8-2014

Factors that contribute to Hispanic English Language Learners' high academic performance in high school science in the Rio Grande Valley of Texas: A multicase study

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FACTORS THAT CONTRIBUTE TO HISPANIC ENGLISH LANGUAGE LEARNERS' HIGH ACADEMIC PERFORMANCE IN HIGH SCHOOL SCIENCE IN THE RIO GRANDE VALLEY OF TEXAS: A MULTICASE STUDY

A Dissertation

by

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Submitted to the Graduate School of the
University of Texas–Pan American
In partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

August 2014

Major Subject: Educational Leadership

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ABSTRACT

Elizondo, Antonio, Factors That Contribute to Hispanic English Language Learners' High Academic Performance in High School Science in the Rio Grande Valley of Texas: A Multicase Study. Doctor of Education (Ed.D.), August, 2014, 223 pp., 2 tables, 7 figures, 283 references, 164 titles.

The purpose of this study was to identify, discover, uncover, examine, and document factors that contribute to Hispanic English Language Learners' (ELL) high academic performance in high school science in the Rio Grande Valley of Texas. Participants were high school seniors enrolled in college-level classes who had scored *commended* on the science exit-level Texas Assessment of Knowledge and Skills and ranked toward the top of their class. One science teacher and school administrator from the respective schools also participated in this study.

One student from each of four different high schools in south Texas was selected to participate. School officials identified students meeting the participant criteria and provided consent documents. In this qualitative multicase study, students were interviewed on three different dates. Administrators and science teachers were also interviewed for triangulation.

Significant findings showed that factors contributing to high academic performance in science were mainly intrinsic. Hispanic ELL students need meaningful responsibilities to internalize self-esteem and self-efficacy to realize high academic performance. Self-motivation, a contributing factor, provides students with a positive outlook on high academic performance and the ability to defer more immediate undermining rewards. Students envision themselves as

future integral members of society by working in a field that will directly provide a positive impact on others. This helps their self-esteem as well as their self-worth and supports high academic performance. Parental and teacher support are critical. Low socioeconomic status is not a causal factor for poor academic performance.

School administrations should facilitate knowledge and skills for appropriate staff to willingly and enthusiastically mentor targeted students and for parents to promote, inspire, and motivate students' positive intrinsic qualities. Future studies should examine different leadership styles that maximize teachers' ability to influence students' high academic performance. Finally, provide students the appropriate guidance to set career goals and demonstrate that high academic achievement is logical, attainable, and beneficial for all students.

DEDICATION

This research project is dedicated to family: to Aminta, especially, whose support and encouragement are bottomless; to my children, Mariza and Anita, whom I love and respect so much; and to my grandchildren, Isabela and Elisa, who inspire me to learn and lead as they illuminate the future with their enthusiastic curiosity and never-ending quest for knowledge about the world around them.

This work is also dedicated to those who are not physically with us: Lisa, Michael, and Ali, whom I still miss after 37 years and wonder whom they could have been, and my parents, Elodia and Antonio, who instilled service, responsibility, a strong work ethic, and political activism but, most of all, an emphasis on education. In deciding to pursue a doctoral degree, my mom's words rang true for me: "When facing a difficult decision, consider the most difficult first. If that is the correct decision, you will know; if it is not, you will be relieved because the rest are easier."

I also dedicate this work to my in-laws, for all their love, respect, and passion for life, especially Mere Saldaña, for modeling service to God and family; to my brothers and sisters, for continuously paving the way; and finally, to my first teacher, my *abuelita* Marillita, for teaching me and countless others how to read and write in her home classroom *la escuelita*.

ACKNOWLEDGMENTS

I acknowledge all the people who were instrumental in this successful dissertation process. Thanks to Dr. Karen Watt, my committee chair, for whom I have endless gratitude for all her work, feedback, and especially for hanging in there while I battled with overemployment. I am thankful for her guidance and support but mostly for her wisdom and gentle persuasion in guiding this process in the optimal direction. I am also grateful to Dr. Marie Simonsson for her dedication and leadership in the doctoral program, as a member of my committee, and as a faculty advisor. Thanks also to Dr. Anita Pankake, whose knowledge, motivation, and pedagogy were inspirational as I went through this process, especially in the early years. Furthermore, I acknowledge Dr. Shirley Mills, whose endless energy and knowledge were always stimulating and admirable. Again, thank you to all my committee members for the high degree of professionalism and ethics displayed throughout the entire doctoral process.

A heartfelt thanks to Dr. John McBride, for helping so many achieve their goals and for giving inspiration and leadership guidance to countless science teachers in all grade levels. His enthusiasm for science and commitment to teachers' knowledge and pedagogy, especially in the Rio Grande Valley, are unmatched.

Thank you to English Language Learners for their *empeño* in learning as well as to their teachers and school leaders for always scrutinizing paths through the maze of attitudes, situations, laws, and programs in order to succeed. My special and sincere thanks go to all

participants in this research study for their time and effort in adding to this much-needed body of knowledge.

I have heart-felt gratitude for members of Cohort V for substantiating the notion that there are excellent educators in public schools throughout the Rio Grande Valley of Texas. Finally, thank you to the University of Texas Pan American for having and supporting a competitive, comprehensive, and top-quality doctoral program.

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CHAPTER I

INTRODUCTION

Education for Hispanics, the largest minority group in the United States, is failing. Hispanics became the largest minority group in the United States in 2002 and will outnumber non-Hispanic Whites by the year 2025 (Ramos, 2005), and they are destined to become the majority group in the United States by 2040. As the Hispanic population increases in the United States, changes to culture, economy, and education will occur (Ramos, 2005). Not educating Hispanics to a world-competitive level will be economically unsustainable for Texas as well as the United States (Murdock, 2007; Murdock, White, Hoque, Pecotte, You, & Balkan, 2003). At the same time, the English language learner (ELL) population is the fastest growing student group in the United States (Finsterbusch & McKenna, 1996; Short & Echevarria, 2005).

Hispanics contribute to the highest population of ELLs in high schools throughout the United States (Garcia, 2005). Data suggest that more than 8 million new students enroll in public schools each year (Garcia, 2005). Many of these students speak a language other than English. The 2000 U.S. Census reported that approximately 20% of school-aged children were in this category (Garcia, 2005). The United States can no longer be passive in educating Hispanic ELLs. Historically, there has been a pattern of low expectations, and it is often assumed that Hispanic students, especially ELLs, are less capable and that educators hold the key to helping these students achieve high academic performance (Kuykendall, 2004).

Unfortunately, Hispanics in high school are not prepared to take exit-level tests, indicating a lack of academic skills as well as a deficiency of the in-depth academic, conceptual, and analytical understanding required for postsecondary achievement (Conley, 2002, 2010). Attending college increases the potential for high salaries, better health, personal and professional growth, and being of service to the community (McGaha & Fitzpatrick, 2010).

Science education and knowledge comprise a major goal in the United States (American Association for the Advancement of Science, 1990). There is a need to understand basic scientific concepts so that individuals can discuss science-related problems affecting us today (National Research Council [NRC], 1995). Science has been neglected with ELL students, and a desired outcome would be to increase science literacy to help individuals make better personal and professional decisions (Torres & Zeidler, 2002).

Additionally, the *U.S. News and World Report* listed the first 20 of the top 50 careers as science related (Wolgemuth, 2010). Science professionals and technicians are in high demand. Because of this demand, science-related careers often pay better. Salaries for science teachers are generally fixed and not determined by market influences; however, there are science teacher shortages throughout the United States, creating a demand for these professionals (Hanushek, 2007; Tyler & Vitanova, 2008).

With crises such as energy and climate change as well as increased world population and threats to American and world interests, new technology must be developed, manufactured, and implemented. American students' interest in high-demand fields can ensure success for the United States, its economy, and its freedom (Miller, 2010). These concerns and their resolutions require an in-depth understanding of scientific research and theory and thus the need for additional science professionals as well as implementation of school curricula to foster these

needs (Marcinkowski, 2010). Furthermore, current students will have to solve existing science-based problems, such as climate change and the possible replacement of current fossil fuels with renewable fuels and alternative energy methods and resources (Hadi-Tabassum, 1999).

Hispanic students' success is important to the country. Historically, ELL students have experienced decades of educational inequality. In Texas, the majority of ELL students are Hispanics (Texas Education Agency [TEA], 2008; 2013). There has been poor and unequal performance among Hispanic ELL students. The U.S. Supreme Court has attempted to remedy this inequality. For example, the 1973 Supreme Court case *San Antonio Independent School District v. Rodriguez* (Ogletree, 2005) found unequal financing in the education of Hispanics (Baker & Green, 2009), and *Lau v. Nichols et al.* (1974) attempted to provide ELL students with instruction in their native language so they could achieve high academic performance in science (Garcia, 2005). The equal protection clause of the 14th Amendment to the U.S. Constitution seeks to provide all students with equal educational opportunities (Alexander & Alexander, 2009).

A Nation at Risk, a 1983 federal commission report, reported that the United States' educational system was failing (Louis, Febey, & Schroeder, 2005). There is widespread loss of confidence in public schools among parents (Ouchi, 2003). Much of the dissatisfaction arises from quantifiable data depicting low scores on high-stakes tests. On these high-stakes tests needed for graduation in Texas, Hispanic ELLs are the lowest scoring subpopulation in public schools, with the worst scores in science (TEA, 2010b). At the same time, schools have to meet the goals set by No Child Left Behind (NCLB), which requires that all student populations meet an established passing rate. NCLB was passed in an effort to improve performance among all student groups and subgroups.

Schools that fail to meet the requirements of NCLB must improve the test scores of low-scoring student populations (TEA, 2009); otherwise, they will not meet Adequate Yearly Progress (AYP). Hispanic ELLs, owing to Texas Assessment of Knowledge and Skills (TAKS) results, hinder high schools from meeting AYP. AYP is a standard under provisions of NCLB that require schools to meet certain passing percentages in English and mathematics and certain graduation rates. The graduation rate is where Science TAKS results impact, positively or negatively, the success of schools with Hispanic ELL students (TEA, 2010a). Furthermore, these schools will be labeled as low performing, based on TAKS, under provisions of NCLB. Eventually, schools that continuously fail to meet AYP will have to restructure, face a state takeover, or close. However, political realities do not allow for schools to be taken over or closed if they fail to meet AYP (Mead, 2007). Unless effective corrective measures are implemented, low-performing schools will continue to exist.

In Texas, Hispanics are the lowest scoring group on TAKS, especially in science. In part, the problem may be that high-stakes tests such as TAKS are written for native English speakers and may test reading proficiency instead of science (Abedi, 2002). Science instruction in the United States, with very few exceptions, is provided in English. Therefore, Hispanic ELLs can easily be at a disadvantage because of a lack of the cognitive-academic language proficiency required for higher level thinking and reasoning used in the study of scientific concepts (Cummings, 1982).

According to reported results of TAKS, Hispanic ELLs score among the lowest, especially in science (TEA, 2008). This can be for several reasons, such as the greater language demands in science tests that make the tests English proficiency tests and not necessarily science tests (Abedi, 2002). ELL students may be proficient conversational English speakers, but the

complex structure of science test questions makes the test linguistically more challenging (Abedi, 2002). ELL students may confuse a scientific model such as climate model with a mathematical model or a fashion model. These three are very different types of models. They may confuse lightening with lightning, desert with dessert, or defuse with diffuse and thus influence their interpretation of words affecting his or her response on test questions (Carrier, 2005). Not helping matters, resources are limited, teacher turnover rates are high, and science is often not tested where ELL students are most concentrated (Lee, 2005).

How well a nation's citizens are educated and skilled determines its welfare (Hanushek, 2007). In 2006, about 20% of children in U.S. schools spoke a language other than English at home (Estrada, Gomez, & Ruiz-Escalante, 2009). Seventy-five percent of all students in bilingual programs are Hispanic, and many of these students are at risk of dropping out of school (Echevarria, Vogt, & Short, 2008). More than 50% of Texas Hispanic students actually drop out prior to high school graduation (TEA, 2008, 2013).

In the Rio Grande Valley of Texas, ELLs are the lowest scoring group on TAKS, with 2008 passing rates of 17% and 38% in the 10th and 11th grades, respectively (TEA, 2008). In 2007, only 31% of those students identified as ELL passed the exit-level TAKS (TEA, 2008), and in 2009, 45% passed the exit-level TAKS (TEA, 2010b). Statewide, the number of all Hispanic students passing the 11th-grade Science TAKS increased from 73% in 2008 to 79% in 2009, compared to 65% in 2007. Non-Hispanic White students had 88%, 91%, and 94% passing rates in 2007, 2008, and 2009, respectively (TEA, 2008).

In the midst of all this, there are Hispanic ELLs who exceed expectations and demonstrate high academic performance by passing the TAKS with the highest possible rating of "commended." These students earn good grades and prepare for postsecondary education by

taking college classes and/or college preparatory classes. They are college ready, which means they are taking or have taken college classes, college entrance exams, or Advanced Placement (AP) or pre-AP courses (Conley, 2007). They are ready to meet the rigors of postsecondary education.

However, with the exception of special needs students, ELL students are the least represented in AP course enrollments (Moore & Slate, 2008). AP is an academically rigorous program through which more than 90% of colleges and universities grant course credits or placement (College Board, 2010). Hispanic student performance on AP tests is still lagging behind the performance of non-Hispanic White students (College Board, 2010). Furthermore, Hispanic students are largely underrepresented in undergraduate programs nationally. Only 8% attend college, and approximately 4% acquire bachelor's degrees (Perna, 2000).

However, a small number of Hispanic ELL students are likely to take college courses, including AP; communicate openly with counselors; and obtain information about postsecondary educational institutions from parents or peers (McGaha & Fitzpatrick, 2010). College classes are often taken through dual and/or concurrent enrollment prior to high school graduation (South Texas College [STC], 2009; University of Texas–Pan American [UTPA], 2009).

It is important to identify contributing factors that lead these students to high academic performance and to cultivate them in others. This may allow Hispanic ELL students to compete with other student populations. Identifying factors that contribute to the high academic performance of selected high school Hispanic ELL students can lead distinct entities and educational leaders to assist other Hispanic ELL students to attain high academic performance. It will take a united effort among parents, teachers, administrators, businesses, and other

community members to assist Hispanic students become high academic performers (Kuykendall, 2004).

Statement of the Problem

The focus of this study is to investigate factors that contribute to Hispanic ELL high academic performance in high school science in the Rio Grande Valley of Texas. Identifying contributing factors can lead to improved academic performance among all students. For the most part, Hispanic ELL high school students' academic performance in South Texas is in dire need of improvement. According to TAKS results, these students had the lowest performance rates from 2003 to 2013 (TEA, 2014). Hispanic ELL students are showing the greatest population growth in Texas schools (TEA, 2009, 2010b). Hispanics account for 50% of births, are the fastest growing population in Texas, are currently the least educated, and possess the highest dropout rate in Texas (Murdock, 2007; Murdock et al., 2003). Hispanics have a higher incidence of poverty, and students in poverty are at greater risk of dropping out of school (Taylor, 2005).

