set policies. However, he believes that these perceptions changed because he did not know what the job was about until he became a principal. The reason his perceptions changed is that as a principal everything starts and stops with him. He did not see that big picture as clearly as he did once he was sitting in the principal's chair. He began to look at all the different conflicts that were going on, at the vision of the school, and at the overall achievement of students. He had to look at every single student, from his lowest achieving student to his highest achieving student and everyone in between, and realize again that he is responsible for all of them.

He received some diversity and multicultural professional development training. However, he received most of his trainings when he was vice-principal at EHS. He did the Ruby Paine training for poverty, but that was when he was overseeing the ELL department there. He also traveled to a couple of conferences in which he participated in

ELL and bilingual workshops at the time when Highpoint was being introduced as a new kind of curriculum. He has been through cultural proficiency training and some SEED training. Last year he attended a workshop on anti-racism, but it did not deal specifically with ELL students, it instead dealt with different populations of students and their perspectives on racism.

He stated that he studied Spanish in high school and sign language in college. He can understand a little bit of Spanish when he is talking to parents. Many times, he also understands a little when talking to students, while students do not perceive him as being able to understand them. He did not have the opportunity to travel abroad. He was born in England and was brought the United States as a child, where he has spent most of his life. He traveled back to England a couple of times when he was young, but he has not traveled anywhere else.

In his opinion, the biggest challenge he faces as an administrator is the diverse range of students and trying to meet their specific needs. In so doing, he believes that is very difficult to evaluate the English level of ELL students in order to place them in the correct classes and then, being able to provide them with the necessary skills for them to be at grade level.

*Principal School G*

Principal of school G identifies himself as a White male, and he has been a principal for the last 8 years. Before he became a principal, he was an assistant principal for 3 years. He dealt with discipline and oversaw programs that the students had

throughout the day. However, he did not act as an instructional leader when he was a vice-principal because it was not part of his job description. Before becoming a vice-principal, he was a teacher and taught environmental science, general science, and agricultural science for 5 years to $8^{th}$, $9^{th}$, $10^{th}$, $11^{th}$, and $12^{th}$ graders. When he was a teacher, he had few students who had language barriers. As he moved from teacher to administrator, he moved into a more populated area where there was more diversity. His school had an ELL coordinator who advised him as an administrator to deal with issues concerning ELL students.

This is his first year in California since he relocated from another state, and he was aware of the challenges of moving from one state to another. However, he was a principal for 7 years in another state, and he said he understood what it means to be a principal, though he also said that the terminology is a little different. He anticipated that in California there would be language issues and challenges regarding how to deal with them.

In his opinion, what the federal government is trying to do with No Child Left Behind certainly highlights certain populations of students and gets school leaders and teachers to see what they are doing well, what they are not doing well, and what they have to do in order to make students to perform better in their schooling process.

He participated in professional development about diversity and multiculturalism when he was living in another state but he has not yet participated in any professional development in California. The professional development he participated in was provided by the school district several times throughout the school year. However, since he was in

an administrative role, he did not gain hands-on practical aspects of dealing with the

students in the classroom. He was mainly there for the instruction given to a large group

of teachers.

He studied two years of German when he was in high school. He had the

opportunity to travel abroad. He traveled to Mexico and Europe. In Europe, he traveled in

France, England, Austria, Italy, Spain, and Netherlands.


*Principal of School H*

Principal of School H considers herself a White woman, third generation

American. She was a vice-principal for 7 years at MVHS, SJHS, and RMHS. Before that,

she taught French and English at MVHS for 16 years. She has been a principal for the last

2 years.

Before she became a principal, she thought that some of the challenges for her as

a principal would be parents appealing disciplinary actions and being unhappy with

grades given to their children. Another challenge she anticipated was coordinating a site

plan for school improvement that addresses individual, departmental, and school-wide

needs. While her perceptions did not change much, the added dimension at BVHS is the

multiple parent groups, which often view themselves as in charge of school programs.

While she has studied Spanish and some Italian, she does not speak much

Spanish, with only a basic level of communication in this language. For example, she can

call parents and tell them that their son or daughter is suspended for three days for

fighting, and if they respond  in Spanish she knows how to say  *"Lo siento mucho pero no*

*comprendo",* which means *"I'm sorry but don't understand."* She also had the opportunity to travel abroad. She traveled to Canada, Mexico, France, Denmark, Germany, Sweden, Switzerland, Italy, Belgium, Philippines, Korea, and Hong Kong.

She participated in professional development training such as multicultural or diversity courses and workshops to prepare her to address the learning needs of ELL students. For example, several years ago, she participated in the credential program SB395, which provided in-service training related to content, administration, and expectations for teachers of English learners. She also participated in the Seeking Educational Equity and Diversity (SEED) training, which is a seminar that focuses on issues of equity and multicultural curriculum.

As a former language teacher, she was surprised by the number of teachers and community members who expect ELL students to cope with the English language, and she was saddened by the general community's perception that immigrant students do not belong in her school.

Inductive Data Analysis

The qualitative analysis of this data was conducted by the use of an inductive approach (Hatch, 2002), which provided thick description of school leaders' perceptions concerning their ELL students. The responses to these questions were categorized based on emergent sub-themes. Table 16 shows the sub-themes that emerged from the open-ended questions of the interviews and surveys.

Table 16

Sub-themes that emerged from open-ended questions from the interviews and surveys

| Sub-themes | Interviews | Surveys | Total |
|---|---|---|---|
| Professional Development | 17 | 13 | 30 |
| Training | 21 | 18 | 29 |
| Staff Development | 10 | 11 | 21 |
| | | | |
| Instruction | 25 | 26 | 51 |
| Best Practices | 21 | 14 | 35 |
| Strategies | 14 | 21 | 35 |
| Differentiation | 20 | 22 | 42 |
| | | | |
| Curriculum | 31 | 20 | 51 |
| Standard-based Instruction | 15 | 14 | 29 |
| Standardized tests | 21 | 16 | 37 |
| | | | |
| Mathematics is universal | 15 | 18 | 33 |
| Same Procedures | 10 | 12 | 22 |
| Same Numbers | 11 | 10 | 21 |
| | | | |
| Cultures | 44 | 35 | 79 |
| Cultural background | 24 | 18 | 42 |
| Culturally | 22 | 11 | 33 |

The sub-themes that emerged from these two sources of qualitative data were organized in thematic categories and represent a rich description of how high principals and vice-principals perceive ELL students in their high schools. Once these themes were identified, interview transcripts and responses to survey open-ended questions were again reviewed to code statements belonging to these themes. In so doing, the researcher immersed in those data, explored many potential categorizations of meaning suggested by the data, and then revisited the processes to ensure the validity of this categorization (Hatch, 2002). In this regard, Johnson and Christensen (2004) stated that researchers need

to immerse "in the details and specifics of the data to discover important patterns, themes, and interrelationships; [this process] begins by exploring, then confirming, guided by analytical principles" (p. 362). Table 17 shows the thematic categories used to organize the qualitative sub-themes.

Table 17

Thematic Categories

| | Thematic Categories | | | | |
|---|---|---|---|---|---|
| Qualitative Measure | Professional Development | Instruction | Curriculum | Universality of Mathematics | Cultural Perceptions |
| Interviews Open-ended Questions | 48 | 80 | 67 | 36 | 90 |
| Surveys Open-ended Questions | 42 | 83 | 50 | 40 | 64 |
| Total | 90 | 163 | 117 | 76 | 154 |

Qualitative Themes

Based on the 24 open-ended interview questions and 10 open-ended questions of the online surveys, five qualitative themes were identified. These themes are Professional Development, Instruction, Curriculum, Universality of Mathematics, and Cultural Perceptions.

*Professional Development*

The quantitative data show that out of the 26 respondents, 22 (84.61%) reported that they had received professional development training such as multicultural and diversity courses or workshops that prepared them to address the learning needs of their ELL students and 4 (15.39%) indicated that they did not participate in staff development activities concerning these issues. In this context, 6 principals (100%) and 16 vice-principals (80%) reported that they had received professional development concerning diversity and multicultural education although not specifically for ELL students, while 4 vice-principals (20%) reported that they never received professional development in this area. Figure 16 reports the participation of principals and vice-principals in professional development that addresses the needs of ELL students.

Figure 16. Participation of principals and vice-principals in professional development that addresses the needs of ELL students
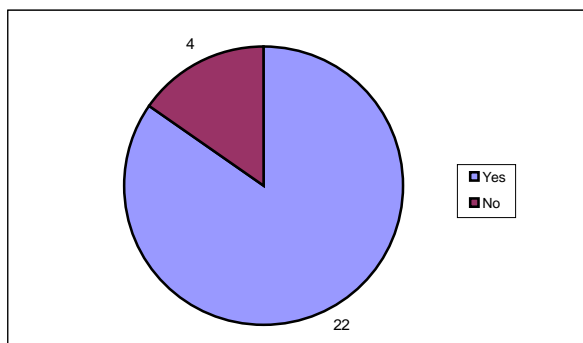


Schools leaders participated in professional development related to Cross Cultural, Language, and Academic Development (CLAD); Cultural Proficiency, Seeking

Educational Equity and Diversity (SEED); Culture of Poverty, Specially Designed

Academic Instruction in English (SDAIE); Multiculturalism; Best Practices; and others

such as World of Difference, Communication, Cultural Norms, and Courageous

Conversations. In this context, figure 17 reports the frequency of each type of

professional development mentioned by the participants in this study.

Figure 17. Types of Professional Development
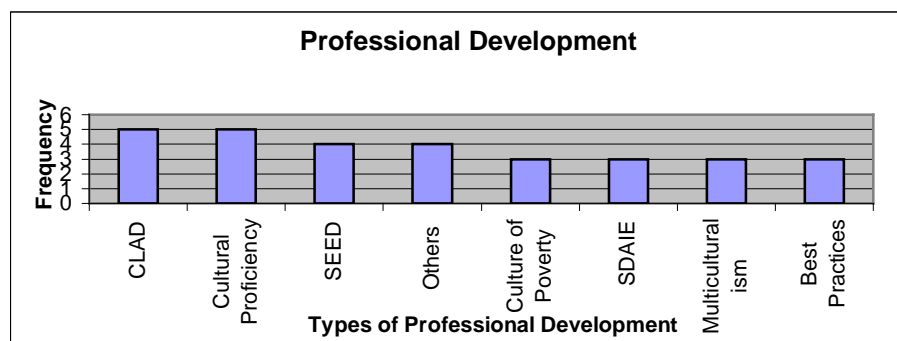


Of the 26 respondents, 22 (84.61%) reported that they need professional

development in order to help them to address the needs of culturally diverse students as

well as to deal with the challenges associated with the academic performance of ELL

students. Of the 22 school leaders, 17 (65.38%) agree and 5 (19.23%) strongly agree that

they need professional development that addresses the issues of ELL students. Four

(15.39%) participants disagree that they need to participate in professional development

in this area. Data analyses suggest that this may be related to their participation in

trainings offered by the school district, which addressed some of the issues concerning

ELL students. Figure 18 reports the need for professional development for principals and

vice-principals that deal with the challenges associated with the academic performance of ELL by addressing their specific needs.

Figure 18. The need of professional development for principals and vice-principals that addresses the specific needs of ELL students
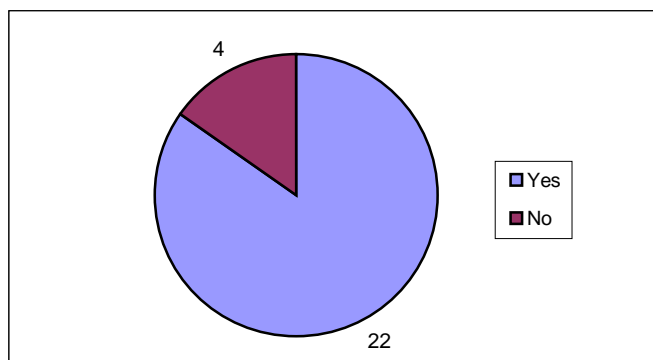


This theme emerged as the one that occurs across most of the respondents' experiences with ELL students. Few school leaders reported that they participated in professional development specifically addressing the specific needs of ELL students.

School leaders expressed their need and willingness to learn more about the various students' cultural groups represented in their schools by participating in professional development that helps them to address the specific needs of ELL students. In this regard, the quantitative data show that there was a strong positive correlation between school leaders being knowledgeable about the various cultural groups represented among the students in their schools and their necessity to participate in professional development that helps them to address the needs of ELL students by helping them to deal with the challenges associated with their academic performance on

standardized high-stakes tests in mathematics (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.866, p = 0.000, N = 25). In other words, in this study, school leaders pointed out that they need additional professional development that provides them with tools and strategies to better serve their ELL population.

As instructional leaders, participants in this study should be provided with professional development opportunities that reflect the vision and expectations of the school district and each of the participants' schools. Professional development needs to focus on empowering leadership throughout the school in order to create a positive school culture and climate that benefits all students, especially ELL students. Looking through the lens of structural and human resource leadership frames, the data show that ongoing and consistent staff development needs to occur in order to foster highly qualified and trained school leaders is an imperative part of an effective school leadership (Joyce & Showers, 2002). In this regard, Cohen and Hill (2001) found that teachers whose learning focused directly on the curriculum were the ones who adopted the practices taught in their professional development. These teachers embraced new curriculum materials when they were supported by leadership and relevant training. Their study also showed that students of teachers who participated in this curriculum-focused professional development did well on standardized assessments. Thus, one principal affirmed, "Professional development helps us to bring ELL students up to the level playing field of the American society. We must do everything within our power to help them to achieve that goal."

*Instruction*

Instruction was identified in the qualitative data as a general approach to selecting and sequencing learning activities that achieve ELL students' learning. Instruction was the most frequent theme with 163 occurrences.

Pedagogical best practices were found to be a valued concept by school leaders in this study. They voiced concern and a need for academic support, differentiation, and collaboration with the teachers. In this study, school leaders believe that the instructional approaches that best work for ELL students are those of pairing strong language students with new-comers, modeling, visual and reading contextual clues, decoding, understanding the culture of ELL students, and checking for understanding, focus on individual student progress and instructional levels, front-loading information, and scaffolding. As evidenced by interviews and open-ended survey questions, school leaders believe that teachers need to implement instructional practices through the use of pedagogical approaches such as ELD, SDAIE, CLAD, SIOP, differentiating instruction, and personalization as well as providing ELL training in order to access ELL students' previous knowledge. However, one school leader affirmed:

> I cannot answer if these pedagogical approaches are really working well for ELL students. I only know what has been tried in my school and I cannot say if it has worked. I am only going on what the research says. I am not even suggesting that our teachers are using one or any of the approaches that I named.

According to the school leaders, one of the best instructional strategies is to place students into groups or paired activities. Yet, they agree that this strategy works best

when all students are incorporated into the interaction of the group and participate in productivity. Unfortunately, in their opinion, some ELL students who are either in a silent period in their acquisition of English or are personally or culturally reticent may not be willing to participate. Other students may respect the apparent shyness, which holds the ELL students' learning back. In this regard, one school leader argued, "Teachers may not be cognizant of this cycle of behavior, but if they are, the result is usually excellent when the ELL student contributes to the group activity."

In general, school leaders believe that personalizing instruction[21] provides more meaning to the subject matter because students are more equipped to make the connection between theory and application. In their opinion, when differentiating instruction occurs, teachers are calibrating instruction and students are still able to meet the learning objectives. They also believe that the SIOP model has great potential as an instructional approach for ELL students because it is direct instruction and provides opportunities for the interaction between teacher and students. They also pointed out that checking for understanding is a critical instructional practice that helps ELL students to better understand the content as well as independent thinking and learning.

In their opinion, teachers also need to use a comprehensive framework for delivering academic instruction for ELL students. One of these frameworks is the Sheltered Instructional Observation Protocol (SIOP) model, which aims to improve ELL students' subject matter comprehension by adapting speech to their language proficiency levels

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[21]Keefe and Jenkins (2000) stated, "Instruction is personalized when it: (a) focuses specifically on the needs, talents, learning style, interests, and academic background of each learner, and (b) challenges each learner to grow and advance from where he or she is at a given point in time to a point beyond. (p. 97)."

using a variety of instructional techniques so that students have adequate support as they work on complex tasks.

One of the important steps for ELL students of the SIOP teaching content is to build students' background knowledge before teaching content by linking concepts to students' personal, cultural, or academic experience. In this study, the quantitative data reveal that there was a very strong positive relationship between the need for ELL students to maintain their cultural background while becoming acclimated to the mainstream culture and school leaders' validation of the cultural perspectives ELL students bring to their schools (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho 0.928, p = 0.000, N = 26). This assertion allows for the validation of ELL students' mathematical knowledge in the mathematics classrooms through the elaboration of specific tasks and activities, which allow them to formalize mathematical concepts through a deeper understanding and comprehension of the mathematical vocabulary. Language differences can be put to use to help students to learn mathematical concepts. In this context, the data show that school leaders believe that teachers should allow extra time for ELL students to perform given tasks and activities because they need more time to understand both the language and mathematics components of a lesson.

The qualitative data also show that the participants in this study support the assumption that not all students are alike and recognize that teachers need to be provided with specific professional development to offset varying students' abilities by differentiating instruction. Based on this knowledge, differentiated instruction is an approach that applies to teaching and learning mathematics so that students have multiple

options for taking in information. In so doing, differentiating instruction is a teaching methodology that is based on the premise that instructional approaches should vary and be adapted in relation to the diversity that is present in classrooms. The qualitative data further support the proposition that differentiating instruction can be effective if it recognizes students varying cultural background, knowledge, language, and their preferred learning styles. One school leader stated, "It is necessary to include differentiation as an instructional strategy in order to access students' different learning styles and their individual level of understanding." In this perspective, by focusing upon student's cultural backgrounds interpretations of mathematical concepts, the curriculum can build upon the pre-existing foundation of knowledge owned by the students. Students can then develop their understanding of mathematics within their cultural background and their motivation to learn.

Participants in this study believe that instructional practices that are effective for ELL students are also good for all students. All students can benefit from clear explanations supported by visual aids and from direct instruction supplemented by opportunities for practice. However, in their opinion, teachers need to differentiate instruction for ELL students in order to accommodate various levels of language acquisition (Genesee, Lindholm-Leary, Saunders, & Christian, 2006). In this regard, a serious consideration of culture coupled with differentiated instruction offer the opportunity for more depth for culturally sensitive teaching. Bennett (1986) emphasized the value of this pedagogical strategy because it is an "approach for understanding individual differences among ethnically different students. The assumption is that

everyone can learn, provided teachers respond appropriately to individual learning needs" (p. 97).

According to the participants, teachers need to modify the delivery of the mathematics curriculum to best meet the needs of their students. The quantitative data reveal that there is a very strong positive correlation between school leaders' belief that teachers need to modify the delivery of the mathematics instruction according to the language proficiency level of ELL students and school leaders helping teachers to identify and design curricular instruction that is adapted to the ELL students' cultural background (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient $= 0.917$, $p = 0.000$, $N = 24$). The data also show that ELL students need a modified curriculum because they are disadvantaged in their learning process in relation to their counterparts. In other words, ELL students' mathematics instruction is inadequate to their learning needs because they approach mathematical problem solving differently (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient $= 0.904$, $p = 0.000$, $N = 25$).

On the other hand, some school leaders stated, "There is no specific pedagogical approach for the work with ELL students since our ELL population is very small." In this regard, another school leader stated:

> I just give the names to teachers who have these students for awareness and ask them to work individually with these students to address their particular areas of weaknesses. In this case, only individual teachers are addressing the specific needs of our ELL students.

Individual teachers work with each student on targeted areas of weakness. I expect students to seek additional help if necessary.

In this study, the quantitative data show that 10 (38.46%) school leaders from schools with a small percentage of ELL students expressed their concern with this situation as stated by one principal, "I have created an English Learner support class and clustered our lowest levels of English learners with that support teacher in their English class." Another school leader stated, "This year we are looking at our ELL population and how we can help them be academically successful." Along this line, another school leader affirmed, "This is our first year offering a non-native English course as an additional support." Another concern expressed by some school leaders is that "there is some inconsistency in how ELL students are taught by classroom teachers."

*Curriculum*

The prior knowledge and experience students bring with them to school has a powerful influence on how they interpret and learn the mathematics taught in school. Valuing and building on students' previous mathematical knowledge and cultural aspects of their everyday experiences is an important component of the mathematics curriculum (Rosa, 2005). In so doing, studying how students use mathematics in their everyday activities is an important tool for educational practice.

Thus, in order to build on the previous understandings about mathematics ELL students bring with them to school, teachers need to understand and value everyday mathematical practices as well as the previous mathematical knowledge learners bring

with them to the classroom (D'Ambrosio, 2001; Ladson-Billings, 2001; Sleeter, 1997; Tate, 1997). Everyday activities serve as models for classroom-based instruction that builds on students' natural motivation and helps students to see the real-world application of the mathematics taught in school (Rosa & Orey, 2007). In this regard, the quantitative data show that there is a very strong positive correlation between school leaders' perception about the relationship between culture and mathematics and their perception that ELL students are disadvantaged in their learning process because their mathematics instruction is inadequate to their learning needs (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.931, p = 0.000, N = 25).

The qualitative data from open-ended interview questions and open-ended survey questions support the assumption that school leaders believe that there is an infinite number of ways that teachers can fit into any school curricula given the different experiences that students bring with them. In their opinion, it is the teacher's responsibility to understand and know their students as well as understand and know what kind of pedagogical actions make them understand the material. They have to pull from their students' experiences or at least talk with them and know what their experiences are, so teachers are able to incorporate that into the curriculum. However, one school leader stated, "I do not think we are anywhere close to that, but I think that is an expectation we should have."

The quantitative data also show that 10 (38.46%) participants believe that weaving students' cultural background into any curriculum makes a more definite connection with the students because there is an appreciation shown for students'

interests and cultural backgrounds. In this regard, one participant in this study stated, "Bringing the richness of culture is important because it validates ELL students' own culture." Overall, school leaders agree that it is important to use culturally specific contexts in teaching and learning mathematics, which includes relevant examples from students' own culture and exposing them to a variety of cultural contexts. In this perspective, one school leader affirmed, "ELL students need a modified curriculum to improve their achievement in mathematics because their cultural background places a certain influence on their learning."

According to the participants, one of the weaknesses of the instructional curriculum design for ELL students is the lack of adopted textbooks that are standard-based and meet the specific needs of these students. Thus, in their opinion, ELL students are not progressing because they are not exposed to a more rigorous standards-based curriculum. In other words, ELL students must be exposed to pedagogical resources that are more aligned to state standards. Another weakness in this curriculum design is the lack of personnel as well as the mixed proficiency levels of the English language of ELL students in classrooms. In this context, school leaders believe that it is hard to individualize lessons for ELL students and give them the help they need to be successful in their learning.

In this study, participants agreed that a modified curriculum is needed in order to build ELL students' ability to move towards English acquisition by exposing them to a standard-based curriculum in which all students have access and learn the same curriculum. In this regard, the quantitative data show that there is a very strong positive

correlation between the necessity of ELL students to be provided with a modified

mathematics curriculum that improves their achievement in mathematics and the

challenges they face to demonstrate their mathematical knowledge in mathematics high-

stakes standardized mathematics testing due to their cultural background (Correlation is

significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.909, p = 0.000, N =

25).

On the other hand, some school leaders stated that they have no instructional

curriculum design in place for ELL students due to their small ELL population. For

example, one school leader stated that:

Our ELL population is smaller than any other school population. It is really so

small that we do not provide any specific focus to it. We do not have a

schoolwide focus to address the needs of ELL students, which is unfortunate

because they need to have access to the support they need to succeed in school.

In this context, another school leader stated, "At this point I have been

concentrating on identifying school wide areas needing improvement; while some areas

impact ELL students, none to date are aimed at that population specifically" while

another school leader affirmed, "With so few ELL students at the school, historically,

there has been a conscious choice to put improvement efforts into other necessary areas."

*Standardized Assessments*

Structures in place that assist in fostering school-wide effective instruction

include the use of mandated assessments, standard-based curriculum, and instruction.

Benchmark assessments serve as a means of accountability and provided data for school leaders and teachers to reflect on and guide their decisions. In this regard, the data is used to assist school leaders and teachers' decision-making about how to implement and modify instructional practices. In so doing, school leaders and teachers must be instructed on how to collect data, disaggregate data, and interpret data in order to provide a clear picture of what the students have learned, along with areas where students need additional support (Johnson, 2002).

According to the school leaders, in order to improve ELL students' achievement in mathematics, teachers need to teach to standards by implementing and applying strategies and pedagogical practices to enhance the curriculum and promote ELL students' achievement on standardized assessments. In order to achieve this goal, one school leader stated, "it is necessary to implement a focused curriculum aligned to the state standards."

School leaders also believe that ELL student's achievement gap is related to standardized tests. Even though they do not necessarily have a problem with standardized tests, they believe that these tests favor a certain type of students over others. Whereas school leaders understand that, there is a need for standardized tests in order to know how students are achieving and progressing towards the state standards, they also believe that these tests are very biased, especially in relation to ELL students, because they do not comprehend the context and the academic language of the problems. As stated by a principal, "ELL students need the academic language such as the use of mathematics vocabulary in word problems and rigorous instruction." Overall, school leaders agree that

ELL students need to be exposed to enough academic language to be successful on high-stakes tests in mathematics.

*The Universality of Mathematics*

There is a common perception that people have been using the same mathematical principles for thousands of years. Whether people are sailing a boat off the coast of California or building a house in India, they may be using mathematics concepts to perform basic daily activities. It has often been pointed out that despite the differences between cultures and languages; mathematics is the same all over the world. Some people may consider mathematics as a universal language because its principles, concepts, and foundations are the same everywhere around the world. For example, one school leader stated, "Mathematics is a universal language and is more easily adaptable to the achievement of ELL students because its concepts and procedures are the same in all cultures."

The United States is the only industrialized nation in the world that does not use the metric system in its commercial and standards activities, although the metric is universally used in science and increasingly in medicine, government, and many sectors of industry. However, many people may argue that no matter what kind of measurement units they are using, people must measure the houses they are building. In other words, houses with different shapes such as square, rectangular, and round houses are built by using the same mathematical concepts and equations. They also argue that the principles of probability are the same. For example, it is well known that the chance of rain in the

Atlantic Forest in Brazil is greater than the chance of rain in the Atacama Desert in Chile

because probability follows the same mathematical formulas.

People often state that mathematics is a universal language. However, according

to the review of literature developed in this study, neither mathematical notations nor the

terms attached to these notations are universal. The procedures students use often differ

from those taught in schools, although they may share underlying mathematical

principles that form the basis of school instruction (Nunes, 1995; Rosa & Orey, 2007). In

this study, the quantitative data reveal that there was a very strong positive correlation

between school leaders' belief that there is a relationship between culture and

mathematics and school leaders' belief that ELL students approach mathematical

problem-solving than non-ELL students due to their unfamiliarity with the cultural

context of the mainstream society (Correlation is significant at 0.01 level (2 tailed) -

Spearman's rho coefficient = 0.911, p = 0.000, N = 25). Moreover, mathematical ideas

and practices, which were developed through practice, from generation to generation,

may seem to be natural to one culture while it may seem to be complicated when applied

to other cultures.

In this context, one approach to understanding the development of students'

mathematics knowledge derives from the work of Vygotsky (1978), who examined the

social and cultural aspects of students' mathematical thinking. According to Carraher

(1989), "mathematical knowledge is not the result of the unfolding of cognitive

development but a cultural practice in which people become more proficient as they learn

and understand particular ways of representing numbers" (p. 320), quantifying, and

operating with these numbers. From this perspective, students develop mathematics knowledge that reflects the activities and practices in which they participate as well as the cultural tools such as number systems, algorithms, and procedures that they use to solve problems (Goodnow, Miller, & Kessel, 1995; Saxe, 1991).

The argument for the universality of mathematics lies in stating that mathematical procedures and numbers are universal. In this regard, on school leader stated, "Teachers may use different cultural examples in their instruction, but mathematical procedures are the same." The underlying mathematical principles may be universal as well as its quantities and structures. In other words, if people come to solve a difficult mathematical problem for the first time, they may in principle rediscover all the underlying mathematical principles by themselves and then use that understanding to help to determine the solution of that specific problem. Along this line, school leaders believe that mathematics is a subject that is easier for ELL students to grasp because it deals with numbers. Klein and Starkey (1988) highlighted the universals in students' mathematical thinking. They also suggested that a "number is a natural domain of human knowledge" (p. 6).

According to this perspective, school leaders in this study believe that ELL students perform better in mathematics than in English because in their opinion "mathematics is universal and numbers are the same in all cultures." Table 18 shows the performance of ELL students in English Language Artes on CST in the nine high schools at AUSD.

Table 18

Performance of ELL students in English Language Arts on the California Standardized

Testing 2008-2009

| English Language Arts – CST 2008-2009 | | | | | | |
|---|---|---|---|---|---|---|
| | Total | Not Proficient | % Not Proficient | Proficient | % Proficient | Absent |
| School H | 7 | 03 | 42.86% | 1 | 14.28% | 3 – 42.86% |
| School F | 10 | 10 | 100.00% | 0 | 0.00% | 0 – 00.00% |
| School I | 18 | 15 | 83.33% | 1 | 5.56% | 2 – 11.11% |
| School B | 19 | 19 | 100.00% | 0 | 0.00% | 0 - 00.00% |
| School C | 121 | 117 | 96.69% | 1 | 0.83% | 3 - 02.48% |
| School A | 23 | 21 | 91.30% | 1 | 4.35% | 1 – 04.35% |
| School E | 91 | 84 | 92.30% | 4 | 4.40% | 3 – 03.30% |
| School D | 113 | 113 | 100.00% | 0 | 0.00% | 0 – 00.00% |
| School G | 23 | 19 | 82.61% | 4 | 17.39% | 0 – 00.00% |
| Total | 425 | 401 | 94.36% | 12 | 2.82% | 12 – 2.82% |

Source AUSD

Table 19 shows the performance of ELL students in Mathematics on CST in the

nine high schools at AUSD.

Table 19

Performance of ELL students in Mathematics on the California Standardized Testing

2008-2009

| Mathematics (Algebra I, Algebra II, Geometry, HS Summative) – CST 2008-2009 | | | | | | |
|---|---|---|---|---|---|---|
| | Total | Not Proficient | % Not Proficient | Proficient | % Proficient | Absent |
| School H | 5 | 02 | 40.00% | 01 | 20.00% | 2 – 40.00% |
| School F | 10 | 09 | 90.00% | 01 | 10.00% | 0 – 00.00% |
| School I | 11 | 08 | 72.73% | 02 | 18.18% | 1 – 09.09% |
| School B | 11 | 09 | 81.82% | 02 | 18.18% | 0 – 00.00% |
| School C | 73 | 64 | 87.67% | 08 | 10.96% | 1 – 01.37% |
| School A | 16 | 16 | 100.00% | 00 | 00.00% | 0 – 00.00% |
| School E | 56 | 37 | 66.07% | 18 | 32.14% | 1 – 01.79% |
| School D | 107 | 98 | 91.59% | 09 | 08.41% | 0 – 00.00% |
| School G | 11 | 03 | 27.28% | 08 | 72.72% | 0 – 00.00% |
| Total | 300 | 246 | 82.00% | 49 | 16.33% | 5 – 01.67% |

Source: AUSD

Tables 20 shows the performance of ELL students on CAHSEE, in English

Language Artes and Mathematics in the nine high schools at AUSD. According to this

context, one school leader stated, "Once students decode some of the mathematical terms,

they are able to solve most of the problems present on high-stakes standardized

assessments."

Table 20

Performance of ELL students in English Language Arts and Mathematics: CAHSEE
2008-2009

| | #ELL Students | Mathematics Passing | % Passing | #ELL Students | English Passing | % Passing |
|---|---|---|---|---|---|---|
| | | | CAHSEE – Grade 10 – 2008-2009 | | | |
| School H | 2 | 0 | 00.00 | 2 | 0 | 0.00 |
| School F | 4 | 1 | 25.00 | 4 | 2 | 50.00 |
| School I | 2 | 0 | 00.00 | 2 | 0 | 00.00 |
| School B | 6 | 1 | 16.67 | 6 | 2 | 33.33 |
| School C | 38 | 20 | 52.63 | 39 | 13 | 33.33 |
| School A | 10 | 1 | 10.00 | 10 | 5 | 50.00 |
| School E | 32 | 23 | 71.88 | 33 | 13 | 39.39 |
| School D | 10 | 4 | 40.00 | 09 | 6 | 66.67 |
| School G | 46 | 20 | 43.48 | 45 | 8 | 17.78 |
| Total | 150 | 70 | 46.67 | 148 | 49 | 33.11 |

Source AUSD

The results from the 2008-2009 school year standardized high-stakes tests for
ELL students in the nine high schools at AUSD appear to validate the participants'
perception about this issue. In this regard, Abedi and Dietel, (2004) affirmed that the
CRESST (National Center for Research on Evaluation, Standards, and Student Testing)
studies "have repeatedly shown that English language learners perform substantially
lower on language arts tests compared to mathematics and science tests" (p. 2).
Additionally, the findings of the CRESST studies suggest that low ELL students'
language ability decreases ELL students' performance on standardized high-stakes tests,

thus influencing the test as an accurate measure of ELL students' content knowledge. In so doing, these tests become a measure of two skills for the ELL students: subject and language (Abedi & Dietel, 2004).

In this study, the quantitative data show that there is a very strong positive correlation between school leaders' perceptions that mathematics is a universal language and its procedures are the same in all cultures and their perception that the culture of ELL students plays an important role in their academic success in mathematics (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.955, p = 0.000, N = 25). For example, one school leader pointed out that if "ELL students come already educated in their native country, then there is no reason that the language of mathematics cannot transfer easily into mathematics class. This may happen because of the universality of the mathematics."

On the other hand, support for universals in students' developing mathematical reasoning may come from research documenting substantial and similar mathematical understanding in students' different subgroups that vary by race and social class (Ginsburg & Baron, 1993) and across groups of students from diverse cultures (Guberman, 1996; Saxe, 1991; Song & Ginsburg, 1987). At the same time, differences in students' mathematics achievement in school are mirrored to some extent by differences in students' different social classes and cultural backgrounds (Secada, 1992; Stevenson & Stigler, 1992; Tate, 1997).

*Cultural Perceptions*

Researchers have offered a variety of explanations for differences in the school achievement of students from different cultural backgrounds (Gutstein, Lipman, Hernandez, & de los Reyes, 1997; Pellegrini & Stanic, 1993). Common sources of group variation in the mathematics achievement of students include the rigor and structure of the mathematics curriculum; the expectations and attributions for success that students, parents, school leaders, and teachers possess; discontinuities between home and school; and cultural values about mathematics and schooling (Ladson-Billings, 1997; Stevenson & Stigler, 1992). Along these lines, one school leader stated that:

> I taught ELL students when I first started teaching. I had to understand the different cultural aspects of my students in order to best serve them. What our culture calls defiance is considered respect in theirs. For example, my students from China never made eye contact; or my students from India called me "teacher" instead of Mr. Whatever. That was their way of being respectful. In our culture, it is viewed as the opposite.

In this study, the qualitative data from open-ended interview and open-ended survey questions show that school leaders believe that mathematics is highly valued in cultures in Asia, Europe, and South America. In their opinion, students from these regions tend to have a much more advanced understanding of mathematics than their American counterparts. In this regard, one school leader argued, "If certain cultures have established a disciplined approach for life in general or an attitude about the value of

schooling and mathematics in particular, then there is a predisposition for students of that culture to perform well in mathematics." Another school leader stated:

> Some cultures place more importance on education than others. If teachers understand that, it may help them understand what is going on with their students, what is going on at their homes, where the students' priorities are, and why they are not doing the work they suppose to do.

In the opinion of these school leaders, members of certain cultures value education more highly than the members of other cultural groups and that they use different mathematical procedures for solving problems. One school leader stated, "This may lead to measurable, however, slight differences in the performance of ELL students in standardized tests in mathematics."

On the other hand, these school leaders do not seem to be aware of the cultural background of their ELL students and the influence it has on their performance on standardized high-stakes tests in mathematics. The quantitative data reveal that there was a strong positive correlation between school leaders' perception that there is a relationship between culture and mathematics and the school leaders' perception that the cultural background of ELL students does not influence their performance on mathematics standardized high-stakes tests (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.886, $p = 0.000$, N = 25). In this regard, school leaders believe that language and cultural background are not factors impeding ELL students' achievement. Therefore, these school leaders believe that ELL students can

achieve high academic standards in mathematics if they are provided with effective

pedagogical strategies.

In the opinions of school leaders, ELL students work harder on standardized tests

because they know that there is a language barrier they have to overcome, yet they often

feel frustrated with these tests due to their weak linguistic skills. One school leader stated,

"While standardized tests may be difficult for ELL students, it does not mean they are not

trying their best." In their opinion, ELL students have great difficulty in understanding

many items of the standardized tests due to cultural differences. One school leader stated,

"Standardized tests are administered through the cultural lens of the host country.

Idiomatic expressions and cultural references are universal obstacles for ELL students."

However, school leaders acknowledge that standardized high-stakes tests are not fair to

ELL students. Along these lines, the quantitative data reveal that there was a very strong

correlation between the perception of school leaders that there is a relationship between

culture and mathematics and school leaders' perception that the gaps in ELL students'

performance are partly due to the impact of language factors on mathematics

standardized assessments (Correlation is significant at 0.01 level (2 tailed) - Spearman's

rho coefficient = 0.803, p = 0.000, N = 25).

From the perspective of the school leaders in this study, parental expectations

consistently have strong effects on ELL students' performance and attitudes towards

mathematics. For example, one school leader stated, "Home and parents' influence play a

high role in how students perceive and value mathematics." The qualitative data from

both the open-ended interview questions and open-ended survey also show that one of the

biggest challenges currently faced by the school leaders is to break the barriers between teachers and their ELL students in the teaching-learning process. In this regard, one principal stated that:

> One barrier is the belief that the gap between the student and the teacher is too big to allow for the small daily interaction that teachers typically enjoy with their students. In my opinion, this does not help the development of relationships, which bridge other gaps for students in the teaching-learning process. Therefore, the outcome is that teachers do not make the effort to connect in those small daily doses of relationship with their ELL students, keeping the gap distinct and wide. From a sociological point of view, it is interesting to see how the few teachers who do make the effort tend to be surrounded by ELL students during down times, like at lunch or after school.

In this context, in the participants' opinion, the barrier between teachers and ELL students may exist because often school leaders and teachers do not acknowledge the diversity of the students in their schools and classrooms. One principal stated:

> The understanding of the teachers about the ethnic diversity of the students in our school is not evident. Therefore, they might not know how to deal with students who have limited proficiency in English or a different cultural background. In my opinion, that limits the kind of education students can get or what they can learn.

Offering another point of view, Bennett (1986) affirmed that school leaders and teachers cannot ignore the influence of culture and language on the teaching-learning process. In general, even though school leaders and teachers acknowledge that ELL

students perceive numbers, symbols, and signs differently according to their own cultural background, the mathematical procedures, operations, and sequences are the same in all cultures. For example, one school leader stated, "I believe that mathematics is about problem solving and does not have much to do with culture." Another school leader argued, "I believe in a right and left brain theory and I do not believe that mathematics is affected by culture."

On a positive note, the data revealed that school leaders have high expectations for ELL students and these expectations are not limited by their cultural orientations, which may contribute to the academic success of students who are guided by another cultural orientation. In this regard, one school leader stated, "I believe every student, independent of cultural background, can be successful in mathematics."

Cultural differences can inhibit the attempts of school leaders and teachers to communicate effectively with students, even though the content may be something otherwise easily learned. One school leader stated, "I believe cultural uniqueness is a factor of one being able to communicate effectively what has been learned and the reverse is also true." However, school leaders believe that ELL students are able to communicate with their mathematics teachers because they have a better understanding about the mathematics language. In this context, a principal affirmed that:

> I have not had a chance to take a look at my specific ELL students. I believe that
> there is a better chance for them to perform better in mathematics than in English.
> My guess is that mathematic principles are part of what they were taught when

they came to the United States so they understand mathematics because it is also important within their culture.

Addressing the Research Questions

In order to analyze the results of this study, the researcher used the median because according to Muijs (2004), it "is the best measure of central tendency for ordinal variables" (p.110). The range was also used to measure the dispersion of the values around the central value (Trochim & Donnelly, 2007). Frequency distributions graphs were used to summarize the data in order to "present quantitative descriptions in manageable form" (Trochim & Donnelly, 2007, p. 264). In this regard, the features of the data for each research question were described by using frequency distributions, median, and range.

According to Muijs (2004), it is not possible to measure the distance between the 4-point Likert scale points (strongly disagree, disagree, agree and strongly agree). In so doing, in this study, responses to a single answer were treated as ordinal data because the researcher could not assume that respondents perceived the difference between adjacent levels of the Likert scale as equidistant unit measures.

*The Median*

The median is the physical center of the distribution. It is also the value in the middle when the values of the distribution are arranged sequentially. In this study, most

of the scores in the distribution of each survey question were clustered about the center of each median value.

*The Range*

The range for each survey question, that is, the dispersion among the values in the distribution of each survey question was tightly clustered around the center of each distribution, which means that it is a good indicator of the central tendency of the data.

*The Missing Data*

It is also important to highlight that in the survey used in this study, 15 questions had no missing data and each one of the remaining 15 questions had less than 10% of missing data. Twelve questions had 1 (3.84%) missing datum and 3 questions had 2 (7.69%) missing data. According to Beaton (1997), less than 10% of missing data does not make much difference in the parameter estimates and the sample statistics. In other words, in this study, there is no gap in the representations between the sample and the targeted population and consequently there is no threaten to its validity.

Research Question 1

What are the general perceptions of high school principals and vice-principals in relation to their ELL population?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative 4-point Likert-scales survey questions 1, 2, 3, and 4 were used to answer

research question 1. The quantitative data reveal that there is a strong correlation between survey questions 1 and 3 in which school leaders believe that ELL students need to maintain their cultural background while becoming acclimated to the mainstream culture and the validation of the cultural perspectives and languages ELL students bring to their schools (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.928, p = 0.000, N = 26). The qualitative open-ended interview questions and open-ended survey questions show that school leaders need to know and embrace students' cultural differences. This will allow school leaders to encourage ELL students to enter mainstream culture without losing their own identity. In the opinion of the school leaders, this helps them to identify and consider a teaching-learning process that responds to the academic needs of their ELL students and validate the linguistic and cultural perspectives they bring to the school

*Survey Question 1: ELL students need to maintain their cultural background while becoming acclimated to the American culture.*

The quantitative data show that of 26 school leaders, 1 (3.85%) strongly disagrees, 17 (65.38%) agree, and 8 (30.77%) strongly agree with Survey Question 1. In other words, the data reveal that 25 (96.15%) school leaders believe that ELL students need to maintain their cultural background while acclimating to the American culture.

According to the school leaders, all students must be given the support they need in order to master the school curricula. However, in order to reach this goal, school leaders pointed out that they need to make connections with ELL students by helping

them to maintain their cultural background while acculturating the new culture. School leaders also stated that they need to help ELL students to understand how the school system works by breaking down their language barrier and helping them to meet their potential so they can be both academically prepared to have options upon graduation as well as to be prepared to succeed after high school.

*Survey Question 2: It is a priority for me to learn about ELL students' different cultural backgrounds.*

The quantitative data show that of 26 school leaders, 1 (3.85%) strongly disagrees, 2 (6.69%) disagree, 18 (69.23%) agree, and 5 (19.23%) strongly agree with Survey Question 2. In other words, the data reveal that 23 (88.46%) school leaders stated that it is a priority for them to learn about the ELL students' cultural background.

The qualitative data from open-ended interview questions and open-ended survey questions show that becoming familiar with the backgrounds and prior knowledge of ELL students allows school leaders to engage ELL students to participate in school experiences that connect with their diverse backgrounds, thereby building on their previous knowledge**.** In this regard, one school leader stated, "If ELL students feel scared and embarrassed, they are less likely to get involved in the school activities."

In this study, school leaders reported that they acquire knowledge about ELL students' cultural backgrounds through experience, observations, academic readings, and professional development opportunities. For example, in relation to observation and experience, one school leader reported learning as "a language learner in a different

country." Another school leader reported, "I was at a very diverse, underperforming school prior to this one." One school leader stated, "I have traveled extensively". In relation to academic readings, one school leader affirmed, "I also read extensively on this topic." In relation to professional development opportunities, one school leader reported, "the district offers courses every once in a while." Another school leader stated, "Our school district employed the services of a Cultural Proficiency company to train all administrators and managers" and another school leader reported that:

> I have attended over 25 different workshops over the 12 years I was in the classroom. As an administrator, I am always looking for ways to better assist my teachers in teaching culturally and linguistically diverse students. I participate in professional development; attend conferences, and read journals and books related to this area.

The qualitative data from open-ended interview questions and open-ended survey questions also suggest that the school leaders' experiences with ELL students may be linked to the size of their ELL population. In so doing, the school leaders' experience with ELL students is limited by the numbers of ELL students they serve. For example, one school leader reported, "Throughout my 33 years in education, I've not been around large populations of ELL students, especially the lower proficiency ones, so it has not been a priority until now." Another school leader stated, "In my credential program there was a diversity course, although it seemed worthless at the time." According to this school leader, it is necessary to look at the challenges faced by ELL students closely because due to the school district programmatic changes, including the closing of ELL

language centers, they are placing students who do not speak English for the first time in all schools. This school leader also affirmed that:

I am finding that our faculty members are not well prepared to teach ELL students in spite of their ELL credentials. We are unprepared and therefore it will take time to find what we need and then to proceed to improve along these lines. I believe we need professional development to be able to shift the pedagogy to see that there are other ways of instructing all students.

Regarding this issue, another school leader expressed the same concern about the closure of the language centers in the school district by stating that:

The school district is getting rid of ELL centers and putting the ELL students into the mainstream classroom. It is probably good that the school district gets rid of the centers because ELL students can experience what they need to within the classroom and teachers need to learn how to handle and work with these students.

These school leaders are also concerned about the challenges faced by teachers and students in this new educational environment. In their opinion, teachers may feel less comfortable in dealing with ELL students. They believe that the challenge is getting teachers to work with students with limited proficiency in English and getting them to do the work at a comfort level.

*Survey Question 3: I value the cultural perspectives and languages ELL students bring to school.*

The quantitative data show that of 26 school leaders, 1 (3.85%) strongly disagrees, 16 (61.54%) agree, and 9 (34.62%) strongly agree with the Survey Question 3. In other words, 25 (96.15%) school leaders stated that they value the cultural perspectives and languages ELL students bring to their schools.

The qualitative data show that school leaders perceive their students as valuable and important. Participants try to reach out and meet the needs of their students by knowing what their needs are. For example, one school leader affirmed, "It's one of my cornerstones that every single student has value. What I practice as a school leader is to look out for every student including my ELL students." In this context, most of the principals stated that they need to make sure that students, especially ELL students, feel comfortable by creating a climate where their cultural backgrounds and languages are valued and respected by the members of the school community.

Even though principals understand the necessity to access both cultures and languages for ELL students to perform in school activities, they also believe that all students, regardless of language, race, ethnicity, and cultural background, can be successful and learn in a supportive learning environment. This would be an environment in which they feel safe, where they do not feel judged, where there is high-energy, where they are interacting with all students as well as with the teachers, and where they make connections between learning and real-life.

*Survey Question 4: ELL students can achieve high academic standards in mathematics.*

The quantitative data show that of 26 school leaders, 1 (3.85%) strongly disagrees, 16 (61.54%) agree, and 9 (34.62%) strongly agree with Survey Question 4. In general, the school leaders in this study believe that all students can achieve high academic standards in mathematics, including ELL students. For example, one school leader stated, "All students are capable of high achievement when they apply themselves to their learning." In this regard, 25 (96.15%) out of 26 school leaders believe that ELL students are able to achieve high academic standards in mathematics. However, 3(11.54%) stated that they do not know enough about this issue in order to identify the factors that contribute toward ELL students' achievement in mathematics.

The qualitative data from both open-ended interview questions and open-ended survey questions show that school leaders believe that the factors that may contribute toward the achievement of ELL students in mathematics are trained teachers, instructional strategies, school district and community support, curriculum alignment to state standards, and students' engagement in school activities.

*Trained and Caring Teachers*

According to the participants in this study, in order for ELL students to be academically successful, they need highly trained teachers who participate in a collaborative departmental decision making process with shared curriculum and benchmark testing. Furthermore, teachers need ongoing training in CLAD techniques that encourage high expectations for all students as well as support and mentoring that

encourage them to adapt to different cultural points of view. The data analyses show that

teachers need to develop positive attitudes toward ELL students and need to use

strategies that make mathematics accessible to them. As well, teachers need support and

mentorship from the leadership that creates realistic and ongoing support mechanism that

enable ongoing professional development in regards to ELL students' issues. In this

regard, one school leader affirmed that it is important that teachers provide a "safe

atmosphere in their mathematics class that encourage ELL students' participation and

risk taking."

*Instructional Strategies*

In this study, participants affirmed that it is crucial to use a variety of instructional

strategies and best practices such as reciprocal and responsive teaching and

differentiating instruction as pedagogical practices that work best for ELL students. For

example, one school leader stated, "Students, with proper support through SDAIE and

CLAD strategies, are able to access important content found within mathematics

curriculum."

*School District and Community Support*

Participants in this study believe that support within the classroom environment

such as translators, collaborative time, one-on-one review, tutoring, and extra time

coupled with intervention such as after school tutoring provides a climate in the

classroom where ELL students are successful and whose culture is valued. In this study,

school leaders reported that this type of educational environment also supports the development of ELL students' mathematical thinking. On the other hand, five (19.23%) out of 26 school leaders pointed out that it is necessary to have support from home and from parents. These school leaders believe that it is necessary to encourage positive engagement of the parents of ELL students as well as to seek out other community members' support. These participants also believe that school leaders, teachers, parents, and students need to work together with the school community to determine what are the best programs, resources and pedagogical materials that help ELL students to be successful in mathematics.

*Curriculum Alignment to State Standards*

Overall, most of the school leaders affirmed that extracurricular resources, focused curriculum aligned to standards, and teacher-modified curriculum help ELL students to achieve high academic standards in mathematics. For example, one school leader affirmed, "I believe that adjusting teaching strategies and learning styles would be more effective and maintain universality and equality of instruction." In this regard, the quantitative data reveal that there is a strong positive correlation between the availability of resources that assist ELL teachers in their work with ELL students and school leaders' perception that teachers apply adequate pedagogical approaches in their work with these students (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.838, p = 0.000, N = 25).

*Students' Engagement in School Activities*

According to the participants' point of view, in order to be engaged in mathematics instruction, ELL students need to be motivated and believe that mathematics is important to them and useful in solving day-to-day problems. Participants also believe that students' ability level, aptitude, and attitude toward mathematics play an important role in their achievement of high standards in this subject matter. In their opinion, other factors such as language understanding, engagement in class activities, prior knowledge and experience related to the content, completion of homework, and discipline also helps ELL students to achieve higher standards in mathematics. For example, one school leader stated, "Most of our ELL students are enrolled in higher level mathematics classes alongside our general population and do very well."

Research Question 1A

What is the relationship between perceptions and teachers' approaches to the schooling of ELL students?

Qualitative open-ended interview questions and open-ended survey questions as well as quantitative Likert-scale survey questions 5 and 6 were used to answer research question 1A. The quantitative data revealed that there is a strong correlation between survey question 5, there are adequate resources available to assist ELL teachers in the instruction of ELL students, and survey question 6, teachers apply adequate pedagogical approaches in their work with ELL students (Correlation is significant at 0.01 level (2 tailed) - Spearman' rho coefficient = 0.838, p = 0.000, N = 25). The qualitative data from

both the open-ended questions interview and open-ended survey questions show that the majority of the school leaders believe that the school district does not provide adequate resources to assist them and teachers in their pedagogical work with ELL students. They also believe that the school district should develop a comprehensive plan to address ongoing training for school leaders and teachers in relation to the challenges faced by the ELL students.

*Survey Question 5: There are adequate resources available to assist ELL teachers in the instruction of ELL students.*

The quantitative data show that of 26 school leaders, 7 (26.92%) strongly disagree, 12 (46.15%) disagree, and 7 (26.92%) agree with Survey Question 5. In other words, 19 (73.07%) school leaders believe that schools do not have adequate resources to assist ELL teachers in the instruction of ELL students.

The qualitative data from both open-ended interview questions and open-ended survey questions show that school leaders believe that there are not enough resources available to assist teachers in their pedagogical work with ELL students. For example, one school leader stated, "There are no resources available. We do have a little bit of money because the school district gives funding by student but it is not enough to provide any kind of tutoring or any special services for our ELL students." Along these lines, another school leader stated that:

We do not have resources available to assist our teachers with their work with

ELL students. I do not think that ELL students have been a priority in the school

district at most sites. Now, it has become a priority based on the district's

Program Improvement Status as it relates to our ELL population.

School leaders also believe that even though there are enough instructional

materials at their disposal, the materials for ELL students still need to be appropriate to

meet their specific needs. From their point of view, there is a necessity for more

consistent professional development for the staff because research-based pedagogy must

be infused into the curriculum. The focus of professional development must be on how to

consistently build academic language across the curriculum, how to value what ELL

students already know and bring into the classroom and build on it, and how to use ELL

students as resources to plan their instruction. Ultimately, they expressed that it is

important to develop a comprehensive plan to address ongoing professional development

for staff.

Participants also pointed out that it is the human resource that is most needed in

this area. In their opinion, it is necessary to have more personnel available to work with

ELL students in order to make personal connections with them. In so doing, one school

leader stated, "Once these professionals lower that filter, then learning can take place." In

this regard, another school leader affirmed that there are "inadequate resources available

to address issues related to ELL students."

Overall, school leaders believe that there is a need to have a school-wide

pedagogical approach to working effectively with ELL students.

*Survey Question 6: Teachers apply adequate pedagogical approaches in their work with ELL students.*

The quantitative data show that of 26 school leaders, 4 (15.38%) strongly disagree, 16 (61.54%) disagree, and 5 (19.23%) agree with Survey Question 6. Only 1 (3.85%) school leader did not answer the question. On the other hand, 2 (7.69%) school leaders stated that they did not know enough about this issue to describe what kind of actions are necessary to make sure that teachers apply adequate pedagogical approaches with their ELL students and 1 (3.85%) school leader stated, "I have never thought about this issue." In this regard, the quantitative data show that only 5 (19.23%) of the 26 school leaders agree that their teachers use adequate pedagogical approaches with their ELL students while 20 (76.92%) school leaders do not believe that this assertion is true.

The qualitative data from both open-ended interview questions and open-ended survey questions show that these pedagogical approaches include but are not limited to scaffolding, differentiated instruction, graphic organizers, student-pair-share, modeling, vocabulary building, and the use of contextual clues. While some school leaders believe that effective teachers apply adequate pedagogical approaches automatically, most of them are not able to specify exactly what these teachers are doing in particular situations and why they apply a particular pedagogical approach. Therefore, school leaders expressed their concern that the expertise that some teachers possess is not transferable to other teachers and classroom situations.

One interesting finding from this study is related to the quantitative survey data that show that 20 (76.92%) out of 26 school leaders perceive that their teachers do not

use adequate pedagogical approaches with their ELL students. According to one school

leader, "In general, teachers strive to connect with their students through a variety of

approaches." However, according to the data from the open-ended questions from the

interview and survey, school leaders suggested that to modify this situation, it is

necessary to provide more professional development and ongoing support if teachers are

to acquire a broader range of instructional strategies that meet the needs of their ELL

students. For example, one school leader stated, "I do not think teachers feel that regular

approaches work, and they feel lost." Moreover, another school leader declared, "Most

of my teachers are at a loss when it comes to stepping outside of their normal

instructional strategies."

According to the school leaders in this study, it is necessary to find ways to

encourage teachers to take advantage of the training that is available to them, and then it

is important to find ways to help teachers to implement and refine the techniques they

learned in training. They also believe that teachers need to take the initiative to form

structures for collegial interaction to learn from each other during collaboration time.

They also emphasized that teachers should work with mentors who may be able to help

them to apply different pedagogical approaches to instruct their students.

From the point of view of the school leaders, a better curriculum is also needed to

build ELL students' ability to move towards English language acquisition while not

losing important mathematical content and instructional concepts because mathematical

learning depends on the ELL students' English language proficiency level. From this

perspective, school leaders agree that current and ongoing professional development that

focuses on strategies for ELL students must be incorporated into the mathematics curriculum.

In this context, school leaders admit that teachers have not received adequate training or support that allows them to acquire the cultural understanding to ideally present instructional materials to their ELL students. In their opinion, the school district needs to invest more time in researching best practices for properly supporting teachers in their pedagogical work with ELL students. For example, one school leader expressed the following concern:

At our site, we have not had a significant ELL population until this year. Little to no support has been provided from the district to school sites to assist with the transition for moving all ELL students to their home schools rather than to the ELL centers. Students are dumped into classes with virtually no support and teachers are struggling with how to teach the new population. Requests for support from the District Office were ignored last year. This year we are putting an ELL Support class in place and have new District ELL people to work with that seem a lot more helpful than the previous people in charge. We need to train teachers and have support in place to assist these students at our site.

Another concern for school leaders in high schools with small percentage of ELL students is that teachers who are trained in SDAIE or CLAD still may not be adequately prepared to work with ELL students. This may be because they did not have a large ELL population in the past. One school leader stated, "I believe CLAD credential was very weak in supporting teachers in being prepared to teach ELL students." In so doing, these

school leaders believe that teachers in their schools are not skilled enough to use strategies that make mathematics more accessible to ELL students." Another school leader stated, "Teachers need more professional development to acquire a broader range of strategies that meet the needs of ELL students. In their opinion, some of these strategies include but are not limited to scaffolding, differentiated instruction, vocabulary building, modeling, student-pair-share, and use of context clues and graphic organizers. In accordance to this perspective, a school leader reported, "Teachers have not received adequate training to acquire the cultural understanding to ideally present materials to our immigrant students." In other words, school leaders need to offer more help to the teachers, especially with the use of these strategies.

Overall, because their ELL school populations have increased during the 2009-2010 school year, school leaders in this study believe that their teachers need more training. In other word, these school leaders need to offer more staff development on best practices and strategies. For example, one school leader stated, "The school district needs to invest time in researching best practices and offering professional development for properly supporting ELL students." Another school leader argued, "Little to no support has been provided from the school district to school sites to assist with the transition forming ELL students to their home schools.

On the other hand, four (15.38%) school leaders stated that they need to promote a school wide approach and perspective, in all subject areas, which aids ELL students' achievement in the school curricula. One school leader affirmed, "I need to provide opportunities across the curriculum to support teachers' needs through professional

development." Along this line, another school leader stated, "I must provide the time and resources for teachers to be well-prepared to assist ELL students to achieve in mathematics."

Overall, it is necessary for school leaders to provide necessary professional development opportunities to their teachers in order to address the weakest areas related to their professional development. Even though it is expected that the school district should offer this kind of service, school leaders must be proactive in relation to this issue by checking with staff members what priorities address their specific needs.

Research Question 2

What are the perceptions of high school principals and vice-principals as to the role of culture in the academic success of ELL students in their schools?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative Likert-scale survey questions 7, 8, and 9 were used to answer research question 2. The quantitative data reveal that there is a strong positive correlation between survey questions 8 and 9 in which school leaders' perception that mathematics is a universal language and its procedures are the same in all cultures and their perception that there is a relationship between mathematics and culture (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.801, p = 0.000, N = 25). The qualitative data from the both the open-ended interview and survey questions show that the majority of school leaders in this study believe that mathematics is a universal language because

people use the same mathematical procedures in all cultures. In this regard, they affirmed that mathematics is about problem solving and does not have anything to do with culture.

*Survey Question 7: Ethnic culture plays an important role in the academic success of ELL students in mathematics.*

The quantitative data show that of 26 school leaders, 9 (34.61%) strongly disagree, 15 (57.69%) agree, and 1 (3.85%) strongly agrees with Survey Question 7. Only 1 participant (3.85%) did not answer the question. In other words, the quantitative data reveal that 16 (61.54%) school leaders believe that ethnic culture plays an important role in the academic success of ELL students in mathematics.

The qualitative data from open-ended interview questions and open-ended survey questions show that school leaders believe that certain ethnic cultures place varying degrees of importance on education and the degree of it determines how well ELL students are able to succeed academically in their schools. In this regard, a school leader stated, "Generally speaking, depending on the cultural background of ELL students and where they come from is going to determine how much they are going to put into education and how much they are going to get out of it." In this context, school leaders believe that the importance of education in a certain culture and parent pressure or the lack of it influence ELL students' motivation to learn.

According to the some school leaders in this study, a family's belief in education is a strong cultural norm. In their point of view, there are cultures that place a higher value on education. For example, one school leader stated, "Within the Asian culture,

education is valued." Another principal affirmed, "We have seen strong family support in certain communities such as Asian communities."

The majority of the school leaders also believe that ELL students need affirmation about their own culture. In order to reach this goal, school leaders and teachers need to make connections and bring the richness of cultures into the classrooms. According to one school leader, "A grasp of cultural differences is a powerful teaching tool, informing nearly all subsequent learning." In their point of view, school leaders and teachers need to be sensitive to ELL students' culture in order to make them to respond to their learning process.

On the other hand, 9 (34.61%) participants do not believe that ethnic culture plays an important role in the academic success of ELL students in mathematics. One school leader stated, "I do not really have a sense of what the cultural connection would be to mathematics." In their opinion, ethnic culture is not an important factor that determines students' achievement in mathematics. They believe that language acquisition and teaching approaches that are adopted by their schools are more important factors to the academic achievement of ELL students in mathematics. Implicitly, this means that it is the language and the mathematics learning that matter most to the performance of ELL students on the mathematics-standardized assessments.

*Survey Question 8: Mathematics is a universal language and its procedures are the same in all cultures.*

The quantitative data show that of 26 school leaders, 2 (7.69%) strongly disagree, 7 (26.92%) disagree, 14 (53.85%) agree, and 3 (11.54%) strongly agree with Survey Question 8. In other words, the data reveal that 17 (65.38%) school leaders believe that mathematics is a universal language and its procedures are the same in all cultures.

The qualitative data from open-ended interview questions and open-ended survey questions show that these school leaders believe that mathematics is a universal language because all cultures use the same numbers to solve problems. In their opinion, in spite of ELL students' language barrier, they perform better in mathematics because mathematical procedures, equations, and numbers are generally the same in all cultures whereas linguistics is different from one language to another. However, these school leaders argued that ELL students need to understand the language component of the lesson and then, when they master the vocabulary they may be able to better perform on mathematics standardized high-stakes tests.

On the other hand, 9 (34.62%) school leaders do not believe that mathematics is a universal language. For example, one school leader stated that:

Numbers are universal for the most part. When I look at how different cultures use mathematics and numbering systems, I believe that, probably, 99% of the world uses the same numbers, but not when people work with measurements. There is the metric system and the English system. If students are coming from countries that use metric system, the translation of that information may be very

difficult. Even though there are ways to translate that information mathematically, this is another challenge that ELL students face. This is one of the reasons that I do not consider mathematics completely universal.

These participants also do not believe that mathematical procedures are the same in every culture, yet they argued that some of these mathematical procedures and practices are similar in every culture.

*Survey Question 9: There is a relationship between mathematics and culture.*

The quantitative data show that of 26 school leaders, 3 (11.54%) strongly disagree, 12 (46.15%) disagree, 7 (26.92%) agree, and 3 (11.54%) strongly agree with Survey Question 9. Only 1 (3.85%) school leader did not answer the question. In other words, the quantitative data reveal that 15 (57.6%) school leaders do not believe that there is a relationship between mathematics and culture.

Even though 10 (38.46%) of 26 school leaders believe that there is a relationship between mathematics and culture, they are not really sure how it occurs. For example, one school leader stated, "I have limited experiences with how culture ties with the mathematics curriculum." The majority of these school leaders have the perception that students see numbers differently and believe that mathematical symbols and signs are slightly different in other cultures. They also perceive that in mathematics, the operations, scope and sequence are done very differently according to various cultures. For example, one school leader affirmed, "Mathematics and education to a larger extent has different importance and historical background in different cultures." Another school leader

argued, "If certain cultures have established a disciplined approach to life in general, or an attitude about the value of schooling and mathematics in particular, then there is a predisposition for students of that culture to do well in mathematics."

These participants asserted that mathematics is valued differently in other cultures, which indicates that the ELL students' home influence may play an important role in how they view mathematics. In this regard, a school leader affirmed, "Mathematics is highly valued in some cultures such as Russian, Ukrainian, Asian, European, and South American. Students from these areas tend to have a much more advanced understanding of mathematics than their American counterparts."

On the other hand, 15 (57.69%) out of 26 school leaders do not agree that mathematics and culture are related. For example, a school leader stated that:

I'm sure some cultures value education more highly than others, and I'm sure some cultures use very different procedures for solving problems, but I do not think this constitutes a 'relationship' between the two. I believe every student, independent of cultural background, can be successful in mathematics."