If Hispanic ELL students do not perform better academically, the status of the United States as a world power is threatened. On one hand, the demand for low-skill, cheap labor continues to attract additional Hispanic immigrant families into the United States. This leads to lower overall earning power among Hispanics and thus economic inequality, which can translate into reduced tax revenues per capita and therefore create the biggest economic challenge facing America in its history (Parrado & Kandel, 2010). The United States will no longer be able to provide defense around the world and will lose its service and technological competitiveness (Parrado & Kandel, 2010).

Hispanic students have several common characteristics. They are often the first in their families to attend college, often are underprepared, have financial responsibilities on which their families depend, have problems in graduating from college, and underperform academically compared to their non-Hispanic White peers (Greene, Marti, & McClenney, 2008). However, a small number of Hispanic ELL students succeed and perform well academically as well as on high-stakes tests and are ready for the rigorous demands of college. Finding factors that contribute to the high academic performance of these students is important so that we may find a framework, a methodology, or strategies to assist academically struggling Hispanic ELL students.

The Rio Grande Valley of Texas is located in the southernmost tip of Texas. Generally, it includes Hidalgo, Cameron, Willacy, and Starr counties. However, because of convenience and availability, most of this study was conducted in Hidalgo County. Hidalgo County has 15 school districts, Cameron County has 10, and Willacy and Starr counties have 4 and 3 districts, respectively (Region One Education Service Center, 2010).

Hispanics, the second largest group in the United States, have less than 25% enrollment in college, compared to more than 40% of non-Hispanic Whites (Marisco & Getch, 2009). Hispanic ELL students' failure to pass a test required for high school graduation, such as TAKS, or not scoring well on the Scholastic Aptitude Test (SAT) or American College Testing (ACT) results in lower and less gainful employment opportunities (Garcia, 2003). High school Hispanic ELL students have the lowest educational attainment of any group. Their parents want them to succeed, but many obstacles prevent them from enrolling and succeeding in college (Marisco & Getch, 2009). However, a small number of Hispanic ELL students have achieved high academic

performance. They earn good grades; acquire high marks on TAKS, scoring "commended"; and are college bound (TEA, 2009).

Identifying factors that contribute to Hispanic ELL students' high academic performance may provide resources and avenues so that these students, who are highly underrepresented in postsecondary schools, can achieve the goal of higher education. It is the goal of this research to find factors that contribute to these high school students' high academic performance in science.

Purpose of the Study

The purpose of this study was to identify, discover, uncover, examine, and document factors that contribute to Hispanic ELL students' high academic performance in high school science in the Rio Grande Valley of Texas. This research project was a qualitative multiple case study (Creswell, 2007; Stake, 2006; Yin, 2009). Qualitative methods to collect, record, and interpret data were used. Owing to conflicting research on the benefit of student extracurricular and co-curricular involvement, such involvement was weighed as a possible contributing factor to high academic achievement (Guest & McRee, 2009). Four students selected to participate in the study were interviewed three times on three different dates (Seidman, 2006) to gain or attain in-depth information about the students' experiences (Yin, 2009).

This study identified factors that contribute to Hispanic ELL students' high academic performance in science. This research added to the body of knowledge and provided information to educational leaders so that they can better understand and implement factors that contribute to ELL students' high academic performance in science.

Definitions

Affirmative action. Affirmative action is a set of laws, policies, or rules that provides advantages for minority groups who have been traditionally discriminated against. Affirmative action aims to create a fair environment through preferred access to education, employment, housing, or health care.

College readiness. College readiness is indicated by a student taking or having taken college classes, college entrance exams, or AP or pre-AP courses (Conley, 2007).

Completion rate. The longitudinal high school completion rate is the percentage of ninth-grade students who complete high school or are enrolled at the end of 4 years from the entry date into high school (TEA, 2008).

Equal opportunity. Equal opportunity describes the intent to provide a fair environment in education, employment, housing, or health care, irrespective of social or cultural differences or certain characteristics, such as race.

Equality. Equality is the equal treatment of individuals without regard to race, gender, or other factors.

Equity. Equity is a legal nonmonetary remedy to a situation that renders a group of people at a disadvantage. Equity is achieved by injunctions, court orders, or changes in policy.

English language learners. English language learners are students with limited English language academic vocabulary in a predominantly English-focused learning environment (Goldstein, Jackson, & Lugo-Neris, 2010). Terms commonly used in the literature include limited English proficient (LEP), English as a second language (ESL), English for speakers of other languages (ESOL), language minority students, and culturally and linguistically diverse (Bagby, Cunningham, Lyall, & Shille, 2003).

Ethnicity. Ethnicity is a term given to members of a group of people who have the same or similar characteristics, such as Hispanics or Latinos.

Graduation rate. This is the percentage rate of students who graduate from high school with a regular diploma that is fully aligned with state graduation standards in the standard number of years. It is section 200.19(a)(i) of NCLB.

Hispanics. Hispanics are persons of any race who can trace their ancestry to Spain or any of its colonies. Hispanics are often from Mexico, Puerto Rico, Cuba, Central or South America, and sometimes places of other Hispanic origin (Haverluk & Trautman, 2008).

Immigrant. This is a foreign-born individual who moved to the United States and set permanent residence (Garcia, 2005).

Institutionalized segregation. Institutionalized segregation occurs when laws or policies of a state, nation, or other major entity support or favor segregation due to race.

Latino. Latino is a term generally used to describe Hispanics.

Limited English proficient. This term describes students with language backgrounds other than English who have not developed the use of the English language to fully benefit from exclusively English instruction (Council Chief of State School Officers, 1992).

No Child Left Behind Act of 2001 (NCLB). This is federal legislation passed in 2001 that provides for more federal accountability and increased results among all student populations (Hayes, 2008).

Race. Race is a term given to a group of people, such as Black or White. Race in this dissertation is also used to describe Latinos affected by segregation and unequal treatment.

Resiliency. Resilience or resiliency is the ability to realize high academic performance and overcome obstacles and/or adversity, which generally predict failure (Henderson, 1998).

Rigor. Rigor involves higher expectations from students based on materials used, completion of work assignments, and students' demonstration of mastery and proficiency at higher academic levels.

Segregation. Segregation is the process by which people, in this case, students, are separated because of race. In the case of this dissertation, Hispanics or Latinos separated because of ethnicity are considered segregated.

Self-efficacy. Self-efficacy is an individual's judgment of his or her ability to complete future actions (Bandura, 1993).

Teacher self-efficacy. Self-efficacious teachers are positive, confident, innovative thinkers who are enthusiastic about a student's high academic achievement (Johnson, 2010), and the term also describes the conviction that a teacher can produce desired outcomes in his or her students.

Tracking. Tracking is a mechanism used to justify the sorting of students based on perceived abilities or other seemingly advantageous criteria that results in unequal treatment of students, unequal educational opportunities, and unequal outcomes (Oakes, 2005).

Transition. Transition is considered an evolutionary change from a language to English to use in a formal educational setting in order to learn.

Research Questions

1. What school or district programs, whether extracurricular, co-curricular, or curricular, identified by selected South Texas Hispanic ELL students, contribute to ELL student academic performance in science?
2. What intrinsic factors do selected South Texas Hispanic ELL students identify as contributing to academic performance in science?

3. What other factors do selected South Texas Hispanic ELL students identify as contributing to their academic performance in science?

Methodology

This research project was a qualitative multicase study (Creswell, 2007; Stake, 2006; Yin, 2009) in which qualitative methods were used to collect, record, and interpret data. This study included four Hispanic ELL students who have exhibited high academic performance in high school science as measured by academic course grades, Science TAKS scores, and college readiness. Each student was interviewed three times individually on three different days (Seidman, 2006) using an in-depth interview method, in which students were asked about facts based on their own experiences (Yin, 2009). Selecting four students for this multiple case study augmented triangulation so that data did not depend on one individual for the total evidence of factors that contribute to these students' high academic performance in science (Yin, 2009).

Students were asked questions to identify factors that led to their high academic performance. These factors included students' perceptions of parental support and extracurricular, co-curricular, and/or curricular factors (Guest & McRee, 2009). Identified factors also included intrinsic and extrinsic qualities as well as English language acquisition, overcoming language barriers, and teaching methodology.

To further increase triangulation, one science teacher and one administrator from the same schools were interviewed after student interview transcripts were written and reviewed by students and the researcher (Denzin & Lincoln, 2005). Teachers and administrators were asked structured questions based on students' responses to verify essential details and identify common emerging themes. To retain anonymity, teachers and administrators were asked about programs and occurrences from the different high schools, such as extracurricular and academic programs,

that student interviews identified as essential to high academic performance. Teachers and administrators anonymously discussed specific students. However, the researcher did not ask questions or for clarification or information about specific students. The only information obtained about students from the school district and/or school officials was to determine if students met the required participant criteria. Students' demographic information was obtained from student participants.

All student interviews were semistructured for the purpose of acquiring students' backgrounds and also to discover or expose factors that contribute to ELL students performing at high academic levels and to help students feel comfortable in communicating information to the researcher (Denzin & Lincoln, 2005; Gubrium & Holstein, 2001). In an effort to further identify previously coded themes, the second and third student interviews were also semistructured and further explored previous responses (Merton, Fiske, & Kendall, 1990). In the first interview, questions were asked such as "What factors contribute to high academic performance in science?"

As further exploration was done, questions remained semistructured. However, if responses from the previous interviews divulged factors that needed further explanation or development, the researcher asked structured and semistructured questions without leading the student toward any particular answer (Merton et al., 1990). Questions were asked such as "What have you thought about from the last interview that you may want to change, delete, or further explain?"

Finally, when warranted, more specific and targeted questions were asked to pinpoint specific factors that contribute to high academic performance of ELL students in science. For example, "Considering what you said previously, why do you think you are a high-performing

student in science?" Unstructured questions were appropriate at the beginning of the interview process. As the interview progressed, the interviewer delivered considerably more structured questions to seek greater specificity in the answers (Merton et al., 1990). For member checking, each interview participant was given an opportunity to review their interview transcripts. This allowed students, teachers, and administrators to verify what they really meant to say and to provide their best and correct responses (Denzin & Lincoln, 2005).

Available teachers and administrators were also interviewed. To avoid corroboration of data, they were aware neither of the student participant nor his or her responses. These interviews were structured and based on student responses to provide triangulation of the data collected (Denzin & Lincoln, 2005) and to achieve a higher level of understanding of student responses (Creswell, 2007).

Participants for this multiple case study were purposefully selected from four different districts. High schools were of different population sizes and were located in the Rio Grande Valley of South Texas. Science teachers from selected schools were interviewed individually. These teacher interviews took place after student interviews were completed, transcribed, and analyzed. Finally, individual interviews with administrators from the same selected schools were conducted. Teacher and administrator interviews focused on topics directly related to factors that contributed to Hispanic ELL student high academic performance in science. These questions asked of teachers and administrators were based on the students' responses to further understand factors that led to Hispanic ELL high academic performance. Teacher and administrator interviews were structured (Merton et al., 1990). These interviews took a conversational tone; however, predetermined questions were asked, and a set protocol was followed (Yin, 2009).

Participants for this study were Hispanic ELL students who scored "commended" on Science TAKS and have high academic performance, as shown with grades and courses taken in high school. They also demonstrated readiness to meet the challenges of attending a college or university by successfully having taken AP and/or college classes. Students with high academic grades were identified as those in the top academic quadrant of their graduating class and who had a grade point average of 90 or higher on a scale of 0–100. Data to determine high academic performance were obtained from each school for the purposeful selection of students to participate in this research project. On the basis of this criterion, all student participants were in their senior year of study in high school.

Audio recording methods were used in all interviews. Field notes were collected during discussions and interviews and written transcripts were created from recordings (Creswell, 2007). Students' academic transcripts were not collected. At the start of student interviews, open-ended questions were asked to identify factors contributing to their high academic performance in science.

A multiple case study approach was to develop a thick description of the factors that contribute to the success of ELL students in high school science (Denzin & Lincoln, 2005; Stake, 2006; Yin, 2009). All interview transcripts were printed and coded to identify themes, and these themes were compared to the themes of the other interviews conducted as part of this research. Using a series of three interviews (Seidman, 2006) with four students individually and at different sites added to the triangulation of the data as well as the transferability of the findings (Denzin & Lincoln, 2005; Stake, 2006; Yin, 2009). Gathering data at four different high schools enhanced validity and accuracy as well as provided for the participants' voices to be represented by allowing them to review their interview transcripts (Denzin & Lincoln, 2005; Seidman, 2006).

Each participating school identified an administrator as the researcher's contact person. The administrator identified students in the school that met the research study's criteria. They selected one student and asked the student if he or she was willing to participate. The student chosen was provided the appropriate consent documents, and a date was set for the first interview. Additional interviews were not conducted. Short and clearly written questions were asked to provoke discussion and responses from participants (Krueger, 1998a, 1998b, 1998c). These types of questions helped to acquire insight into factors that contribute to the high academic performance of Hispanic ELL students in science.

Limitations and Delimitations

This study was limited to the pertinent time frame, classes, and schools where students were enrolled. Grading systems varied from school to school as well as from teacher to teacher. Selected students demonstrated high academic achievement in the classroom that may have been assessed distinctly by individual teachers or by different schools. Every effort was made to obtain objective responses from students, teachers, and administrators. However, in all cases, the researcher was able to interview students in a controlled environment where others were not present. These environmental factors aided in eliminating outside influences and optimized students' responses to further enhance honesty, accuracy, and/or the level of detail of their replies to questions. However, it is possible that students on their own part may not give totally honest responses. At the time of the interviews, the researcher worked as a science teacher at a high school within the geographic area but not in a school selected for this research.

Assumptions

The quantitative data obtained for this study, such as student TAKS scores, enrollment in preparatory college readiness classes, and socioeconomic data, were appropriate measures to use for purposeful selection of participants for this study. It was assumed that schools and school districts provided accurate, needed information about students after all release forms were signed, received, and documented. The researcher also assumed that students' answers were accurate and factual. Furthermore, it is the assumption of the researcher that the findings of this study transfer to other schools with similar populations within the same geographic area. To some extent, findings should transfer to schools outside the geographic area and with different populations.

Significance of the Study

Identifying factors that contribute to Hispanic ELL students' high academic performance can help in the development and implementation of strategies for all students and schools. Findings of this study can assist in identification and implementation of programs, activities, or strategies based on contributing factors that are capable of affecting high academic achievement. Educational leaders can implement identical or similar programs to target and assist students, especially Hispanic ELL students (Gregorius, 2011). This can contribute to ELL students' improved academic performance, especially in science. If students can achieve high academic performance in secondary science and the Science TAKS, the most failed test among Texas high school students (TEA, 2010b), school leaders can find and implement programs to assist these students in facing the challenges of today's high-stakes testing culture (Jackson & Castro, 2011). In addition, schools will be able to meet the provisions of the NCLB, which will keep schools

from being rated as ineffective and facing possible closure (School Improvement Resource Center [SIRC], 2010).

As of March 2010, the Texas Education Agency (2009) had 24 Texas high schools listed as not having met AYP for at least 5 consecutive years. AYP is a standard under the provisions of NCLB, which requires schools to meet certain percentage passing rates in English and Mathematics as well as certain graduation rates (TEA, 2010a), which is where science impacts success or failure. In Texas, more than 150 high schools and more than 350 schools have not met the AYP standard. Some of these schools are in the Rio Grande Valley of Texas. In identifying factors that contribute to the high academic performance of ELL students, schools can work toward a remedy to assist students and their families in achieving a positive science experience in high school.