These school leaders believe that mathematics is about problem solving and does not have much to do with the cultural background of the students. In their opinion, if mathematics principles are taught to ELL students, they should be able to perform well in mathematics because culture, other than issues related to language, does not really impact on learning and succeeding in mathematics.

In this study, participants believe that different cultural examples can be used in the teaching and learning of mathematics, and that mathematics procedures are the same

in all cultural groups. In their opinion, all students, including ELL students, with proper scaffolding and background knowledge can be successful in acquiring mathematical skills. In other words, in the participants' opinion, mathematics is about problem solving and does not have much to do with culture.

Overall, the school leaders in this study pointed out that they have limited experiences concerning the relationship between mathematics and culture. In reality, the quantitative data show that 10 school leaders (38.46%) did not have enough knowledge about this issue to describe how mathematics is related to culture. Despite the highly diverse community in which these academic leaders live in, the data also show that three (11.54%) school leaders have never thought about this issue prior to this study.

<p style="text-align:center">Research Question 2A</p>

What are their perceptions about ELL students' cultural background as challenges to academic performance on mathematics standardized high-stakes tests?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative Likert-scale survey questions 10, 11, 12, and 13 were used to answer research question 2A. The quantitative data reveal that there is a strong positive correlation between survey questions 11 and 12 in which the perceptions of these school leaders about the way ELL students approach mathematical problem-solving differently due to their unfamiliarity with the cultural context of the mainstream society and their perception that the cultural background of ELL students does not influence their performance in mathematics standardized high-stakes tests (Correlation is significant at

0.01 level (2 tailed) - Spearman's rho coefficient = 0.846, p = 0.000, N = 25). There is

also a strong positive correlation between survey questions 12 and 13 in which the

perceptions of school leaders regarding the fact that the ethnic background of ELL

students does not influence their performance in mathematics assessments and their

perception that ELL students are disadvantaged in their learning process when compared

to non-ELL students because their mathematical instruction is inadequate to their

learning needs (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho

coefficient = 0.863, p = 0.000, N = 25). The qualitative data from open-ended interview

questions and open-ended survey questions support this finding from the quantitative data

because for the majority of the school leaders stated that mot of the problems ELL

students have with mathematics achievement and performance on standardized

assessments can be linked to language problems and not to their cultural background. In

this perspective, one school leader stated, "The performance of ELL students in

standardized assessments is more about their attitude towards mathematics than the

influence that their cultural background has on the mathematics teaching-learning

process."

*Survey Question 10: Gaps in ELL students' performance are partly due to the impact of*
*language factors on mathematics-standardized assessments.*

The quantitative data show that of 26 school leaders, 19 (73.07%) agree, and 3

(11.54%) strongly agree with Survey Question 10. Only 3 school leaders (11.54%)

disagree with this statement. In this regard, one school leader stated, "I have not spent

any time studying English proficiency as it impacts learning mathematics." Only 1 school leader (3.85%) did not answer the question. In other words, the data reveal that 22 school leaders (84.61%) believe that gaps in ELL students' performance are partly due to the impact of language factors on mathematics-standardized assessments.

The qualitative data from open-ended interview questions and open-ended survey questions show that school leaders believe that English proficiency plays an important role in the learning of mathematics for ELL students. In their opinion, most mathematics classes rely heavily on English language as the base for instruction. Thus, academic language is an important concept that needs to be developed in order to help ELL students to be successful in mathematics. In the school leaders' opinion, ELL students need to understand the academic language of mathematics as well as its terminology and vocabulary. For example, one school leader stated, "As ELL students move to higher level mathematics classes, they start to deal with more abstract concepts, which deal with terminology. If they do not understand the terminology, they cannot understand what is being taught."

Participants also believe that teachers need to teach ELL students the testing language because one term can change completely the context of the test question. For example, a school leader argued, "If ELL students are having trouble with the language in the test and they are skimming it, they misread that section and they are not solving the problems correctly." In other words, language proficiency, especially in standardized testing, plays a big role in the academic success of ELL students. According to one

school leader, "The more language acquisition and vocabulary students develop, the more confident they feel when they are testing."

School leaders also pointed out that ELL students also need to understand the cultural settings of word problems before they can solve these problems, that is, they have to understand how to apply the mathematics vocabulary in the context of the United States. For example, one principal stated that:

A word problem in New York might refer to take a train on the subway. Students who come from a third world country might not have any contextual clue about subways. So, they might get lost in the context of the subway. Even though they learn the meaning of the term subway, they still may not understand the meaning of cultural setting of the concept of the subway. Alternatively, it might be relative to the melting of snow, how fast snow melts. However, if a student has never seen snow, they may have no idea what that implies.

According to the qualitative data from open-ended interview questions and open-ended survey questions, school leaders believe that language seems to play a significant role in the learning of mathematics. In their opinion, ELL students need to master a language well enough to understand the mathematical concepts and skills in order to solve mathematical problems that are posed in words. Thus, participants agree that ELL students who learn mathematics in a language that is not their mother tongue face difficulty in understanding the vocabulary in the problems and thus do not perform well in mathematics tests that involved word problems.

*Survey Question 11: ELL students approach mathematical problems differently than non-ELL students due to their unfamiliarity with the cultural context of the mainstream society.*

The quantitative data show that of 26 school leaders, 2 (7.69%) strongly disagree, 12 (46.15%) disagree, 10 (38.46%) agree, and 1 (3.85%) strongly agrees with Survey Question 11. Only 1 school leader (3.85%) did not answer the question. The data reveal that 14 (53.85%) school leaders do not believe that ELL students approach mathematical problems differently than non-ELL students due to their unfamiliarity with the cultural context of the mainstream society. On the other hand, 11 school leaders (42.30%) believe that ELL students approach mathematical problems differently than non-ELL students due to their unfamiliarity with the cultural context of the mainstream society.

The qualitative data from open-ended interview questions and open-ended survey questions show that these school leaders recognize that students, who come to their schools, especially those from other countries often do mathematics in different ways, which means that they solve problems in accordance with their own cultural backgrounds. Another important aspect is that participants respect students' different cultural backgrounds by allowing them to use their own strategies to solve mathematical problems in mathematics classes. In this regard, one school leader stated that:

> I know some students who have come from other cultures were taught mathematics differently. In the United States, you solve a problem using step one-step two, step three, and step four. In other cultures, students might be taught 3 or

4 different ways to approach the same problem. Therefore, in some cultures students are taught multiple ways to solving a problem.

Participants also believe that ELL students need to be acknowledged for their learning and for the previous knowledge that they bring to the classroom. In the school leaders' opinion, if teachers give relevance to the curriculum, they are able to show students that what they are doing in their daily lives matters and has value. In this perspective, a school leader stated that:

> Different cultures have different ways of dealing with mathematics and they have it imbedded in their society and mores. They have it imbedded in the way that they do business and they have it imbedded in the jobs that they perform. Therefore, making curriculum relevant to students brings it alive to them.

*Survey Question 12: The ethnic cultural background of ELL students does not influence their performance in mathematics standardized high-stakes tests.*

The quantitative data show that of 26 school leaders, 5 (19.23%) strongly disagree, 10 (38.46%) disagree, and 10 (38.46%) agree with Survey Question 12. Only 1 school leader (3.85%) did not answer the question. The data also show that 6 school leaders (23.08%) did not know enough about this issue in order to describe how the ethnic cultural background of ELL students does not influence their performance in mathematics standardized high-stakes tests and 5 other school leaders (19.23%) affirmed the same although they never previously thought about this issue. In this context, the quantitative data reveal that 15 (57.69%) of 26 school leaders agree that the cultural

backgrounds of ELL students influence their performance in mathematics standardized high-stakes tests. The school leaders who participated in this survey have this perception because they believe that ELL students are unfamiliar with how mathematics is interpreted by American society.

In their opinion, some cultures value education more highly than others, and some cultures use very different procedures for solving problems, which may lead to measurable, however slight, differences in the performance of ELL students in standardized assessments. In other words, participants believe that the performance of ELL students in mathematics standardized high-stakes tests is related to how the culture of the student values mathematics. For example, one school leader stated, "Students whose cultural background does not see mathematics as a necessity do not feel beholden to do well on the tests as they do not see a value in it."

On the other hand, 10 (38.46%) school leaders do not agree with the assertion that ELL students' cultural backgrounds influence their performance on mathematics standardized high-stakes tests. These school leaders believe that performance in mathematics is more about attitude than culture. In so doing, one school leader argued that this is "true, but only to a small degree does cultural background influence performance. Mexican students who come with little formal education at all are negatively influenced regarding their performance."

These school leaders also have the perception that most of the challenges faced by ELL students with mathematics achievement in standardized assessments can be linked to language problems. In their opinion, reading instructions and work with word

problems play a great role in the performance of ELL students in mathematics because they have to deal with mathematical vocabulary. This means that the context of the problems makes it challenging for ELL students to determine the solution for these problems. However, school leaders pointed out that context clues could be the key to understanding the questions in these tests. One school leader stated that it is necessary to "have supportive staff and teachers who can understand different cultural ways of approaching mathematics… by ensuring support systems are available in native language to help ELL students become successful in standardized high-stakes mathematics tests".

Some of the school leaders participating in this survey also stated that standardized tests are administered through the cultural lens of the host country. In so doing, idiomatic expression and cultural references are universal obstacles for any linguistic immigrant student. In other words, ELL students have great difficulty understanding many items on the tests due the cultural differences.

According to the participants, one of the problems related to the performance of ELL students on standardized high-stakes tests is that they may have had instruction that may not support them in acquiring higher levels of mathematics. In so doing, one of the school leaders declared, "In schools that have larger numbers of minority students, there are many new teachers in the profession with less experience in the field of teaching ELL students."

*Survey Question 13: When compared to non-ELL students, ELL students are disadvantaged in their learning process because their mathematical instruction is inadequate to their learning needs.*

The quantitative data show that of 26 school leaders, 1 (3.85%) strongly disagrees, 14 (53.85%) disagree, 10 (38.46%) agree with survey Question 11. Only 1 school leader (3.85%) did not answer the question. In other words, the data reveal that 15 school leaders (57.69%) do not believe that ELL students are disadvantaged in their learning process because their mathematical learning is inadequate to their learning needs when compared to non-ELL students. The data also reveal that 10 school leaders (38.46%) believe that this is a true statement.

The qualitative data from open-ended interview and open-ended survey questions show that school leaders pointed out that ELL students do not perform as well as mainstream students. In their opinion, this gap is consistent across school districts, schools, and throughout the state. For example, one school leader stated that the difference in performance between non-ELL students and ELL students is "probably about 200 points on our API scores." On the other hand, another school leader stated that:

We are just starting to compare the performance of ELL students in standardized tests with other students. One of the roles of our new counselor is to track our ELL students and start this comparison. We have not done any special monitoring of ELL students.

In their opinion, one of the barriers for ELL students' performance in mathematics is the academic language because most of the problems deal with the

English language and if they do not understand how to answer the question, they are going to answer it correctly. In this regard, one school leader stated that:

> My non-ELL students perform at a higher rate than my ELL students simply because they can read the text and understand the question. They know what specifically is being asked of them while ELL students are trying to decode what the question is before they can even answer it. They may struggle even longer to decode and then comprehend, and then get to formulate an answer. Whereas non-ELL students who read, decode, comprehend, might be able to answer the question immediately. Therefore, on a standardized test, which are typically multiple choices, ELL students are at a disadvantage because it takes them longer to determine what the meaning of the question is and what is actually being asked of them.

In other words, school leaders believe that monolingual English students have the advantage of the English language. In particular, they believe that ELL students must become acclimated to the academic language of the school curriculum in order to better perform on standardized assessments.

## Research Question 2B

How do they use these perceptions to promote a school climate that helps ELL students to perform better on mathematics standardized high-stakes tests?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative Likert-scale Survey Question 14 was used to answer research question 2B.

*Survey Question 14: I create a school climate in which native English-speaking and ELL*

*students achieve high standards in mathematics while working and learning with each*

*other in a climate of mutual respect.*

The quantitative data show that of 26 school leaders, 7 (26.92%) disagree, 17

(65.38%) agree, and 1 (3.85%) strongly agrees with Survey Question 14. Only 1 school

leader (3.85%) did not answer the question. The data also show that 4 school leaders

(11.54%) stated that this issue is not relevant to their job, 3 (7.69%) did not know enough

about this issue to describe how they can create a school climate that favors the

achievement of high standards in mathematics by ELL students, and 2 (3.85%), stated

that they have not thought about this issue. The quantitative data show that 18 (69.23%)

of 26 school leaders believe that they create a school culture in which native English-

speaking and ELL students achieve high standards in mathematics while working and

learning with each other in a climate of mutual respect.

The qualitative data from open-ended interview questions and open-ended survey

questions show that in the opinion of the school leaders, they achieve this goal by

exposing both native English-speakers and ELL students to a standards-based curriculum.

They also pointed out that where there are gaps, either with English-speakers or ELL

students, they need to make sure that the curriculum is chunked[22] to better serve both

populations. In this regard, one of the school leaders stated, "We make every effort to

advocate for students, but it is a challenge, as we must fight the skewed understanding of

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[22]Chunked curriculum is a kind of curriculum in which the content is grouped or categorized into smaller and meaningful sets of topics that help students to achieve academically.

equity and the frustrations of teachers to make this statement true." In their schools, Student Government leads the charge in creating a school in which all students can achieve. For example, one school leader stated that they have programs such as "Camp Bronco for incoming freshmen, senior buddies, and many other programs that make it cool to be cool to other students."

These school leaders believe that teachers feel supported in writing referrals that support schoolwide discipline, especially bullying-type behavior in class. As one school leader stated, "We encourage teachers to have students work together and show respect for all." School leaders also stated that they achieve this goal by having high expectations for all students, especially ELL students. They also support all learning regardless of discipline as well as good instruction to all modalities because they are good for all students, including ELL students.

From this perspective, one school leader affirmed, "I have mathematics tutors in various languages and students helping ELL students in the classroom. I have teachers who differentiate their instruction and work with students individually to make sure that they understand the content." Along these lines, another school leader stated, "My influence on the mathematics department is focused on improving learning for all mathematics students."

Two school leaders, the principal of high school C and the principal of high school D respectively, described how they create a school climate that promotes the achievement of ELL students in mathematics.

Principal of school C stated:

This school usually has an overall theme for California Standardized Testing

(CST) and activities including ELL students. We have hosted assemblies for ELL

students in the past acknowledging their achievements such as Highest GPA and

Honor Roll. An inspirational speaker has also been a part of the motivational

assemblies, which have the objective to reinforce importance of high-stake

testing. In relation to the high school exit exam, we have the CAHSEE STARS,

which is a 3 or 4 Saturday sessions intervention targeting 3 subgroups including

ELL students. Additionally, students who were not able to attend Saturday

sessions, after school tutoring was provided by qualified mathematics teachers.

Similarly, principal of School D stated:

We promote a school climate that helps ELL's perform better in mathematics on

high-stakes tests by promoting a culture of exposing students to standardized tests

as well as tests procedures and strategies, where students are giving the

opportunity to read, understand, and interpret different kinds of released

questions. Students practice these problems during warm-ups on a daily basis and

by taking quizzes and tests that contains released questions and questions

formatted according to the standardized testing design.

On the other hand, 7 school leaders (26.92%) do not create a school culture in

which native English-speaking and ELL students achieve high standards in mathematics.

In their opinion, one of the reasons that they are not reaching this goal is that they have a

small ELL population in their schools. In this regard, one of the school leaders stated, "Sadly, we do not. I cannot say that we deal with ELL issues at all because I am not even aware that we have had an issue. They are probably there but I am not aware of them." In this perspective, another school leader stated that:

> I would not deem to make school wide emphasis on strategies specific to mathematics instruction and learning, when considering ELL students. I would much prefer a school wide approach and perspective, in all subject areas, to aid ELL students in achieving.

However, school leaders also expressed their concern with this issue. They believe that they need time and resources to create an equal atmosphere where ELL students can succeed. For example, one principal stated that:

> We are developing toward that goal; however, we currently have no ELL teachers and have only a few ELL students, although some of our ELL students speak no English at all and are not able to interact with the curriculum because of language barriers.

Even though, these school leaders do not oversee mathematics as well as ELL students, they believe that they need to increase their impact on creating a school climate that favors the achievement of all students, especially ELL population.

Research Question 3

What is the relationship between the perceptions of school leaders concerning ELL students and their depth of understanding of the effects of the cultural background of ELL students has on their academic performance in mathematics?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative 4-point Likert-scales survey questions 15, 16, and 17 were used to answer research question 3. The quantitative data show that there is a very strong correlation between survey questions 15 and 17 in which school leaders believe that ELL students are unable to demonstrate their content knowledge in mathematics high-stakes tests and their belief that ELL students need a modified curriculum to improve their achievement in mathematics due to the influence of their cultural background on these tests (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.909, p = 0.000, N = 25). This finding is supported by the qualitative data from open-ended interview questions and open-ended survey questions, which show that the majority of school leaders believe that the cultural background of ELL students does not influence their performance on standardized assessments. They also believe that preparation of lessons and curriculum modification are factors that help ELL students to learn to succeed on standardized tests.

*Survey Question 15: Due to their linguistic background, ELL students are frequently unable to demonstrate their content-area knowledge in mathematics high-stakes standardized tests.*

The quantitative data show that of 26 school leaders, 7 (26.92%) disagree, 16 (61.54%) agree, and 3 (11.54%) strongly agree with the Survey question 15. The data also show that 19 (73.08%) respondents believe that the linguistic background of ELL students acts as a barrier to their performance on mathematics assessments. On the other hand, 7 participants (26.92%) do not agree with this assertion.

The qualitative data from open-ended interview questions and open-ended survey questions show that school leaders believe that one of the challenges faced by ELL students in their performance on mathematics standardized high-stakes tests is related to their ability to understand the questions in those tests as well as their ability to understand the abstract mathematical concepts they have to learn. In their opinion, it is necessary that ELL students be exposed to a rigorous mathematics curriculum while they acquire academic language through the development of mathematics vocabulary, which contributes to their ability to solve word problems. They believe that ELL students have not been exposed to enough academic language to be successful on high-stakes standardized tests in mathematics.

Participants also stated that ELL students need to acquire enough academic knowledge that helps them to understand a given problem and perform all operations that allow them to solve that problem. In this regard, one school leader stated that:

I think one of the challenges faced by ELL students are the standardized tests. I do not know how many other cultures even have a standardized test bubble in the answer test for mathematics. However, that, to me, seems like it would be a cultural difference. It seems sort of absurd to do a test in mathematics that way. I believe that it becomes more of a question of what is practical to score rather than what is the best way to test students' real knowledge.

*Survey Question 16: Due to their ethnic cultural background, ELL students are frequently unable to demonstrate their content-area knowledge in mathematics high-stakes tests.*

The quantitative data show that of 26 school leaders, 17 (65.38%) disagree and 8 (30.77%) agree with Survey Question 16. Only 1 participant (3.85%) did not answer the question.

On the other hand, the qualitative data from open-ended interview questions and open-ended survey questions show that the majority of school leaders do not seem to be aware of the impact of ELL students' cultural backgrounds on their performance on mathematics standardized high-stakes tests. For example, a school leader stated, "I just do not know how culture might impact the performance of ELL students on standardized mathematics tests. I have no idea." Another school leader stated, "This issue is not part of my previous study and work." In the opinion of these school leaders, there is no relationship between mathematics and the cultural background of ELL students, which does not influence their performance on mathematics assessments. From this perspective,

they believe that ELL students' cultural backgrounds do not play an important role in the teaching-learning mathematics process.

On the other hand, some school leaders also believe that cultural background could have an influence on the performance of ELL students on mathematics standardized high-stakes tests because different cultures have different perceptions of the value of mathematics. For example, one school leader stated that:

There are different values on intellect. There are values on how people pursue a

life in different cultures so I believe there could be links between the values

cultures place on mathematics. However, I do not know anything about it.

Another school leader was also concerned about this issue and stated that:

Unfortunately, I do not think we have always had a specific plan of action to

target ELL students on mathematics-standardized tests. In the past, we scratched

the surface by pulling ELL students together for an assembly and explaining the

importance of the test and acknowledging their contributions to the school.

*Survey Question 17: ELL students need a modified curriculum to improve their achievement in mathematics because the ethnic cultural background of each student places a certain influence on their performance on standardized high-stakes mathematics testing.*

Of 26 school leaders, 18 (69.23%) disagree and 7 (26.92%) agree with Survey Question 17. Only 1 participant (3.85%) did not answer the question. The data also show that 5 participants (19.23%) did not have enough knowledge about this issue in order to

describe what kind of modifications are necessary in the school curricula to meet the needs of their ELL students. Three participants (11.54%) had never thought about this issue. The quantitative data also show that 7 school leaders (26.92%) in this study agree that ELL students need a modified curriculum to improve their achievement in mathematics because the cultural background of each student places a certain influence on their performance on mathematics standardized high-stakes tests. According to the qualitative data from open-ended interview and open-ended survey questions, in relation to this issue, one school leader stated that:

> I believe cultural uniqueness is a factor in one is being able to communicate effectively what has been learned, and the reverse is also true, cultural differences can inhibit a teacher's attempts to communicate effectively to a student, even though the content may be something easily learned otherwise.

However, the majority of the participants believe that ELL students do not need mathematical language modifications. In their opinion, ELL students need support in areas of the mathematics curriculum that deal with vocabulary and terminology. In this perspective, curriculum modification in mathematics would include differentiation in order to access ELL student's different learning modalities because good instruction is good instruction for all students, including ELL students.

According to these participants, all students must learn the same standards through a modified curriculum that improves mathematical learning. Yet, they believe that it is necessary to address the specific needs of an ELL student who has been in the United States for 1 month versus 1 year versus 15 years. There is also the question of the

ELL students' level of mathematics achievement, and whether or not there are any Special Education issues involved. In this context, despite the importance given to standardized tests, the majority of the school leaders believe that they have to be more concerned with the ELL students' learning process, and quite secondarily, with their test scores.

On the other hand, 18 (69.23%) out of 26 school leaders do not believe that culture plays a role in influencing the performance of ELL students on mathematics standardized high-stakes testing. Since school leaders believe that ELL students' English proficiency level influence their performance on these tests, they believe that it is important that academic language is emphasized when teachers teach mathematics. In this regard, these school leaders stated that ELL students need more language support than modified curriculum. For example, one school leader stated, "I believe that adjusting teaching language strategies and styles would be more effective and maintain universality and equality of instruction."

The majority of the participants in this study believe that the cultural background of the students is not the issue. In their opinion, the issue is the curriculum preparation and modification that allows mathematical content to be accessed by ELL students while they are learning English as a second language. Along this perspective, one school leader affirmed, "Again, this is not related to culture, but attitude towards the test."

Research Question 3A

What kind of ethnic cultural background knowledge do high school principals and vice-principals believe they possess to improve the academic performance of ELL students in mathematics?

Qualitative open-ended interviews questions and open-ended survey questions responses were used to answer question 3A. The qualitative data show that school leaders expressed their concerns to create a school environment in which all students, especially ELL students, are provided with the intellectual tools to become successful students. Participants stated that they need to acquire and possess knowledge about the cultural background of their students in order to improve their academic performance on mathematics standardized high-stakes tests. In so doing, these participants indicated that they need to support a learning environment of varying abilities, cultures, and socioeconomic backgrounds. They also believe that parents need to be informed and involved in this learning environment.

According to the majority of the participants, the ELL population is growing in all schools in the school district. They are also concerned because there are no more language centers in the district. In this context, these participants believe that it is critically important that they prepare ELL students to be on a level playing field with every student so that when they leave the school system, they are prepared to be successful in society. In this regard, a school leader stated, "In this new context, that is a big challenge for us but I believe it is important for us to keep moving in the right direction."

Participants also stated that they like to develop relationships with students because they believe that students with whom school leaders and teachers develop relationships and show some type of interest try harder and work harder in their classrooms and are willing to participate in the school activities. For example, one school leader stated that:

From my perspective, family situations and the importance of education in the household are the kind of knowledge I would like to acquire and possess. This is what I would like to know about ELL students, so I may be able to help to them to succeed in school. I would like to know more about ELL students' families before I can help them succeed academically.

According to this context, one school leader stated that:

I would like to acquire more knowledge about ELL student's learning styles and the predominant way they are taught. By learning styles, they mean how students learn best based on their learning modalities such as visual, kinesthetic, and auditory. I also would like to acquire knowledge based on ELL students' cultural background as well as about cooperative learning groups.

Some of the participants also believe that specific training that connects mathematics and culture would be helpful so that leaders could understand the influence culture has on mathematics. This might encourage a greater understanding of the influence culture has had on mathematics and the learning thereof. For example, one school leader stated, "If school leaders and teachers could relate a problem and get a student to think about a problem in terms of a concept they have experience with and

knowledge of, that would probably be helpful." They also believe that would be valuable

being able to make connections to students in their own cultures. In this regard, one

principal stated that:

> I believe that being able to tie the relevance of the academic curriculum of what
>
> teachers are teaching to ELL students to their cultural background is probably the
>
> best and would be the most helpful for school leaders. Based upon that, how can
>
> the teacher tie that experience to a mathematics problem or a mathematics
>
> concept? Why is this important to them? Well, if teachers are able to show that
>
> connection, then I believe that teachers have a better connection with their
>
> students.

Overall, the qualitative data from open-ended interview questions and open-ended

survey questions show that participants are concerned about finding ways to improve the

academic performance of ELL students in mathematics standardized high-stakes tests.

They are also aware of ways teachers might be able to help remove barriers for ELL

students' achievement in mathematics.

## Research Question 4

What are the high school principals and vice-principals perceptions of ELL

students' performance on standardized high-stakes tests in mathematics?

Qualitative open-ended interviews and open-ended survey questions as well as

quantitative 4-point Likert-scales survey questions 18, 19, 20, 21, and 22 were used to

answer research question 4. The quantitative data reveal that there is a strong positive

correlation between survey questions 19 and 20 in which school leaders collaborate with teachers to design appropriate pedagogical practices in mathematics for ELL students and their assurance that teachers modify the delivery of the mathematics instruction for ELL students according to their language proficiency levels (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.807, p = 0.000, N = 24). The qualitative data from both open-ended interview questions and open-ended survey questions show that participants believe that ELL students must be provided with materials that are rigorous but facilitate a clearer understanding of the materials. For example, one school leader stated, "I also need to provide teachers with professional development that helps them to differentiate instruction and plan lessons that teach ELL students according to their level of understanding."

*Survey Question 18: Standardized tests are difficult for ELL students because they do not put in the necessary time and effort as non-ELL students.*

Of 26 school leaders, 8 (30.77%) strongly disagree, 14 (53.85%) disagree, and 4 (15.38%) agree with Survey Question 18. The data quantitative data show that 6 participants (23.07%) did not have enough knowledge about this issue in order to elaborate upon this assertion. According to this data, 4 (15.38%) of 26 school leaders agree with the statement that standardized tests are difficult for ELL students because they do not put in the necessary time and effort as non-ELL students. In their opinion, if ELL students do not speak or read English well they likely spend a large amount of time

trying to decipher word problems on standardized tests, which can lead them to feel frustrated with these tests due to their weak linguistic skills.

Overall, 22 (84.61%) out of 26 school leaders do not agree with the premise that standardized tests are difficult for ELL students because they do not put in the necessary time and effort as non-ELL students. For example, one school leader stated, "Students who value education, no matter what their background, will put effort into their education." In this study, participants believe that all students do their best in standardized tests, independent of their ELL status or cultural background. They also stated that it is not a factor of time spent on practice that can hold ELL students back; instead they believe that it may be a factor of not understanding what to practice or to be able to communicate what was learned or what is not yet understood. In their opinion, while non-ELL students can tell a teacher what they do not understand, ELL students may be inhibited through language and/or cultural barriers. In this regard, one school leader affirmed, "Working hard and understanding the language are two different things."

The majority of participants in this study also stated that most ELL students try harder than their non-ELL counterparts and put extraordinary effort into trying to do their best. One school leader affirmed, "I find several ELL students who work hard, if not even harder, yet they are far behind so it is a challenge for them to keep up to the standards the state has set." Along these lines, another school leader stated that:

I disagree with this premise because the question implies a lack of motivation in ELL students. I have not experienced this in general terms. In fact, I have seen ELL kids work harder because they know there is a language barrier to overcome.

The majority of the school leaders believe that standardized tests are difficult for ELL students because these students do not really know the academic language that is used in tests. Furthermore, while standardized tests may be difficult for ELL students it does not mean that they are not trying their hardest. Thus, they believe that often, the challenge is the lack of academic language especially when standardized tests include word problems. They also suppose ELL students might get frustrated more quickly. According to one school leader, "ELL students reach their *give up* point more quickly due to language challenges." Another school leader stated, "I think ELL students do put forth the effort but may give up when they begin to struggle." Another reason given by these school leaders for this level of frustration is the lack of pedagogical instruction that makes a difference for ELL students. In their opinion, teachers are not using best practices that best address ELL students' specific needs.

*Survey Question 19: I collaborate with teachers to design appropriate pedagogical practices in mathematics for ELL students.*

The quantitative data show that of 26 participants, 3 (11.54%) strongly disagree, 16 (61.54%) disagree, and 6 (23.07%) agree with Survey Question 19. Only 1 participant (3.85%) did not answer the question. In this study, the data also reveal that 19 school leaders (73.08%) do not collaborate with teachers to design appropriate pedagogical practices in mathematics for ELL students while the qualitative data show that school leaders reported limited experiences with the design of pedagogical practices in the mathematics curriculum and its connections with ELL students. In this regard, one school

leader stated, "When it comes to mathematics strategies and ELL issues, I have little to offer."

The analysis of quantitative and qualitative data also show that, overall, these school leaders do not take an active role as an instructional leader who helps teachers in designing pedagogical approaches that meet the needs of ELL students. For example, 1 school leader (3.84%) stated, "I have no role in mathematics in my school", 3 school leaders (11.54%) stated, "I do not oversee mathematics", while 2 school leaders (7.69%) stated, "I do not oversee ELL students". Another school leader affirmed, "My school has historically had a very small ELL population so we have not addressed these issues, particularly in mathematics."

On the other hand, the quantitative data also reveal that 6 participants (23.07%) believe that they do collaborate with teachers to design these pedagogical practices. The qualitative data from pen-ended interview questions and open-ended survey questions show that the influence of some school leaders on the mathematics department is focused on improving learning for all mathematics students. In this regard, one school leader stated, "I am not a mathematics department supervisor, but I would encourage and support the necessary modifications if I felt it would be better to meet the needs of the ELL students."

*Survey Question 20: I make sure that teachers modify the delivery of the mathematics instruction for ELL students according to their language proficiency levels.*

The quantitative data show that of 26 school leaders, 17 (65.38%) disagree and 9 (31.62%) agree with Survey Question 20. This data also show that even though school leaders are concerned about the academic challenges faced by ELL students because of their English language proficiency level, 17 participants (65.38%) affirmed that they are not sure that teachers modify the delivery of the mathematics instruction to meet the language proficiency level of their ELL students. However, they agree that ELL students struggle with accuracy in the English language, which is a barrier to their academic achievement.

Along these lines, the majority of the participants are also aware that some ELL students do not have the necessary educational foundation and proficiency in their native language to build upon, which makes it more difficult for their acquisition of the English language. For example, one participant argued that:

In their home country, some of ELL students may did not get past 3$^{rd}$ or 4$^{th}$ grade and then they come to California and they are supposed to not only learn English, but learn English at a 9$^{th}$ or 10$^{th}$ or 11$^{th}$ grade level. Therefore, when they are asked to write a paragraph construction in a five-paragraph essay, they might not even have had much sentence construction in their native language that they can relate to or make a connection to.

On the other hand, 9 participants (31.62%) believe that one of the weaknesses of the instructional curriculum design for ELL students is the lack of adopted textbooks that

are standard-based as well as the lack of differentiation instruction in the delivery of the lessons. Thus, in their opinion, ELL students are not progressing because they are not exposed to a more rigorous standards-based curriculum. According to the participants, another weakness in this curricular design is the lack of personnel as well as the mixed proficiency level of English language of ELL students in classrooms. In this context, one school leader stated, "It is hard to modify the delivery of the lessons as well as to individualize lesson-plans in order to give ELL students the help they need to be successful in their learning."

*Survey Question 21: As an instructional leader, I make sure that ELL students are provided with a challenging school curriculum that is equivalent to that of native-English speakers.*

Of 26 school leaders, 6 (23.08%) disagree, 15 (57.69%) agree, and 3 (11.54%) strongly agree with question 21. Only 2 participants (7.69%) did not answer the question. The quantitative data also show that 5 participants (19.23%) did not have enough knowledge about this issue in order to describe how they might provide a challenging school curriculum for ELL students that is equivalent to that of native-English speakers. Three participants (11.54%) had never considered this issue prior to this study.

Overall, the quantitative data reveal that 18 (69.23%) out of 26 school leaders believe that as instructional leaders, they make sure that all ELL students are provided with a challenging mathematics curriculum that is equivalent to that of native-English speakers. In their opinion, they reach this goal by following the school district curriculum

and by using adopted standards-based textbooks. In other words, ELL students do not get a watered down version of the curriculum and have access to the same mathematics curriculum as mainstream students. In this regard, one school leader stated, "ELL students are provided with materials that are the same difficulty but easier to understand. I also provide teachers that differentiate and make lessons that teach to each student's individual level of understanding." Another school leader affirmed, "We schedule students in mathematics classes based on their achievement. Unfortunately, many ELL students are usually starting in mathematics classes that are of the lower level based on their achievement in middle school."

Some of the participants also stated that in their data decision-making process and curriculum meetings they discuss the challenges faced by ELL students and what instructional strategies teachers have to use with these students to move them towards meeting the state standards. This is also done by observing and meeting with teachers regarding content standard instruction and by supporting the classroom environment with materials that meet the specific needs of ELL students and also by providing teachers with professional development in this area.

On the other hand, 6 school leaders (23.07%) stated that they do not believe that as instructional leaders, they are providing ELL students with a challenging mathematics curriculum that is equivalent to that of native-English speakers. For example, one school leader stated that:

We are just beginning to look at the issue closely. We are finding that our faculty are not well-prepared to teach ELL in spite of their ELL credentials, we have no

transitional program in place, and we are due to district programmatic changes,
experiencing the placement of students here, for the first time, that speak no
English at all. We are unprepared and therefore will take the time to find out what
we need and then will proceed to improve along those lines.

These school leaders pointed out that they are not mathematics supervisors and do
not have a strong role in mathematics at their schools. Yet, they encourage and support
teachers in their efforts to make the necessary accommodations to meet the needs of ELL
students. In this study, school leaders in high schools with small percentage of ELL
students do not oversee ELL students. However, since their ELL population is increasing,
they are just beginning this process. For example, one school leader stated, "I do not
spend the time that I should to ensure that ELL students are offered an adequate
curriculum."

*Survey Question 22: As an instructional leader, I help teachers to identify and design
curricular instruction that is adapted to the ELL students' cultural background.*

Of 26 school leaders, 15 (57.69%) disagree, 9 (34.61%) agree, and 1 (3.85%)
strongly agrees with Survey Question 22. Only 1 participant (3.85%) did not answer the
question. The data reveal that 15 participants (57.69%) believe that they help teachers to
identify and design curricular instruction that is adapted to the ELL students' cultural
background.

The qualitative data from open-ended interview questions and open-ended survey
questions show that these participants believe that there are probably several ways to

identify and design pedagogical activities based on ELL students' cultural experiences that may fit into any school curricula. In their opinion, it is their responsibility to help teachers to know their students as well as understand what kind of pedagogical actions they have to apply in order for their ELL students to understand the material. These school leaders believe that they need to help teachers to pull from their students' experiences or at least talk with them and know what their experiences are, so teachers are able to incorporate those experiences into the curriculum.

On the other hand, 10 participants (38.46%) do not believe that they are performing this role as an instructional leader. For example, one school leader stated, "I don't believe we are anywhere close to that, but I believe that is an expectation we all should have." However, these school leaders believe that they must be more active in this area.

Research Question 4A

How do they perceive the influence of their roles in closing the achievement gap of ELL students in mathematics?

Qualitative open-ended interviews and open-ended survey questions were used to answer research question 4A. Qualitative data show that school leaders in this study believe that they have an important role in closing the achievement gap in their schools. In their opinion, they have to set the tone for what they want to see happen in their schools. In this perspective, one school leader stated, "I am the one who sets the tone for what the expectations are for students, teachers, and staff members."

In this study, the participants believe that their role in closing the achievement gap of ELL students is to provide opportunities across the curriculum to support teachers' needs through professional development. This could involve training in applying instructional practices such as checking for understanding, differentiated instruction, workshops, and speakers as well as promoting the implementation of school-wide pedagogical approaches in all subject areas, which aids ELL students' achievement in the school curricula. This means that they must provide the time and resources for teachers to be well-prepared to assist ELL student achieve in mathematics as well to make sure that they are meeting the needs of all students. They also stated that it is important to support teachers by providing primary language support when needed as well as class size reduction, when possible. In this regard, one school leader stated that:

I am the one who has to look at improving each student subgroup and the one who provides professional development for teachers so they know and understand how to deal with different subgroups of students. By doing that, it ultimately affects what teachers do in their classrooms and how their students learn.

On the other hand, the majority of the school leaders believe that this is a challenge to overcome. For example, one principal stated:

We are just starting our after-school tutoring for students and we do not have enough money targeted for ELL students, but I am hoping that I can siphon some money into our ELL students and get them to jump into the tutoring program so teachers can help them in their areas of weakness.

This principal also stated, "I have not even met with the students individually to see if they are going to be willing to do that and I do not know their degree of motivation to come in after school and work on those specific areas." In this regard, in order to address this issue, this principal affirmed, "After-school tutoring is just a concept right now, that we are starting with this new counselor to see if we can pull ELL students after school and give them some extra help and support."

Most of the school leaders believe that another role in promoting students' success is to make sure that they access the resources and programs that are available at their school sites. However, they are aware that even though these programs are open to all students, they need to apply different approaches for culturally and linguistically diverse students to promote their participation in these programs. In this regard, one school leader stated that:

> School leaders need to find interpreters to help students to break down some of the language barriers, to put students in environments where they are comfortable. They need to work with professionals who help them to achieve both personally and academically.

In the opinion of 12 participants (46.15%), another important role is to help ELL students become prepared to succeed after their high school experience. One principal stated, "I must do everything within my power to help them to achieve that goal", while another school leader added, "It's the moral imperative of what we need to do for our ELL students." Unfortunately, this is a trend that does not seem to be prevalent among

school leaders in high school at AUSD because 14 school leaders (53.85%) did not express their concern in relation to this issue.

Research Question 5

How do perceptions about ethnic cultural proficiency influence the opportunities of high school principals and vice-principals to be reflective practitioners?

Qualitative open-ended interviews and open-ended survey questions as well as quantitative 4-point Likert-scales survey questions 23, 24, 25, and 26 were used to answer research question 5. The quantitative data reveal that there is a strong positive correlation between questions 23 and 24 in which school leaders take the time to reflect upon their role as leaders to meet the needs of ELL students and their feelings about being prepared to address the educational needs of their ELL students (Correlation is significant at 0.01 level (2 tailed) - Spearman's rho coefficient = 0.813, p = 0.000, N = 26). The qualitative data from open-ended interview questions and open-ended survey questions show that the majority of the participants are seeking different ways to reflect on their leadership practices. In their opinion, they need to spend more time in classrooms and reflect on teachers' practice and pedagogy, reflect on data from standardized tests, and reflect on the importance of formative and summative assessments for the achievement of ELL students. In their opinion, these reflections may help them to understand the challenges they face in their role as instructional leaders in meeting the needs of their ELL students and promoting their success in their schooling.

*Survey Question 23: I take time to reflect upon my role as a leader, as it pertains to meeting the needs of a diverse student population.*

The quantitative data show that of 26 school leaders, 16 (61.54%) agree and 10 (38.46%) strongly agree with Survey Question 23. This means that, in this study, 26 school leaders (100%) believe in taking time to reflect upon their roles as a leader in order to meet the needs of a diverse student population.

The qualitative data from the open-ended interview and open-ended survey questions show that principals believe that the school district is building ways to reflect what is happening for learning at the district level. Principals stated that they have monthly leadership academies, which meet every third Wednesday in which the school district provides trainings for all high school principals. This provides time for discussion about what they are doing and what needs to be done at their school sites. They also discuss the challenges faced by different students groups and subgroups and address ways to deal with these problems. In so doing, they believe that this is where the reflection about their leadership practice is built in. In other words, these principals believe that the school district is trying to make time for them to reflect upon their own beliefs, their school's mission, their core values, and how they can continue to improve themselves as leaders to better help their students. For example, one principal stated:

> Time is always that valuable commodity that we have a need for. As a district, I see the training for administrators going in a very nice direction, nice trend and my direct supervisor and his direct supervisor, and his direct supervisor are taking on more of a coaching model, helping us reflect, helping to give us time to reflect

on what we are doing for students and how we are doing it and why we are doing what we are doing and what we need to do differently. Can we do it better by changing our practices?

In order to become a more reflective practitioner in relation to the issues faced by ELL students, one principal affirmed that:

I need to spend more time reviewing the achievement level of our ELL students and dialogue with them about their specific needs. I believe that this is really one of the areas we have focused almost no attention on, because the ELL population in my school is so small. Even though they are small, they are still a subgroup that is underperforming when you compare them to our mainstream population.

Principals also stated that another opportunity for reflection concerning the challenges faced by ELL students is the time they spend in the classrooms because observations allow them to see what is going on with the achievement and performance of ELL students, especially in mathematics. Time in classrooms also allow principals to see how teachers are practicing their pedagogy, which in turn allows principals to reflect upon those practices and help their teachers to improve their pedagogical work and instructional practices.

Principals also pointed out that looking at formative assessments as well as summative assessments such as STAR and CAHSEE data also help them to reflect on their leadership practices. They believe that if ELL students are not progressing based on the data, they need to go deeper into the data to start looking at patterns and other variables such as length of stay in the United States, academic placement, and other

multiple forms of assessment. They stated that as they look deeper into the data, individual action plans for each student must be developed based on this data. Principals stated that looking at the data on a consistent and regular basis, individually and with expert support, help them to become more proficient in data analysis as well as more reflective in relation to the students' achievement and performance on standardized high-stakes test, especially for ELL students. In this regard, one school leader stated, "I have the opportunity to become more immersed in the data to help determine specific needs of ELL students because data help teachers to redirect or inform their instruction."

*Survey Question 24: I feel well prepared to address the educational needs of ELL students.*

The quantitative data show that of 26 school leaders, 4 (15.38%) strongly disagree, 11 (42.31%) disagree, 10 (38.46%) agree and 1 (3.85%) strongly agrees with Survey Question 24. According to the data, 15 school leaders (57.69%) do not feel that they are prepared to address the specific needs of their ELL students.

The qualitative data from open-ended interview questions and open-ended survey questions show that, in this study, school leaders face challenges in their roles as instructional leaders in meeting the needs of their ELL students as well as in promoting their success. They also expressed their concerns about finding ways to meet the needs of specific students' subgroups. In this regard, a school leader stated that:

Then I have to dig down into what, who are all students? Here it is a very diverse population of students and when I say diverse, I am not talking about the color of

their skin. I am talking about their level of success. For example, I have students

who are going to Harvard and I have students who are dropping out.

These participants also pointed out that one of the challenges they face is to find

programs that best help their ELL students to be successful in the school curricula. In this

regard, one school leader expressed this concern by stating, "There are programs galore

out there and finding which one works for your site, your situation, and the students you

have is the challenge." In this perspective, the majority of the school leaders stated that

another challenge is to make sure that students receive the same amount of instruction

and the same quality of instructional books and materials that mainstream students

receive. In other words, these school leaders expressed their concern about students'

equality concerning resources and implementation of rigorous instructional practices.

The majority of school leaders in this study also believe that they are not well

prepared to deal with the challenges faced by their ELL students such as the need to

provide time, resources, funding, and growth opportunities that help teachers to be well

prepared to assist their ELL students to perform and achieve in mathematics and other

school subjects. This means that these school leaders believe that they must provide

professional development opportunities for their teachers to help them to better

understand how ELL students learn as well as providing time for staff members who are

experienced in working with ELL students to have open and honest dialogue and share

their successful experiences with other staff members in their school sites. They also

believe that they need to bring in the research and have experts speak about best practices

that work for ELL students.

Another challenge faced by the participants in this study is to find pedagogical ways that break the communication barriers that exist between teachers and ELL students in the teaching-learning process. School leaders believe that, even though all teachers have been CLAD trained, they need more staff development in order to address the specific needs of their ELL students. In their opinion, another challenge is to deal with the lack of teachers' understanding that ELL students are able to succeed at different rates. For example, in the opinion of one principal, "This lack of understanding happens because most teachers do not see themselves as qualified to teach ELL students, although they have received the CLAD credential."

While more than half of the school leaders in this study feel that they are not well prepared to deal with the challenges faced by their ELL students, they believe that they have an important role in promoting academic success. They need to be supportive and provide resources and learning opportunities for both teachers and students alike. In their opinion, learning opportunities can be provided through ongoing staff development, coaching, increased classroom visitations, peer coaching and the opportunity to attend workshops that address students' cultural and linguistic issues. In addition to standard textbooks, resources might include supplemental materials and expert speakers. In this regard, one school leader stated, "I need to have a supportive role as a school leader who provides learning opportunities and resources for my staff.

*Survey Question 25: I seek ways to develop my cultural proficiency for understanding the cultural background and academic needs of ELL students.*

The quantitative data show that of 26 school leaders, 5 (19.24%) disagree, 17 (65.39%) agree, and 4 (15.38%) strongly agree with Survey Question 25. Overall, 21 (80.77%) out of 26 school leaders believe that they are seeking ways to develop their cultural proficiency for understanding the cultural background and academic needs of their ELL students.

The qualitative open-ended interviews and open-ended survey data show that school leaders reach this goal in different venues such as by attending different professional development trainings, doing research, reading books and journal articles, participating in group discussions and collaboration on Thursdays[23], attending district trainings, seminars, and workshops, taking related classes, and discussing ideas with the district office. For example, one school leader stated, "I first got my CLAD credential some years ago, but recently returned and went through SDAIE training to sharpen my understanding of current thought in instructional modification for ELL instruction." Another school leader affirmed, "I am looking for ways, attending workshops, to better assist my teachers in teaching to diverse cultures and ELL abilities."

These school leaders also stated that they are trying to interact with ELL students and their families and they are attempting to gain additional knowledge about ELL students' cultural background and learning, but they are often dealing with many

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[23]There are different kinds of meetings on Thursdays. In general, they are related to professional development and staff training concerning technology and strategies, departmental collaboration, and other issues related to the necessities of the school and the staff.

challenges that hinder their sole focus on ELL students. They also believe that the

acquisition of additional knowledge about their ELL students help them to understand the

context of ELL students lives and learning experiences. In this regard, one school leader

stated, "I am interested in different cultures and discussing those differences with the

students I meet. In that way I strive to further my understanding of the cultural diversity

at my site." Along this perspective, another school leader affirmed, "I am a multi-lingual

educator with experience living overseas and bring an empathetic lens to the challenges

facing our ELL population."

On the other hand, the quantitative data show that 5 school leaders (19.23%)

disagree with the premise that they seek ways to develop their cultural proficiency for

understanding the cultural background and academic needs of their ELL students.

According to the quantitative data, 2 school leaders (7.69%) stated that they have no time

for this type of professional development, 2 school leaders (7.69%) stated that they do not

know enough about the content to elaborate upon the question, and 1 school leader

(3.85%) affirmed, "I have not thought about this issue prior to this study".

*Survey Question 26: Student's ethnic and cultural backgrounds influence my decision making process.*

The quantitative data show that of 26 school leaders, 9 (30.77%) disagree and 17

(65.38%) agree with Survey Question 26. In this regard, 17 (65.38%) out of 26 school

leaders believe that students' ethnic and cultural backgrounds influence their decision

making process. The quantitative data also show that 3 school leaders (11.54%) did not

know enough about the content to elaborate upon the question and 2 school leaders (7.69%) have not thought about this issue prior to this study. According to the qualitative open-ended interview questions and open-ended survey questions, school leaders do not have self-awareness in relation to this issue. Since school leaders are responsible for the decision making process, it is necessary for them to possess some knowledge in relation to issues concerning ELL students.

The qualitative data from open-ended interview questions and open-ended survey questions show that students' ethnic and cultural backgrounds influence school leaders' decision-making process only to the extent of trying to meet the needs of their ELL students such as providing SDAIE classes whenever possible to give ELL students' additional support from trained teachers who use best practices. These school leaders also stated that there are probably isolated instances of their decisions being influenced by cultural differences. In these situations, they believe that they encourage the inclusion of cultural differences in their decisions related to the improvement of the school culture. For example, one of the school leaders stated, "Culturally, our school is quite diverse. Understanding and collaborating with cultural diversity enriches the school and its students; therefore, I consider cultural and ethnic differences in most all school decisions."

In this context, these school leaders believe that there are always different ways to tackle the same problem, some of which might be more effective depending on the ELL students' cultural background. However, they believe that it is important to be fair to all students. They also believe that they need to understand their ELL students' cultural

background and develop better ways to communicate with ELL students and their

families. In this regard, one school leader stated, "Often resources I choose to offer ELL

students are available according to their cultural identification." In this regard, another

school leader affirmed, "I try to make sure I understand a cultural perspective before

making decisions." In their opinion, they also believe that students' ethnic and cultural

differences influence their decision making process in the elaboration of the individual

education plan and in how to assist ELL students in accessing the school curricula.

The quantitative data also show that 9 school leaders (34.62%) believe that the students'

ethnic and cultural differences do not influence their decision making process because

students on a high school campus "know the rules, regardless of their linguistic and

cultural backgrounds, and they need to be treated fairly with equality." However, this

seems rather limited because equity does not seem to be possible in all cases, all the time,

where sometimes school leaders may not really treat every student in the same way.

According to Scheurich and Skrla (2003), there is something wrong in the way school

leaders and teachers are operating their schools and classrooms or in the way they are

treating their students, especially, students from minority groups such as ELL students. In

other words, school leaders and teachers must be committed to affirming diversity by

facilitating dialogue with students, families, staff, and with the stakeholders in the school

community. Communications and ongoing dialogue would ground affirming schools and

school districts and prepare school leaders to lead diverse schools to equitable student

academic success.

In this context, some school leaders believe that students are all equal and should not be discriminated either for or against. For example, a school leader stated, "I try to be fair and objective in my decision making process." This implies that these school leaders have the same rules and procedures for all students because in their opinion it is important to maintain consistency in their actions. In so doing, one school leader stated, "I do use different approaches with different students but ultimately make decisions based on what is best for students regardless of their ethnic or cultural differences."

Summary

This chapter presents a review of the purpose of the study and the problem statement. It also presents the research questions, data collection procedure and a brief discussion about the importance of the response rate for the study. As well, this chapter presents the reader with a discussion related to non-participation rates as well as its possible reasons. The data analysis and findings from the principals' interviews and principals and vice-principals surveys are also presented in this chapter.

In this mixed-methods study, the interviews were composed of 24 open-ended questions and the principals and vice-principals' survey was composed of 30 Likert scale questions with 10 open-ended questions. A descriptive univariate and bivariate analysis for quantitative findings as well as qualitative analysis for qualitative findings were all presented. Qualitative themes that emerged from the qualitative data were also presented and discussed. Quantitative and qualitative data analysis and reporting for each of the five research questions and sub-questions were also included in the chapter.

In this study, the analysis of the data reveals that school leaders possess some knowledge about the diversity of the students in their schools and that they need to learn about the backgrounds of their ELL students in order to value the cultural perspectives and languages these students bring to their schools. The majority of the school leaders have limited experiences concerning the relationship between mathematics and culture. However, they believe that an emphasis needs to be placed on the cultural and linguistic backgrounds of ELL students as a resource for their learning and curricular activities. The data also reveal that some school leaders do not seem to be aware of the impact of ELL students' ethnic cultural background on their performance on standardized high-stakes tests, yet these same leaders are concerned about how to find ways to improve the academic performance of these students in mathematics assessments. The majority of school leaders in this study believe that most ELL students try harder academically than their non-ELL counterparts and put extraordinary effort into trying to do their best in standardized assessments.

The quantitative and qualitative data show that the role of the school leaders in closing the achievement gap of ELL students is to provide opportunities across the curriculum to support teachers' needs through professional development in applying instructional practices as well as to promote the implementation of a school-wide range of pedagogical approaches in all subject areas, especially in mathematics. The majority of school leaders believe that students' cultural backgrounds influence their decision making process only to the extent of trying to meet the needs of their ELL students. However,

these school leaders also stated that there are probably isolated instances of their decisions being influenced by cultural differences.

A complete discussion of the findings of this study is addressed in chapter 5, which also contains the implications of the study, and recommendations for practice and further studies.

Chapter 5

SUMMARY, DISCUSSIONS, IMPLICATIONS, RECOMMENDATIONS, AND

CONCLUSIONS

I hope that this study will contribute towards scholarship that assists educational leaders

to develop ways in which to close the achievement gap in regards to their ELL

population. As well, it is hoped that this research will contribute as well towards a better

understanding of how to meet the specific needs of our ELL students. I would like to

specifically see the perceptions of other instructional leaders in the district in relation to

ELL students and how their perceptions may change based on the results of this study

(Principal School C).

Introduction

Chapter 5 presents a summary of the study, which includes a brief description of

its purpose, a review of the research questions that guided the study, a synopsis of related

literature, a description of the methodology, and the findings. The summary is followed

by a discussion of the findings, which is presented through a structured review of answers

from the five research questions as well from the five themes that emerged from the

qualitative data. Chapter 5 also includes a discussion of the recommendations for practice

and recommendation for further studies. The theoretical contribution of this study to the

existing body of literature is also addressed in the implications section of the chapter.

Finally, the researcher presents in this chapter a brief conclusion of the study.

Summary of the Study

Many school districts face the challenge of increasing ELL populations. The demand for high school leaders who effectively manage and harness complex linguistically and culturally diverse schools is growing rapidly. As California becomes ever more multicultural, successful leadership will come only to those school leaders who have and understand the skills to respond appropriately to these cross-cultural challenges. This trend has a tremendous effect on high schools in California, especially those with higher percentages of ELL students because high-school leaders are accountable for the achievement and performance of ELL students on standardized high-stakes tests in mathematics. This is crucial when ELL students are expected to be proficient on the CAHSEE and CST examinations.

This study identified specific perceptions of school leaders in the nine high schools at AUSD that contribute to the way that these leaders help ELL students and influence ELL students' performance on standardized assessments. The results of this study may be used to inform high school leadership about what preparatory program and professional development most contribute to efficacy about how to utilize existing experiences to further enhance their school leaders' cultural proficiency awareness. An additional benefit could be gained as principals and vice-principals reflect on their perceptions about ELL students and utilize the findings of this study to further understand the very importance of their perceptions. Leaders can build on their understanding of the influence of ELL students' cultural background in achievement and performance in school activities.

*Purpose of the Study*

One of the purposes of this study was to develop an understanding of the association between culture and mathematics by the identification, through the investigation of linguistic and cultural backgrounds, of cultural factors that may explain differences in student mathematics achievement. This study offered an inductive analysis of various data themes that emerged from open-ended interview questions and open-ended survey questions. As well, the analysis looked at data that revealed how students' cultural background plays an important role for principals and vice-principals in high schools that have ELL students and how these school leaders come to entertain alternative viewpoints of their students' linguistic and cultural backgrounds and its influence on standardized mathematics high-stakes tests. The key point was related to the focus on culture and its connection to mathematics education, which may generate different kinds of school climates that utilize students' existing knowledge in order to better impart mathematical knowledge: a sense of connectedness to students' cultural experience and mathematics into schools heightens their motivation to learn, leading to an increase in their achievement in mathematics and overall mathematics performance.

*Research Paradigm*

The research paradigm chosen for this mixed-method research was that of dialectical perspective, in which the researcher applied both pragmatism and transformative-emancipatory paradigms to conduct the study. In applying the pragmatism paradigm, the researcher combined deductive and inductive approaches by mixing both

qualitative and quantitative research methods, which involved different forms of data collection and analysis. The researcher also applied some aspects of the transformative-emancipatory paradigm by placing importance on the challenges faced by ELL students on their achievement on standardized high-stakes tests in order to promote educational success for this marginalized group of students (Mertens, 2003; Tashakkori & Teddlie, 2009).

*Theoretical Framework*

Cultural and social environments are central to learning because they play a role in communicating and receiving information and in shaping the thinking process of school leaders, teachers, and students (D'Ambrosio, 1990). The theoretical framework used to analyze the findings of this study was Culturally Relevant Education (Ladson-Billings, 1995), which acknowledges, responds to, and celebrates students' linguistic and cultural backgrounds by offering full and equitable access to education for students from all cultures. Since Culturally Relevant Schools, Culturally Relevant Leadership, Culturally Relevant Pedagogy, and the Cultural Aspects of Ethnomathematics are interrelated to Culturally Relevant Education (D'Ambrosio, 1990; Gay, 2000), the findings of this study were also framed by the application of these theoretical approaches.

*Research Questions*

In this study, the following research questions provided a guideline for the investigation of school leaders' perceptions concerning ELL students:

1. What are the general perceptions of high school principals and vice-principals in relation to their ELL population?

    a) What is the relationship between their perceptions and teachers' approaches to the schooling of ELL students?

2. What are the perceptions of high school principals and vice-principals as to the role of culture in the academic success of ELL students in their schools?

    a) What are their perceptions about ELL students' cultural background as challenges to academic performance on mathematics standardized high-stakes tests?

    b) How do they use these perceptions to promote a school climate that helps ELL students to perform better on mathematics standardized high-stakes tests?

3. What is the relationship between the perceptions of school leaders concerning ELL students and their depth of understanding of the effects of the cultural background of ELL students has on their academic performance in mathematics?

    a) What kind of ethnic cultural background knowledge do high school principals and vice-principals believe they possess to improve the academic performance of ELL students in mathematics?

4. What are the high school principals and vice-principals perceptions of ELL students' performance on standardized high-stakes tests in mathematics?

    a) How do they perceive the influence of their roles in closing the achievement gap of ELL students in mathematics?

5. How do perceptions about ethnic cultural proficiency influence the opportunities of high schools principals and vice principals to be a reflective practitioner.

*Review of Related Literature*

One of the challenges faced by the educational system in the United States is the growing number of students from linguistically and cultural diverse backgrounds (Obiakor & Utley, 1997) coupled with an increasing number of ELL students with comparatively low academic performance in standardized high-stakes testing. In this regard, Gándara, Maxwell-Jolly, and Benavídez (2007) affirmed that statewide measures of achievement indicated that English language learners in Californian schools are not performing well. They also stated that the performance of ELL students in mathematics is far below basic when compared to their English-speaking peers: in comparison to ELL students, almost twice as many English fluent students pass the high school exit exam mathematics section and almost three times as many English fluent students score at basic or above in Geometry. Therefore, both cultural and linguistic diversity draw increased attention by many educators and researchers as areas identified as having connections to failed educational systems. In this context, there is an emergent sense of urgency to resolve this inability to effectively educate all students, including ELL students. According to Valencia, Valenzuela, Sloan, and Foley (2001), the inability of the educational system to teach minority students, such as ELL students, is of great concern because they are the fastest growing segment of the student population in the United States.

In particular, the role of high school leaders plays a vital importance for ELL students because this role influences the learning experience outcomes for these students as well as their transformation into active and empowered members of society (Fulan, 2001). Furthermore, school leaders need to understand the complex relations of ELL students' cultural and linguistic backgrounds to school performance and achievement in mathematics. In this regard, it is crucial that these leaders become sensitive to the multicultural needs of their students (August & Hakuta, 1997; Cummins, 2000). School leaders also need to recognize and address any preconceived notions that they might have about students' linguistic and cultural backgrounds in order to grow as educators and culturally relevant leaders. Along this line, Scheurich and Skrla (2003) stated, "a leader for equity and excellence understands that the most important issue in public education is creating schools that are both equitable and excellent" (p. 100).

The primary purpose of this study's review of literature was to provide research related to the topic for investigation: the perceptions of high school leaders in relation to ELL students and the influence of ELL students' cultural backgrounds on mathematics standardized high-stakes assessments. The second purpose was to add to the body of knowledge regarding perceptions held by high school leaders who work with ELL population and the identification of factors that influence those perceptions. In so doing, the review of literature explored relevant issues in regards to perceptions high school leaders possess in relation to their ELL students. Particularly, characteristics of the changing student population found in today's educational system in the United States were also presented. The review of literature also presented research related to the

achievement gap of English language learners on mathematics standardized high-stakes tests. The discussion continued with a review of literature regarding Culturally Relevant Education, which currently serves as the standard and research-based theoretical framework for Culturally Relevant Schools, Culturally Relevant Leadership, and Culturally Relevant Pedagogy. Finally, a comprehensive review of the cultural aspects of mathematics through the study of ethnomathematics was also part of the literature analysis.

The review of literature also supported the conclusion that there is a growing concern about and awareness of the need to fully understand diversity in public schools in the United States. Furthermore, there is a necessity for the development of an educational system that meets the specific needs of all its learners, especially a growing and equally deserving ELL population.

*Methodology and Procedures*

A mixed-methods approach was used in this study to "build on the synergy and strength that exists between quantitative and qualitative research methods in order to understand a phenomenon more fully than is possible using either quantitative or qualitative methods alone" (Gay, Miles, & Airasian, 2006, p. 490). In this regard, Patton (2002) suggested that researchers use mixed-methods "to be responsive to the nuances of particular empirical questions and the idiosyncrasies of specific stakeholder needs" (p. 585). Data collection instruments included interview and survey protocols. The interview protocol was composed by 24 open-ended questions and the survey protocol was

composed by 30 four-point Likert scales and 10 open-ended questions. The researcher also discussed various stages of the data collection process and described the components applied in data analysis as well as methods to assure the reliability and validity of the study.

## Summary and Discussion of the Findings

In this study, the examination of the high school leaders' perceptions in relation to ELL students revealed a variety of findings. Six categories of findings were identified from the quantitative data analysis through the univariate and bivariate descriptive statistics. Data was collected from both 30 four-point Likert-scale questions as well as from an inductive analysis of the five themes that emerged from the qualitative data collected from 24 open-ended interview questions and 10 open-ended research questions.

### Category 1: General High School Leaders' Perceptions in Relation to ELL Students

ELL students face several unique challenges. They need to learn the broad concepts related to culture in the United States through a process of acculturation as part of learning English. Whether in the context of English Language Development (ELD) or academics, school leaders teach basic cultural information that includes behavior, norms, and expectations. This part of the training and learning process is just as important as any linguistic, academic, and technical knowledge ELL students gain in their schooling.

The researcher's intention was to examine general perceptions school leaders held with regard to their ELL students and the schooling experience by investigating

principals' and vice-principals' perceptions about ELL students, including their

knowledge about culture and the challenges in identifying the needs of ELL students. The

researcher's purpose was to examine the degree to which school leaders embraced the

principle of affirming the cultural and linguistic background of their ELL students, their

knowledge base, and their perceptions about these issues. It was also the researcher's

intention to verify whether school leaders were knowledgeable about the various cultural

groups represented by students in their schools. In so doing, the findings in this category

are as follow.

*Finding 1.1*

In this study, the qualitative and quantitative data analysis revealed that a great

majority of the high school leaders at AUSD believe ELL students need to maintain their

cultural backgrounds while becoming acclimated to the mainstream culture through the

use of adequate resources that help these students reach this goal. In this study, this is an

important factor because the quantitative data show a strong positive correlation between

the need for ELL students to maintain their cultural background while becoming

acclimated to the mainstream culture and the availability of resources that assist teachers

in their instructional work with ELL students (Correlation is significant at 0.01 level (2-

tailed) - Spearman's rho coefficient = 0.811, p = 0.000, N = 25).

*Finding 1.2*

According to the quantitative data, 25 (96.15%) school leaders believed all

students, including ELL students, could achieve high academic standards in mathematics.

In their opinions, all students are capable of high achievement when they apply

themselves to the learning process. In their opinions, factors that may contribute toward

the achievement of ELL students in mathematics are teachers, strategies, support,

curriculum, and students' engagement in school activities. However, the results of both

quantitative and qualitative data show the majority of school leaders believed no adequate

resources were available to assist teachers in their pedagogical work with ELL students.

Even though they believe there are enough instructional materials at their disposal, these

materials still need to be appropriate to the needs of their ELL students by addressing the

cultural and linguistic challenges they face in their schooling. The school leaders

demonstrated a professional commitment to help ELL students succeed in their schools.

In so doing, the quantitative data show there is a strong relationship between school

leaders' beliefs that teachers apply adequate pedagogical approaches with their ELL

students and the necessity that these students maintain their linguistic and cultural

backgrounds in their learning and acculturation process (Correlation is significant at 0.01

level (2-tailed) - Spearman's rho 0.805, $p = 0.000$, N = 25).

*Finding 1.3*

The quantitative data reveal that 22 (84.62%) participants were knowledgeable

about different students' cultural backgrounds in their schools. The qualitative data

support this finding because school leaders' responses with regard to general perceptions

of their ELL students indicate evidence that participants possess some knowledge about

the linguistic and cultural diversity of their students. The data analysis also reveals that

the knowledge that school leaders possess about ELL students comes from professional

development opportunities provided by the school district, from their own experience on

the job, from professional readings, and from participation at congresses and conferences.