A greater importance must be placed on Hispanic ELL students' academic achievement, which will result in the continued economic and technological competitiveness of the United States. Educating students and developing strong wage earners among the fastest growing group in the United States will in turn add to the success of our communities, states, and country.

Student high academic performance is important in secondary education. With the NCLB, some schools are being reported as ineffective. Most Texas high schools do not meet AYP because of the underachievement of their Hispanic ELL populations (TEA, 2008). In 2009, the Hispanic student population comprised 47.9% of the total population. This is the largest ethnic population in Texas public schools. The non-Hispanic White population is only 34.0%. Yet graduation rates for Hispanics and Whites are 37.5% and 44.8%, respectively. The ELL population is identified by the state as LEP and comprises 16.9% of the total population, a 3% annual increase between 2007 and 2008 and more than 8% in 2 school years since the school

year ending in 2007 (TEA, 2009). Less than 25% of Hispanics are enrolled in college, compared to more than 40% of non-Hispanic Whites (Marisco & Getch, 2009). Hispanics are the fastest growing population in the United States (Edl, Jones, & Estell, 2008). By identifying factors that contribute to Hispanic ELL students' high academic performance in science, school leaders can attempt, if possible, to remedy some of the problems this student population has faced to help them achieve high academic performance.

However, postsecondary academic achievement is of extreme importance. Acquiring a college degree increases the potential for increased income, good health, and personal as well as professional growth (McGaha & Fitzpatrick, 2010). Finding contributing factors for Hispanic ELL student academic achievement can affect others positively by implementing effective educational programs to serve these students. Some research indicates that legislatively mandated programs may not be the most effective for improving academic achievement (Greene & Trivitt, 2008). Other programs may offer greater promise in helping students prepare for and complete college (Watt, Huerta, & Lozano, 2007). A better understanding of student activities, whether curricular, extracurricular, or co-curricular, and outcomes of their involvement in these activities can lead to a better understanding of what actually improves students' chances of high academic performance (Greene et al., 2008). In the U.S., Hispanic ELL students compose the fastest growing student group. These students, just like any student in the United States, should have the same educational opportunities, without intentional or unintentional barriers (Kuykendall, 2004).

Summary

There are many concerns about educational opportunities for Hispanic ELL students, as indicated by their performance in academic classes, their results on high-stakes tests, and their

graduation rates. However, there are those who succeed. The low performance rate on the high school Science TAKS, the dropout rate, and the lack of high academic performance among this population are all indicators that problems exist. However, those students within this group who succeed may be able to contribute to the high academic performance of others. By identifying factors that contribute to high academic performance in high school science, teachers, schools, and school districts can implement programs or provide lessons that are conducive to Hispanic ELL student high academic performance in science.

The results of this research project are important because they could result in gainful employment of these students by providing avenues for high academic performance in high school as well as in postsecondary studies (Garcia, 2003). They could also mean a more scientifically literate Hispanic population (Carrier, 2005). This research study is a way of obtaining qualitative data that may lead to further research in producing good academic students in our society. The ELL student population growth rate is increasing. Between the 1990 and 2000 U.S. Census, there were 2.9 million more Hispanics, and they should be given the same educational opportunities as anyone in the United States (Kuykendall, 2004).

In the next chapter, a review of literature provides a background to ELL students, ELL student education, and barriers that exist currently and historically. In the following chapter, a research methodology is detailed. This methodology assisted in providing an insight into factors that contribute to the high academic performance of Hispanic ELL students in science in South Texas.

CHAPTER II

REVIEW OF LITERATURE

The review of literature includes several topics and subtopics related to ELL students and high academic performance in high school science. First, a historical background of Hispanic education is presented. Within the historical account, some contributing elements, such as bilingual education, segregation, and barriers, are discussed. Tracking and ability grouping that affect Hispanic ELL students' academic performance, academic rigor, institutional racism, and classism were also addressed as related to Hispanic ELL students. Additionally, teaching and learning methods were reviewed to further provide a background to Hispanic ELL science education. Some of the methods addressed in this chapter were instrumental in identifying contributing factors to the high academic performance of Hispanic ELL students in high school science. College readiness, careers in science, and high-stakes tests, also discussed in this chapter, may have had contributing or causal implications for Hispanic ELL student academic achievement. Other important topics in this chapter are self-efficacy, self-esteem, and motivation among these students.

Bilingual education is a federally funded program that has been used for many years. Tracking has contributed to ELL students' education for several decades as well. Other programs or teaching strategies discussed in this chapter are sheltered and dual language instruction, which are efforts to improve the academic achievement of ELL students. Inquiry-based teaching and learning, which includes the 5E model, is a lesson delivery methodology that

enables students to learn by doing hands-on work as well as by speaking and writing science using the scientific vocabulary needed to achieve high academic performance.

High-stakes testing, self-efficacy, self-esteem, and motivation are influences that contribute to high academic performance or to students' failure. Segregation, a possible problematic social situation, is also discussed. College readiness is an additional topic that is later discussed in the review of literature. Any or all of these can be contributing factors to students' high academic performance with positive or negative consequences.

History of Hispanic English Language Learners' Education

Hispanics are the fastest growing minority in the United States (Edl, Jones, & Estell, 2008) and have a recorded history in Texas that spans more than five centuries. Minorities are increasing in numbers as well as in percentages. It is important to consider the history of Hispanics and education to better understand the plight of Hispanic ELL students.

Texas, in the 1800s and early 1900s, having a high literacy rate in the south (Calvert, De Leon, & Cantrell, 2007), felt justified in spending less on education per pupil than northern states (Montejano, 1987). The need to educate future leaders, which did not include Hispanics, allowed for the segregation of schools based on color and ethnicity, and therefore schools with unequal resources and education were established for Texas Hispanic children (Montejano, 1987). This provided a need to establish separate school systems for Hispanic children, with the first Mexican school set in Seguin in 1902 (Montejano, 1987). Establishing a Mexican school system added to a financial funding disparity in the state that is still under discussion today (Calvert et al., 2007).

In 1984, the Mexican American Legal Defense Fund (MALDEF) sued the state of Texas over school funding disparities. MALDEF contended that less affluent school districts, where

greater populations of Hispanics resided, received almost half as much funding compared to more affluent areas due to a disparity in the property tax base and therefore affluent populations receive more funding per student (Calvert et al., 2007). The Texas State Supreme Court upheld a lower court decision in *Edgewood ISD v. Kirby* that deemed that the Texas school finance structure was discriminatory (Calvert et al., 2007). These unequal practices continue to be contested under lawsuits such as *West Orange-Cove v. Alanis* (2005).

Hispanics, who comprise the vast majority of ELL students in Texas, have been in the area prior to Texas becoming a state (Calvert et al., 2007; Montejano, 1987). Others came to Texas for employment opportunities through a variety of methods, including the 1940s federal Bracero Program, which provided Mexicans a legal avenue to work as agricultural laborers in the United States (Schwartz, 2002). A significant section of our ELL student population comes from these immigrant families. In 1954, Chief Justice Warren delivered the opinion of the U.S. Supreme Court in *Brown v. Board of Education of Topeka,* outlawing segregation and nullifying the separate-but-equal doctrine that had existed for more than 50 years with the support of a previous Supreme Court decision in the case *Plessey v. Ferguson* (Alexander & Alexander, 2009). The *Brown v. Board of Education of Topeka* (1954) decision is the most important opinion rendered by the U.S. Supreme Court affecting education in the United States (Alexander & Alexander, 2009).

Hispanics, being White but speaking Spanish, had been segregated without fear of legal ramifications owing to race (Wilson, 2003) until a U.S. district court ruled in *Delgado v. Bastrop* that segregation because of language was a violation of the equal protection clause of the 14th Amendment to the U.S. Constitution (Richardson, 1999a, 1999b). However, these students could be legally segregated on the basis of scientific test results (Wilson, 2003). The *Delgado*

case and others decreased segregation in Texas. Yet, Driscoll Consolidated Independent School District held Hispanic students in first and second grades multiple years, which was considered segregation owing to language and which led to high dropout rates among Hispanic students (Wilson, 2003).

In 1955, Linda Perez, an English-speaking student, was placed in a Spanish-speaking class because of ethnicity. However, being an English-speaking student, she became the first Hispanic allowed in an English-speaking class in the Driscoll Consolidated Independent School District. Parents of other English-speaking Hispanics sued Driscoll Consolidated Independent School District based on discrimination because of language. This successful lawsuit, *Hernandez v. Driscoll CISD,* was the first desegregation case to be brought by Hispanic families (Wilson, 2003). In several lawsuits in Texas, Edgewood Independent School District and San Antonio Independent School District have been involved in inequitable financing of education, which is upheld to be a violation of the equal protection clause of the 14th Amendment to the U.S. Constitution (Walsh, Kemerer, & Maniotis, 2005). The fundamental principle of these lawsuits is that property-based tax revenues collected by school districts in more economically affluent communities far exceed those of poor areas, where larger numbers of Hispanics reside, and therefore cannot provide equal education within the state. These inequities are in violation of both federal and state constitutions (Walsh et al., 2005).

Another aspect of education relative to Hispanics is bilingual education. Largely because of *Lau v. Nichols et al.* (1974), school districts were required to remedy language deficiencies so that students could receive an equal education with instruction in their primary language or become fully immersed in ESL programs so that they could become fluent English speakers and receive instruction in all-English classes (Walsh et al., 2005). This provided fuel to the

previously enacted Bilingual Education Act of 1968, known as Title VII, which was later replaced with NCLB (Menchaca-Ochoa, 2006). In *Castaneda v. Pickard* (1981), it was argued that segregation occurred because of ethnicity. This case furthered the implementation of bilingual education by setting standards for programs targeting ELL students and thus weakened language barriers in schools (*Castaneda v. Pickard,* 1981).

Owing to the reporting of student subpopulations, NCLB has uncovered the reality that ELL students do not score as well as Whites or English-speaking Hispanics on state-mandated tests (TEA, 2008). Schools were not meeting AYP under NCLB, which requires all populations to score above a minimum and periodically raised goals (Hess & Finn, 2004). This disparity in scores shows an inequality in the education being provided to our ELL students (Garcia, 2001).

History of Bilingual Education

Bilingual education in Texas started even before Texas became a state. In the early years, bilingual education was not considered a legal matter (Blanton, 2004). The primary purpose of bilingual education in the 1700s was to teach Christianity and to assimilate the Texas natives into the dominant culture (Blanton, 2004). In the 1830s, Stephen F. Austin proposed a school to "Mexicanize Anglo children" by teaching them Spanish and having English studies as well (Blanton, 2004). The purpose of bilingual education today, as it was at its inception, is to use the native language to teach the dominant language (Blanton, 2004; Sass, 2009).

During the last part of the 1800s, the people of Texas, who included Mexicans, Germans, and Czechs, taught in their native languages, with some English as well (Blanton, 2004). Parochial schools started to flourish in Texas. By the early 1900s, in response to racist practices in education, the *escuelita* (little school) movement started, in which working-class Mexican Americans formed organizations called *mutualistas,* hired Mexican teachers, and largely ignored

the English language teachings (Blanton, 2004). Bilingual supporters argued that pedagogically, bilingual education was justifiable and that students had a better chance of learning English content and could be assimilated into the dominant American society (Blanton, 2004).

In 1906, immigrants, using the Nationality Act, were required to speak English to become U.S. citizens. This gave increased acceptance to discrimination and exclusion (Perez, 2004). In 1923, a U.S. Supreme Court decision in *Meyer v. Nebraska* supported bilingual education, stating that to prohibit the use of other languages was a violation of the 14th Amendment to the U.S. Constitution (Cordasco, 1976). *Brown v. Board of Education of Topeka* (1954) desegregated schools in the United States (San Miguel, 2005). This was a monumental decision that changed education in America. Other decisions affecting bilingual education are the Civil Rights Act of 1964, which granted financial assistance to public schools (Glazer, 1998); the Elementary and Secondary Education Act of 1965 (ESEA), which provided aid to public schools; and President Lyndon B. Johnson's War on Poverty (Wiese & Garcia, 1998). In 1968, the Bilingual Education Act, which is Title VII of the ESEA of 1965, gave federal funding to bilingual–bicultural education, provided financial support so that school districts could meet the needs of ELL students, and provided training to further support these students' education (Cordasco, 1976). In 1974, the *Lau v. Nichols et al.* decision eliminated ethnicity or language as a means to discriminate (Cordasco, 1976). Under this ruling, districts that did not establish bilingual education programs were deemed no longer eligible for federal funding. Additionally, in 1978, a court case against the Raymondville School District in South Texas was filed because school practices toward Mexican Americans and other Hispanics were discriminatory and included segregation and grouping criteria (*Castañeda v. Pickard*, 1981). A judge ruled for the defendants. However, the Fifth Court of Appeals ruled in favor of the plaintiffs. The *Castaneda*

v. Pickard case established criteria for programs that serve ELL students so that they would address their needs.

The bilingual tradition in Texas has been dynamic and spirited. It has included several ethnicities and many judgments, in courts, schools, and homes. Sometimes bilingual education faces intense opposition; however, it is one of very few commitments to the students' home language and cultural affirmation (Blanton, 2004). Bilingual education is a tool to teach, to instruct, and to elevate students' intrapersonal esteem and is classic to American education today (Blanton, 2004).

Segregation, Desegregation, and Resegregation

Segregation in education has existed in the United States since at least the late 1800s. A Supreme Court decision in 1896 institutionalized segregation by establishing a separate-but-equal doctrine. *Plessey v. Ferguson* lawfully established segregated facilities for Blacks and Whites. This provided a path for racial segregation of schools. Educational segregation was more prevalent in the South, where a dual system was established. Typically, Black children attended schools staffed with Black teachers, and White children had White teachers. This was supported by state laws, local policies, and the dominant society.

Within the legal system, Blacks were not eligible to serve on juries. Thus, in 1879, a murder decision was overturned (*Strauder v. West Virginia*, 1879). This could be viewed as the beginning of a new interpretation of the equal protection clause of the 14th Amendment. Years later, in a landmark U.S. Supreme Court decision, *Brown v. Board of Education of Topeka* (1954), the separate-but-equal doctrine was outlawed, and segregation was deemed unconstitutional. This decision affected public and private schools. Previously, under the separate-but-equal doctrine, Blacks and Whites had separate public areas and were confined to

those area or fines would be imposed. However, actual application of the law imposed fines on Blacks in White areas but not on Whites if they were in Black-designated areas. The separate-but-equal doctrine clearly established Whites as the dominant race. Under the 14th Amendment to the U.S. Constitution, all persons are guaranteed equal protection. Amendment XIV, section 1 of the U.S. Constitution states that

> all persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person with its jurisdiction the equal protection of the laws.

It is the word *person* that provides strength and a basis for the argument in favor of equal protection and for the decision to outlaw segregation because of the unequal standards for Blacks and Whites (Alexander & Alexander, 2009).