Hence, there is a strong positive correlation between school leaders' priorities to learn

about ELL students' cultural backgrounds and the availability of adequate resources to

assist ELL teachers in the instruction of their ELL students (Correlation is significant at

0.01 level (2-tailed) - Spearman's rho 0.815, p = 0.000, N = 26).

School leaders are also aware that they must be knowledgeable about the different

cultural groups represented in their school community. In this regard, there was a strong

positive correlation between school leaders being knowledgeable about the various

cultural groups represented by the students in their schools and their necessity to

participate in professional development that prepares and helps them to address the

learning needs of ELL students (Correlation is significant at 0.01 level (2-tailed) -

Spearman's rho coefficient = 0.804, p = 0.000, N = 25).

*Finding 1.4*

The majority of the school leaders in this study believed there was a need for a

school-wide pedagogical approach to working effectively with ELL students because, in

their opinion, teachers do not apply adequate pedagogical approaches in their work with

ELL students. Therefore, to modify this situation, the school leaders believed it was

necessary to provide more professional development and ongoing support for teachers to

acquire a broader range of instructional strategies that meet the specific needs of ELL

students as the ELL population continues to grow. Even though the majority of the school

leaders possess enough knowledge about student diversity, they believed they needed to

learn more about the ELL students' different linguistic and cultural backgrounds in order

to value the cultural perspectives and languages the students brought to their schools. In

other words, participants in this study perceived the need for more professional

development in how to deal more effectively with challenges faced by ELL students for

school leaders and teachers.

*Finding 1.5*

Participants in this study are seeking ways to improve the academic achievement

of all students by expressing their concern about the academic success of ELL students.

The qualitative and quantitative data in this study show that the school leaders are trying

to push staff and students toward achieving higher goals and that they are searching for

instructional methods and pedagogical approaches to better address the needs of all

students, especially the specific needs of ELL students. According to the data analysis, it

is the school leaders' intention to use instructional approaches that influence the

achievement of all students, especially ELL students, through a variety of strategies and

pedagogical approaches that relate students' previous experiences, interests, and school

curricula. In this perspective, the quantitative data reveal a strong positive correlation

between school leaders' priority to learn about ELL students' cultural background and their beliefs that teachers apply adequate pedagogical approaches in their work with ELL students (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.881, p = 0.000, N = 25).

*Finding 1.6*

The major evident pattern this researcher gathered from the data of the interview and survey responses was that the majority of the participants in this study were honest in recognizing their own professional needs and the ways that those needs can be met. They were also willing to make an effort and invest time to get to know their students and educate themselves about leadership strategies more suitable to these students. Thus, the quantitative data show a strong positive correlation between school leaders' needs to participate in professional development that helps them address the needs of culturally diverse students and deal with the challenges associated with ELL students and school leaders' participation in professional development training such as multicultural and diversity courses that prepare them to address the learning needs of ELL students (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho coefficient = 0.808, p = 0.000, N = 26).

*Discussion of the Findings*

When school leaders accept that students learn in different ways, they face daily decisions about uniformity and diversity and the necessity to develop alternative

curriculum and assessment measures. However, a deep awareness of diverse linguistic and cultural backgrounds requires a commitment to the belief that all students can be successful learners. In this regard, Pate (1982) stated that school leaders who feel genuine pride in their own ethnic group are most apt to accept other ethnic groups. The researcher considers this statement to be true for the school leaders who work in high schools in AUSD.

The more school leaders in the nine high schools at AUSD positively perceive and understand the beliefs, values, norms, and traditions of ELL students, the more opportunities open for the students to reach academic success in all subject areas, especially in mathematics. Knowledge of students' cultural diversity is part of the process that facilitates participants in this study to identify and consider a teaching-learning environment responsive and relevant to the academic needs of ELL students in their schools. In other words, when ELL students recognize that school leaders take cultural background and language seriously enough to learn about it, these students feel their language and culture are valued and respected, which motivates them to fully participate in the learning process.

Accordingly, Abt-Perkin and Rosen (2000) argued that before school leaders and teachers can address the linguistic and cultural needs of their students, they must first become aware of the influence of their own culture so that they may see how their own assumptions and perceptions create obstacles for an effective teaching-learning process for ELL students. In this context, it is important that the participants in this study

recognize that valuing diversity means giving students space in which they are able to practice their own culture while learning the aspects of the new culture.

Furthermore, Scheurich and Skrla (2003) argued that the more school leaders know about their students' languages and cultural backgrounds, the better they are able to interpret their behavior and attempts at communication. The knowledge of students' linguistic and cultural backgrounds may help the school leaders in this study to examine their own leadership practices and become more sensitive in order to provide diverse learning experiences by improving instructional pedagogies and methodologies for students that result in improving instruction for all students, especially ELL students.

Along this line, if the learning experience is adjusted to accommodate the different learning approaches of ELL students, school leaders may be able to use ELL students' strengths to further their academic schooling. In this new learning environment, ELL students are also able to learn the content of the school curricula through a variety of pedagogical practices and appropriate resources that best meet their educational needs. The analysis of both qualitative and quantitative data show some evidence that school leaders are moving in the right direction toward acknowledging and valuing the diversity that exists in their school sites.

In so doing, school leaders in the nine high schools at AUSD must be encouraged to be aware of their students' differences to adequately provide better services for students from linguistic and culturally diverse backgrounds. Transformative school leaders who understand the above concepts consciously attempt to respond to the diversity ELL students bring to their schools. This means that the participants should

approach diversity not as a concept but as an action. In other words, when they embrace

diversity, they honor and respect students whose life experiences differ from their own

but are equally important. This also means that school leaders must listen to, seek to

understand, and validate students' points of view and different cultural experiences. It

requires them to step outside the constructs of their own cultural realities and self-

perceived worlds to freely view life through the lens of the students. School leaders and

students are all members of the school community in which cultural diversity is often not

a lived reality. However, such school leaders who embrace diversity must become

constant seekers of the students' cultural knowledge. To forge relationships with

students, teachers, families, and communities, they must realize that they must be able to

better understand them culturally. Honoring and embracing diversity challenges school

leaders in this study to explore their own personal perceptions about diversity and

different cultural and linguistic groups. It also requires school leaders to consciously

recognize the ways in which their perceptions shape their behavior toward students. The

genuine acceptance of diversity always begins with one's self. They have to acknowledge

the feelings of discomfort they hold and confront these feelings, then challenge

themselves to open their minds.

According to Haberman (1999), high expectations are critical for students'

achievement and should permeate the school climate regardless of students' cultural,

linguistic, or socioeconomic backgrounds. In the opinion of the majority of the school

leaders in the nine high schools at AUSD, they must reflect about the creation of a school

environment that maintains high expectations for all students and uses standards-based

instruction, benchmarks, and data analysis in their decision making process. In this perspective, Goldenberg and Sullivan (1994) and Minicucci and Olsen (1992) posited that culturally relevant school leaders advocate for higher expectations for ELL students. In this study, the common theme among the participants was that they recognize that they need to hold the same high expectations and standards for their ELL students that they hold for the other student subgroups in their schools. The quantitative and qualitative data also reveal that school leaders' high expectations may influence teacher-student interactions and ELL students' academic outcomes. On the other hand, some of the participants linked their leadership expectations with the kind of interaction they establish with their students, the type of learning environment they create, and the system they praise to affirm dignity and worth of their students' linguistic and cultural backgrounds. This means that setting high expectations for ELL students is just as critical as designing effective instruction for their learning.

In the context of this finding, culturally and linguistically diverse students represent both an opportunity and challenge for school leaders to value and promote the understanding of diversity in their schools. In this study, the analysis of both quantitative and qualitative data show that school leaders and teachers may achieve this goal through participation in professional development opportunities that specifically focus on the needs of their ELL students. For example, one school leader stated that:

As an administrator I am always looking for ways to better assist my teachers in teaching culturally and linguistically diverse students. I participate in professional development; attend conferences, and read journals and books related to this area.

In this regard, the school leaders who were interviewed stated that it is necessary to develop and implement professional development for both school leaders and teachers to better serve their ELL population. A brief discussion about professional development for both school leaders and teachers is given next.

*Professional Development for Teachers*

The majority of the school leaders in this study agreed there is a need for teachers to be provided with information on instructional classroom practices that complement ongoing research on the effective teaching of ELL students. Since the leaders believed that teachers do not apply adequate pedagogical approaches in their work with ELL students, it is important to shape teachers' instruction to guide classroom pedagogical practices via appropriate support from their school leaders. In the opinion of the school leaders, the adequate use of those practices contributes to the accurate measurement of ELL students' achievement in state and federal accountability systems. Hence, teachers need be encouraged and supported in learning to develop effective instructional strategies through professional development (Zepeda, 2008). As stated by one school leader, "Teachers need more professional development to acquire a broader range of instructional strategies that meet the needs of ELL learners."

*Professional Development for School Leaders*

Even though the majority of the participants had been exposed to professional development related to diversity issues, many were still seeking educational, cultural, and

linguistic professional development opportunities that strengthen their cultural sensitivity, knowledge, and leadership skills, while others relied on their years of experience as educators and any other professional experiences the school or school district provided them. Participants acknowledged the need for more professional development that would help them to deal more effectively with ELL students. However, O'Donnell, Tharp, and Wilson (1993) argued that the planning for professional development is not enough because creating a sense of community is essential and may significantly improve the school-learning environment. In so doing, school leaders need to be well prepared to emphasize the everyday concerns of their students, which should be incorporated into the design of school activities.

Participants in this study may not be able to meet the specific needs of their ELL students unless they:

a) Develop positive attitudes toward all students and their abilities to learn,

b) Develop skills in differentiating instruction, acquire knowledge of cultural perspectives and developmental needs, strive and celebrate diversity, promote equity for all, and

c) Learn how to apply these understandings in their own schools.

To reach the above goals, school leaders need to participate in professional development opportunities that address the above issues (Taylor & Sobel, 2001). According to Zepeda (2008), effective professional development is one highly effective systemic approach to supporting ELL students because it can fuse knowledge of cultural differences, instructional strategies, and curriculum knowledge in order to provide

teachers with culturally relevant pedagogy. In this context, it is important that school leaders in the nine high schools at AUSD recognize the existent and needed professional development support that helps them improve their leadership skills.

Category 2: The Role of Culture and Language in the Academic Success of ELL Students

While questions about the relationship between mathematics and culture are not easy to address, they are crucial and should be contemplated. Because of the changing demographics of student populations in the nine high schools at AUSD, reflections and discussions about the relationship are vital to the education of ELL students. In so doing, there is an immediate need for school leaders and teachers to be able to work with a wide variety of students who are diverse in their cultures, languages, and learning styles.

In this regard, the discussion of the findings in this category addresses issues concerning the connections between culture and language in the academic achievement of ELL students. It embraces the belief that language and culture may influence the performance of ELL students on standardized high-stakes examinations. It was the researcher's intention to find out if principals and vice-principals have a clear awareness and understanding of the diversity of their student population in order to help students, especially ELL students, in their achievement in mathematics-standardized assessments. In this context, the findings in this category are as follows.

*Finding 2.1*

The results from both qualitative and quantitative data reveal that the majority of the participants in this study believed culture plays an important role in the academic success of ELL students in mathematics. For example, 10 (38.4%) school leaders believed their own cultural background influenced their own learning of mathematics during their own schooling. In so doing, the particular school leaders agreed that the cultural backgrounds of their ELL students influences performance in mathematics standardized high-stakes assessments because students are unfamiliar with how mathematics is interpreted in the United States. However, from the leaders' points of view, school leaders and teachers need to develop connections with ELL students and make better use of the richness of the many cultures in schools and classrooms in order to assist students by creating a stronger connection to the learning process. Leaders believe that weaving students' linguistic and cultural backgrounds into any curriculum can demonstrate an appreciation for students' cultural background. According to the quantitative data, there is a strong positive correlation between the school leaders' belief that culture plays an important role in the academic success of ELL students and their belief that ELL students approach mathematical problem-solving differently due to their unfamiliarity with the cultural context of the mainstream culture (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.801, $p = 0.000$, $N = 25$).

*Finding 2.2*

The majority of school leaders in this study believe mathematics is a universal language and that its procedures are the same in all cultures. The school leaders did not see a relationship between mathematics and culture and did not have a deep understanding of mathematics, considering it to be mostly arithmetic and algebra. In other words, they did not see the connections between culture and mathematics because they were not aware of the influence of ELL students' cultural background had on their performance on standardized high-stakes tests. For example, 16 (61.54%) school leaders did not believe their cultural background influenced their own learning of mathematics when they attended schools.

They pointed out that they had limited experiences concerning the relationship between mathematics and culture, yet they believed emphasis needed to be placed on utilizing the linguistic and cultural backgrounds of ELL students as a resource for their learning and curricular activities. In their opinions, it is necessary to place attention on the cultural perspectives ELL students brought to their schools as a resource to approach that information. In this regard, the quantitative data show there is a strong positive correlation between school leaders' beliefs that ELL students are able to achieve high standards in mathematics and school leaders' beliefs that mathematics is a universal language and its procedures are the same in all cultures (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.842, $p = 0.000$, $N = 25$).

*Finding 2.3*

The majority of the school leaders in this study believed the gaps in performance of their ELL students were partly due to the impact of language, as opposed to cultural factors, on standardized mathematics assessments. The reasoning is that most mathematics curricular activities and assessments rely heavily on the English language as the basis for instruction. The school leaders have the perception that most of the challenges faced by ELL students with mathematics achievement are linked only to language problems. In the school leaders' opinions, since ELL students receive the same amount of instruction and have access to the same materials and curriculum, ELL students are not disadvantaged in their learning process because their mathematical learning is inadequate to their needs when compared to their counterparts.

*Finding 2.4*

In this study, the quantitative and qualitative data show that the majority of the school leaders believed ELL students do not approach mathematical problems differently than non-ELL students due to their unfamiliarity with the cultural context of the mainstream society. They believed ELL students must become acclimated to the academic language of the school curricula to better perform in school activities as well as on standardized high-stakes assessments in the core curriculum, including mathematics. In order to do so, they agreed it was important to create a school climate in which all languages and cultures are equally valued. In so doing, the school leaders believed they must create a school culture in which native English-speaking and ELL students achieve

high standards in mathematics while working and learning with each other in a climate of mutual respect. Thus, there is a strong positive correlation between school leaders' perceptions that creating a school culture in which native-English speakers and ELL students achieve high standards in mathematics and school leaders' perceptions that culture plays an important role in the academic success of ELL students (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.856, p = 0.000, N = 25).

*Finding 2.5*

The majority of the school leaders in this study perceived language to be an important factor that influences ELL students' performance in mathematics instruction and assessments. In their opinions, some of the language factors that influence mathematics performance are difficult vocabulary and words with mathematical meanings different from their everyday meanings[24] . In relation to word problems, the quantitative and qualitative data show that the school leaders believed one of the difficulties associated with the above problems is that they are either set in artificial contexts or lack context altogether[25], which in the leaders' opinions, may create confusion, even for native English speakers. To address the above issues, the majority of the school leaders agreed it was necessary to provide professional development on instructional strategies that integrate the teaching of academic mathematical language and the learning of a second language by focusing on the systematic use of various strategies

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[24]See Perkins and Flores (2002) and Rosa and Orey (2007).
[25]See Rosa and Orey (2007).

and pedagogical practices that help ELL student retain mathematical vocabulary, concepts, and content.

*Discussion of the Findings*

Some school leaders in this study provided statements that demonstrated some understanding of the linguistic and cultural differences of their ELL students, yet they did not seem to have an adequate comprehension or knowledge about the direct link between culture and mathematics. Thus, the participants did not demonstrate a clear understanding of the influence of cultural differences on the performance of their ELL students in mathematics assessments.

The review of literature shows that ELL students have an extensive knowledge of mathematical ideas and practices deeply rooted in their own culture, traditions, and daily lives. According to Kawagley (1990), it is important for school leaders and teachers to tap into this reservoir of traditional knowledge. Thus, ongoing dialogue and professional development about this relationship may provide school leaders and teachers in the nine high schools at AUSD with valuable information that may help ELL students be successful learners. Even though culture is embedded in language, most school leaders in this study were not aware of its influence in the learning of mathematics. As a result, they may fail to see culture as it explicitly relates to the teaching of the school curricula, especially in mathematics. Precisely because culture is what people take for granted, the majority of the school leaders at AUSD may often be unaware of the norms and

expectations that govern their behavior until those norms are not followed by someone who is unfamiliar with their culture (D'Ambrosio, 1993).

On the other hand, many scholars believe mathematics activity is highly cultural (D'Ambrosio, 1990; Eglash, 1997; Rosa & Orey, 2008). For example, Dossey (1992) asserted that mathematicians do not agree on the nature of mathematics, debating whether or not it is bound by culture (internalists) or culture-free (externalists). Internalists such as Bishop (1988) and D'Ambrosio (1985) believe mathematics to be a cultural product developed as a result of various activities such as counting, locating, measuring, designing, and playing. Other mathematicians such as Kline (1980) are externalists who believe mathematics activity to be culture free. Thus, they do not believe in the connection between mathematics and culture. The majority of school leaders in this study possessed an externalist view of mathematics, which means they perceive mathematics as culture-free, and some of them possessed an internalist view of mathematics because they perceive mathematics as a cultural product.

According to D'Ambrosio (1990), culture and mathematical learning are connected in important ways because early life experiences and the values of a person's culture may affect both the expectations and the processes of learning mathematics. In so doing, if this relationship is true, it is possible to assume that students who share the same cultural background may have common ways of learning and doing mathematics, which may lead them to use similar procedures for problem solving. People from different cultures may not share the same mathematical ideas, practices, or way of doing mathematics (Rosa & Orey, 2009). Along this line, the review of literature shows that

mathematics is learned differently in other cultures. The appropriate use of mathematical activities related to the culture of ELL students is an important tool for extending understanding and providing real-world associations for the learning of mathematical content. This context allows school leaders in the nine high schools at AUSD to develop an understanding of the influence of culture in the process of teaching and learning mathematics as related to the achievement of ELL students on standardized assessments in mathematics. Further reflection on their own understanding of ELL students' culture and the comprehension of these influences might help leaders to restructure their leadership styles.

For school leaders to posses a culturally and linguistically relevant school leadership implies sensitivity for the ELL students, that is, getting to know them and their families and the assets they bring to school. Thus, it is necessary for school leaders to create a school environment in which the cultural background of ELL students is an important factor in academic success. In general, school leaders in this study stated that it was important to use culturally specific contexts in teaching and learning mathematics, which includes relevant examples from students' own culture and exposing them to a variety of linguistic and cultural contexts (Pease-Alvarez, Espinoza, & Garcia, 1991). In this regard, a school leader stated, "Bringing the richness of culture is important because it validates ELL students' own culture."

According to the school leaders in this study, language is an important factor that influences the performance of ELL students in mathematics. In the context of this finding, the review of the literature confirms this perception (Perkins & Flores, 2002;

Rosa & Orey, 2009). For example, Valverde (1984) noted that differences in English and Spanish contributed to Hispanic students' poor performance and involvement in mathematics. Along this line, Moore (1994) affirmed that Native American languages did not align well with traditional mathematics vocabulary and terms, thereby causing learning problems for Native American students. In this context, the majority of school leaders in this study were able to identify some linguistic factors, such as vocabulary and different meanings for mathematical words in different contexts such as at school and at home, that may influence ELL student achievement in mathematics. Some of the school leaders mentioned cultural perspectives on units of measurements and different mathematical procedures for problem solving. The majority of the school leaders expressed their concern with word problems because ELL students must be able to understand the language in the problem, interpret that language so they may be able to identify the mathematics relations to understand what the problem is asking, and convert the language and the mathematics relations to abstract symbols.

The participants also affirmed that the understanding of mathematical problems is more difficult for ELL students because word problems are elaborated in artificial situations, which do not allow them to make connections with their previous knowledge. In their opinions, this also makes it difficult for ELL students to use reading skills learned in other subject areas to help them understand the language of these problems. For example, if ELL students do not fully understand the language used to describe the situation in a word problem, they have difficulty connecting the mathematical operations necessary to solve that specific situation. In this case, the language of the problem may

lack redundancy, so there are no repetitions or expansions, both of which help ELL students construct and corroborate meaning.

In the opinion of the majority of the school leaders in this study, to address the aforementioned issues, it is necessary to provide professional development on instructional strategies that integrate the teaching of the academic language of mathematics and the learning of a second language by focusing on the systematic use of various strategies that help ELL students retain mathematical vocabulary. It means professional development opportunities should be developed in a way that integrates mathematics and the teaching of academic language by focusing on the systematic use of various pedagogical strategies. In the participants' opinions, such integration would allow ELL students to learn the English language through pedagogical actions adapting learning strategies to meet students' language needs by emphasizing the teaching-learning process through the contextualizing of the mathematics curriculum.

Category 3: The Effects of the ELL Students' Cultural Background on their Academic Performance in Mathematics

The researcher was particularly interested in examining the knowledge base of principals and vice-principals regarding ELL students' cultural and linguistic differences as they relate to the challenges faced by these students in academic performance on standardized high-stakes assessments, especially in mathematics. The researcher's intention was to examine whether principals and vice-principals acknowledge the

influences culture and language have on the academic performance of their ELL students on these assessments.

*Finding 3.1*

Qualitative and quantitative data reveal that the majority of school leaders did not believe ELL students' inability to demonstrate their content-area knowledge in mathematics assessments was due to the influence of their cultural background. In this regard, they believe there is no relationship between mathematics and culture. The quantitative data show there is a strong positive correlation between school leaders' perceptions of the influence of ELL students' cultural background on their ability to demonstrate their mathematical knowledge on standardized assessments and the relationship between mathematics and culture (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.807, $p = 0.000$, N = 26).

*Finding 3.2*

The majority of the school leaders in this study believed linguistic background of ELL students can act as a barrier to performance on mathematics assessments. They stated a need for the acquisition and possession of knowledge about the cultural background of their students to help ELL students improve their academic performance in mathematics standardized high-stakes tests. In their opinion, one of the challenges faced by ELL students with regard to performance on standardized mathematics assessments is related to the ability to understand the questions as well as the ability to

comprehend the abstract mathematical concepts they have to learn. According to the majority of school leaders in this study, it is necessary to enhance standards-based curriculum to address these mathematical issues. In their point of view, it is necessary that school leaders and teachers participate in continuous professional development and collaboration to determine which specific instructional and pedagogical approaches are needed.

*Finding 3.3*

In the qualitative data, the majority of school leaders expressed their concerns with regard to the creation of an inclusive school environment in which all students, including ELL students, are provided with the intellectual tools to be successful. Some of the participants in this study stated that their own perceptions and knowledge about ELL students' cultural and language backgrounds are important factors in defining the way they adapt or modify the school climate to better serve particular student populations. They also stated that learning, accepting, and embracing the cultural and linguistic needs of ELL students should become part of the learning process, thereby enabling teachers to personalize teaching and learning experiences for their students. The school leaders recognized that they play an important role in educating all students and create a school environment that fosters school-wide instructional and curricular strategies that best meet the needs of all students.

*Finding 3.4*

The analysis of both quantitative and qualitative data reveal that the majority of

school leaders in this study did not seem to be aware of the impact of ELL students'

cultural background on their standardized high-stakes assessments performances, yet

these leaders are concerned about how to find ways to improve the academic

performance of these students in mathematics and take specific actions to remove some

of the barriers to the mathematics achievement of this school population. There is a

strong positive correlation between school leaders' beliefs that culture plays an important

role in the academic success of ELL students in mathematics and their beliefs that the

cultural background of ELL students does not influence their performance in

mathematics standardized high-stakes tests (Correlation is significant at 0.01 level (2-

tailed) - Spearman's rho 0.807, $p = 0.000$, N = 25).

*Finding 3.5*

In this study, qualitative and quantitative data reveal that the majority of the

participants expressed awareness of some aspects of Culturally Relevant Instruction and

ethnomathematics even though they were not able to identify pedagogical and

instructional practices related to either approach. According to the school leaders, such

types of instructional practices are not the norm in high schools at AUSD because of the

emphasis on standardized test results under NCLB. The data also suggest that the

majority of the school leaders in this study were not aware of the cultural needs of their

students because their leadership and pedagogical practices may be only aligned to a

narrowed curriculum model that focuses on standardized assessments. In so doing, school leaders need ongoing professional development opportunities to help them learn new ways to make their schools culturally and linguistically relevant to their students (Gay, 2002; Sleeter, 2001).

*Discussion of the Findings*

With respect to language and culture, the majority of the school leaders in this study provided statements that demonstrated some of their understanding of linguistic and cultural differences and the subsequent influence of each on the learning of mathematics by ELL students. However, they did not seem to have adequate experiences or knowledge about the direct links between culture, language, and mathematics. Furthermore, the participants in this study were also concerned with the fact that in some cases, ELL students resolved that they themselves were not going to be able to achieve the academic content in their classes.

These school leaders must be aware of the academic challenges faced by their ELL students because English language proficiency may be a barrier to the academic achievement in all subject areas by these students, especially in English and mathematics. In this study, school leaders believed ELL students struggle with accuracy in the English language and they seem to be aware that some ELL students may not have the necessary educational foundation and proficiency in their native language upon which to build. For example, one school leader argued that:

In their home country, some of ELL students did not get past 3rd or 4th grade and then they come to California and they are supposed to not only learn English, but also learn English at a 9th or 10th or 11th grade level. Therefore, when they are asked to write a paragraph construction in a five-paragraph essay, they might not even have had much sentence construction in their native language that they can relate to or make a connection to.

It is paramount that participants in this study increase their commitment to help all students achieve their academic goals, especially ELL students. The participants 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 and linguistic demands. In this context, ELL students must comprehend, synthesize, and communicate higher levels of knowledge that require advanced English language skills. The participants face the challenge of helping ELL students who possess a limited knowledge base from which they have to build because many of them have had equally limited schooling or even no schooling at all in their countries of origin. This creates greater challenges for academic achievement because issues of diversity will increase as the ELL population in the nine high schools at AUSD continues to grow.

A strong commitment by school leaders in this study is one important factor for the success of ELL students (Walqui, 2000). A study conducted by Pease-Alvarez, Espinoza, and Garcia (1991) revealed that effective school leaders are well informed about the curricular and instructional strategies in place within schools for ELL students. Moreover, school leaders who consider themselves to be instructional leaders perceive

their success with ELL students as a direct manifestation of their own increased

achievement. Evidence of improvement in student achievement can be found in a study

conducted by Leithwood and Montgomery (1982), which stated that school leaders act on

this very perception by placing both ELL achievement and the well-being of teachers and

students as some of the most important school priorities along with encouraging and

supporting instructional programs. This must be one of the primary goals of leadership in

high schools at AUSD.

On the other hand, a key feature of NCLB is to ensure success for all students.

Schools and school districts must meet Adequate Yearly Progress (AYP) state criteria for

academic progress for all students as well as subgroups of students. This places a new

focus and accountability on the levels of achievement for all students, especially for ELL

students. Since three out of nine high schools at AUSD have a large percentage of ELL

students, one of the problems identified in these schools is the impact of NCLB on their

curricular and instructional practices. The issue is related to the large-scale assessment

and curriculum development. The primary philosophy is to focus the school curriculum

on the preparation for high-stakes testing instead of letting the high-stakes testing

evaluate the effectiveness of what is being taught (Chudowsky & Pellegrino, 2003;

Goertz & Duffy, 2003; Gunzenhauser, 2003; Lehr & Lange, 2003). Furthermore,

according to Haycock and Wiener (2003), NCLB outlines the process states must follow

to develop systems that measure the progress of all students. This process includes setting

challenging academic standards, developing annual state-level assessments that address

state standards, specifying successive targets for AYP, and providing increased support to schools that consistently do not meet their AYP.

In this regard, the analysis of both qualitative and quantitative data reveal that in the educational context of the nine high-schools in AUSD, curriculum enhancement needs to go beyond the normal and narrowing curriculum concept implemented by high schools under NCLB. In other words, some school leaders believed the developed curriculum must include the modification, adaptation, and refinement of the teacher's pedagogical work through effective professional development that meets the specific needs of their ELL students. In this perspective, a curriculum based on Culturally Relevant Pedagogy and ethnomathematics, which bridges home cultures and school experiences of ELL students, should be used to create resources for teaching and learning. In so doing, the quantitative and qualitative data in this study show that the first step in this pedagogical action is that school leaders and teachers must learn more about and honor the students' values and belief systems[26]. Once participants in this study establish an atmosphere of cultural respect, it is easier to incorporate the students' cultural backgrounds into the school climate as well as into classroom instruction. May and Mumby (2005) stated that in such instruction, the role of school leaders and teachers is "to transmit the knowledge as well as to facilitate creating a context for the construction of the knowledge" (p. 279).

According to the Center for Equity and Excellence (1996), school leaders' knowledge of best pedagogical practices and effective learning environments for ELL

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[26]See D'Ambrosio (2001) and Rosa and Orey (2008).

students were found to be vital in directing effective educational programs for this school population subgroup. The results from this study show that school leaders in the nine high schools at AUSD agreed with the aforementioned point of view. Participants in this study possess some basic knowledge about best practices that work for ELL students, yet not necessarily in all subject areas. For example, one school leader stated, "Instruction in solving word problems that breaks the process down into specific steps and teaches comprehension strategies that are specific to mathematics problems could help ELL students understand the mathematics problems and thus be better able to solve them."

It is crucial that school leaders help teachers create and implement a mathematics curriculum and instruction that is more culturally relevant to the ELL students' needs. However, this requires suitable assessment techniques as well some knowledge about the connections between mathematics, language, culture, and ELL students' daily experiences. These school leaders must recognize that they need to help teachers move beyond the traditional teaching practices and help them implement different instructional strategies, different kinds of school curricula, and develop an alternative way of reaching ELL students to promote their academic achievement. For example, one principal stated, "We are trying to implement a project-based learning philosophy in some subject areas, including mathematics. I am hoping that a hands-on approach and the development of relationships between the curriculum and real-life situations will motivate them to be successful in their learning process." In this regard, according to the results of some studies, it is required that teachers who serve ELL students incorporate more active student learning in their instructional practices (Padrón & Waxman, 1999; Rosa & Orey,

2007). Glikman (1998) argued that Culturally Relevant Pedagogy is a kind of instruction that respects the students' desire to know, desire to participate in relevant discussion, desire to become a problem solver, and a desire to explore individually and with others, rather than receiving teacher-dictated learning. Thus, according to Banks, Cookson, Gay, Hawley, Irvine, Nieto et al. (2001), the use of Culturally Relevant Pedagogy is an important aspect of this process because it is a reflective teaching method that supports students' differences when planning instruction and builds on students' linguistic and cultural backgrounds.

Effective instructional classroom practices for ELL students represent a growing area of research, and recent findings on the extent of linguistic demands and cultural effects of test items help national leaders determine the best guidance for state assessment procedures (Abedi, 2004). ELL classroom practices with formative and summative assessments are a necessary desired outcome on standardized high-stakes assessments. Another necessary outcome is the recognition that these practices play a critical role in student instruction (Kopriva & Saez, 1997). Classroom activities are building on and value the cultural experiences and knowledge of all students regardless of whether or not they come from the dominant culture (D'Ambrosio 1990). According to Ladson-Billings (1995) and D'Ambrosio (1990), culturally relevant teaching and ethnomathematics are pedagogies that empower students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes.

It is paramount to identify and implement the instructional classroom practices needed to close the achievement gap of ELL students on standardized high-stakes

assessments. In relation to this principle, school leaders in this study must be aware that in classrooms with students from linguistically and diverse backgrounds, instruction must explicitly activate students' prior knowledge, scaffold, and build relevant background knowledge as necessary. In their opinions, school leaders and teachers should be provided with adequate professional development opportunities that offer them the necessary tools, teaching strategies, and practices that best meet the needs of their ELL students. Fuchs, Fuchs, Thompson, Yen, Al Otaiba, Nyman et al. (2001) suggested that professional development and training should focus on developing and sharing instructional strategies that promote the achievement of linguistically and culturally diverse students.

Overall, in this study, school leaders' perceptions about best practices are aligned with research based on best instructional practices and culturally relevant education as discussed in the review of related literature in this study. School leaders must apply the knowledge of effective instructional leadership to strengthen students' learning because their actions must be directed toward the learning process of ELL students (Méndez-Morse, 1991).

Category 4: ELL Students' Performance on Mathematics Standardized High-stakes Tests

The relationship of culture and mathematics learning must be addressed in reference to student achievement. According to Guild, McKinney, and Fouts (1990) and Myers (1980), while relating culture and achievement requires much more examination, serious inequity results if schools undervalue behaviors that certain cultures foster.

Gardner (1991) advised that cultural practices yield students "who are characteristic of their own culture and who may appear dysfunctional in a culture that embraces a divergent or opposing set of assumptions" (p. 53). The appearance of dysfunction affects the student's potential for successful achievement. Bennett (1986) warned that ignoring the effects of culture and language on learning affects all students, especially students from different linguistic and cultural backgrounds.

In this context, the researcher was interested in investigating whether principals and vice-principals were committed to actively involving students from linguistically and diverse students in all aspects of the educational setting by providing them with the appropriate educational programs and resources to meet their needs. The researcher's intention was to examine the school leaders' commitment to the inclusion of ELL students in their schools. In this regard, Cohen (1990) stated that inclusion is essential for the academic success of such students in schools. According to this perspective, the findings in this category follow.

*Finding 4.1*

The qualitative and quantitative data reveal that the majority of school leaders in this study agreed that standardized tests are difficult for ELL students. However, they believed it is not because ELL students do not put in the necessary time and effort when taking the assessments. In their opinion, most ELL students try harder than their non-ELL counterparts and put extraordinary effort into trying to do their best in standardized testing. They stated that standardized tests are difficult for ELL students because they do

not know the academic language used on these assessments. In so doing, ELL students struggle with accuracy in the English language, which is a barrier to their academic achievement in standardized mathematics assessments.

*Finding 4.2*

In relation to pedagogical practices, the majority of the school leaders in this study affirmed that they were unsure whether teachers modify the delivery of the mathematics instruction to meet the language proficiency levels of their ELL students. However, analyses of the quantitative and qualitative data reveal that the school leaders did not collaborate with teachers to help them modify the delivery of the mathematics curriculum aimed at helping ELL students succeed in mathematics. They also reported that they had limited experiences with the design of pedagogical practices in the mathematics curriculum and its connections with the linguistic and cultural backgrounds of ELL students.

*Finding 4.3*

Even though the majority of the school leaders in this study believed teachers need help in identifying and designing curriculum and instructional methods adapted to the specific needs of ELL students' linguistic and cultural backgrounds, they also agreed they did not take an active role as instructional leaders in helping teachers design adequate pedagogical approaches to reach such a goal. In their opinion, as instructional leaders, they need to make sure ELL students are provided with a challenging

mathematics curriculum equivalent to that of native-English speakers. According to their responses, they reached this goal by following the school district curriculum guidelines and by using adopted standards-based textbooks. In other words, ELL students do not get a watered-down version of the curriculum; rather, they have access to the same mathematics curriculum and pedagogical materials as mainstream students.

*Finding 4.4*

The quantitative and qualitative data also show that the high expectations for ELL students held by the majority of the school leaders in this study are not limited by their own cultural orientations, which may contribute to the academic success of students guided by other cultural orientations. However, the school leaders believed they need to learn about their students' backgrounds and provide culturally relevant resources to promote a school climate that encourages them to perform better on standardized assessments. In other words, the school leaders have the same academic expectations for ELL students as they have for their non-ELL population. Even though they believe success for different student subgroups can be reached in different ways, they also believe all students must experience the same level of success.

*Finding 4.5*

With regard to the role of school leaders in closing the achievement gap of ELL students, the majority of the school leaders believed they needed to provide opportunities across the curriculum to support teachers' needs through professional development

opportunities. In their opinion, it is necessary that the trainings focus on the application of instructional practices such as checking for understanding, differentiating instruction as well as multicultural and diversity issues. They also need to bring in speakers and promote the implementation of a school-wide range of pedagogical approaches in all subject areas, which aid ELL students' achievement in the school curricula and standardized assessments.

*Discussion of the Findings*

The No Child Left Behind (NCLB) Act of 2001 requires that all students, including ELLs, reach high standards by demonstrating proficiency in English language arts and mathematics by 2014. Schools and school districts must help ELL students and other student subgroups make continuous progress toward this goal. Through the mandates, NCLB establishes high expectations for all students and seeks to reduce the achievement gap between advantaged and disadvantaged students. In this context, school leaders in the nine high schools at AUSD are also facing such challenges.

According to Abedi and Dietel (2004), the above are worthy goals because they require extraordinary improvement in students' learning. However, the researchers also stated that the challenges for ELL students are especially difficult, involving both educational and technical issues. According to Abedi and Dietel (2004), the issues include historically low ELL performance and slow improvement as well as issues of measurement accuracy. They showed that the language demands of standardized high-stakes tests negatively influence the accurate measurement of ELL performance because,

for this kind of student population, these tests measure both achievement and language ability. Abedi and Dietel (2004) stated that the consequence of such a procedure is downward pressure on ELL test scores worsened by the addition of new ELL students, who are typically low achieving. On the other hand, they stated that factors outside of a school's control do influence the performance of ELLs on these tests.

In relation to the nine high schools at AUSD, the impact of this national mandate is that teachers teach to the standardized tests, thus narrowing the curriculum to improve students' scores on the state exam at the expense of other important skills and subjects not being tested. The analysis of the results of the qualitative and quantitative data in this study show that the majority of participants recognize that standardized assessments underestimate the abilities of diverse students; yet, they were not against them as a criterion for evaluating students' academic achievement and attainment. However, they also acknowledged that standardized high-stakes tests are not fair assessments for ELL students.

Since, in California, standardized examinations shape what is taught in schools, there is a tendency to focus on preparation for assessments and examinations, which usually lead to an over-emphasis on only covering the content material found in these tests. In the opinion of some school leaders, teachers should provide students with the necessary skills by working out problems similar to those likely to appear on these assessments. Conversely, the participants also believe teachers should use a variety of measurements that give their students a chance to demonstrate their own understanding and learning in different ways.

With respect to the academic progress of their students, the majority of the school leaders in this study held some expectations of their ELL students with regard to mathematics standardized high-stakes tests. They had the expectations that ELL students can be successful on the examinations by meeting their annual growth target if given enough time and support to acquire the academic English language. They also hope that exposing students to the testing language, procedures, and processes may help them improve scores on the standardized assessments. In their opinion, ELL students also need extended time on standardized tests.

These school leaders also affirmed that their ultimate goal was for all students to have the same opportunities to succeed. One principal stated, "When people are talking about success for schools, they are looking at students graduating and meeting the proficiency on the state standards." Based on the responses from interviews and survey questions, school leaders in this study displayed elements consistent with the review of literature regarding high expectations for ELL students. According to Shannon and Bylsma (2007), having high expectations for students, particularly ELL students, is a cornerstone of an effective school climate. In this study, the factor of students' high achievement encompassed the underlying components of having high expectations for all students and setting challenging academic goals for the students, especially ELLs.

On the other hand, even though the analysis of quantitative and qualitative data show that the school leaders did not take an active role as instructional leaders who help teachers in designing pedagogical approaches that meet the specific needs of ELL students, they perceived that they have roles in improving the performance of ELL

students in mathematics standardized assessments by observing and meeting with teachers regarding content standard curriculum and by providing classrooms with needed instructional materials that help ELL students to acquire English and the mathematical content. They also believe that as instructional leaders they needed to take an active role with regard to issues concerning ELL students by providing SDAIE classes whenever possible to give ELL students additional support with trained teachers who use best instructional practices to work with this kind of school population. Overall, school leaders in this study demonstrated dedication and commitment to improving the performance of ELL students on standardized high-stakes assessments. One school leader stated, "I think our students are extremely resilient, much more resilient than they are given credit for."

Category 5: School Leaders as Reflective Practitioners

Becoming a linguistically and culturally relevant school leader requires an honest appraisal of school life from the viewpoint of ELL students and one's own professional perspective. This analysis requires school leaders in the nine high schools at AUSD to identify, examine, and reflect on their own perceptions, beliefs, attitudes, behaviors, and preparations that enable them to effectively serve their diverse community, including their ELL students. This means they must continue to seek professional development activities that enrich their leadership practices by having opportunities to reflect upon their leadership skills. This should include ongoing assessments related to the responsibilities for the learning of all students. School leaders need to recognize that it is

necessary to continue to learn about ELL students' linguistic and cultural backgrounds, to align the school curricula to reflect students' background knowledge and experiences, to research best leadership and pedagogical practices, and participate in conferences related to this area.

This category addressed questions that required school leaders to think about their own educational values and perspectives in relation to their ELL population. The researcher's intention was to examine how principals and vice-principals perceive ELL students through a process of self-reflection and action within the context of actual school experience concerning these students. In this context, the researcher presents a brief description of each finding in this category.

*Finding 5.1*

The quantitative data show that 26 (100%) school leaders in this study believe that taking time to reflect upon their roles as leaders in order to meet the needs of a diverse student population is a valuable use of their time. The qualitative data from the open-ended interview questions and open-ended survey questions show that principals believe the school district is building ways to help them reflect about what is happening in relation to students' learning at the high school level. The school leaders also stated that their perceptions about the linguistic and cultural backgrounds of their ELL students influence the opportunities they have to become reflective practitioners.

*Discussion of Finding 5.1*

  In the opinion of these school leaders, the school district is encouraging them to reflect on their own beliefs, the mission of their school, their core values, and how they can continue to improve themselves as leaders to better help their students. According to the responses from the open-ended interviews and survey questions, district meetings are more than just time for reflection because school leaders are also able to compare notes and strategize. This is an interesting and valuable school district initiative because school leaders need time away from the daily pressures of their jobs to be able to reflect on their own leadership practices.

  The participants' perceptions of their ELL students and the ways they act on those perceptions are linked to the creation of an inclusive school climate in each high school setting. It is necessary that the school leaders reflect on their own cultural background because it allows them to understand the influences and unintended biases they may have when interacting with students from linguistically and culturally diverse backgrounds. They also have to be able to expand their capacity to appreciate and deal with the cultural and linguistic differences in their schools to create an accepting and engaging environment in which all students are respected and view themselves from a multicultural perspective. It is crucial that the school leaders in this study have enough time to self-reflect on their own responsibility in creating a climate that supports a positive view of diversity in their schools. According to Orange and Howitz (1999), school leaders' and educators' cultural values, social interests, and goals, especially if different from those of their students, could conceivably create a barrier in understanding what is best for their

students. In this regard, school leaders in this study must be allowed to reflect on their self-perceptions and self-knowledge to better acknowledge and respect their students' culture and language as way of knowing.

*Finding 5.2*

The qualitative data reveal that as a school district, principals at AUSD meet once a month as a *leadership academy* to read, discuss, reflect, and apply current research in order to develop common understandings about their leadership practices. They are using the *Theory of Action for Leadership* model, which suggests that being in the classroom consistently has a positive impact on the daily practice of school leaders. As described by these principals, another aspect of the theory of action model is the idea of consistent use of data and the implementation of high quality professional development for school leaders and teachers. A second source of support are network meetings, where principals put into practice what has been presented at the leadership academy or have an essential theme or focus question they pose to the group. Both of these meetings are held once a month, in addition to monthly Smart Walks. (what are Smart Walks?)

Most of the principals in this study stated that these meetings allow them to think differently and reflect upon what is happening in the classrooms versus what they need to do in the classroom. In their point of view, these coaching sessions help them to reflect on their leadership practices because it puts a more constant focus on their practices regarding leadership, evaluation, and school programs. They also believe that the high school director at AUSD is supporting them as instructional leaders. In their opinion, the

director seems to be well prepared to train them to recognize the various elements of teaching and learning, which in turn allows them to reflect and discuss the various instructional practices they observe in the classrooms.

*Discussion of Finding 5.2*

In recognizing the need to better support principals, AUSD has restructured the role of its high school director to allow him to spend more time at each high school. His focus is on coaching principals regarding conducting effective classroom observations, recognizing best teaching practices, recognizing areas of schoolwide weakness as well as areas in which an individual teacher needs pedagogical help and support. In so doing, principals are being coached by the director via the Smart Walk to help them gain the necessary skills to more effectively coach teachers. One of the goals of this approach is redesigning classroom instruction to transform learning for both students and teachers. This is based on the Fulan's book "Breakthrough", which principals read and discuss at their monthly meetings. This is a new leadership process for high school principals at AUSD and appears to be well received by the principals because they are learning how to reflect on their own leadership practices.

As a result, principals are now more familiar with their teachers' instructional patterns and how to help teachers' pedagogical practices reach all students, including ELL students, and in all courses, including mathematics. In so doing, the high school director is assigned to meet with the principals of each high school twice monthly. He comes for half a day, begins with Smart Walk alongside the principal, visiting a variety

of classrooms for about 10 minute intervals. At the end of each classroom visit, he asks

the principal, in the hallway, questions aligned with the principal's objectives and

protocol as they pertain to the principal's school. For instance, one principal stated, "A

protocol at my school is that we are in our third year of doing course-by-course common

assessments on a quarterly basis, which then requires a common curriculum and a

common pace." In other words, principals have one-on-one coaching sessions, which are

based on visiting classrooms and practicing observations where they discuss classroom

visits and site-based problems. For example, they discuss how they can find ways to help

teachers to engage students in the lessons as well as how to get these students to discuss

what they are learning. At the end of all the classroom visits, the high school director

returns to the office with the principal and debriefs for about an hour. In the opinion of

the principals, two things typically happen: first, there is an in-depth discussion regarding

protocols and objectives, followed by a discussion about how to coach teachers to better

align with the protocols and objectives. In so doing, the high school coordinator models

coaching techniques with the principals by the way he structures the conversation.

On a cautionary note, principals may want to reflect on these exercises to examine

if they are participating in activities that are based on a one-size-fits-all approach to

teaching and learning. For example, relationally oriented tactics such as coaching may

not be equally effective for all teachers. In other words, striving for a common

curriculum, a common pacing guide, and common assessments has the potential to

become a one-size-fits-all approach. One must keep in mind that how school leaders

approach one teacher in the hopes of better alignment with school goals may be very different from how they approach other teachers.

It is also important that this leadership-training model allows principals to reflect on their leadership practices and how to develop action plans that align with their unique school characteristics and generate meaningful change in their schools. However, one principal stated:

> For me, it has been much more of a process of trying to grasp where the district is moving in terms of instructional practices and expectations, in terms of evaluation, in terms of expectations of principals than that of internalizing valuable leadership skills. Of course, this is not indicative of all the high school principals, but it seems to be the majority response.

Mot of the principals involved in these exercises affirmed that it has influenced them in being more reflective about what they are hoping to accomplish with their teachers and how to achieve it. For example, one principal stated, "I am finding out that I need more than just reflection. The coaching and discussion is valuable." In this regard, this process of change may stimulate reflection, causing principals to question what they are doing and why they are doing it and it may remind them of the purpose of their jobs as principals. This approach may be a good exercise for principals because it is easy for them to become set in routines and thereby see events that happen in their school through opaque lenses.

Finally, in the opinion of half of the principals in this study, even though Smart Walks do not revolutionize their leadership styles nor encourage them to radically change

their leadership practices, they believe that the fact they are trying a leadership approach that is different from what they have used in the past. In their opinion, this approach encourages them to reflect and think about the necessary changes in their daily work needed to better serve the school community. In this context, the majority of the principals in this study believe that they need to move beyond reflection and into action. In their opinions, this depends on the leaders' attitude towards this goal. However, these principals stated that they are still too early in their coaching and training to fully grasp how to effect instructional change as a result of their coaching, but they do believe that they are in the right path to reach this goal.

*Finding 5.3*

Some of the school leaders also pointed out that looking at the data from formative and summative assessments such as STAR and CAHSEE data helped them reflect on their leadership practices. In their opinions, they needed to look at students' data on a consistent and regular basis, both individually and with expert support, to increase their proficiency in data analysis and be more reflective of the students' achievement and performance on standardized high-stakes assessments. The participants acknowledged students' linguistic and cultural backgrounds and are working to create school environments where such students feel comfortable to learn and achieve on standardized assessments.

*Discussion of Finding 5.3*

High school leaders in this study have many sources of data and each of them has the power to tell a story about their student subgroups, teaching practices, and school climate. For example, they have data information about ELL students' performance on assessments, their attendance patterns, their involvement in school activities, and also their feelings about the school. ELL students' performance data provide opportunities that allow these school leaders to reflect on their leadership practices, and it also allows teachers to reflect on their teaching practices. However, collecting, organizing, and analyzing data and then putting the pieces together to create a picture of ELL student performance in each one of the nine high schools at AUSD is an overwhelming task for both school leaders and teachers. They find themselves unprepared for such work because, in their opinion, they did not receive formal training on how to use data nor on how to use it to guide school change. As a result, much of the valuable information available to them is not analyzed or shared among the various stakeholders at AUSD. Hence, it should be a priority for these school leaders to consistently gather and share data for use in planning and implementing actions that favor school improvement and student achievement.

Currently, external factors such as NCLB mandates are creating pressure to change the way school leaders and teachers analyze ELL student performance on standardized high-stakes assessments. The mandate also encourages these school leaders and their teachers to monitor and evaluate the way in which these factors are structured, operate, and are accomplished in order to make the necessary school changes. However,

one of the challenges for school leaders is to lead their schools to become data-driven schools that develop a culture of evidence (Morest & Jenkins, 2007). Culture of evidence is a process that involves a cooperative engagement among school leaders, faculty, and staff to use data to understand student achievement problems, design strategies for remedying those problems, and evaluate the effectiveness of those implemented strategies. It is important to understand how to prioritize its data, how to make data analysis decisions a shared pedagogical experience, how to link data-driven decision-making to a continuous school improvement process, and, based on this data, how to develop and implement a different power structure in which necessary actions are developed to modify instruction and implement the use of different pedagogical methodologies that meet the needs of all its students (Morest & Jenkins, 2007). For their high schools to become data-driven schools, the school leaders need to give time for teachers to prioritize their students' data. On the other hand, with all of the data currently available, it is important not to become overwhelmed with too much information, which may be difficult to analyze and interpret. However, if school leaders in this study do not collect or share relevant data, there is a risk of focusing too heavily on one or two data sources that may not expose the problems or patterns arising in both individual and district schools. Another important aspect that needs to be considered is that school leaders, teachers, parents, and students themselves have much to offer student achievement. In so doing, as part of the plan for high schools at AUSD to become data-driven schools, school leaders need to create non-competitive and safe opportunities for

stakeholders to come together, share data, and make informed decisions about the schools' strategic plans.

*Finding 5.4*

The majority of school leaders in this study believed they were not prepared to address the specific needs of ELL students because they need to reflect on the challenges they face in their role as instructional leaders in meeting the specific needs of their ELL population as well as in promoting ELL academic success**.** They also expressed concerns about finding ways to meet the needs of other student subgroups in their schools. They pointed out that one of the challenges they faced was finding programs that best help ELL students to be successful on standardized assessments. The participants believed they created a school culture in which native English speakers and ELL students achieve high standards in mathematics while working and learning with each other in a climate of mutual respect. In their opinions, they would achieve the goal by exposing both native English speakers and ELL students to a standard-based curriculum and adjusting teaching strategies to maintain the universality and equality of instruction.

*Discussion of Finding 5.4*

The analysis of both quantitative and qualitative data demonstrates that the majority of the participants in this study believed ELL students who feel inadequate or feel they do not belong at the school might not attempt to speak or take the social and emotional risks necessary to learn in a new educational environment and culture. In the

opinion of these participants, a sense of frustration and sadness may exist among many

ELL students. Such feelings may act as a psychological filter that slows the learning

process of ELL students. Calming the students by creating a safe and non-threatening

environment in which learning takes place fosters progress for everyone in the school. In

other words, school leaders must strive to create a non-threatening environment in which

all students, especially ELL students, are able to relax and thereby lose their fears of

taking risks. It is the job of AUSD high school leaders to set a clear tone of success for all

students by rewarding all efforts, including the first tentative efforts by ELL students to

participate in school activities. To reach this goal, it is necessary for the participants in

this study to welcome behaviors that reduce ELL students' frustration during their

schooling. It supports the assumption that school climate is a function of what is going on

with the total school picture. Teachers and staff need to have positive influences with

their school leaders to create a school environment in which ELL students feel

comfortable about becoming lifelong learners, feel safe to participate in the school

activities, and enjoy coming to school. If the school leaders provide a positive learning

environment, then they have a better chance to meet the needs of all students, especially

ELL students.

School leaders representing the nine high schools at AUSD must build a

supportive inter-school and intra-school climate where differences are not neglected but

are rather explored, discussed, valued, and celebrated through different school activities

and staff-student interactions. In this study, both qualitative and quantitative data show

that the school leaders were beginning the process of reflecting on their own leadership

practices. Thus, they also need to reflect upon the difficulties and challenges many ELL students face in schools, and they must be committed to including these students in all aspects of the educational system by providing them with the most appropriate educational opportunities in a culturally safe environment.

*Finding 5.5*

Even though more than half of the school leaders in this study felt they were not well prepared to deal with the challenges faced by their ELL students and did not have the ability to meet the specific needs of this kind of student population, they believed they had an important role in promoting the academic success of this unique student subgroup. The majority of the school leaders believed they needed to seek ways to develop their cultural proficiency to understand the linguistic and cultural backgrounds and academic needs of their ELL students. They also believed the acquisition of additional knowledge about their ELL student population helped them reflect upon and understand the context of ELL students' lives and learning experiences. For example, the quantitative data show there is a strong positive correlation between school leaders feeling prepared to address the needs of their ELL students and their necessity to develop their cultural proficiency training to understand the cultural background and academic needs of these students (Correlation is significant at 0.01 level (2-tailed) - Spearman's rho 0.804, p = 0.000, N = 26).

*Discussion of Finding 5.5*

Fullan (2001) stated that school leaders have limited preparation or training to face such challenges, that is, school leaders do not have the skills necessary to provide effective leadership for ELL students. Both quantitative and qualitative data show that school leaders in this study are facing the aforementioned challenges. Therefore, the ability to support meaningful and sustained environments based on a data-driven decision making process is a hard and arduous task. On the other hand, Miramontes, Nadeau, and Commins (1997) found that long-term professional development is essential for school leaders to lead the process of academic improvement of all students, including ELL students. Goldenberg and Gallimore (1996) shared this point of view by affirming that professional development provides opportunities for school leaders to develop knowledge and skills crucial for work with ELL students. A critical component of evidence-based decision-making is a willingness to investigate the existing data. This means that participants in this study need to go beyond what is readily apparent in their data to see what other inferences they can make. Evidence-based decision making and accountability will afford these school leaders the opportunity to delve deeper, which allows for more successful school leadership.

*Finding 5.6*

In this study, 17 (65.38%) school leaders affirmed that the students' cultural backgrounds influence their decision-making processes. However, 5 (29.41%) of these participants were not able to describe how their students' background influenced the way

they make decisions. These school leaders believe that students' cultural backgrounds influenced their decision making process only to the extent of trying to meet their needs because there are isolated instances of decisions being influenced by their cultural differences. In these situations, they believed they encourage the inclusion of cultural differences in their decisions related to the improvement of the school culture. They also reported that students' cultural differences influence their decision making process in the elaboration of the individual education plan and in how to assist ELL students in accessing the school curricula. Overall, the quantitative and qualitative data show that school leaders' perceptions and knowledge about the linguistic and cultural backgrounds of their ELL students may have some influence in their decision-making processes regarding these students.

*Discussion of Finding 5.6*

According to Fulan (2001), many school leaders did not have the skills necessary to provide effective leadership for ELL students because they had limited experience and preparation related to the educational challenges faced by ELL students. Thus, the ability to reflect upon and support a meaningful and sustained environment based on a data-driven decision making process is a hard and arduous task for high school leaders in this study. To solve the problem, long-term professional development is essential for school leaders in leading the process of academic improvement of ELL students (Goldenberg & Gallimore, 1996). Sharing this point of view, Zepeda (2008) affirmed that professional development provides opportunities for school leaders to develop knowledge and skills

crucial for working with ELL students. A critical component of evidence-based decision-making is a willingness to investigate the existing data. School leaders in the nine high schools at AUSD must be encouraged to go beyond what is readily apparent in their data to see what other inferences they can make. Evidence-based decision making and accountability afford the school leaders the opportunity to delve deeper, which allows for more effective school leadership. Since school leaders are responsible for the decision-making process in their schools, it is necessary for them to be knowledgeable in relation to issues concerning ELL students. Along these lines, it is paramount that they possess the knowledge and skills necessary to deal with the challenges of making decisions in a diverse educational environment promoting a school climate that meets the specific needs of all students (Reyes, Vélez, & Peña, 1993), including ELL students.

<div style="text-align:center;">Category 6: High Schools with Small ELL Population</div>

In this study, the quantitative data from the 4-point Likert scales and the qualitative data from the open-ended interview questions and open-ended survey questions reveal that the school leaders' experiences with ELL students may be linked to the size of their ELL population. Thus, the school leaders' experience with ELL students is directly limited by the numbers of ELL students they serve. It is necessary to look even more closely at the challenges faced by ELL students in these high schools. In so doing, the researcher presents a brief description of each finding in this category.

*Finding 6.1*

The quantitative data show that 10 (38.46%) of the school leaders in this study stated there was no specific pedagogical approach for working with ELL students since they have a small ELL student population. In their opinion, there was no specific instructional curriculum design in place for ELL students in their school due to the small ELL population at their site. However, the school leaders expressed concern regarding the situation because the language centers in the school district were closed. Hence, they were apprehensive about the challenges faced by teachers and students in a new environment in which the ELL population is increasing.

*Finding 6.2*

In this study, the majority of the school leaders believed that teachers may feel less comfortable in dealing with ELL students. They believe the challenge they face as school leaders is to get teachers to work with students with limited proficiency in English and get them to do the work at a comfortable level. Another concern for school leaders in these schools is that teachers who are trained in SDAIE or CLAD still may not be adequately prepared to work with ELL students. It may be because the teachers did not have a large ELL population in the past. For example, one school leader stated, "Teachers at our site need more training in working with ELL students. We have not had a large ELL population in the past, but it has increased this year." In other words, school leaders in high schools with small percentages of ELL students need to offer more help to the teachers, especially with the use of strategies.

*Finding 6.3*

The majority of the school leaders in this study believe teachers were not skilled enough to use strategies that make mathematics more accessible to their ELL students. In their opinion, some of these strategies include, but are not limited to, scaffolding, differentiated instruction, vocabulary building, modeling, student-pair-share, and the use of context clues and graphic organizers. They also believe that adjusting teaching strategies and styles would be more effective for maintaining the universality and equality of instruction.

*Finding 6.4*

The quantitative data show that about one-third of the school leaders in this study believe they do not create a school climate in which both native English-speaking and ELL students achieve high standards in mathematics, as a result of their unfamiliarity with ELL issues. However, they believe they need to create an equitable atmosphere for ELL students, which allows content to be accessed while learning English as a second language.

*Discussion of the Findings*

Overall, in this study, the majority of school leaders from high schools with small percentages of ELL students reported they had limited experiences with ELL students. Even though the school leaders believed they were receiving appropriate support in the area of professional development from the school district, they felt they needed more

professional development related to issues concerning multiculturalism, diversity, and cultural proficiency. School leaders from high schools with large percentages of ELL students also stated they needed additional professional development to better serve their ELL population.

Another issue raised by the data is that the majority of school leaders from schools with a small percentage of ELL students believe they were not able to help their ELL students achieve success with the school curricula because of the small size of their ELL population. However, such school leaders expressed concern with the aforementioned issue. To reach a goal of academic success for ELL students, the leaders stated they needed more time and resources to facilitate the creation of a more equitable atmosphere in which ELL students can succeed as well as the creation of a school climate that favors the achievement of their ELL population. Overall, in this study, the quantitative and qualitative data reveal that in high schools with small percentages of ELL students at AUSD, the ELL issue does not seem to be large enough or visible enough to mandate ELL strategies in all classrooms or to create a school climate in which diversity is a valuable tool to use with the necessary pedagogical actions for ELL students. However, school leaders were concerned because they felt they were not prepared to deal with the continued growth of their ELL population. The quantitative and qualitative data show some evidence that participants in this study believe the use of adequate pedagogical approaches that meet the educational needs of their ELL students, in the long run, are detrimental to the academic development and achievement of these students. According to the school leaders, it is an issue of vital importance because, for

the first time, the school district is placing students who speak no English in all high

schools due to district programmatic changes that include the closing of ELL language

centers.

Implications of the Study

This study has important implications for schools with ELL students. Four of

these implications are:

1) The need to provide opportunities for school leaders to reflect on their personal

and professional leadership practices,

2) The need for consistency in the implementation of culturally and linguistically

relevant curriculum and congruent instruction,

3) The need to have an appropriate educational structure that responds to the

academic needs of ELL students, and

4) The need to have an appropriate educational structure that utilizes the

connections between culture and mathematics.

These implications incorporate and integrate diverse ways of knowing,

understanding, and representing information for school leaders, teachers, and students.

Instruction and learning take place in an environment that encourages multicultural

viewpoints and allows for the inclusion of knowledge that is relevant to students. If

school leaders and teachers are provided with professional development that helps them

to develop a learning environment that is relevant to and reflective of students' social,

cultural, and linguistic experiences, then they are able to act as guiders, mediators,

consultants, instructors, and advocates for the students, helping to effectively connect their community-based knowledge to classroom learning experiences. Along these lines, school leaders and teachers are also able to nurture and support students' competence in both home and school environments (Ladson-Billings, 1995). This perspective helps school leaders and teachers to use students' cultural experiences as a foundation upon which to develop knowledge and skills. Content learned in this way is more significant to the students and facilitates the transfer of what is learned in school to real-life situations (Padrón, Waxman, & Rivera, 2002).

*Opportunities for School Leaders to Reflect on Their own Leadership Practices*

In order to carry out effective leadership practices for ELL students, school leaders need to be given more opportunities to reflect on their own leadership practices, and consequently more opportunities to learn how to structure a school environment conducive to equity-based learning. In this study, the participants expressed the dilemmas and challenges experienced by committed educators who face an increasing number of ELL students in their schools.

School leaders articulated their concerns about how to deal with students who are still in the process of acquiring the academic language, citing the lack of professional development to meet the specific needs of their ELL students. They found themselves in positions where they need to find time to reflect and educate themselves so they can respond to the demands of effectively serving their students. By reflecting on their leadership practices, high school leaders in this study have the opportunity to build

awareness of school climate, press for the use of or pay close attention to effective teaching strategies for ELL students, and recognize the value of the mathematics curriculum, instruction and assessments that reflect the specific needs of their students.

Through this process, these school leaders may improve their students' acquisition and retention of new knowledge by working from students' previous knowledge base, which means getting to know their students and the school community. In so doing they may improve both their own and their students' self-confidence by respecting the existing knowledge and context. By doing this, these school leaders may increase the transfer of school-taught knowledge to home and real-life situations, and they may enhance their students' knowledge and the value of linguistic and cultural backgrounds as well as the learning of how to become full participants in the mainstream culture. These opportunities must be built into each high school planned activity and may be determined by the school leaders' overall philosophy about diversity and multiculturalism.

*Consistency in the Implementation of Linguistically and Culturally Relevant Instruction*

Not all participants in this study viewed themselves as well trained in strategies that effectively help them to serve their ELL population. To make a decision about how to modify pedagogies in response to the needs of ELL students, equal support must be given to both school leaders and teachers so they can gain increased and effective research-based instructional practices for ELL students.

The consensus and research related to best practices has stated that curriculum, assessments, and instruction need to be meaningful and relevant to all students as well as appropriate to individual language and cultural backgrounds (Cummins, 2001; D'Ambrosio, 1993; Nieto, 1999; Rosa & Orey, 2007). These best practices and strategies range from the simple use of visual representations such as a vocabulary wall activity (Orey, 2009), scaffolding, graphic organizers, and differentiating instruction to the Sheltered Instruction Observation Protocol (SIOP) model. An implementation of these pedagogical practices aims mainly to help ELL students in developing their cultural identity and encourages them to strive for academic excellence and outstanding participation. Although school leaders in this study believe that professional development helps school leaders and teachers to improve their leadership and teaching practices, the lack of consistency in the implementation of the teaching and learning strategies in their schools does not contribute to an effective outcome of those strategies.

The professional development of educators who serve ELL students needs to be seriously addressed in order to improve their education and reduce the academic gap among other student subgroups. As previously discussed in this chapter, the participants would like t more information and educational experiences related to ELL students, time for training and planning, and opportunities to collaborate and learn from different sources. Research has shown that professional development is more successful when it aims to enhance and expand the repertoire of leadership skills and instructional strategies of both school leaders and teachers rather than radically alter them (Gersten, Woodward, & Morvant, 1992; Richardson, 1990; Zepeda, 2008). The participants in this study who

recognize their own strengths and weaknesses and the need of specific professional opportunities demonstrated the first step towards the improvement of their leadership and teaching practices.