Blacks, and subsequently Latinos, got equal constitutional protection because of the word *person* in the 14th Amendment rather than *citizen,* differently from previous popular belief by the dominant White society that the Founding Fathers did not allow descendants of Africans, imported slaves, equal protection within the Constitution as per the *Dred Scott* decision. The Civil Rights Act of 1964 added momentum to equal rights, including education (Gatewood, 1970; Gralia, 2014; San Miguel, 2005). However, in 1964, schools were still largely segregated by race, Texas included. Although technically White, Hispanics were also segregated from non-Hispanic Whites. Through the middle of the 20th century, Latinos had dismal educational facilities and curricula. The 1950 U.S. Census showed that the median educational attainment for persons aged over 25 years was 3.5 years for Latinos and 10.3 years for other White Americans. Approximately 27% of persons aged 25 years and older with Spanish surnames had

received no schooling at all. Legal challenges were scarce since *Del Rio ISD v. Salvatierra* in 1930 (San Miguel, 2005). In this case, Hispanics (Mexican Americans) claimed they were denied facilities used by the "other White race" even in the same school. In 1948, the League of United Latin American Citizens and the American GI Forum of Texas successfully challenged the Texas public school system in *Delgado v. Bastrop ISD* (Allsups, 2007).

In 1931, a judge ruled that the Lemon Grove School Board was wrong and that it was unlawful to separate all Mexicans (Hispanics) from White students. This California case involved more than 70 Mexican (Hispanic) students attending Lemon Grove Grammar School. The judge demanded immediate reinstatement of the Mexican (Hispanic) children into the main school on the basis of Mexicans being equal to Whites (Madrid, 2008). In the mid-20th century, separating or segregating White children from other White children was not unlawful. Latinos or Mexicans are considered biologically and legally White. In 1947, the Ninth Circuit Court in California and the Texas attorney general agreed that segregation of Mexican American children in the public school system was unlawful. Gustavo Garcia, an attorney, filed suit against Bastrop and three other school districts. He represented Minerva Delgado and 20 other Mexican American parents; the suit charged segregation of Mexican children from other White races. Judge Ben H. Rice of the U.S. Western District Court of Texas agreed and ordered the cessation of segregation of Hispanic students in Texas, with a deadline of September 1949. However, the court allowed segregated classes in first grade on the same campus if there were language-deficient or non-English-speaking students as identified by scientific and standardized tests. In 1947, in *Westiminster School District of Orange County v. Mendez,* the Ninth Circuit Court decided that segregation of Mexican (Hispanic) decent taxpayers was in violation of their

constitutional rights. In *Bolling v. Sharpe* (1954), the Supreme Court ruled that segregating minority students deprived them of equal protection under the 14th Amendment.

In 1954, *Brown v. Board of Education of Topeka,* a unanimous decision by the U.S. Supreme Court, overturned earlier rulings going back to the separate-but-equal doctrine of *Plessey v. Ferguson* by declaring that state laws establishing separate public schools for Black and White students denied minority children equal educational opportunities. As a result, de jure racial segregation became illegal and a violation of the equal protection clause of the 14th Amendment. The decision opened the door for the possible consideration that Hispanic students, because of inherent differences to Whites, could become educationally integrated into public schools. In 1957, *Herminca Hernandez et al. v. Driscoll Consolidated ISD* ended pedagogical and de jure segregation in the Texas public school system (Allsups, 2007).

In 1955, the *Brown II* Supreme Court decided to delegate the task of desegregation to district courts with "all deliberate speed." The phrase "all deliberate speed" was seen as unclear and resulted in delaying desegregation. Many traditionally White schools were purposely converted to Black schools, but adequate funding was not provided. In some areas, such as in Prince Edward County, Virginia, integration did not occur immediately. It was not until *Columbus Board of Education v. Penick* (1979) that a ruling based on *Brown I* and *Brown II* determined that the Columbus, Ohio, school district was not operating a racially neutral unitary school system and that it was cognitive and deliberate. They also deliberately failed to end a dual system. The Columbus School District was ordered to end segregation. Back in Arkansas, the board of supervisors stopped funding the schools and allowed them to remain closed until 1964. In the meantime, White students were given assistance to attend White-only private schools. In *Lau v. Nichols et al.,* San Francisco schools failed to provide instruction for Chinese

students because of language barriers. It was decided that the school district, while receiving federal assistance, discriminated against these students. In 1969, the Supreme Court in *Alexander v. Holmes County Board of Education* stated that "all deliberate speed" for desegregation was no longer constitutionally permissible (Alexander & Alexander, 2009). Every school district was required to terminate dual systems immediately and operate unitary schools or a single school district with full integration.

After such monumental judicial decisions as *Brown v. Board of Education of Topeka* (1954), there continued to be resistance to the idea of desegregation. The school district of Little Rock, Arkansas, created a desegregation plan, while other Arkansas school districts found and implemented ways to perpetuate segregation. Through a constitutional amendment, the state legislature outlawed segregation. Laws were passed to remedy the ills of segregation. The laws passed relieved children from mandatory attendance at segregated schools. The school board of Little Rock continued with the desegregation program. In 1958, a lawsuit was filed in U.S. district court. This occurred after the integration crisis involving the "Little Rock Nine," a group of nine African American students who enrolled in a racially segregated White school. The suit was filed by members of the school board along with the superintendent of schools, urging the suspension of its plan of desegregation. They alleged that public hostility to desegregation and the opposition of the governor and state legislature created an intolerable and chaotic situation. The relief they requested was for African American children to be returned to segregated schools and to postpone the implementation of the desegregation plan for 2.5 years. The district court granted the school board's request, but it was reversed on appeal. The Supreme Court, in *Cooper v. Aaron* (1958), unanimously signed an opinion that the Arkansas school board acted in good faith; however, they decided that it was permissible under the 14th Amendment's equal

protection clause of the U.S. Constitution to maintain law and order by depriving Black students of equal rights under the law. Additionally, the Court cited the supremacy clause (Article VI, clause 2) of the U.S. Constitution, which states that the

> Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the authority of the United States, shall be the Supreme Law of the land; and the Judges in every State shall be bound thereby, anything in the Constitution or Laws of any State to the Contrary notwithstanding.

This gave the Supreme Court the power of judicial review (*Marbury v. Madison,* 1803). It is also a violation of the oath that public officials swear to uphold the Constitution. Education is the ultimate responsibility of state governments. However, that responsibility must be carried out in a manner consistent with the requirements of the Constitution of the United States, including the 14th Amendment (Alexander & Alexander. 2009).

South Texas was not very different from the rest of the South. However, segregation included an additional group that was the largest minority in the area. This group was labeled Latinos, Mexicans, Mexican Americans, or Chicanos. Latinos are Hispanics, considered White under the law, but are different from Whites in ethnicity, language, culture, and socioeconomics. A method used to justify segregation was by assigning students to their respective neighborhood schools. This was used as an excuse not to integrate the already segregated neighborhoods. Residential segregation was the basis of a lawsuit filed by Joe Cisneros (*Cisneros et al. v. Corpus Christi Independent School District et al.*) in 1970. Minority students residing within the school district filed a class action lawsuit alleging that they were denied their constitutional rights under the equal protection clause of the 14th Amendment to the U.S. Constitution. The class action lawsuit alleged that the school district purposefully established a segregated school system by creating neighborhood schools. This created segregated schools for Hispanic and Black students.

The court held that Hispanics were discriminated against and ordered the district to operate under a single school system to serve all students equally (*Cisneros et al. v. Corpus Christi Independent School District et al.,* 1970). With this ruling, districts in Texas were directed to abandon the dual education system, segregation, and to integrate students into a single, unitary educational system. Under the provisions of the ruling, the district was to develop a unitary plan from plans submitted by the parties in the suit which made changes to zones, included busing, and paired schools. This was an important decision as it brought the identification of Latinos (Hispanics) as a legal or recognized minority. In *United States v. State of Texas (Gregory-Portland Independent School District Intervention)* (1978), a U.S. district court intervened and held that Mexican American (Hispanic) students were discriminated against and that if violations were not remedied, the school district would face suspension of accreditation and withholding of state funds (Keremer, 2010). The court held that the evidence overwhelmingly supported the conclusion that the school district had intentionally discriminated against the Mexican American students and that it had not attempted to eliminate the dual school system in the district.

The identification of Latinos or Mexican Americans as a "racial" entity was paramount in implementing a remedy to segregation. Without that ruling, there would be no segregation because all students would be considered White. A court decision that directly impacted the identification of Latinos as a "racial" group was *United States v. TEA (Austin ISD),* in which the district court ordered Austin Independent School District to convert from a dual system of education to a unitary system without regard for the Mexican American population within the appellee district (Keremer, 2010). The court held that these actions contributed to segregation in education, whether by causing additional segregation or maintaining existing segregation, and

that they denied students equal protection of the law and were a violation under the U.S. Constitution's 14th Amendment.

The court also held that the Mexican American population of Austin, Texas, was an identifiable minority for purposes of the equal protection clause of the 14th Amendment. In the ruling, the court applied a close scrutiny standard and held that the appellee had, in its choice of school site locations, construction and renovation of schools, drawing of attendance zones, student assignment and transfer policies, and faculty and staff assignments, caused and perpetuated the segregation of Mexican American (Hispanic) students within the school system.

Segregation in the South has not ended. The struggle between doing what is right under the equal protection clause and what is practical is ongoing. White students are often overrepresented in higher level classes, whereas Hispanics are overrepresented in remedial classes throughout the United States (Oakes & Wells, 1998). In South Texas, schools struggle to meet the minimum standards of TAKS as well as the federal standards imposed by NCLB. School personnel facing these challenges are provided with well-intentioned alternatives that foster illegal activities such as segregation through tracking (Oakes, 2008). Tracking is a justifiable method based on providing better instruction by segregating students by ability—at times, the ability to speak English—where the higher groups are treated better within this very public separation of students (Oakes, 2005). Segregation can also take place by creating neighborhood schools and limiting access to the area already segregated by race and economic class. Private schools are often segregated by socioeconomic class. Poor students cannot afford tuition. Even with tuition-free schools, such as charter schools, poor students cannot afford transportation, and troublesome students are often sent back to their corresponding public

schools. This allows the more economically affluent the ability to segregate their children into alternative schools (Oakes, 2005).

Barriers and Obstacles to English Language Learners' Academic Performance

There are many obstacles that ELL students face in education. This portion of the review of literature focuses on the topics of tracking, poverty, academic rigor, language, institutionalized racism, classism, and curriculum.

Tracking and Ability Grouping of English Language Learners

Educators have different opinions about tracking and ability grouping. Even though many argue that ability tracking of students lowers achievement for those in lower tracks, a study in Kenya showed that placing students in classes based on achievement test scores was of greater benefit than placing students in classes randomly, without regard to grades or ability (Duflo, Dupas, & Kremer, 2009). However, patterns show a disproportionate placement of ELL students in lower tracks (Artiles, Rueda, Salazar, & Higareda, 2005). Oakes (2008) stated that this is true for Hispanics and Blacks in general. Additionally, tracking establishes school policies that limit students' access to equal educational and career opportunities (Oakes, 1983).

Tracking in the early 20th century was used for career preparation (Mallery & Mallery, 1999). If schools were to do away with tracking and allow students and parents a choice, there would be little movement from the lower to the higher tracks (Yonezawa, Wells, & Serna, 2002). This is likely due to students wanting to learn where they perceive they get respect as well as abiding by social and institutional barriers that are difficult to remove (Yonezawa et al., 2002).

Although the debate on tracking continues, some think that tracking has changed and that students currently are allowed flexibility to move to different ability group levels or tracks

(Duflo et al., 2009). Others argue that tracking and ability grouping are a violation of the equal protection clause of the 14th Amendment to the U.S. Constitution because of its unequal treatment by race or ethnicity (Mallery & Mallery, 1999). To a great extent, ELL students are placed and tracked with other ELL students and never meet the entire criteria to exit and thus become a self-fulfilling prophecy: These students never advance academically or linguistically (Vang, 2005).

Often, people who want to do what is best for students reinforce the old patterns of tracking and inadvertently create inequities in education (Oakes, 2008). Eliminating tracking entails more than removing written rules and implementing programs. It is a deconstruction of generational barriers, both intrinsic and extrinsic to students, parents, teachers, and administrators. It is the identification and elimination of social spacing that serves as barriers. The process, which is difficult and complex, must be reshaped to serve all students (Mallery & Mallery, 1999; Vang, 2005; Yonezawa et al., 2002). Where tracking is done, mislabeling and unfair assignment provide students with inferior education and therefore lower further educational opportunities and employment capabilities, which uphold society's injustices toward these students (Oakes, 1998). Under provisions of NCLB, data are disaggregated by ethnicity, which uncovers schools that show low academic performance among Hispanics (Oakes, 2008) and thus among ELL students.

Poverty of English Language Learners

In 2007, poverty in the United States for all populations was at 12.5%, and for individuals under 18 years of age, it was 18.0% (U.S. Census Bureau, 2007). ELL students have among the highest poverty and school dropout rates (McCardle, Mele-McCarthy, Cutting, Leos, & D'Emilio, 2005). One of the largest language minorities is Hispanics, numbering more than 39

million nationwide, making ELL students the fastest growing group in the United States, and of all ELL students, 80% speak Spanish as their first language (McCardle et al., 2005).

In education, poverty means a lack of resources (Payne, 2005). These resources include materials, time, and transportation. The lack of resources leads to not being in control of emotional, mental, or physical well-being as well as not having viable and positive influential adult role models (Payne, 2005). The language barrier has a negative effect on students in poverty. Language acquisition directly impacts learning and only happens when there is a significant relationship (Payne, 2005). Having these relationships gives the learner an incentive to learn the language for communication purposes and because of pressure from the group or individuals. These relationships are also a predictor of high academic performance, which is evident in adolescent peer group influences on behavior and attitudes (Caldas & Bankston, 2001). Language acquisition is largely referred to as acquiring a new language. However, language acquisition can be associated with developing a formal language that is used for effective communication at school or work so that these individuals can function within the larger dominant society (Payne, 2005).

Hidden attitudes and habits that children living in poverty possess are often interpreted as a lack of intelligence (Payne, 2005). These students value relationships more than things and view education as very abstract and unrelated to the real world. The failure to see education as a cause and predictor for high academic performance and achievement keeps children in poverty from striving further and working harder in school and in language acquisition, and in obtaining English as a communication tool in both formal and informal settings (Norman & Hyland, 2003; Payne, 2005). The lack of exposure to vocabulary is an additional problem among children of poverty. The informal language used, how the language is used, and the relatively small number

of vocabulary words heard hour by hour over several years put these children at an academic disadvantage as well as an employability disadvantage (Hart & Risley, 2003; Payne, 2005).

Generally, there are two types of poverty: *situational poverty,* which is lack of resources due to a situation such as illness or divorce, and *generational poverty,* which is poverty that has existed within a family for more than one generation (Payne, 2005). Generational poverty is one of the most difficult low-socioeconomic circumstances from which to emerge. People in generational poverty generally feel that society owes them a living. People who are in situational poverty feel they can get themselves out and experience success. In generational poverty, marriages are often common law, so linkages are hard to trace, as are parental responsibilities (Payne, 2005). This hinders students from experiencing academic success. As the number of students in generational poverty increases, it becomes progressively more difficult to teach in a middle-class mode, as done in most schools by most teachers, and the understanding gap widens (Payne, 2005). To remedy this situation, it becomes important to serve as role models for these children and to guide them and serve as advocates so that they can learn the alternative lifestyles to poverty (Payne, 2005).

For people in poverty to achieve the middle class, they must relinquish, at least temporarily, certain relationships. However, these relationships are difficult to leave because of the emotional attachment those in generational poverty possess (Payne, 2005). *At risk* individuals often refers to children in poverty who may not succeed in school and most likely will not succeed in life (Pellino, 2007).