*Appropriate Educational Structure that is Relevant to the Academic Needs of ELL Students*

Another implication of this study is related to the overlooked needs of the educational structure that is appropriate to ELL students in the nine high schools that encompass curricula, instruction, assessments, and preparation of school leaders and teachers who work in this specific school district. Nieto (1999) emphasized that school districts should take a serious look at educational structure from curricula, pedagogy, and the hiring process to all the other policies and practices that promote a school climate that is either empowering or disempowering for those students who have different cultural and linguistic backgrounds from their school leaders and teachers.

In order for the school district to respond to the academic needs of ELL students, it is necessary to implement a modified mathematics curriculum for this school population, which requires an honest appraisal of school life from the perspective of each staff member in the school district. This also requires each staff member to identify, examine and reflection upon their own biases, beliefs, perceptions, attitudes, and academic expectations toward their ELL students. After that reflection, it also requires a curriculum alignment to the academic, cultural, and social needs of all students, including ELL students. As previously discussed in Chapter 2, ELL students need to see themselves

in the curriculum, instruction, and assessments. According to Bransford, Brown, and Cocking (2000), these students need to be placed at the center of the teaching and learning and have opportunities in which they experience a sense of belonging and ownership.

The nine high schools at AUSD need to count on school leaders and teachers who recognize the culture and language backgrounds of their ELL students and be able to differentiate instruction to respond to their academic needs. In this regard, the quantitative data and qualitative data revealed that some of the school leaders already have some knowledge of how to create a school climate and use general pedagogical practices that reinforce the principle that students' language and cultural backgrounds are resources for further learning. While being aware of and valuing that there are strong seamless links connecting home, school, and community, it is also necessary to implement high expectations and standards for students.

School leaders who bring outstanding competencies to their work and reflect on their leadership skills and practices offer students from different cultural and linguistic backgrounds greater opportunities to succeed in their schools (Scheurich & Skrla, 2003). If school leaders want to be successful with students of various cultures, then it is necessary that they learn all they can about their students so that the very learning opportunities and structures they provide are relevant to students' needs. Furthermore, according to Zepeda (2008), it is paramount that, in order to help their teachers and students, these school leaders provide professional development that addresses effective

instruction and accommodate the cultural and linguistic backgrounds as well as the individual learning styles of their ELL students.

*The Connections between Culture and Mathematics*

At the beginning of the $21^{st}$ century, both a greater and more sensitive understanding of mathematical ideas, previous knowledge, and practices from members of diverse cultural groups have become increasingly available through the growth of the fields of ethnology, culture, history, multiculturalism, anthropology, linguistics, and ethnomathematics. One of the characteristics of ethnomathematics is to help to develop the concept of what mathematics really is through it is connection with culture (D'Ambrosio, 1990). Thus, one of the purposes of the analysis of ethnomathematical studies is to trace the development and transformation of mathematical ideas by developing research on how an ethnomathematical perspective on the mathematics curriculum contributes to a new perspective on mathematics education.

Currently, an ethnomathematics program offers a broader view of mathematics, which embraces ideas, processes, methods, previous knowledge, and practices related to different cultural environments. This aspect leads to increased evidence of cognitive processes, learning capabilities, and attitudes that may direct a learning process occurring in mathematics classrooms in the nine high schools at AUSD. In addition, reflection on the social and political dimensions of mathematics offers an important perspective for a dynamic and globalized modern society, which recognizes that all cultures and all people develop unique methods and explanations that allow them to understand, act, and

transform their own reality. In this regard, Ethnomathematics is the study of mathematical ideas developed by different sociocultural groups and offers a contextualization of the curriculum that contributes to the elaboration of pedagogical practices in multicultural classrooms (Rosa & Orey, 2007a).

Ethnomathematics research emphasizes education for social justice, wherein it is necessary to empower students by teaching them about real-world issues and instills in them a desire to seek out and work towards this goal. In this regard, individuals who do not believe in their own cultural roots can easily assimilate dominant cultural values without critically reflecting on the values of the new culture. In other words, an ethnomathematics program teaches school leaders and teachers to understand and accept the cultural roots of their students by valuing their mathematical ideas, practices, and previous knowledge as well as recognizing the applications of academic mathematics. This program also supports the learning of academic mathematics because individuals from minority groups, which include ELL students, need to have equal access and be knowledgeable about academic and standardized mathematics (Rosa & Orey, 2003). It is crucial to ensure that the learning of mathematics is contextualized and grounded in the needs and expectations of the students and the community that utilizes it. In other words, this means teaching mathematics for social justice.

In so doing, teaching mathematics for social justice through an ethnomathematical perspective reminds school leaders and teachers that information may be meaningless unless it is embedded in an appropriate contextual understanding. In other words, social justice relies on the relevant political and cultural aspects of mathematics in order to

guide its instruction because teaching for social justice encourages the exploration, interpretation, and reconsideration of what is understood about mathematics (D'Ambrosio, 1993). Usually, the processes of mathematics are not easily amendable to teaching for social justice considerations. However, there are exceptions within the field of ethnomathematics because it explores different methods of organizing mathematical ideas, practices, previous knowledge, and problem solving. In this regard, ethnomathematics explores how different cultures organize and classify mathematical knowledge. However, according to D'Ambrosio (2001), the ethnomathematics program also supports the learning of academic mathematics. This is because individuals from minority groups such as ELL students need to have equal access and be knowledgeable about the mathematics of the dominant culture (Rosa & Orey, 2003).

Ethnomathematics as pedagogical action demonstrates that mathematics is contextualized and grounded in the needs and expectations of the community that utilizes it. Along this line, the goal of ethnomathematics is to contribute both to the understanding of culture and the understanding of mathematics but mainly to the relationship between the two. Educating students mathematically consists of much more than just teaching them mathematical concepts. Instead, this kind of teaching is much more difficult to do, and the problems and issues are much more challenging because it requires a fundamental awareness of the values that underlie mathematics and recognition of the complexity of educating students about these values. It is not enough to teach students mathematics; it is necessary to educate them about mathematics, to educate them through mathematics, and to educate them with mathematics (Bishop, 1991).

An important change in mathematics instruction and curriculum needs to take place in order to accommodate the demographic change in the school population in the nine high schools at AUSD. School leaders and teachers need to be instructed in gearing education more toward students of different languages and cultures. Concerns about equity in mathematics education have been coming to the forefront in many countries in the world (Keitel, Damerow, Bishop, & Gerdes, 1989). Therefore, the main goal of school leaders in this study should be to bring about this equality among students in part by incorporating ethnomathematics into lessons and mathematics curricula.

Ethnomathematics aims to draw from the cultural experiences and practices of individual students, their communities, and the society at large and uses them all as vehicles to not only make mathematics learning more meaningful but, more importantly, to provide students with the insights of mathematical knowledge as embedded in their social and cultural environment. One important implication of this approach is to emphasize connections between mathematics and culture in the mathematics curriculum. In so doing, it is paramount that school leaders in this study consider the students' linguistic and cultural backgrounds in designing and selecting school activities.

With the increased growth of a diverse student population in the nine high schools at AUSD, the school curricula need to reflect on the intrinsic and cultural learning of all students. This means that school leaders and teachers must be prepared to address students' linguistic and cultural backgrounds in the mathematics classroom. According to D'Ambrosio and Rosa (2008), this inclusion improves students' academic achievement, helps move classrooms towards an equitable learning environment, helps students to form

positive beliefs about mathematics, integrates mathematics with other disciplines, and promotes mathematical understanding.

According to Davidson and Kramer, (1997), when students feel that the mathematics in the classroom does not relate to them, their experiences, or their culture, they feel unconnected and do not feel comfortable in participating. In other words, students' cultural backgrounds provide a means for students who usually do not fully participate in mathematics class to make real life connections to the mathematical content. Masingila and King (1997) stated that ethnomathematics is a usable tool in the mathematics classroom that helps students to make connections and develop deeper mathematical understanding. They also discussed how ethnomathematics, as a viable classroom tool, help students learn about mathematical practices of other cultures as well as develop a deeper understanding of their own mathematical practices. In this regard, as students learn about other cultures, they can also learn about others' mathematics, since their mathematics is a part of their culture (D'Ambrosio, 1993; Rosa & Orey, 2007b).

One of the most important implications of this study for mathematics education is that ethnomathematics may be used as a tool to motivate disenfranchised students to pursue their study of mathematics (D'Ambrosio, 1990). School leaders and teachers must provide students with relevant mathematical experiences by integrating into the curriculum mathematical topics from their own cultures (Rosa, 2000). Ethnomathematics facilitates the achievement of two objectives in mathematics teaching: a) it can establish a multicultural context for mathematics knowledge and skills and b) it can help students in making connections among other disciplines (D'Ambrosio & Rosa, 2008). In so doing,

students maximize the possibilities for improving their attitudes towards mathematics at the same time that they are improving their mathematics skills. Hence, ethnomathematics is a medium through which school leaders and teachers may have a positive impact on the affective and cognitive domains of students who are underachieved in mathematics.

School leaders in this study must start to discuss this issue not only in terms of equity but also in terms of mathematical viability. Placing the onus on mathematics education at all levels, including helping school leaders, teachers, and students to recognize that what they are doing mathematically, is vital to maintaining and developing the technological underpinnings of a globalized society. Overall, there is hope that school leaders, teachers, and students in the nine high schools at AUSD may begin to recognize that mathematics is ubiquitous even if it is not always visible.

Finally, given standardized requirements in mathematics content, certain mathematical concepts and skills must be covered, but often even these requirements can be treated from the point of view of mathematics from the structures of languages and cultures. The knowledge of academic mathematics is a useful tool for doing jobs and even for creative thought, but it is also limited and limiting (D'Ambrosio, 1990; Powel and Frankenstein, 1997). Looking at mathematics from different cultures does more than teach students about mathematics because it also teaches school leaders, teachers, and students about mathematics in ways they would never see in the traditional mathematics curriculum. In this context, participants in this study and teachers need to be challenged as professionals in order to perceive the connections between language, mathematics, and culture and provoke thought and critical thinking skills in all of their students.

Recommendations for Transformative Leadership Practices in regards to ELL

Populations

In order for high schools to function as effective educational environments, the leadership has an important role to play in bringing together the diversity that exists in these schools. While retaining the school leaders' ability to make independent decisions, the true administrative role of transformative school leadership is to serve as mentors for school improvement. According to Lipman-Blumen (1996), this kind of connective leadership requires an interdependent environment, which is orientated toward specific goals for all students. In this regard, it is necessary to project, develop, and implement a course of action to achieve this goal. However, the course of action taken by these high schools must aim towards the success of its diverse student groups, including ELL students, by increasing the effectiveness of classroom instruction, as well as using these practices to connect the content of each subject area to social issues. This course of action must be composed by a set of recommendations that involves a set of actions regarding ELL students.

AUSD has six high schools with a small percentage of students from different cultural and linguistic diverse backgrounds. The school district also has three high schools with a highly diverse student body. This aspect broadens the range of collectively held viewpoints by school leaders, teachers, students, and staff and subsequently allows school leaders to provide an atmosphere that improves the quality of each student's educational experience through an understanding and appreciation of diversity (Moses & Chang, 2006). In this context, it is recommended that continued cultural proficiency

training coupled with specific subject area training be made available to the staff in the nine high schools at AUSD because if school leaders and teachers see the value of cultural diversity, they may discover and create ways to build bridges to their students (D'Ambrosio, 1990). Therefore, in order to encourage the value of diversity, school leaders in AUSD high schools need to develop a sense of diversity within a school community by valuing the differences which are manifest in students' lives and to use those differences as the basis for school teaching-learning process (Walker & Quong, 2000).

The success of these recommendations depends on the maintenance of effective and continuing relationships among school leaders, teachers, students, and the members of the school community. If communication in these high schools is defined as the transfer of meaning between school leaders, teachers, students, and other stakeholders, then it ranges from completing a task to creating and maintaining satisfying human relationships (Burbules, 2005). In this study, the word transfer implies the creation of meaning for the recommendations in the mind of school leaders, teachers, students, and community members through different communication networks in the nine high schools at AUSD high schools.

In this context, creating a positive learning environment for ELL students starts with school leaders. Based on the results of this study, the review of the literature, and the research conducted, the following recommendations must be addressed and developed for a transformational leadership practice to create high schools that address the needs of ELL students.

*General Recommendations*

All staff, including school leaders, in the nine high school schools at AUSD must gain instructional ideas, tools, strategies and methodologies to better equip them to work with ELL students across all curriculum areas, especially in mathematics, and improve overall school wide cross-cultural communication. In so doing, in order to increase the expertise of school leaders and teachers for working with diverse populations, the implementation of the Sheltered Instruction Observation Protocol (SIOP) model is highly recommended. The SIOP is an explicit model of sheltered instruction that teachers should use to improve the academic success of ELL students (Short & Echevarria, 1999). The protocol is defined as a tool derived from best practices identified in the research literature and experiences of participating teachers and researchers who collaborated in developing the observation protocol. The protocol is composed of 30 items grouped into three sections: Preparation, Instruction, and Review and Evaluation. Under Instruction, items are further clustered into the following subsections: Building, Background, Comprehensible Input, Strategies, Interaction, Practice and Application, and Lesson Delivery. This protocol, which is used to provide feedback regarding classroom instructional behaviors, rates teachers using a Likert scale with scores ranging from zero to four and uses descriptors of teaching behaviors to define the individual scoring options.

*Recommendation 1: English Language Development (ELD) Action Team*

The first step is to constitute an English Language Development (ELD) Action Team at each high school at AUSD. The ELD Action Team and the principal would be responsible to seek necessary resources to provide an ELD coach. Next, the staff would be surveyed by the ELD Action Team to determine their specific needs and the best possible uses of a coach. The information gathered from the survey would then be shared with principals and coaches to help them to guide ongoing decisions related to coaching support.

*Recommendation 2: Professional Development*

If school leaders want to continue to improve the achievement of ELL students, they must make professional development a top priority and use the best and most up-to-date instructional classroom practices available. In this regard, school leaders need to provide teachers with the necessary support to reflect on their own practices by aiming to identify their strengths and improve with the support of the school leadership (Zepeda, 2008). It is also crucial that school leaders participate in professional development to meet the specific needs of ELL students.

More specifically, the ELL Action Team ideally would meet during the summer to plan possible professional development options for the coming year, which could include:

a) Providing a curriculum that integrates ELL best instructional classroom practices and lessons across all subject areas,

b) Refining the professional development model according to specific ELL student data,

c) Arranging experts in the ELL field to present at staff meetings,

d) Regularly presenting best practices in ELL instruction, curriculum modifications, and material adaptations,

e) Ensuring that all staff members learn the basic components of ELD teaching by using the English Language Proficiency Standards as a basis for learning and discussion,

f) Providing examples of case studies related to ELL students and best practices during professional development days to model instructional decision making,

g) Committing to a standard time at professional development days for sharing ELD practices among staff,

h) Providing in-services on research-based best ELL instructional practices,

i) Providing Cultural Proficiency trainings,

j) Providing professional development on instructional classroom practices that are based on Culturally Relevant Pedagogy and Ethnomathematics,

j) Communicating findings and needs to regional institutions of higher education that train teachers, and

k) Encouraging school leaders and teachers to attend multicultural conferences.

*Recommendation 3: Data-Driven Decision Making Plan*

School leaders need to learn to look deeper into data in order to develop individual action plans for each student. This must be done on a consistent and regular

basis, both individually and with expert support in order to help school leaders to become more proficient in data analysis as well as more reflective in relation to their students' achievement and performance on standardized high-stakes test, especially for ELL students.

In this context, in order to establish a Data-Driven Decision Making Plan for high schools in AUSD, it is important that both school leaders and teachers are allowed to build knowledge about different aspects of improvement processes because this fact helps them to learn about the effective use of the data (Sargent, 2004). In so doing, it is necessary to develop and implement a Data-Driven Decision Making Plan for these high schools, which consists of developing a data committee, collecting qualitative and quantitative data, analyzing data patterns, identifying student needs, and designing specific strategies for planning differentiating instruction.

Along this perspective, school leaders and teachers should use the most effective assessment methods when measuring the progress of their ELL students in order to make well-informed decisions regarding classrooms instruction and assessments practices for these students. Compared to any other measurable educational resource, the quality and effectiveness of teachers is the most powerful determinant of either the educational success or failure of ELL students. However, maximizing the quality of teaching at these high schools should propel its educators to use research-based best practices instruction to meet the specific needs of ELL students.

*Recommendation 4: School Leaders Recommendations*

The qualitative and quantitative data analysis in this study revealed recommendations made by the school leaders in this study:

a) Highly qualified teachers are needed to work with ELL students. They noted that this is not the typical practice in the current educational model. More commonly, newer teachers or teachers who may not be highly skilled in this area are assigned into ELL programs.

b) Teachers must be trained in SDAIE methods and cultural proficiency and diversity issues to better meet the specific needs of these students. In this regard, one school leader stated, "I need to support the implementation of professional development on differentiated instruction and other pedagogical techniques and consistent instructional strategies that meet the needs of ELL students."

c) There should be a limitation of the number of ELL students in classes so they can be provided with one-on-one contact with teachers. Along these lines, one school leader offered, "I would like to implement class size reduction by using some Title I and Title II money, bringing in more aides, and bring in another teacher in order to give ELL students the attention they need and deserve."

d) Permanent textbooks and school district benchmarks adoption.

e) Translation services for ELL students. One school leader argued, "The budget cut and the financial constraints of the school district do not provide the translation services for its ELL students."

f) The nine high schools at AUSD need to develop a comprehensive program that addresses the specific needs of the ELL population they serve.

g) Support and help teachers to review their instructional practices by providing opportunities for collaborative dialogue and planning. This means that teachers need time to engage in structured conversations to reflect and examine their own educational practices.

*Recommendation 5: Ethnomathematics and Culturally Relevant Curriculum*

The ethnomathematics and a Culturally Relevant Curriculum models require that the true learning of mathematics involves experiencing diverse cultural mathematical practices as they occur and exploring these practices in a controlled classroom environment (D'Ambrosio, 2001). Thus, the implementation of this kind of mathematics curriculum requires a change in teaching style and in classroom discourse. Using cultural practices to exemplify mathematical ideas requires discussion, questioning, group work, and the use of students' previous knowledge.

In this context, it is necessary to work on integrating ethnomathematics and Culturally Relevant Education into the mathematics curriculum (Presmeg, 1998). It is also crucial to integrate into this curriculum professional development that deals with the relationships between ELL students' perceptions of mathematics and their motivation to learn this discipline. In so doing, it is recommended that the implementation of professional development opportunities for both schools leaders and teachers outline a scheme for classifying, analyzing, designing, and reviewing the mathematics curriculum

and that focuses on relationships between culture and mathematics by applying an ethnomathematical perspective and culturally relevant pedagogy into the mathematics curriculum.

*Recommendation 6: Acquiring ELL Students' Cultural Knowledge*

In order to acquire linguistic and cultural knowledge about their students and improve school climates, school leaders must tap into their students' background knowledge about their native languages, countries, cultures, and educational systems, which is often very different from their own backgrounds. In so doing, school leaders must be encouraged to become aware of their students' linguistic and cultural differences in order to help them to adequately provide better services for students from linguistic and culturally diverse backgrounds. Along these lines, Peregoy and Boyle (2001) recommended that school leaders and teachers should:

1) Find out the country of birth, the length of time in the United States, the language spoken at home, and the events associated with immigration, in particular, traumatic situations, of each student.

2) Learn about students' linguistic and cultural backgrounds, including customs, religion, traditions, family life, holidays, celebrations, clothing, and food. They may even want to study the historical figures, musical and artistic traditions, geography, and biodiversity of these cultures so that they may be able to make connections with their students by exploring information that is and culturally linguistically relevant to their students.

3) Explore ELL students' academic history to learn about their time in school and matheracy and literacy levels.

In addition, it is also suggested that school leaders and teachers learn one of the languages of their ELL students. This may provide school leaders and teachers with invaluable insight into their ELL students' linguistic and cultural backgrounds and may help school leaders to better understand the difficulty of the task their ELL students face in their daily school activities.

*Recommendation 7: Learning ELL Students' Cultural Backgrounds*

In order to help ELL students draw on their previous knowledge, it is important that school leaders and teachers appreciate and understand the linguistic and cultural backgrounds of these students. In this regard, school leaders also need to find ways for ELL students to share their own cultural experience within the school community. This may mean asking students to show how a school curriculum topic connects to their lives or to give an example of a particular idea, as they would experience it in their native country. For example, a vocabulary wall can be built in each mathematics classroom that shares the words for mathematical concepts and topics (Orey, 2009).

It is important that students interview their parents or relatives in order to learn more about their memories and past experiences and how this connects to their current school and life experiences. ELL students may find this an invaluable activity because even if they speak their native language with their parents and are surrounded by their culture at home, they may not have had an opportunity to talk to their parents and

relatives about their life and school experiences and values. It is also recommended that school leaders and teachers draw upon the language, culture, and background experiences their students bring to the learn environment and build new concepts upon their experiential foundation. Since these strategies also work with mainstream students, their incorporation into the school curricula may help to create a school climate that values and is supportive of all linguistic and cultural perspectives.

*Recommendation 8: Recognizing and Appreciating Students' Diversity*

If teaching and learning approaches are adjusted to accommodate ELL students' different learning needs, it is paramount that school leaders use ELL students' linguistic and cultural background to help them achieve their academic goals. Thus, it is crucial that school leaders recognize that appreciating and valuing diversity means giving students space in which they are able to apply their own cultural understandings while learning the aspects of the American culture. This means that school leaders would benefit from approaching diversity not merely as a call to action but embrace diversity in which they honor and respect students whose life experiences may differ from their own but are equally important. This also means that school leaders must listen to, seek to understand, and validate students' points of view and different cultural experiences. It requires that they step outside of the constructs of their own cultural realities and self-perceived worlds to freely view life through the lens of each student because they are all members of the school community in which cultural diversity is often not a lived reality.

Recommendations for Further Studies

This study has demonstrated that there is much more to be explored and researched if school leaders are to look into the impact of culture and language has on mathematics learning. School leaders, teachers, and students derive their own culture from their social environment. Consequently, understanding their own and other cultures may help them "to clarify why we behave in certain ways, how we perceive reality, what we believe to be true, what we build and create, what we accept as good and desirable, and so on." (Barnett, 1990, p. 47)

Based on the data and implications of this study, the following recommendations for further research are offered for further consideration:

*Recommendation 1*

The researcher was only interested in finding the perceptions of 6 principals and 20 vice-principals in the nine highs school in one school district setting near Sacramento in California. Further research should include school leaders of elementary and middle schools in other schools at AUSD as well as in other school districts in California and the United States.

*Recommendation 2*

Leadership practices specific to the improvement of achievement for ELL students in suburban as well as in urban and rural settings should be investigated in more detail.

*Recommendation 3*

A comparison of two or more instructional and pedagogical approaches that yield high achievement results for ELL students should be undertaken.

*Recommendation 4*

Further studies need to look into whether and how cultural differences rooted in primary schools may contribute towards secondary school performance. Ethnic differences may bring about cultural differences in terms of language, practices, rituals, attitudes, values, beliefs, and perceptions. Perhaps these factors give rise to equally diverse ways of teaching and learning of mathematics, and consequently might result in differences in mathematics achievement.

*Recommendation 5*

More research is needed to determine the exact steps and/or stages that school leaders need to take to modify their leadership skills and practices to make a significant difference in the academic life of ELL students, especially in school districts in which the majority of school leaders and teachers are culturally and linguistically different from their students.

*Recommendation 6*

Moreover, in order to look into the influence of culture and language on mathematics learning, the researcher recommends that further studies need to investigate

how different social and cultural values are manifested in the process of the teaching and learning of mathematics. According to Hofstede (1997), values and beliefs are the deepest manifestation of culture, and present broad tendencies about how one ought to behave or prefer certain states of affairs over others. Values are inherent in mathematics as a subject, and values are manifested in the specific goals and objectives of the curriculum. Also manifested are the values that underpin a mathematics teacher's decision-making and philosophy of teaching. For example, preferences or criteria for making decisions during mathematics teaching, values that influence teachers' and students' behaviors and attitudes towards mathematics such as attributes or qualities of successful mathematics students, and values that are hidden behind unwritten curricula, which is decided implicitly by all members of the school and its social community.

*Recommendation 7*

It is also recommended that further studies explore mathematics achievement by adopting cultural beliefs, values, and attitudinal changes of different student cultural groups, even to the extent of modifying disadvantages in cultural and language factors by adopting some new methodologies in mathematics education such as Culturally Relevant Pedagogy and ethnomathematics.

*Recommendation 8*

There are significant variations across ELL students in patterns of academic achievement, which are not accounted for by their socioeconomic status, as evidence of

the influence of their achievement in standardized high-stakes tests. In this context, it is recommended that further studies take into account the socioeconomic status of ELL students as an important factor that influences academic achievement on standardized high-stakes tests, including mathematics.

*Recommendation 9*

It was helpful to learn how school leaders' cultural background and experiences have influenced their work with ELL students. Certainly, participants in this study shared many commonalities in perceptions, values, and beliefs regarding ELL students. However, it would be worthwhile to explore how school leaders' cultural backgrounds influence their interpretations of equity, social justice, and linguistically and cultural diversity in their schools. In this perspective, a more focused research is necessary to study school leaders' personal challenges in promoting success and equity for ELL students.

*Recommendation 10*

While this study focused on principals and vice-principals, it would be valuable to research school district leadership and their engagement in dialogic examination of how they perceive their roles regarding culturally and linguistically diverse students and how they support ELL students' access and educational opportunities in the decision-making of the elaboration of the school district policies.

Personal Reflection

The review of literature of this study showed that school leaders and teachers are responsible in a moral, ethical, and legal sense for all of their students, including ELL students. These students, like all others, are protected by Title VI of the Civil Rights Act, stating that school systems are "responsible for assuring that students of a particular race, color, or national origin are not denied the opportunity to obtain the education generally obtained by other students in the system" (Lyons, 1990, p.70). A section of the U.S. Equal Educational Opportunities Act (EEOC), the federal agency responsible for interpreting and enforcing Title VI, adds that states are mandated also to protect and help students overcome language barriers that impede equal participation by its students in its instructional programs.

In this context, school leaders need to recognize that their role in a culturally and linguistically diverse school environment involves a commitment to prepare themselves to lead in this dynamic type of community. If school districts expect its schools to effectively carry out its mission and vision, in addition to being a place where students learn, it should become a place that embraces Culturally Relevant Education, Curricula, Instruction, and Assessments that respond to the changing demographics and socioeconomic circumstances of its students. By practicing Culturally Relevant Education, school leaders and teachers make it possible for students to be prepared for meaningful academic and social roles in their school community (Boyer, 1993). They also help their staff, teachers, and students to address the promotion of racial, ethnic,

linguistic, and cultural equity and equality as well as an appreciation of diversity in their schools.

School leaders need to work harder to make sure ELL students are acquiring the English language while learning mathematics concepts. This is a hard task for school leaders, teachers, and ELL students because these students may lose their motivation for learning during this educational process. However, this would not be a concern if school leaders and teachers, who are trained in second language acquisition programs such as CLAD or SDAIE, create an inclusive school environment based on Culturally Relevant Education and incorporate the concepts of Culturally Relevant Pedagogy into the teaching-learning process of ELL students within their subject area. In other words, the challenges for high school leaders working with an ever-growing ELL population in educational communities in California encompass but are not limited to some of the following areas:

1) The opportunity for professional development in the provision of these services,

2) The integration of the students' community and previous experiences in school in an authentic and empowering manner.

3) The promotion of effective instructional practices,

4) The implementation of fair assessments that use its results to improve instruction,

5) The implementation of professional development opportunities that increase teacher capacity and cooperation for the instruction of ELL students, and

6) The creation of a linguistically and culturally relevant school.

Based on the results of this study, it is crucial that school leaders help teachers who serve ELL students to design lessons and curricula that incorporate a more active form of student learning into their instructional practices. However, in order to modify instructional strategies to better respond to the needs of ELL students, school leaders need to embrace a culturally relevant approach to teaching and learning, provide ongoing and ever more detailed professional development opportunities, authentic linguistic and cultural instruction, and assessments that bridge home and school through school and classroom activities. In other words, school leaders' and teachers' conceptual and pedagogical frameworks, leadership talents, skills, and practices must be congruent with the ELL students' communities, languages, cultures, and expectations.

These instructional practices represent a model of classroom instruction that has been uncommon for ELL students during their schooling process. It is very important to reshape the educational structure of instruction of ELL students into one that promotes effective school leader-student interaction as well as teacher-student interaction in a school climate in which there is active student participation in the learning process. Consistent school-wide instructional practices should be used to foster students' performance, especially for ELL students. School leaders need to be more proactive as instructional leaders and implement the use of these pedagogical practices in their schools.

Another issue to be considered in this reflection is that many school leaders stated that ELL students find themselves in mainstream classrooms taught by teachers who have little or no formal preparation for working with a linguistically and culturally diverse

student population. For example, well-meaning teachers with inadequate training can sabotage their own efforts in creating positive learning environments through hypercriticism of errors because they may not see native language usage as an appropriate scaffold for ELL instruction.

On the other hand, experienced teachers who teach ELL students may also face unique pedagogical challenges in the classroom. For example, they must follow the official curriculum to prepare students for standardized tests in order to ensure that they meet academic performance expectations. Another challenge is that the mathematics curriculum for grades 9-12 draws conceptual content knowledge from algebra to calculus. Each one of these specialized contents contains abstract mathematical concepts that teachers explain through a variety of strategies so that ELL students can learn along with their native English-speaking peers. From this researcher's perspective, a major challenge for school leaders and teachers involves the question of balancing both time constraints and teaching the scope and sequence of a given mathematical content in a given time. To facilitate the needs of ELL students in the classroom, it becomes necessary for school leaders to help teachers apply instructional strategies that are democratic and equitable yet effective for students with different learning styles and linguistic and cultural needs.

Since the findings of this study revealed that the majority of the school leaders believe that teachers do not feel comfortable in teaching ELL students, one might safely conjecture that even though the teachers are trained in CLAD and SDAIE technique, they are not really sure in how to use a variety of instructional strategies to help ELL students to express their ideas and knowledge in a new language and culture. All of this seems a

bit odd, as all teachers are now CLAD certified, which indicates that the CLAD certification process is either insufficient or not being taken seriously by teacher candidates. In this researcher's opinion, new hires should be required as part of the interview process to certify and demonstrate a deeper understanding to what to do with diverse and ELL student populations.

By reflecting upon the results of this study, transformative and culturally relevant school leaders must know their school communities. Aside from assessing school needs only in terms of instructional approaches, they also need to be able to reflect upon questions such as:

- What languages are spoken in their schools?

- Where are their students from?

- Are students first, second, or third generation immigrants?

- What are existent intragroup and intergroup differences between students?

Schools leaders must approach these issues by interacting as much as possible with the school community because it is extremely misleading to assume that all students from one cultural or linguistic background are a monolithic group. In so doing, it is necessary that school leaders support their staff and teachers to understand how language and culture play out in the lives of linguistically and culturally diverse students. This would include understanding how the dynamics in the students' communities influence their performance and behavior in classrooms. This approach may support school leaders and teachers to understand how school decisions may impact the school community and how the schools can be more successful in connecting with the community. This is an

additive approach to education whereby students' languages and cultures are valued and used as a resource to facilitate connections with students in respectful and empowering ways.

School leaders must also advocate for fair accountability systems that accurately provide the necessary students' academic information to the school community by disaggregating student data. However, disaggregating data for ELL students cannot be lumped into only one student subgroup for analysis. The accountability measures for culturally and linguistically diverse students must be analyzed based on their time in program and years of identification as English language learners. This is what this researcher calls advocacy. The work of an advocate requires school leaders to challenge any statement or action that purposefully harms any disenfranchised group of students. However, in order to be successful, this form of social action cannot be practiced in isolation because courageous, transformative and culturally relevant leadership needs a supportive network of allies such as staff, teachers, and stakeholders in the school community.

This researcher also believes that school leaders need opportunities to reflect upon their own leadership skills and practices. These opportunities may help them to think critically about how their leadership practices align themselves with their core values. In addition, professional development and leadership training as well as teachers' trainings should include competencies that address not only how to work with a diverse student population but also how to adopt inclusive approaches in the school leaders' leadership styles that support success for all students, including ELL students. Policy makers and

educators maintain the *status quo* if school districts only offer professional growth opportunities that only help to produce school leaders and teachers who continue past practices of not confronting the issues of diversity and cultural proficiency.