The best way to approach students in poverty is to treat them like other students. These students need a rigorous curriculum, and teachers should have high expectations (Pellino, 2007). However, certain strategies can be used so that these students can compete academically.

Examples are scaffolding lessons and chunking of information so that students can process and learn what is taught. Students should be made responsible for their own learning with a support mechanism for them and their families as well as engulfed in an atmosphere of mutual respect (Pellino, 2007). These and other strategies can be used with children in poverty and ELL children to improve their chances of high academic performance.

Academic Rigor and English Language Learners

Students' ability to understand scientific concepts is paramount to them becoming better consumers, better understanding and appreciating the world around them, and becoming problem solvers in a multidimensional world (Roman, 2009). The science curriculum in high schools consists almost entirely of biology, chemistry, and physics (Conley, 2005). Texas is no exception. Science courses in Texas, especially those courses in which ELL students are enrolled, focus mostly on vocabulary and terms at the expense of a deeper conceptual understanding of scientific phenomena that assists students in developing analytical skills. This lack of deeper understanding hinders opportunities to acquire knowledge of science in the real world by using scientific inquiry and scientific investigation (Conley, 2005; Dickinson & Jackson, 2008; NRC, 2000). NCLB replaced ESEA. ESEA provided financial assistance to school districts with low-income students. With NCLB, schools are required to meet predetermined goals on state-mandated tests to narrow the achievement gap among the different student populations (Guilfoyle, 2006). Although the intent of NCLB is to close the achievement gap, it does the opposite. Schools, in an effort to meet the AYP criteria of NCLB, ensure that students pass the state-mandated tests, which results in stifled innovation and narrowing of the curriculum (Guilfoyle, 2006). Concentrating on achieving success on high-stakes tests compromises rigor and, in some cases, eliminates it.

Under NCLB, the graduation rate is measured by the number of students finishing high school and not the number of students who started and finished high school (McNeil, Coppola, Radigan, & Heilig, 2008). It is easier for school leaders to accept students leaving and not being counted as dropouts than to attempt to achieve AYP. The state of Texas uses a completion rate. The completion rate is measured by counting the number of students who graduate or are enrolled in school at the end of 4 years (TEA, 2007). As long as students are enrolled during a fifth year of high school, they are counted as having completed high school. Actual graduation is not required. This provides students having difficulty in school the option to drop out and provides school leaders with an incentive to allow it to happen so that the school can concentrate on meeting the state test passing rates demanded by NCLB (McNeil et al., 2008).

In classrooms, when ELL students are not academically proficient in English, teachers tend to lower expectations and reduce rigor (Estrada, Gomez, & Ruiz-Escalante, 2009). If teachers need to translate content, the translations are simple and less rigorous than the English version (Estrada et al., 2009). The expectations are lowered for ELL students. Teachers' intent is to help the students, however, it hurts them academically, and they pay the price later (Estrada et al., 2009). High school students need rigor and depth of academic study. Although there is no statistical supporting evidence, students who stated that they covered at least one science topic in depth performed better in college science classes (Schwartz, Sadler, Sonnert, & Tai, 2008).

Language Challenges and the English Language Learner

Not knowing the language used in the classroom creates a barrier in learning. Not knowing how to communicate limits the likelihood of understanding and learning. Teachers often use valuable time teaching a subject's vocabulary and ignore content. Therefore ELL students do not get the deeper understanding needed to make logical connections to be able to

succeed as the construction of knowledge occurs (Conley, 2005; Dickinson & Jackson, 2008). This is especially true with science subjects that have a constructivist approach to learning and understanding. Language is used as a tool for learning. One method learners use to obtain knowledge is language. Information transferred linguistically allows for knowledge to be built (Tobin, 1993). Science knowledge is required to build new science knowledge (Tobin, 1993). An epistemological view of constructivism is that the teacher brings knowledge and learners together so that the learners can obtain knowledge (Tobin, 1993). If language is a barrier, learning does not occur.

In ethnicity studies, proficiency in language, not ethnicity, contributes to students' having lower views of teachers and struggling in school. Clearly English proficiency is a causative risk factor (Laffey, Espinosa, Moore, & Lodree, 2003). It is said that relationships are a good predictor of educational success. Kinship can be a loving family relationship in which parents nurture and engage their child in discussions; however, as children's socioeconomic status decreases, so does their exposure to vocabulary as well as their academic performance in school (Hart & Risley, 2003). In fact, Hart and Risley further stated that by age 3, children in families receiving welfare will have heard 13 million words, compared to 26 million in working-class families and 45 million in families with professional parents. The interventions needed to equalize poor children's lack of exposure to vocabulary mounts tremendously. By high school, the time needed to help children catch up is enormous, difficult, and close to impossible to achieve (Hart & Risley, 2003).

Institutionalized Racism and the English Language Learner

Institutionalized racism in schools and education is racism that is entrenched in curriculum, policies, and practices, and *racism* is "ethnocentric beliefs and behaviors based on

the notion that European Americans are superior to African Americans, Asians, Latinos (Hispanics), and other ethnic groups" (deMarrais & LeCompte, 1999, p. 265). Institutionalized racism can be furthered by the use of standardized tests that are biased against certain ethnic groups or by uneven representation in special education classes (deMarrais & LeCompte, 1999). Institutionalized racism condones and perpetuates inequality among ethnic groups. Discrimination and segregation are examples of racism. When an institution creates a situation of unequal treatment of ethnic groups, it is institutionalized racism (Jonsson, 1999). *Edgewood Independent School District v. Kirby* was concerned with institutionalized racism in which school financing was not equal. The Texas State Supreme Court ruled that the school finance system in Texas was unconstitutional because of the unequal funding of school districts. School districts were funded based on local property taxes. Property taxes in more affluent areas that had more White students received much more funding than poor districts that had higher numbers and percentages of minorities. Poor districts were at the control of the state government. They lacked control over curricula, student–teacher ratios, and many other factors (Darling-Hammond, 1997).

Often teachers rate their students by means other than academic performance. Teachers reliably assess Hispanic ELL students in bilingual classrooms worse than other students in various areas of interpersonal competence (Edl, Jones, & Estell, 2008). They are seen as inferior to their European American counterparts and are rated lower than Hispanics in regular classes (Edl, Jones, & Estell, 2008).

NCLB's graduation rate as well as Texas's completion rate could be considered institutionalized racism. Both the Texas standard for high school completion and the federal NCLB standard for high school graduation are flawed and hurt ELL students. The completion

rate used by Texas mandates that the student has to be enrolled or have graduated at the end of 4 years (TEA, 2007). A student who does not graduate but is enrolled after a 4-year stay in high school is the Texas completion rate standard. Graduation does not need to occur. This enrollment at the end of 5 years is counted as successful completion of high school (TEA, 2007). In the NCLB standard of graduation, a student must graduate in 4 years or not be there to be counted against them and therefore leads to students dropping out of school prior to graduation (McNeil et al., 2008). Schools are faced with the dilemma of whether to educate all students or comply with the mandates of NCLB (McNeil et al., 2008). These standards lead to those having problems and lacking resources leaving school prematurely and not graduating. Those affected the greatest are students of low socioeconomic status and ELL students. This could be considered institutional racism. In some cases, affirmative action–type policies, such as lowering standards so that Hispanics can meet entrance requirements of universities, can be considered a keep-back of achievement of this ethnic group (Finsterbusch & McKenna, 1996).

In one study with more than 250,000 participants, found that 75% of Hispanic students and 80% of ELL students did not graduate in 5 years. The graduation rate for these students was 33% (McNeil et al., 2008). Additionally, the researchers stated that test-based accountability did not improve schools, nor did it provide for equitable educational attainment of subpopulations such as Hispanic ELL students. However, it does cause students to drop out of school, which gives rise to school compliance with accountability mandates such as NCLB (McNeil et al., 2008). This is institutionalized racism.

Classism and the English Language Learner

Classism refers to inequalities between socioeconomic groups. This type of inequity is a form of sociopolitical power over a group of lower socioeconomic status. The dominant group

systematically benefits at the expense of others (Smith, Foley, & Chaney, 2008). Schools generally function with middle-class norms. People in poverty have their own norms that are different from the norms of the middle class (Payne, 2005). Districts, schools, and teachers that do not meet the needs of poor students may be responsible for classism. Schools and individual teachers should be aware of how students perceive them (Liu, Soleck, Hopps, Dunston, & Pickett, 2004). Students respond according to their perceptions. Teachers should understand the socioeconomic context of students prior to evaluating them (Liu et al., 2004). The aim should be to promulgate and improve positive educational outcomes for these students. Students' academic achievement is influenced by social status. Students with lower socioeconomic status generally have lower achievement. Socioeconomic status is a good predictor of achievement (Nielsen & Lerner, 1986). However, a student who attends school with students of higher economic status tends to do better academically (Liu et al., 2004).

Hispanics make up 75% of all students in bilingual and other ESL support programs. The vast majority (89%) of Hispanic students read below their grade level (Echevarria et al., 2008). These programs are generally used to convert ELL students to English-proficient students without regard to their native language. Education professionals may consider ELL students' lack of fluency in English as a deficiency, making these programs unsuccessful in producing literate students in either language (Echevarria et al., 2008).

Curriculum

This section discusses five curriculum-based or curriculum-related topics. Teaching and learning are discussed as they relate to Hispanic ELL students in South Texas. College readiness, science achievement, and how it translates to careers and economic power, and how high-stakes tests affect these students, are also addressed. Finally, self-efficacy, self-esteem, and

self-motivation and how these relate to high academic achievement are discussed as factors that influence high academic achievement.

Teaching and Learning

Teaching Hispanic ELL students is often challenging. Students in poverty generally score below middle-class students on IQ tests because these tests measure acquired knowledge and not intelligence (Payne, 2005). ELL students are sometimes identified as having learning disabilities based on IQ tests or other tests that rely on acquired knowledge and not on intelligence (Linan-Thompson, Vaughn, Prater, & Cirino, 2006; Payne, 2005). Students may not practice their verbal communication skills because of how they sound. The earlier a student learns a language, the closer the student will be to having a native accent (Hoy & Hoy, 2009). Mastering a second language—English, in this case—requires *contextualized language skills,* which are interpersonal communication skills and skills in academic language used in reading for comprehension and writing fluently (Hoy & Hoy, 2009).

Science content has rich and complex terminology, and often conceptualization is demanding for most high school students. Even students who exhibit high-quality verbal and written academic skills in other classes have difficulty with these inherently complex applications (Hoy & Hoy, 2009). Students improve academically when taught in their native language (Hoy & Hoy, 2009). This is why it is important to use certain teaching strategies in the classroom, but more important, educational leaders need to find programs or other avenues so that these language-minority students will have the same opportunities to learn as any other student. Hispanic ELL students must master the semantics and syntax of English for academics as well as practical language for formal and informal communication (Echevarria et al., 2008).

Students, to achieve high academic success, must feel welcome in school and classrooms as well as having a feeling of hope and that treatment in school is fair for them (Kuykendall, 2004). For Hispanic ELL students to have high performance academically, they must experience success. This is not the lone responsibility of teachers and administrators but also of parents and the entire community (Kuykendall, 2004). It is ethical to work toward allowing these students to achieve high academic performance. In highly successful schools that teach underprivileged students, such as Hispanic ELL students, teachers and administrators believe that their students can compete with any other student academically, even if the other students have economic and academic advantages (Reyes, Scribner, & Scribner, 1999). Caring enough to find the key to motivating these students to learn can be considered as an ethical responsibility of educators. The ethics of care provides for teachers and administrators to collaborate to provide support systems for students and to allow students to be more involved with their learning and decision making (Reyes et al., 1999; Shapiro & Stefkovich, 2005).

For children to learn, they must have an appropriate educational background and be willing to accept the knowledge that is taught, and it is educators' responsibility to make learning relevant for every student (Payne, 2005). Programs and strategies can help in teaching Hispanic ELL students.

Sheltered Instruction

Sheltered instruction, sometimes called *sheltered instruction observation protocol*, is a style of teaching to provide instruction in meaningful content to ELL students as well as promote English language development (Echevarria et al., 2008). Sheltered instruction can be used in all subjects with all students, and its successes are well documented (Echevarria et al., 2008). This teaching model provides meaningful science instruction using Gardner's theory of multiple

intelligences and Vygotsky's proximal development by utilizing several methods and strategies to allow for multiple learning techniques (Echevarria et al., 2008). It is the goal of sheltered instruction that students become independent learners. This occurs using strategies such as scaffolding, which is a building of knowledge in sequenced increments that ultimately transfers responsibility for learning to the student using metacognitive, cognitive, and social–affective strategies (Echevarria et al., 2008).

Sheltered instruction is effective because it does not provide a watered-down version of science content; instead, it constantly focuses on how English is used to make content information intelligible through the use of visual aids such as pictures, models, demonstrations, and graphic organizers (Colburn & Echevarria, 1999). Sheltered instruction is a method of teaching using strategies so that linguistically and culturally diverse students, especially in science, will benefit by learning content effectively (Echevarria et al., 2008).

Dual Language Instruction

Dual language (DL) programs vary from school to school and from teacher to teacher. However, they all use a combination of two languages, the native language and English, on a daily basis to reinforce English language acquisition (Reyes, 2007). DL program's aim is to create bilingual and bicultural students by using content to teach language and by guiding students in achieving high academic success in a manner that fosters and improves existing language use and skills while learning the new language (Garcia, 2005). There are two main models of implementation: the 50% model, in which both languages get equal use, and the 10% model, in which the dominant language gets 90% usage in the early grades and decreases as students master a second language (DeJesus, 2008; Garcia, 2005). This helps students with content and language acquisition at the same time. Teachers have the opportunity to use their

best teaching qualities and methodologies for content comprehension when implementing a DL program (Reyes, 2007). Beyond teaching and learning in DL classes, there is a positive value placed on students' background regardless of language or socioeconomics. It gives all students a sense of esteem and worth by acknowledging their language and culture. There is two-way communication among those students who would normally not have too much in common (Garcia, 2005).

Inquiry-Based Teaching and Learning

Inquiry-based teaching and learning can take more than one approach. *Inquiry* is a teaching method or learning method that students can use to acquire scientific knowledge (NRC, 2000). Inquiry can be formal or informal. Scientists and students can use a form of inquiry to find explanations to better understand phenomena in the world around us. An observed phenomenon, once identified, can be explored using existing knowledge. Explanations can be suggested or a hypothesis formed. Students plan, design**,** and conduct investigations that test the hypothesis; gather the evidence**;** and display it in a meaningful way (NRC, 2000). Inquiry gives students a process that can be used in any subject for learning purposes. This is called *inquiry-based learning***,** or sometimes it is referred to as *problem-based learning* (Hoy & Hoy, 2006).

The 5E model is another approach to inquiry. This approach has five steps: engage, explore, explain, elaborate, and evaluate. The 5E model is designed to amplify students' interest, increase students' participation by using hands-on activities, and improve effectiveness by using verbal and nonverbal communication, while allowing students creativity and flexibility to enhance the likelihood of long-term conceptual understanding of the scientific phenomenon in question (McDonnough & Cho, 2009; Orgill & Thomas, 2007; Reyes et al., 1999). Using

inquiry methods in the science classroom better serves ELL students. In this type of learning, students use critical-thinking skills that promote language development (Lee, 2005).

College Readiness

College readiness is the new public high school frontier. Many believe that if college readiness is achieved in high schools, high-stakes test scores will rise and the low-performing school status will disappear. However, for students to be college ready, four key elements must exist, according to Conley (2010b): key knowledge and understanding, adequate academic behaviors, the right cognitive strategies, and certain contextual skills and awareness. Colleges and universities have a more quantifiable method of determining college readiness. A local university states that a scaled score of 2200 on the Mathematics and English Language Arts TAKS with a writing score of 3 is enough for a student not to take remedial classes, a form of college readiness (UTPA, 2009). Additionally, the UTPA also accepts an ACT composite score of 23 with 19 in English and 19 in Math. Alternately, a student can score 1070 on the SAT with a 500 Verbal/Critical Reading and Math (UTPA, 2009).

Examining students' academic performance in high school science could possibly be a predictor of college readiness. It may be possible to achieve readiness through comprehensive science, technology, and math learning. The National Center for Education Statistics found that college students who enrolled in science, technology, engineering, and math (STEM) programs generally did better than non-STEM majors (National Center for Education Statistics, 2009).

Many students falter in college. A potential reason could be that high school is very different from college. Curricula, expectations, and rigor are not aligned (Conley, 2007). College students are expected to think, analyze, and debate at higher levels using supporting evidence and sound inductive and deductive reasoning (Conley, 2007). This is something that

few high school students actually experience. Using scientific tools for learning, such as hypothesizing, evaluating, and drawing conclusions based on the evidence, is an inherent set of tools for deeper understanding that prepare students for college course work (Conley, 2010a, 2010b). State tests cannot be used to indicate college readiness because of their incompatible goals (Cavanagh, 2003). However, a way to remedy this is to realign state tests so that they can provide greater incentives toward college readiness (Cavanagh, 2003). Additionally, high schools need to realign the content of their curricula, instruction, and expectations to those of colleges and universities (Conley, 2007). Often high schools and districts are concerned with students' college eligibility and acceptance; however, students' high academic performance in college should be the aim. To achieve this high academic performance, students need to be college ready, and that requires collaboration among various entities, including high schools, colleges, and state educational agencies (Cline, Bissell, Hafner, & Katz, 2007). In the case of Texas high schools, it should include schools, the Texas Education Agency, and the Higher Education Coordinating Board. Improving skills so that high school students succeed in college should be a goal so that equality in educational opportunities can improve (Cline et al., 2007). Another step toward college readiness is having high school teachers write syllabi and submit them for internal and external review, which may improve intracourse alignment as well as incorporating college faculty input (Conley, 2007).

Science Achievement and Careers

How well a nation's citizens are educated and skilled determines its welfare (Hanushek, 2007). Not having more students seeking to become science professionals will have a negative impact on American freedom and values as well as an adverse effect on the economy (Miller,

2010). In the last few years, the U.S. economy has transformed from manufacturing to services and information (Tran & Nathan, 2010).

For Hispanic students, it is often external factors or lack of identifying the relevancy of education that impede their pursuit of higher or vocational education (Constantine, Kindaichi, & Miville, 2007). However, positive reinforcement and experiences from school and family reduce obstacles and increase the relevancy of a postsecondary science education (Constantine, Kindaichi, & Miville, 2007). Students' positive experiences in science provide an avenue for them to believe that they can perform better in science, which in turn increases academic science achievement (House, 2008). Increased science literacy among the citizenry not only ensures the well-being of the country but increases the individual's earning capabilities, job security, problem-solving skills, and respect.

Through science expertise, individuals enhance their ability to learn how to work cooperatively with others (Bilgin & Geban, 2006). Additionally, scientific experiences in the classroom provide students with the ability to make better informed decisions by doing research and problem-solving scientific issues or other situations using scientific inquiry–based methods, which enhances their analytical and critical thinking as well as resourcefulness and therefore provides increased self-efficacy while increasing their scientific knowledge (St. Omer, 2002). Working on real research projects helps students to become more confident, fosters their competence in the nature of science, develops their intellect, and provides them with science content knowledge (Sadler & McKinney, 2010).

Science and science-related careers are in demand and, in many cases, pay better than in nonscience fields. Salaries for science teachers are not necessarily determined by market influences; however, there is a need for science teachers throughout the United States (Tyler &

Vitanova, 2008). Even where there is a single salary schedule regardless of discipline, such as is the case with public school teachers, there is a higher demand for certified science majors, and their positions are more secure than those of nonscience teachers (Hanushek, 2007). In addition to possessing science teaching certification, teachers who are strong in science content have more science efficacy, spend more time teaching science, and are more competent in doing so (Buss, 2010). This improves student academic achievement, which is the desired outcome in any academic course. The effects of science on daily events are extensive. Some of the most pressing issues are scientific-based problems, such as climate change, energy development, and our daily role as consumers. Individuals should possess a basic understanding of science to make better informed decisions on real evidence as well as being critical of products and policies on the basis of their understanding of science (Ben-Ari, 2007; Metz, 2008).

In recent years, there has been a renewed focus on STEM education. This renewed focus on STEM careers also provides an avenue for students to seek baccalaureate degrees or careers in information and communication technology through community college programs (Waters, 2008). Some programs, such as Educate to Innovate and National Lab Day, are attempts to encourage students to seek careers in these areas so they can solve problems and create innovative solutions to facilitate the United States' place as a leader in the world (Froschauer, 2010).

High-Stakes Tests and Testing

High-stakes testing has been implemented in most of the states in the United States (Altshuler & Schmautz, 2006). These tests were implemented to measure schools' effectiveness and to ensure that the public is aware that schools are held accountable. In the last decade, the federal government has taken a greater role in accountability through NCLB. This law also

provides for changing demands on the workforce (Altshuler & Schmautz, 2006). These tests make public officials look good, and their ability to measure intelligence or the ability of minorities is questioned (Kuykendall, 2004). Some of these tests measure social class values and have biased wording (Kuykendall, 2004). An example of litigation regarding such an issue was the California case *Larry P. v. Wilson Riles* (1979), in which a U.S. court of appeals upheld the ruling of a lower court that IQ tests were biased and that using such tests is biased and therefore unconstitutional according to the equal protection clause of the 14th Amendment of the U.S. Constitution.

High-stakes tests, at least in part, are meant to assess student achievement as well as teacher and school effectiveness (Hood, 1998). However, TAKS serves as an indicator of whether schools meet the provisions of NCLB and not as a diagnostic tool (Orlich, 2003). Instead of funding students' educational goals, much of the funding, almost $2 billion between 2002 and 2008 goes to testing, and this does not include all states (Orlick, 2003). Instead of trying to reach a minimum standard, schools should try to reach the top levels of academic achievement. The College Board's AP program has shown that the top students in the United States are among the best in the world (Orlich, 2003). A Texas study showed that a small number of ELL students enroll in AP classes and experience a low success rate (Moore & Slate, 2008). However, Hispanic student AP enrollment increased significantly between the 2004–2005 and 2005–2006 school years (Moore & Slate, 2008). Hispanics, as other minorities, aspire to graduate from college (Walker, 2007). In fact, some authors state that Hispanics in the early grades of secondary schools often have greater aspirations for higher education than White students (Walker, 2007). The mandates of NCLB demand "continuous and substantial improvement for all students," including the ELL student population (Hoy & Hoy, 2009).

Additionally, there is a concern that high-stakes tests can be biased or unfair; however, problems with test questions arise not from bias but from a lack of procedural fairness, where students are unable to demonstrate their best performance because of the use of a different language and terminology, making it difficult for ELL students. It could also be because of students' values, which may be different than those of the test question authors (Hoy & Hoy, 2009). Different values could be those of the middle class when the student lives in a culture of poverty, or values could arise from a difference in ethnic backgrounds. The consequences of high-stakes testing are tracking of students who do not score well and altering and lessening the intellectual rigor of the curriculum so that students pass the test (Shepard, 2003) and help the school meet AYP, a provision of NCLB. For a test to be effective, it must have high content standards and rigor so that the schools can live up to the challenge and help students master a deeper understanding of content knowledge, not just pass a test (Shepard, 2003). Nonetheless, the purpose of testing should be not only to identify teachers' strengths and weaknesses but, more important, to use data to improve student learning and student achievement (Sclafani, 2003).

Self-Efficacy, Self-Esteem, and Motivation

Self-efficacy is the belief or the confidence that one can accomplish a task or mission by whatever means required, regardless of the reality of the person's existing abilities; in other words, it is the confidence one has in accomplishing a task or mission (Bandura, 1993; Jinks & Lorsbach, 2003; Stanley & Murphy, 1997). It should be a teacher's goal to instill self-efficacy in students so that they can be in command of their academic affairs and their learning. As they achieve more academic success, they can raise their aspirations, increase self-efficacy, and therefore acquire self-motivation and succeed (Bandura, 1993). It is important for teachers to

have an efficacious attitude toward teaching and learning so that students can achieve high academic success. When teachers lack self-efficacy, students believe that they lack the ability to succeed and therefore suffer academically (Bandura, 1993).

Parents with self-efficacy assume that they have a combined responsibility with the school in their child's education. The greater their efficacy, the greater role they play in their children's learning, increasing students' likelihood of being successful (Bandura, 1993). Teachers provide grades for students, and students compare with other students. This comparison allows students to measure themselves, quantifiably, with others and has a profound influence on self-efficacy (Bandura, 1993). Comparing grades allow students to self-regulate, and those who see improvement experience increased efficacy, better and clearer thinking, and an increased likelihood of improving performance even further (Bandura, 1993).

Teachers need to possess the confidence that they can teach so that students will function in a high academic performance settings. They need to believe in their ability to impart knowledge or to teach so that students can maximize their learning and academic performance. Teachers with self-efficacy generate and design positive learning classrooms and optimize instruction and guidance so that students can achieve a higher level of academic success (Bandura, 1993). ELL students must possess self-efficacy so that they can learn and function successfully in English. Intrinsically, individuals who possess a significant desire to learn a different language do so (Csizer & Dornyei, 2005). In the same light, students who want to achieve high academic success will perform with greater self-efficacy.

Self-esteem and self-efficacy, at first, may seem to be the same thing (Putman, 2009; Stanley & Murphy, 1997). However, *self-esteem* is how a person views or feels about oneself, whereas *self-efficacy* is how confident the person is about being able to accomplish tasks or

missions. Some have stated that Hispanic students may be getting fed negative stereotypes from children's books (Hasse, 2002). This may be detrimental to self-esteem. However, if students acquire greater efficacy, they become motivated and persistent. With proper goal setting, they can be motivated to become less concerned about failure and become motivated to accomplish tasks with persistence and perseverance (Hoy & Hoy, 2009). This type of self-efficacy leads to motivation to achieve and should be intrinsic. When extrinsic factors are the prime motivators, there may be harmful effects once those external motivating factors are removed (Shepard, 2003). These factors could be anything that students perceive as having value, whether the rewards are tangible or intangible.

Resiliency

Resiliency is the ability to endure or grow even though barriers or difficulties are abundant. It is the ability to gain confidence when all indications are that one should fail (Gordon-Rouse, 2001). In education, students' ability to exceed the expected failure due to adversity and instead produce high academic performance is resiliency (Boon, 2008). Low socioeconomic status is often a predictor of academic failure. Resilient students succeed despite low socioeconomic status (Schoon & Bartley, 2008). Additionally, students who succeed with similar backgrounds to many other students who fail are considered to be resilient (Morales, 2010).

Therefore, to consider a student as academically resilient, there must be two components. First, there must be persistent risk factors reducing the student's likelihood for high academic performance, and second, the student should be able to overcome those risks and achieve high academic performance. Not knowing the English language is considered a limiting risk factor and a predictor of low academic performance. ELL students are considered to be at risk for

academic failure, and therefore ELL students who achieve high academic performance are considered to be resilient (Morales, 2010).

Summary

Historically, Hispanic students have experienced unfair treatment in schools, not only in Texas but also nationwide. This is evident in the numerous lawsuits filed and won by Hispanics over the past century. The 14th Amendment, NCLB, and rulings of the U.S. Supreme Court and lower courts prevent further discrimination and segregation in schools. However, Hispanics still post lower test scores than their White counterparts, though it is worth noting that some ELL students excel in their studies. The low test scores could be attributed to certain barriers, such as poverty, lack of rigor, inability to understand and comprehend English content, institutionalized racism, and classism. Teachers of ELL students give excessive attention to vocabulary and comprehension instead of attending to depth and content, which is what really matters most. Pedagogy should be required to be culturally appropriate and should show that it helps Hispanic ELL students succeed in high-rigor classes (Reyes et al., 1999). Several teaching methods are suggested by previous literature, such as bilingual education, sheltered instruction, DL instruction, inquiry-based teaching and learning, and ability and tracking grouping. Motivation also plays an important role in education as it can drive students to excel. Studies have found that if students, teachers, and parents have high self-efficacy, then students do far better in their studies. Teachers with self-efficacy can generate and design positive learning classrooms and excel in instruction and guidance so that students can achieve a higher level of academic performance (Bandura, 1993). The standards set by NCLB for graduation rates and by the state of Texas for completion rates as measured for school performance have detrimental

consequences. A college-readiness standard is deemed more appropriate for measuring student performance and goals.

The next chapter details a methodology for obtaining data from four Hispanic ELL students with documented high academic performance in high school science. Each student was interviewed three times on three different dates. Themes that emerged from these interviews were further explored by interviewing science teachers and administrators. This information helped in the identification of factors that contribute to these ELL students' high academic performance.

CHAPTER III

RESEARCH METHODOLOGY

The research design and methodology includes several topics. First, the listed research questions delineate the purpose for this research study. The focus of this study was to find and identify factors that contribute to the high academic achievement of Hispanic ELL students in science using a multiple case study approach. This chapter details research questions, research design, data collection methods and sources, site and participant selection, and data analysis procedures. It also details how data were collected through interviews, how interviews were conducted, and how participants were selected and questioned. This is an exploratory study to identify, discover, or uncover factors that contribute to the high academic performance of South Texas Hispanic ELL students in science. Hence, if justified by the data, findings may assist in theory development to better understand why some Hispanic ELL students perform well academically in science when the majority does not. This chapter also addresses ethical issues, research bias, transferability, validity, and reliability of the study. The study protocol was approved by the Institutional Review Board (IRB) at the University of Texas Pan American (Appendix A).

Research Questions

The following questions were answered in this study:

1. What school or district programs, whether extracurricular, co-curricular, or curricular, identified by selected South Texas Hispanic ELL students, contribute to ELL student academic performance in science?
2. What intrinsic factors do selected South Texas Hispanic ELL students identify as contributing to academic performance in science?
3. What other factors do selected South Texas Hispanic ELL students identify as contributing to their academic performance in science?

Research Design

The research was qualitative in nature and a multiple case study approach is used (Creswell, 2007; Stake, 2006; Yin, 2009). Data were gathered from individuals from four different high schools, focusing on students as cases with supporting data gathered from other participants. In addition, this multiple case study approach intended to provide, qualitatively, a contextual understanding of how and why these Hispanic ELL students achieve high academic performance in science when the vast majority of similar students do not (Stake, 2006; Yin, 2009). This research design was flexible so that modification would take place if information or data discovery deemed it necessary (Yin, 2009).