School leaders and teachers must also be aware that learning another language, especially becoming academic competent in it, is a lengthy process. The rationale behind this is that academic, decontextualized language or content offers few clues for learners and is therefore much more difficult for ELL students to learn. This is especially true for ELL students who start this process in the later grades (Collier, 1989) as well as for students who are not literate or academically skilled in their first language. Therefore, the process of learning a second language is generally idiosyncratic and dependent on different variables, which need to be considered in this educational process. Therefore, school leaders and teachers must attempt to provide ELL students with instruction that applies different instructional strategies so they can gain academic achievement in their cognition, metacognition, linguistic, cultural, and social competences (Chamot & O'Malley, 1992). For example, when asking students to solve an equation, teachers cannot assume that ELL students know how to solve it in the cultural context of the United States because each culture has a linguistic and cultural mathematical thinking process to solve problems (Rosa & Orey, 2009). In other words, school leaders should help teachers to develop and provide a meaning-based, context-rich, and cognitively demanding curriculum in all subject areas.

The school and classroom environments must be a welcoming place for students, including ELL students, and the school community. The cultural and linguistic resources

that students come with must be integrated and celebrated in the schools and in the classrooms. In the researcher's opinion, a last word of caution must be given to school leaders and teachers. Although this issue has been framed mainly as a language issue, school leaders and teachers must always remember that the education of linguistically and culturally diverse students is often preoccupied with issues about immigration, distribution of wealth and power, and the empowerment of students. Thus, it is essential for school leaders and teachers, professional development that encompasses knowledge, skills and practices to best meet the specific needs of ELL students in order to improve their motivation to learn mathematics as well as their performance in standardized high-stakes assessments.

The results of this study helped the researcher to understand that ELL students cannot be provided special assistance in the English language only. They must be provided assistance also in acquiring subject-area knowledge in several ways, which can be done with richer and more sustained collaborations between school leaders, content area teachers, and English language specialists so that instruction does not only focus on decontextualized skills and language. In order to do precisely this, many school leaders and content area teachers need ongoing training in making language and content more accessible to ELL students. This also can also be done through the training of school leaders and teachers in Sheltered English through a more comprehensive program called the Sheltered Instruction Observation Protocol (SIOP) in which the specific needs of ELL students are addressed and discussed. This approach may help school leaders and

teachers address the feelings of discomfort they may have when working with of the ELL school population.

Overall, a supportive school-wide climate, school leadership, customized learning environment, articulation and coordination within and between high schools, use of native language and culture in instruction, balanced curriculum that includes both basic and higher-order skills, explicit skill instruction, opportunities for student-directed instruction, use of instructional strategies that enhance understanding, opportunities for practice, systematic student assessment, staff development, and school community involvement offer insights that help school leaders in their complex job of serving culturally and linguistically diverse students.

In the context of this study, it is the researcher's hope that the results be used to determine how high school leaders' perceptions are influenced by an understanding of the effects of the linguistic and cultural backgrounds of ELL students on their academic performance in mathematics standardized high-stakes assessments. In addition, it is also the researcher's hope that this study can offer insight into the development of a series of recommendations for transformative leadership practice that would help high school leaders successfully meet the specific needs of their ELL student population.

## Conclusions

The challenge of the new millennium and the increased accountability it demands requires a different kind of leadership that enables school leaders to better serve their students. In addition to administrative knowledge and skills, Sergiovanni and Starrat

(1998) affirmed that leadership development tends to be shaped by a set of "beliefs, opinion, values, and attitudes, which provide a foundation of practice" (p. 133). On other words, this is a set of personal educational values and beliefs that has become to be known as an "educational platform" (p. 133) that guides school leaders' actions and decision-making. Sergiovanni and Starrat (2001) also stated that an educational platform "is made up of those basic assumptions, beliefs, attitudes and values that are underpinnings of an educator's behavior" (p. 84).

In this context, Sergiovanni and Starrat (2001) stated, "educators carry on their work, make decisions, and plan instruction based on their educational platform" (p. 70). Therefore, school leaders need to develop their own educational platform and engage in reflection, which is essential to their leadership practice. Similarly, researchers have recognized that reflecting about or pondering an ideal, issue, perception, belief, or problem leads school leaders to an enhanced educational practice (Airasian & Gullickson, 1997). Since professional reflection constitutes a valued strategy for enhancing professional practice, school leaders must reflect about their own leadership practice in order to understand, critique, and modify it because "reflection is a central process of constructing knowledge and developing professionally" (Airasian & Gullickson, 1997, p. 219).

In this study, a deep understanding of both culture and its connection with mathematics is an important source of knowledge for school leaders to reflect on as well as to use to modify and transform their leadership practices. In this regard, if school leaders are to facilitate successful learning opportunities for all students, they must know

their students, their cultural roots, linguistic backgrounds, previous experiences, and how

they view the world.  This also includes knowing about ELL students' linguistic and

cultural values that influence their performance on standardized high-stakes assessments.

Every student of every culture, race, ethnicity, socioeconomic status, gender, age,

ability, and talent deserves to have an equal opportunity to be successful in school.

Knowing each student's cultural and linguistic background is essential for providing

successful learning opportunities for all students, especially for ELL students.

Understanding ELL students' cultural and linguistic differences may help school leaders

to facilitate, structure, and validate successful learning for every student through a variety

of strategies and practices that best fit their specific needs through professional

development that addresses these issues.

In this context, in order for ELL students to reach their full potential, instruction

should be provided in ways that promote the acquisition of increasingly complex

mathematical knowledge and language skills in a social climate that fosters collaboration

and positive interactions among these students. Such classrooms are inclusive in their

emphasis on high standards, expectations, and outcomes for all students (Lipman, 1995).

Important features of such settings include high expectations, exposure to academically

rich curricula, materials, resources, and approaches that are culturally and linguistically

relevant, appropriate, and adequate to ELL students' needs in order to enhance their

mathematical learning and achievement. In addition to using effective methods and

materials, teachers should possess cross-cultural communication skills and develop clear

understandings of their culturally and linguistically diverse students (Garcia &

Dominquez, 1997).

In conclusion, school leaders and educators who understand learning and cultural

differences strive for intentional variety in instruction, curriculum, and assessments. In

this regard, school leaders can increase their awareness of linguistic and cultural

differences through encouraging and supporting appropriate professional development

experiences and best pedagogical practices for all levels of teachers and students,

including their own.

APPENDICES

# APPENDIX A

## School District's Permission

**Accountability and Organizational Evaluation**

July 30, 2009

To Whom It May Concern:

I have reviewed the abstract of the research proposal for Milton Rosa, to be conducted during the 2009-10 school year. Based on the abstract, written questionnaire, and interview protocol, I have approved this research to move forward.

I acknowledge that this will include collecting written survey information from high school principals and vice principals and an oral interview with high school principals. It is my expectation, as a San Juan Unified School District representative, that all information will be coded and will remain fully anonymous. The schools and school district will not be identified in the research or any resulting publication. Participation will be voluntary on the part of principals and vice principals.

We welcome this research as its findings will inform the work which occurs within the district. If I can be of additional assistance, please let me know.

Sincerely,

Director, Accountability and Organizational Evaluation

APPENDIX B

Human Subject's Approval

September 28, 2009

To:     Milton Rosa
        Doctoral Candidate
        Educational Leadership & Policy Studies

From:   John Schaeuble, Chair
        Committee for the Protection of Human Subjects

Re:     Protocol 09-10-002 (Aug)
        "Understanding the perceptions of high school leaders about ELL students'
        achievement gap: The case of mathematics"

The Committee for the Protection of Human Subjects conditionally approved your application at its September 21, 2009 meeting. With the additional materials you have provided your project is now approved as "No Risk."

This IRB approval is with the understanding that you will promptly inform the Committee if any adverse reaction should occur while conducting your research (see "Unanticipated Risks" in the CPHS Policy Manual). Adverse reactions include but are not limited to bodily harm, psychological trauma, and the release of potentially damaging personal information.

The approval applies to the research as described in your application. If you wish to make any changes with regard to participants, materials, or procedures, you will need to request a modification of the protocol. For information about doing this, see "Requests for Modification" in the CPHS Policy Manual.

Your approval expires on September 30, 2010. If you wish to collect additional data after that time, you will need to request an extension for the research. For information about doing this, see "Requests for Extension" in the CPHS Policy Manual.

If you have any questions, please contact me at 278-6666 or the Office of Research Administration at 278-7924. Thank you.

JS:at

## APPENDIX C

### Interview Protocol

*Background Information*

1. Describe the position you had before becoming a principal? Where, how long and what grades did you teach?
- How long have you been a principal?

2. Before you took this position, what did you think some of the challenges would be as a principal?
  - Did this perception change? Why?

3. Have you studied languages other than English?

4. Have you had the opportunity to travel abroad?

5. How many ELL students do you currently have in your school?

6. Have you ever received professional development training such as multicultural or diversity courses or workshop to prepare you to address the learning needs of ELL students?
  - If yes, could you please, describe what kind of professional development you participated in?

*Category 1: General high school leaders' perceptions in relation to ELL students*

7. When you started your administrative profession, what were the unexpected challenges you have faced or are currently facing concerning the education of ELL students?

8. How do you feel about the academic challenges faced by your ELL students? Are you concerned, pessimistic, optimistic, or other?

9. What is the difference in performance on standardized tests between your non-ELL and ELL students?
  - Why do you think this is so?

10. Describe the pedagogical approaches that are working well for ELL students.

11. Are adequate resources available to assist your teachers in the instruction of your ELL students?
  - What do you need most in this area?

12. What are the strengths and weaknesses of your school's instructional design, for example, course work and curriculum, for ELL students?
  - To what degree have you been successful in addressing weaknesses?
  - What improvements would you like to see take place? Recommend?

*Category 2: The Role of culture and language in the academic success of ELL students*

13. Do you believe that ethnic culture plays a role in the academic success of your ELL students?

- Why or why not?

14. Are there ways to include student's ethnic cultural experiences into the mathematics curriculum?

- Why or why not?

15. What role does English language proficiency play in learning mathematics for your ELL students?

16. How do you promote a school climate that helps ELL students perform better on mathematics standardized high-stakes tests?

*Category 3: The effects of the ELL's ethnic cultural background on their academic performance in mathematics*

17. What are the challenges your ELL students face in their performance on mathematics standardized high-stakes tests, which can attributed to their ethnic cultural background?

18. What kind of ethnic cultural background knowledge would be most helpful to you to improve the academic achievement of ELL students, especially on mathematics?

*Category 4: ELL' performance on mathematics standardized high-stakes tests*

19. With respect to academic progress, what are your expectations of your ELL students on mathematics standardized high-stakes tests?

20. How do you view the influence of your role in closing the achievement gap of ELL students in mathematics?

*Category 5: School leaders as reflective practitioners*

21. What values and beliefs do you possess in relation to ELL students that guide your practice as a school leader?

22. What opportunities for reflection do you currently have or wish to have to become a more reflective practitioner in relation to the needs of your ELL students?

23. What do you perceive to be your role as a school leader in promoting success for culturally and linguistically diverse students?

- Is this different from promoting success for all students?
- What are the biggest challenges you face in this role?

*Conclusion*

24. Is there anything else you would like to add?

APPENDIX D
Survey Protocol

# Understanding the Perceptions of High School Leaders About ELL Students: The Case of Mathematics

Dear Colleague, thank you very much for volunteering to complete this survey. I really appreciate your time and effort in completing this task. Please complete all the items in the five sections of the survey. Following the five sections, there is a small background section that needs to be completed as well. Each item requires you to select the response that best describes your perceptions about ELL students. Please, complete and return the survey no later than October 12, 2009. Thank you very much for your time and input making this study possible! Milton Rosa

## Category 1: General high school leaders' perceptions in relation to ELL students.

Please, look at the list below and rate each statement accordingly.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 1) ELL students need to maintain their cultural background while becoming acclimated to American Culture. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 2) It is a priority, for me to learn about ELL students' different cultural background. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 3) I value the cultural perspectives and languages ELL students bring to school. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 4) ELL students can achieve high academic standards in mathematics. | ○ | ○ | ○ | ○ |

If so, please list the factors that contribute toward this achievement.

If not, please list the factors that contribute for their non-achievement.

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 5) There are adequate resources available to assist ELL teachers in the instruction of ELL students. | ○ | ○ | ○ | ○ |

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 6) Teachers apply adequate pedagogical approaches in their work with ELL students. | ○ | ○ | ○ | ○ |

If so, could you please describe these pedagogical approaches.

If not, could you please describe what is needed to modify this situation?

If you are not able to answer this open-ended question, could you please, explain why?

☐ I do not have time to elaborate on the answer right now.

☐ I do not know enough about the content to elaborate upon the answer.

☐ I have not thought about it.

☐ This is not relevant to my job.

## Category 2: The Role of culture and language in the academic success of ELL students.

Please, look at the list below and rate each statement accordingly.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 7) Ethnic culture plays an important role in the academic success of ELL students in mathematics. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 8) Mathematics is a universal language and its procedures are the same in all cultures. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 9) There is a relationship between ethnic culture and mathematics. | ○ | ○ | ○ | ○ |

If so, could you please, describe how?

If not, could you please explain why?

If you are not able to answer this open-ended question, could you please, explain why?

☐ I do not have the time to elaborate on the answer right now.

☐ I do not know enough about the content to elaborate upon the answer.

☐ I have not thought about it.

☐ This is not relevant to my job.

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 10) Gaps in ELL students' performance are partly due to the impact of language factors on mathematics standardized assessments. | ○ | ○ | ○ | ○ |

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 11) ELL students approach mathematical problem-solving differently than non-ELL students due to their unfamiliarity with the cultural context of the mainstream society. | ○ | ○ | ○ | ○ |

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 12) The ethnic cultural background of ELL students does not influence their performance in mathematics standardized high-stakes tests. | ○ | ○ | ○ | ○ |

If so, could you please describe how?

If not, could you please, explain why?

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 13) When compared to non-ELL students, ELL students are disadvantaged in their learning process because their mathematical instruction is inadequate to their learning needs. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 14) I create a school culture in which native English-speaking and ELL students achieve high standards in mathematics while working and learning with each other in a climate of mutual respect. | ○ | ○ | ○ | ○ |

If so, could you please, describe how?

If not, could you please, explain why?

If you are not able to answer this open-ended question, could you please, explain why?

☐ I do not have the time to elaborate on the answer right now.

☐ I do not know enough about the content to elaborate upon the answer.

☐ I have not thought about it.

☐ This is not relevant to my job.

# Category 3: The effects of the ELL students' cultural background on their academic performance in mathematics.

Please, look at the list below and rate each statement accordingly.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 15) Due to their linguistic background, ELL students are frequently unable to demonstrate their content-area knowledge in mathematics high-stakes standardized tests. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 16) Due to their ethnic cultural background, ELL students are frequently unable to demonstrate their content-area knowledge in mathematics high-stakes standardized tests. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 17) ELL students need a modified curriculum to improve their achievement in mathematics because the ethnic cultural background of each student places a certain influence on their performance on standardized high-stakes mathematics testing. | ○ | ○ | ○ | ○ |

If so, could you please describe what kind of modifications?

If not, could you please explain why?

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I donot have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

## Category 4: ELL students' performance on mathematics standardized high-stakes tests.

Please, look at the list below and rate each statement accordingly.

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 18) Standardized tests are difficult for ELL students because they do not put in the necessary time and effort as non-ELL students. | ○ | ○ | ○ | ○ |

If so, could you please, list some of the factors that contribute for this kind of behavior?

If not, could you please, list some of the factors that contribute for this kind of behavior?

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have enough time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 19) I collaborate with teachers to design appropriate pedagogical practices in mathematics for ELL students. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 20) I make sure that teachers modify the delivery of the mathematics instruction for ELL students according to their language proficiency levels. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 21) As an instructional leader, I make sure that ELL students are provided with a challenging school curriculum that is equivalent to that of native-English speakers. | ○ | ○ | ○ | ○ |

If so, could you please, describe how?

If not, could you please, explain why?

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 22) As an instructional leader, I help teachers to identify and design curricular instruction that is adapted the ELL students' cultural background. | ○ | ○ | ○ | ○ |

## Category 5: School leaders as reflective practitioners

Please, look at the list below and rate each statement accordingly.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 23) I take time to reflect upon my role as a leader, as it pertains to meeting the needs of a diverse student population. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 24) I feel well prepared to address the educational needs of ELL students. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 25) I seek ways to develop my cultural proficiency for understanding the cultural background and academic needs of ELL students. | ○ | ○ | ○ | ○ |

If so, could you please, describe how?

If not, could you please, explain why?

[ ]

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 26) Students' ethnic and cultural differences influence my decision making process. | ○ | ○ | ○ | ○ |

If so, could you please, describe how?

[ ]

If not, could you please, explain why?

[ ]

If you are not able to answer this open-ended question, could you please, explain why?

- ☐ I do not have the time to elaborate on the answer right now.
- ☐ I do not know enough about the content to elaborate upon the answer.
- ☐ I have not thought about it.
- ☐ This is not relevant to my job.

## Category 6: Background Information

27) What cultural label (ethnicity) do you use to describe yourself?

[ ]

How long have you been a principal/vice-principal?

[ ]

Please, look at the list below and rate each statement accordingly.

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 28) I am knowledgeable about the various cultural groups represented among the students in my school. | ○ | ○ | ○ | ○ |

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 29) I need professional development that helps me to address the needs of culturally diverse students to deal with challenges associated with the academic performance of ELL students. | ○ | ○ | ○ | ○ |

Have you ever received professional development training such as multicultural or diversity courses or workshops to prepare you to address the learning needs of ELL students?

○ Yes
○ No

If yes, could you please, describe what kind of professional development you participated in?

| | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| 30) I believe that my cultural background impacted my learning in mathematics. | ○ | ○ | ○ | ○ |

APPENDIX E
Letter of Invitation - Principal

September 08, 2009

Dear Principal

I am a doctoral candidate in the Educational Leadership & Policy Studies department at California State University in Sacramento, currently working on my doctoral dissertation. It is with great pleasure that I am inviting you to participate in my research. I have received permission from our school district to include your high school in my study.

I have had the great honor of being able to work as a mathematics teacher in our school district, at _____ High School, for the last 10 years. I have become extremely interested in learning about the challenges, issues, and successes concerning our particular ELL population, especially in regards to their struggles to learn mathematics in a cultural context that is different from their own.

The purpose of my research is to capture and describe the perceptions of the school leadership (principals and vice-principals) in high schools concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

The purpose of this letter is to ask you to participate in an interview with the researcher at a time and location that is most convenient for you. I also would like to ask you to complete an online survey. I anticipate that the interview will take you no longer than 50 minutes as well as it will take you no longer than 30 minutes to complete the survey.

***I also would like to schedule an interview, after school, for the month of October, 2009.***

The anticipated benefit of this study is a better understanding of the perceptions of high school leadership (principals and vice-principals) concerning the challenges faced by the ELL students in the district in relation to their success or failure in mathematics standardized high-stakes testing under NCLB. It is hoped that the results of this project will lead to the development of a series of suggestions and strategies that may help high school leaders to successfully meet the needs of their ELL students. I am more than glad to share the results of my research with you.

You will receive $15 Starbucks card as a compensation for you participation in my study

All information is confidential and every effort will be made to protect your anonymity. Information you provide on the consent form, interview, and survey will be stored separately from data. The researcher's dissertation chair may have access to all data collected duration the project. Your individual performance will not be reported. Only the results of all participants as a group will be reported. The final research report will not include any identifying information. All data and documentation collected will be destroyed upon completion of my study.

Your participation is greatly appreciated!
My best regards,

Milton Rosa

APPENDIX F
Letter of Invitation – Vice-principal

September 08, 2009

Dear Vice-principal

I am a doctoral candidate in the Educational Leadership & Policy Studies department at California State University in Sacramento, currently working on my *doctoral* dissertation. It is with great pleasure that I am inviting you to participate in my research. I have received permission from our school district to include your high school in my study.

I have had the great honor of being able to work as a mathematics teacher in our school district, at       High School, for the last 10 years. I have become extremely interested in learning about the challenges, issues and successes concerning our particular ELL population, especially in regards to their struggles to learn mathematics in a cultural context that is different from their own.

The purpose of this letter is to ask you to complete an online survey. I anticipate that it will take you no longer than 30 minutes to complete the survey.

The anticipated benefit of this study is a better understanding of the perceptions of high school leadership (principals and vice-principals) concerning the challenges faced by the ELL students in the district in relation to their success or failure in mathematics standardized high-stakes testing under NCLB. It is hoped that the results of this study will lead to the development of a series of suggestions and strategies that may help high school leaders to successfully meet the needs of their ELL students. I am more than glad to share the results of my research with you.

You will also receive $15 Starbucks card as a compensation for you participation in this study.

All information is confidential and every effort will be made to protect your anonymity. Your individual performance will not be reported. Only the results of all participants as a group will be reported. The final research report will not include any identifying information. All data and documentation collected will be destroyed upon completion of the study.

In a few weeks you will be receiving the invitation letter to be a participant in this study as well as the informed consent document for your review with specific information on the study.

Your participation is greatly appreciated!

My best regards,

Milton Rosa

# APPENDIX G

Introductory Email Letter for Participation in the Survey (For principals)

Date

Name of the Participant

Dear Participant,

I am a doctoral candidate in the Educational Leadership & Policy Studies department at California State University in Sacramento, currently working on my doctoral dissertation. It is with great pleasure that I am inviting you to participate in my research.

I have had the great honor of being able to work as a mathematics teacher in our school district for the last 10 years. I have become extremely interesting in learning about the struggles, issues and successes concerning our particular ELL population, especially in regards to their struggles to learn mathematics in a cultural context that is different from their own.

The purpose of my research is to capture and describe the perceptions of the school leadership (principals and vice-principals) in high schools concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

I have received permission from our school district to include your high school in the study.

The purpose of this letter is to ask you to participate in an interview with the researcher at a time and location that is most convenient for you. The interview has 24 open-ended questions. As a participant in the interview you can decide at any point to not answer any specific question or to stop the interview.

I also would like to ask you to complete an online survey, which has 30 Likert scale questions and 10 open-ended questions. As a participant in the survey you can decide at any point to not answer any specific question or to stop the survey.

I anticipate that the interview will take you no longer than 50 minutes as well as it will take you no longer than 30 minutes to complete the survey.

In a few days you will be receiving the invitation letter to be a participant in this study as well as the informed consent document for your review with specific information on the study.

Your participation is greatly appreciated.

My best regards,

Milton Rosa

APPENDIX H

Introductory Email Letter for Participation in the Survey (For Vice-principals)

Date

Name of the participant

Dear Participant

I am a doctoral candidate in the Educational Leadership & Policy Studies department at California State University in Sacramento, currently working on my doctoral dissertation. It is with great pleasure that I am inviting you to participate in my research study.

I have had the great honor of being able to work as a mathematics teacher in our school district for the last 10 years. I have become extremely interesting in learning about the struggles, issues and successes concerning our particular ELL population, especially in regards to their struggles to learn mathematics in a cultural context that is different from their own.

The purpose of my research is to capture and describe the perceptions of the school leadership (principals and vice-principals) in high schools concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

I have received permission from our school district to include your school in the study.

The purpose of this letter is to invite you to complete an online survey, which has 30 Likert scale questions and 10 open-ended questions. As a participant in the survey you can decide at any point to not answer any specific question or to stop the survey.

I anticipate that it will take you no longer than 30 minutes to complete the survey.

In a few days you will be receiving the invitation letter to be a participant in this study as well as the informed consent document for your review with specific information on the study.

Your participation is greatly appreciated.

My best regards,

Milton Rosa

APPENDIX I

Introductory Letter for Participation in the Study

Date

Name of the participant

Dear Participant

It is with greater pleasure that I am inviting you to participate in the study, which I am conducting as a doctoral candidate in the Educational Leadership & Policy Studies department at California State University in Sacramento. I am currently working on my doctoral dissertation.

I have had the great honor of being able to work as a mathematics teacher in our school district for the last 10 years. I have become extremely interesting in learning about the struggles, issues and successes concerning our particular ELL population, especially in regards to their struggles to learn mathematics in a cultural context that is different from their own.

The purpose of my research is to capture and describe the perceptions of school leadership (principals and vice-principals) in high schools concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

The goal of the study is to determine how leadership perceptions are influenced by an understanding of the effects of the cultural background of ELL students on academic performance in mathematics standardized high-stakes tests such as CAHSEE and CST. As well, this research seeks to describe the approaches that high school leaders use in relation to their ELL student population. Finally, it is a goal of this project to develop a series of suggestions and strategies that may help high school leaders to successfully meet the need of their ELL students.

It is important that your responses be included in the overall results of this study. Please be assured that your responses will remain completely anonymous and confidential since all results will be reported in a group format.

Enclosed is the Informed Consent document for you review with specific information on the study. If you agree to participate in this important study I would like to invite you to take a few minutes to read and sign the informed consent document and return it to Milton Rosa by the school district mail (_____ Mathematics Department).

I appreciate your willingness to participate in this study. Thank you in advance for your consideration and support.
I have included my email address and my home phone number so you can contact me if you have any concerns or questions.

My best regards,

Milton Rosa

## APPENDIX J

Informed Consent Document to Participate in Research (For Principals)

You are being asked to participate in a research study that will be conducted by Milton Rosa, a doctoral candidate in the Educational Leadership & Policies Studies department at California State University, Sacramento. The title of my dissertation is: *Understanding the Perceptions of High School Leaders about ELL Students' Achievement Gap: The Case of Mathematics*. Permission to conduct this study has been granted by our school district.

*Purpose*

The purpose of the study is to capture and describe the perceptions of principals and vice-principals in nine high schools in a suburban school district near Sacramento concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

The goal of this study is to determine how leadership perceptions are influenced by an understanding of the effects of the cultural background of ELL students on academic performance in mathematics standardized high-stakes tests such as CAHSEE and CST. As well, this research seeks to describe the approaches that high school leaders use in relation to their ELL student population. Finally, it is a goal of this project to develop a series of suggestions and strategies that may help high school leaders to successfully meet the need of their ELL students.

*Research Procedures*

After reviewing this form and agreeing to participate in the study, the following will happen:

a) You will be asked to participate in one interview with the researcher at a time and location that is most convenient for you. The interview has 24 open-ended questions and it should take no longer than 50 minutes. With your permission, the interview will be audio taped and then the tape will be transcribed. The recording will not include any identification information and will not include name, address, identification number, or any other personal information such as birthdate, phone number, and email address. The tape will be destroyed three months after the conclusion of the study. Until that time, the tape will be stored in a locked file cabinet in the researcher's house. After interview questions are analyzed, the transcription will be also destroyed as well. As a participant in the interview you can decide at any point to not answer any specific question or to stop the interview.

b) You will be also asked to complete an online survey with 30 Likert scale questions and 10 open-ended questions. The survey will take no longer than 30 minutes of your time. Your response to the survey will be anonymous and kept confidential. The surveys will not ask for any kind of identification information and will not include name, address, identification number, or any other personal information such as birthdate, phone number, and email address. As a participant in the survey you can decide at any point to not answer any specific question or to stop the survey.

*Risks*

Some of the questions in the interview and survey concerning your perceptions in relation to ELL students may elicit emotional responses as you reflect upon these questions. Some of the questions in the interview and survey may also seem personal, but you may participate as much or as little in the interview and survey as you wish and you do not have to answer any question if you do not want to. If you experience any psychological discomfort in answering the interview and survey questions and want any help any time after completing the research, you may call the school district Employee Assistance Program at MHN at _____ or TDD Users at _____for counseling services provided by licensed counselors.

*Benefits*

The anticipated benefit of this study is a better understanding of the perceptions of high school leadership (principals and vice-principals) concerning the challenges faced by the ELL students in the district in relation to their success or failure in mathematics standardized high-stakes testing under NCLB.

It is hoped that the results of this project will lead to the development of a series of suggestions and strategies that may help high school leaders to successfully meet the needs of their ELL students.

*Confidentiality*

All information is confidential and every effort will be made to protect your anonymity. Information you provide on the consent form, interview, and survey will be stored separately. The researcher's dissertation chair may have access to all data collected during the project. Your individual performance will not be reported. Only the results of all participants as a group will be reported. The final research report will not include any identifying information. All data and documentation collected will be destroyed upon completion of the study.

*Compensation*

You will receive a $ 15 Starbucks card for your participation in the interview and you will also receive another $ 15 Starbucks card for your participation in the survey. If you only participate in the interview, you will receive only one Starbucks card. If you only participate in the survey, you will receive only one Starbucks card.

*Contact Information*

If you have any questions about this research, you may contact Milton Rosa at _____ or by e-mail _____. You may also contact my dissertation chair, Dr. Maria Mejorado, at California State University, Sacramento, at _____ or by email at _____.

*Consent*

Your participation in this study is entirely voluntary. You are free to decline to participate in this study or to withdraw from it at any time.

Thank you so much for your time and attention, it means a lot not only to me, but to our students as well. Thank you in advance for your participation.

I have read the descriptive information presented in this document. I understand that my participation is completely voluntary. My signature indicates that I agree to participate in the study. I also agree to have my interview taped. Please, sign and return this informed consent document to Milton Rosa at _____ High School through the school district mail.

Participant Signature: _____ Date: _____

I agree to have the interview audio taped.
(  ) Yes                         (  ) No

Participant Signature: _____ Date: _____

Researcher's Signature: _____ Date: _____

# APPENDIX K

Informed Consent Document to Participate in Research (For Vice-Principals)

You are being asked to participate in a research study that will be conducted by Milton Rosa, a doctoral candidate in the Educational Leadership & Policies Studies department at California State University, Sacramento. The title of my dissertation is: *Understanding the Perceptions of High School Leaders about ELL Students' Achievement Gap: The Case of Mathematics.* Permission to conduct this study has been granted by our school district.

*Purpose*

The purpose of the study is to capture and describe the perceptions of principals and vice-principals in nine high schools in a suburban school district near Sacramento concerning the challenges faced by ELL students in relation to their success in mathematics standardized high-stakes tests under NCLB.

The goal of this study is to determine how leadership perceptions are influenced by an understanding of the effects of the cultural background of ELL students on academic performance in mathematics standardized high-stakes tests such as CAHSEE and CST. As well, this research seeks to describe the approaches that high school leaders use in relation to their ELL student population. Finally, it is a goal of this project to develop a series of suggestions and strategies that may help high school leaders to successfully meet the need of their ELL students.

*Research Procedures*

After reviewing this form and agreeing to participate in the study, you will be also asked to complete an online survey with 30 Likert scale questions and 10 open-ended questions. The survey will take no longer than 30 minutes of your time. Your response to the survey will be anonymous and kept confidential. The surveys will not ask for any kind of identification information and will not include name, address, identification number, or any other personal information such as birthdate, phone number, and email address. As a participant in the survey you can decide at any point to not answer any specific question or to stop the survey.

*Risks*

Some of the questions in the survey concerning your perceptions in relation to ELL students may elicit emotional responses as you reflect upon these questions. Some of these questions may also seem to be personal. You do not have to answer any question if you do not want to. If you experience any psychological discomfort in answering the interview and survey questions and want any help any time after completing the research, you may call the school district Employee Assistance Program at MHN at _____ or TDD Users at _____ for counseling services provided by licensed counselors.

*Benefits*

The anticipated benefit of this study is a better understanding of the perceptions of high school leadership (principals and vice-principals) concerning the challenges faced by the ELL students in the district in relation to their success or failure in mathematics standardized high-stakes testing under NCLB.

It is hoped that the results of this project will lead to the development of a series of suggestions and strategies that may help high school leaders to successfully meet the needs of their ELL population.

*Confidentiality*

All information is confidential and every effort will be made to protect your anonymity. Information you provide on the consent form and survey will be stored separately. The researcher's dissertation chair may have access to all data collected during the project. Your individual performance will not be reported. Only the results of all participants as a group will be reported. The final research report will not include any identifying information. All data and documentation collected will be destroyed upon completion of the study.

*Compensation*

You will receive a $15 Starbucks card for your participation in this study.

*Contact Information*

If you have any questions about this research, you may contact Milton Rosa at _____ or by e-mail at _____. You may also contact my dissertation chair, Dr. Maria Mejorado, at California State University, Sacramento, at _____ or by email at _____.

*Consent*

Your participation in this study is entirely voluntary. You are free to decline to participate in this study or to withdraw from it at any time.

Thank you so much for your time and attention, it means a lot not only to me, but to our students as well. Thank you very much in advance for your participation.

I have read the descriptive information presented in this document. I understand that my participation is completely voluntary. My signature indicates that I agree to participate in the study. Please, sign and return this informed consent document to Milton Rosa at _____ High School through the school district mail.

Participant Signature: _____ Date: _____

Researcher's Signature: _____ Date: _____

APPENDIX L

Survey Reminder

Dear Participant,

I hope you have received my survey regarding school leaders' perceptions about ELL students and their performance on standardized high-stakes tests. If you have not yet completed and returned your survey, I ask that you do so at your earliest convenience. You information is very important and I appreciate your participation.

Thank you very much!

Milton Rosa

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