This research study sought to examine those factors that high-performing ELL students identified as contributing to their success in science. The multicase study was approached from both the emic perspective, which was the students' point of view, and the etic perspective, which was the researcher's analytical perspective (Creswell, 2007). However, some characteristics of a phenomenology may exist within these case studies because of individuals having shared the

same experiences (Creswell, 2007) of being ELL, Hispanic, and achieving high academic performance in high school science. This is different from Creswell's (2007) description of a case study approach as an "event, program or activity" (p. 78). In this multiple case study, four individual students were interviewed on three occasions for approximately 60 min (Seidman, 2006). The cases were compiled and compared for similarities and differences. Students were chosen from four differently sized high schools to investigate the possibility of prevalent inherent characteristics arising from school population size (Stake, 2006).

Site and Participant Selection

Prospective participating high schools within each school district were provided with the superintendent's response letter (Appendix C) granting permission to conduct research within their high school. The designated school administrator was provided with the study's participant criteria and asked if they would allow researcher to conduct the study and provide possible student participants. All suggested students met the specified criteria. Only one student per school was proposed and asked to participate.

Site Selection

Four students were chosen from four different high schools. The high schools were of different populations from 1A to 5A, as established by the University Interscholastic League (UIL; 2009). Owing to availability and proximity, the four targeted size designations were 1A, 3A, 4A, and 5A high schools. This enhanced the possibility of looking at the phenomena in different settings to add to the contextual diversity of the multiple case study analysis (Stake, 2006). The high schools were selected from the Rio Grande Valley of Texas, which includes a four-county area comprising Cameron, Hidalgo, Starr, and Willacy counties. The emphasis was

placed on Hidalgo County because of its proximity and the availability of the targeted population to the researcher. However, schools in the other counties were considered but not included in this study.

Participant Selection

Participants interviewed for data collection included four Hispanic ELL students. Each student attended one of four different high schools in the Rio Grande Valley of Texas. The four different schools were of different population sizes as defined by the UIL. The participating students had shown high performance on the exit-level, 11th-grade Science TAKS by having received a "commended" rating. These students displayed academic success and preparedness for the academic challenges of college by being university eligible or having been admitted to a college or university. They had to be enrolled or to have taken dual credit or concurrent enrollment classes and had to be ranked academically at the top quadrant of the graduating class with a grade point average (GPA) of 90 or above on a 0 to 100-point scale. A *commended* rating on the spring 2008 TAKS was a scaled score of 2400 or higher (TEA, 2008). To be college ready meant that a student was taking or had taken college classes or college entrance exams or was participating in AP or pre-AP courses (Conley, 2007). If TAKS, GPA, and college readiness measures had not been available, other criteria would have been used. This criterion included an ACT score of 22 or higher or an SAT score of 1030 or higher and ranked in the top 10% of the student's graduating class. All participating students met the criteria which were set by the local university for students seeking to enroll concurrently in college courses. Concurrent enrollment involves high school students taking college classes for university credit (UTPA, 2009). The sites and participants were selected using purposeful sampling strategies (Creswell, 2007).

Four high schools were selected based on size and location. Contact was made with school districts' superintendents via a letter (Appendix B). The researcher visited with each superintendent or his or her designee and provided a letter of response (Appendix C) so that the district could formally approve the researcher's request to conduct a study in the school district. Once a superintendent provided formal approval, principals were notified and a copy of the approval letter was provided to each of or a designee. Once students were identified by the school as meeting criteria for the study, the school contacted them and provided an Informed Consent Document (Appendix D) if the student was 18 years of age or older. Students younger than 18 years of age were given a Parental Informed Consent Document (Appendix E) and asked to return it if their parents agreed to their participation. The researcher provided an Informed Assent Document (Appendix F) to participants younger than 18 years of age so that they could also decide if they wanted to participate. Parents fluent in Spanish were also provided with the Spanish version of the Parental Informed Consent Document: "Documento de Autorizacion Del Padre" (Appendix G).

Individual students selected for the study were full-time high school students. They were classified as seniors, identified as ELL and Hispanic, ranked in the upper quadrant with a 90% GPA or higher in academic classes, passed the Science TAKS with a "commended" designation, and deemed as college ready or college bound because they took college preparatory courses, such as AP or pre-AP classes, or successfully took college classes while in high school. In addition to these criteria, students allowed to take any college entrance exam were considered college ready.

Participants for the study were selected purposefully and on a voluntary basis. Students who met the criteria were invited to participate. Purposive sampling aided in creating

opportunities for a deeper analysis of the phenomenon examined (Stake, 2006). A science teacher and an administrator were interviewed from the same high schools from where the students were selected. The science teachers were not the student participants' teachers.

Data Collection

Data collection took place in the students' respective high schools during the school day or at their homes. This facilitated locating students for the interview sessions and providing them with transcripts for member checking. Each case was studied independently and compared to the other case studies for similarities and differences (Stake, 2006). This cross-case analysis added to transferability, triangulation, and the strength of the study (Denzin & Lincoln, 2005; Stake, 2006).

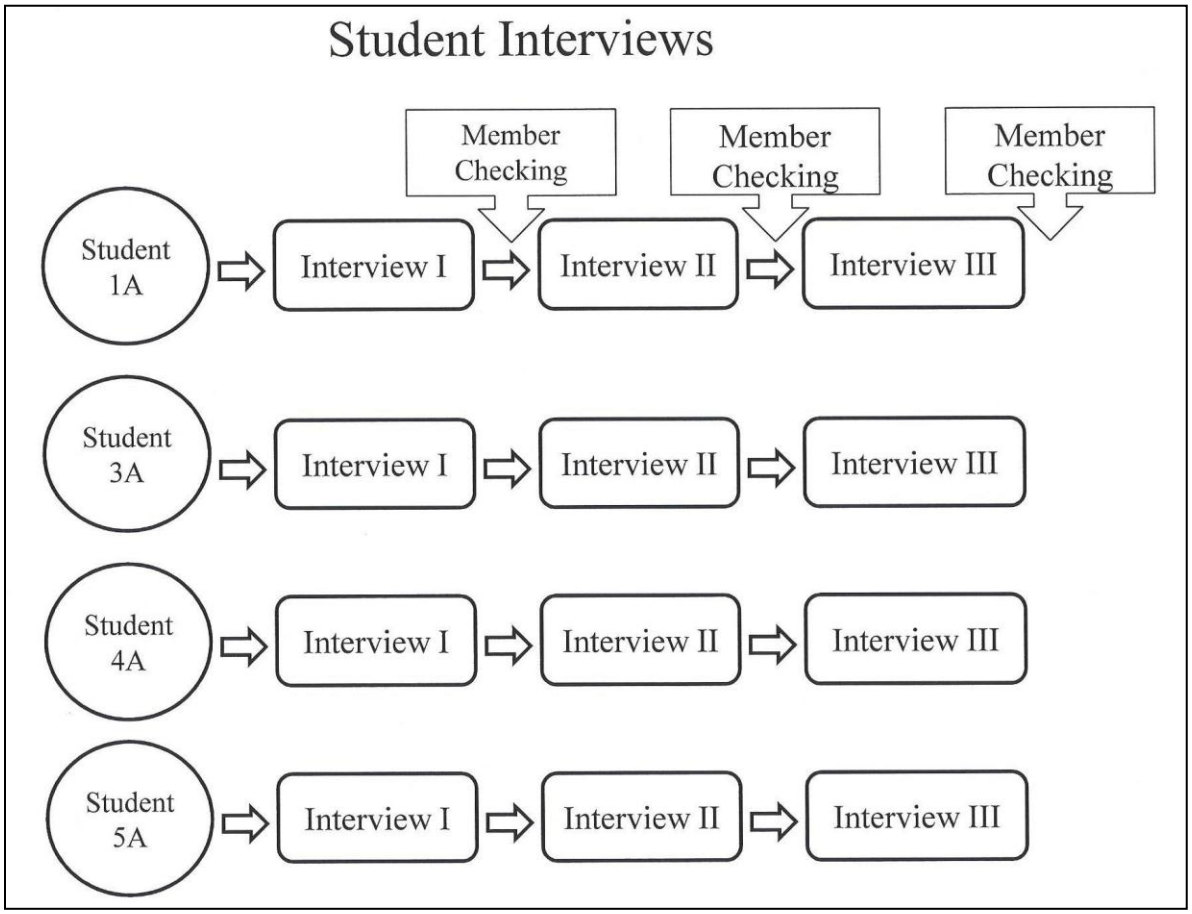
The science teacher and administrator were interviewed after the students' interviews were completed, transcribed, and analyzed with NVivo software. Science teachers and administrators were interviewed individually, except for Rose High School, where they insisted on a joint interview to save time. The focus was to further examine the students' experiences and perceptions as described in their interviews (Seidman, 2006).

Student Interviews

Students, science teachers, and administrators were interviewed. Each student was interviewed a series of three times for less than 1 hour (Seidman, 2006). The first interview focused on the students' perceptions of what allowed, assisted, or made them achieve high academic performance in science. This was more of a historical account and included school, family, peer, and work experiences (Seidman, 2006). The participants identified experiences that led them to high academic performance. The second interview inquired about and clarified

previous statements made about students' experiences. Participants were asked how each of their experiences, such as relationships with family, peers, school, or work, influenced high academic performance. This was an attempt to build in detail what was said (Seidman, 2006). Finally, the third interview was used to enlighten and highlight deeper meanings in the participants' experiences that led them to high academic success (Seidman, 2006). Seidman stated that the three-interview structure and the goals within each interview are important because of the direction in which these interviews take participants so that meaningful information can be gathered. Student questions were open-ended, and follow-up questions were asked as deemed appropriate (see Appendix H).

Figure 1. Student Interviews

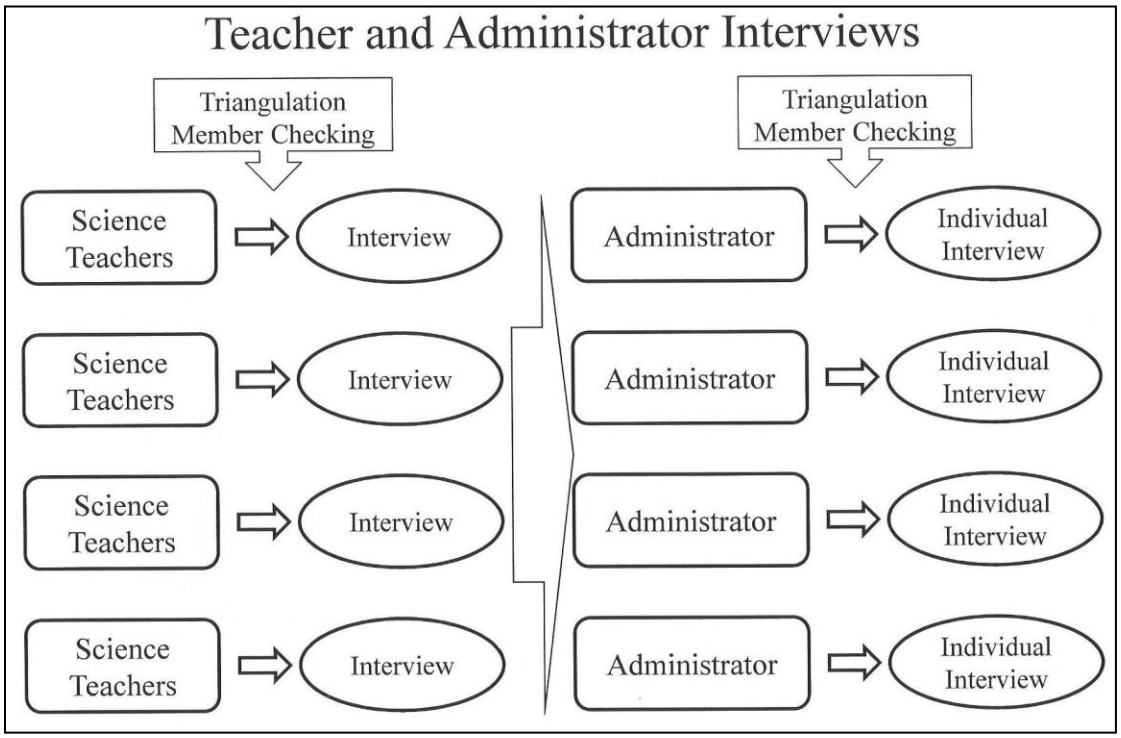


Science Teacher Interviews

One science teacher from each participating school was interviewed individually. In one case, a science teacher was interviewed concurrently with an administrator. Teachers were from the same schools as the student participants, and to ensure anonymity, they were not the participating students' teachers. The questions the science teachers answered were based on student interview transcript analyses. The teacher interviews were conducted after the student interviews were completed and analyzed.

Each teacher, just as the administrators and student participants, individually added, deleted, or elaborated on the importance of information given (Creswell, 2007). The duration of the interview was important. Interviewees were given time to think, analyze, and comment. In this study, each interview lasted between 30 and 40 min. Interviews lasting longer may have had an adverse consequence and resulted in undue stress to interviewees (Seidman, 2006).

Figure 2. Teacher and Administrator Interviews



Administrator Interviews

Administrators were interviewed once for approximately 1 hour on an individual basis. In one case, an administrator was interviewed concurrently with a science teacher. Administrators interviewed in this research were from the same schools as the student participants. Questions for administrators were created based on the analysis of students' interviews. These interviews were conducted after student and science teacher interviews were completed and analyzed. Interviews were limited to approximately 1 hour to maximize the flow of information and allow administrators to comment on the student and teacher participants' comments (Seidman, 2006).

Interviewing Procedures

All interviews were audio recorded and field notes were taken when discussions and interviews were conducted with students, teachers, and administrators. Written transcripts were created from audio recordings, and students' academic transcripts were reviewed by school officials as needed (Creswell, 2007). Participants were asked open-ended, semistructured questions individually to determine what factors contribute to their high academic performance in high school science. Students were placed in a formal setting (Denzin & Lincoln, 2005), such as a private library room or conference room, without others present. The researcher conducted the interviews using semistructured questions to best uncover evidence from participants (Denzin & Lincoln, 2005). Even though the questions were semistructured, the interviews were less formal and took the form of guided conversations so that the flow of the interviews were smooth in such a way that the participants felt comfortable answering and participating (Yin, 2009). At the beginning of the first interview, participants identified themselves and stated demographic information. The researcher verified the information to be consistent with the information

provided by the school. In addition, students were asked to verify that they met the participation criteria of the research study, as described earlier. Participants sat in a position so that the researcher could read the participants' body language, if needed. It was not the intent of the researcher to use body language unless it became an issue that needed to be observed, discussed, or evaluated. However, body language did not play a role in this study.

The interviews were in depth (Yin, 2009). As previously stated, the researcher conducted three interviews with students and one interview with teachers and administrators. A focused interview (Merton et al., 1990) was used during the initial interview and a conversational style was used with a set of predetermined and follow-up questions (Yin, 2009). The researcher's intent was to allow the participants' influence to dominate in obtaining the evidence rather than making use of the researcher's corroboration of the participants to reach preconceived findings (Yin, 2009). However, interviewees may have been subject to biased influences or poor recall, or they could have failed to properly articulate at the moment they answered a question (Yin, 2009). In an effort to reduce these inaccuracies, findings were corroborated with other interviewees, and transcripts and follow-up questions were prepared for their deliberation so that the participants could have full influence on clarifying or eliminating any inaccuracies in the findings.

An intrinsic case study design helped to develop a thick description of factors that contribute to the high academic performance of Hispanic ELL students in high school science (Denzin & Lincoln, 2005). All interviews were transcribed verbatim to produce written transcripts. Coding identified themes, and these themes were compared across interviews in this study in an effort to triangulate the data (Denzin & Lincoln, 2005). To enhance the validity and accuracy of factors that may contribute to the academic success of Hispanic ELL science

students, data gathering was done at three different high schools of different size populations so that the voices of a wide spectrum of students could be uncovered. Students were allowed to review written transcripts to further facilitate the expression of their voices in the findings of this research.

Interview Questions

Several open-ended questions were asked during interviews (Appendix H). These questions were followed by other questions to clarify or uncover data that may otherwise not be mentioned. The researcher asked the open-ended questions.

Triangulation

Interviews were conducted by asking each student the same questions. Follow-up questions were utilized to clarify or confirm information provided by participants. Once transcripts were written, participants were asked to review them to ensure accuracy.

To clarify observations and to reduce misinterpretations or misperceptions on the part of the researcher, participants reviewed transcripts; engaged in member checking; and were given opportunities to comment, clarify, and change what they said or meant to say (Denzin & Lincoln, 2005). Themes for each of the cases were compared in an effort to triangulate the data (Denzin & Lincoln, 2005). Using this multiple case study approach provided multiple sites as sources of evidence to enhance triangulation (Yin, 2009).

To ensure accuracy in stating the findings of the research phenomenon, the researcher did not simplify, understate, or add to the participants' communications. Any question, oversimplification, or unclear situation was discussed and clarified with the participants prior to reporting the results (Stake, 2006). This member check relied on the participants' continuous

input (Merriam, 1998). In such a case where multiple perceptions of the factors for high academic performance in science had been given by participants, the results were reported as such (Stake, 2006). To further triangulate the data, personal logs, notes, sketches, interpretations, or other materials related to the interviews were kept and stored electronically. A preliminary findings report was written and discussed with participants so that their voices became evident in the findings (Denzin & Lincoln, 2005; Stake, 2006).

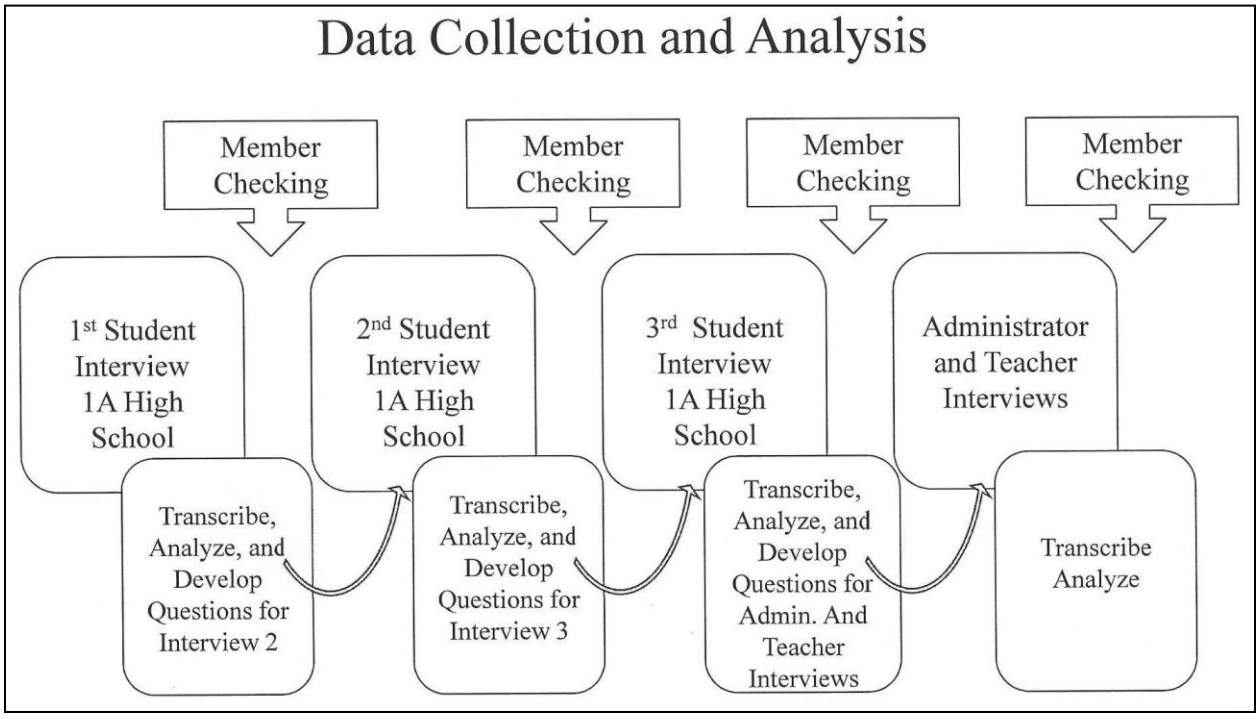
A teacher and an administrator from each of the selected high schools were interviewed to enhance triangulation (Figure 3). Owing to their usefulness and knowledge, teachers and administrators were interviewed about the phenomenon discussed (Stake, 2006), and additional interviews were not conducted. Triangulation could have occurred using multiple investigators (investigator triangulation), multiple sources (data triangulation), multiple methods (methodological triangulation), or triangulation of perspective of the same data (theory triangulation; Merriam, 1998; Yin, 2009). In this research, the focus was on data triangulation. Even though the use of multiple cases enhances the strength of the study, another method of triangulation was used, which was interviewing teachers and administrators.

Data Analysis

Using a multiple case design helped in developing a thick description (Denzin & Lincoln, 2005) of factors contributing to Hispanic ELL high academic performance in science. Data were analyzed using NVivo software. Codes were assigned by tagging or labeling prevalent topics. Categories were identified from the labels or tags, and themes were established from these categories. A categorical aggregation (Creswell, 2007) analysis was used by compiling data and seeking reemerging themes. Naturalistic generalizations (Creswell, 2007) were developed that

educational professionals in any school or location could use to make good decisions to benefit the Hispanic ELL population in science.

Figure 3. Data Collection and Analysis

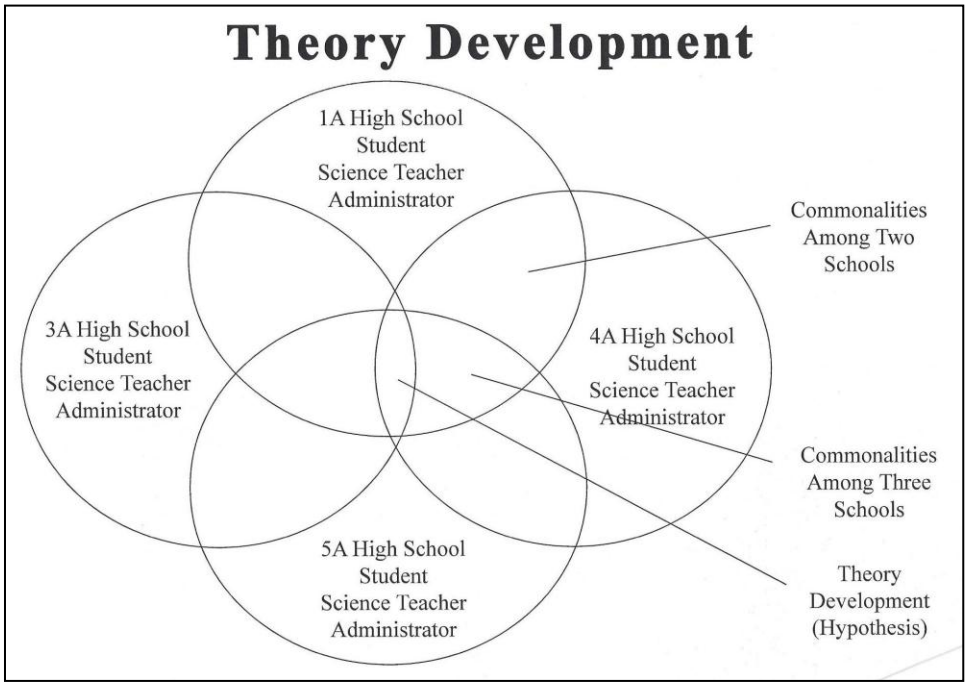


Theory Development

This multiple case study shows factors that contribute to Hispanic ELL science students' high academic performance in science. In qualitative research, theories are built by building on concepts and themes from the interviews (Rubin & Rubin, 1995). Based on the analysis of data in this study, findings were limited to develop a theory (Yin, 2009). The developed theory is not a full representation of Hispanic ELL students' high academic performance in science but rather a small piece of a complex puzzle. The theory would indicate the role of parents' and teachers' influences as well as the students' intrinsic need to succeed. A theory is an explanation or

generalization of how or why a phenomenon exists as it does (Creswell, 2007). Figure 4 shows source of data from four cases to develop a testable hypothesis from a cross-case perspective.

Figure 4. Theory Development



A theory must concentrate on how or why high academic performance occurs (Yin, 2009). Most ELL science students are not successful. Those who are may indicate that certain teachers or programs contributed to their high academic performance in science. However, in developing a theory, it is not the intent to identify which teachers have better success rates, but it would be important to focus on those teachers' qualities, assuming that such qualities are factors that interviewees identified as contributing to their high academic performance in science.

Ethics

Participants included high school students who were minors. Informed consent as well as informed assent documents were signed and collected from parents and participants,

respectively, prior to any interview. The researcher did not engage in deception in any manner. In fact, interview transcripts and notes were always open and available to participants. To establish anonymity, student and school names were protected by assigning pseudonyms. The purpose of the study was conveyed to participants, and the researcher discussed all methods used to collect and analyze data. Participants were able to review transcripts so that they could agree that what they stated was what was meant, and they were encouraged to make any necessary changes and clarifications (Creswell, 2007). Part of the review occurred in subsequent interviews (Seidman, 2006). In addition to providing participants with transcripts and the opportunity to change or further explain their comments, the research gave students an opportunity to contact the researcher so that any questions or comments that might arise after the interviews were heard could be considered by the researcher.

Institutional Review Board

All necessary forms were obtained from the IRB prior to starting this research study. The researcher completed the Collaborative Institutional Training Initiative course for behavioral research investigators. All participants signed informed consent forms indicating their agreement to participate in the research study. The IRB approval notice and consent forms are in appendixes to this dissertation.

Research Bias

This study was conducted in an objective manner. It was the researcher's intent to provide accurate information without bias. However, the researcher, at the time of data collection, was a high school science teacher as well as a college physics professor. Conducting interviews in four high schools enhanced the validity and accuracy of the findings. Additionally,

transcripts were provided to participants so that their voices would be evident. This ensured that the participants' true intent is reflected in the findings. In this study, it was the aim of the researcher to explore and not advocate for pertinent or related issues. The researcher did not support or ignore findings but did attempt to understand the issues and findings from the participants' perspectives (Cresswell, 2007). Additionally, the researcher had an attitude of openness to any findings (Yin, 2009). To further avoid biases, preliminary findings were reported to participants for member checks (Denzin & Lincoln, 2005). All contrary comments and alternative explanations were documented and noted and are reflected in the final research findings to reduce bias (Yin, 2009). Themes from coding were compared. To avoid bias in qualitative research, LeCompte (2000) suggested a five-step approach, as follows: organize data according to what it is and where it came from, utilize a sorting process to keep like items of data together, group data items, assemble emerging patterns, and create structures. Data were checked for credibility as needed.

Transferability

The intent was to conduct four case studies. However, one participant pulled out of the study and three case studies were conducted in three different high schools. A cross-case analysis was done to determine similarities, differences, and connections in this multiple case study (Stake, 2006). The information generated in this qualitative multiple case study came directly from the participants. They indicated the factors contributing to high academic performance of Hispanic ELL students in science. The transferability of findings in this study may be at least partial in some populations (Rodon & Sese, 2008). The goal was to focus on the participants to acquire a deeper understanding of factors contributing to this population's high academic performance in high school science. Transferability also came from using the multiple

case study approach. This approach is similar to generalizing the results of an experiment in quantitative research as it uses multiple experiments to state a scientific explanation. In this research, multiple cases were used to improve transferability of the findings (Yin, 2009). Follow-up data and communication were needed and were accomplished via e-mail to achieve the highest possible quality of data (Yin, 2009).

The evidence obtained in qualitative research can be utilized for additional qualitative or quantitative studies (Veerman & Yperen, 2007). Doing further studies and obtaining additional evidence will determine the extent of transferability of this study as well as its validity (Creswell, 2007).

At the same time that the researcher used a multiple case study approach in an attempt to explain complex phenomena, he also used a cross-case analysis (Stake, 2006) to further enhance his ability to focus on those unifying explanations that bring complex concepts into a singular or a simpler set of distinguishable concepts. As the analysis took place, a preliminary explanation emerged (Stake, 2006). The ethical responsibility of the researcher is to allow for variations or changes to the preliminary findings or impressions of the study (Stake, 2006). To avoid preliminary conclusions, the researcher was the sole preparer of all findings with input from participants and experts in the area of ELL students. Yin (2009) suggested five analytic techniques to develop good case studies: pattern-matching logic, explanation building, time series analysis, use of logic models, and cross-case synthesis. This multiple case study used pattern-matching logic, explanation building, and cross-case synthesis techniques.

Validity and Reliability

Reliability occurs when findings can be replicated (Merriam, 1998). In case studies, the high-quality organization and availability of field notes, transcripts, and other contributing

documentation to the cases' database should be readily available to other researchers. Others being able to review all data and documents adds to the reliability of the study (Merriam, 1998; Yin, 2009). Triangulation is a key factor in reliable findings. Validity is enhanced when the researcher remains as an observer and does not become part of the politics (Wood, 2006). Merriam (1998) stated that in qualitative studies, if it makes sense to the reader and seems plausible, it has greater validity; this is known as internal validity. However, Yin (2009) stated that internal validity occurs during data analysis. Additionally, a study with strong internal validity uses logic models, addresses contradictory reasoning, stimulates concept building, and ensures that observable patterns match (Yin, 2009).

Summary

This chapter described the qualitative design and data collection methods of the research study as well as the treatment of data. The aim of this research was to investigate and identify factors contributing to Hispanic ELL students' high academic performance in science. The research results may enable school administrators to examine the factors uncovered in this study as possible solutions for implementation or as a starting point to find solutions to problems that ELL students experience in science. These possible solutions and the findings of this study may enable administrators to better understand the complex problems that ELL students face, especially in science, in their schools and districts. The next chapter describes excerpts of the case studies.

CHAPTER IV

CASE STUDIES

Introduction

In this chapter, three cases are presented. The case studies involve three students from three different South Texas high schools. Each student was interviewed three times. To gain a broader perspective, a teacher and an administrator from each of the selected schools were also interviewed. The purpose of the interviews was to discover factors that contribute to high academic performance of Hispanic ELL students in high school.

The three high schools represented different population categories as defined by the UIL of Texas. They are categorized as 1A, 3A, and 4A. These schools are all located in South Texas. All students, schools, and districts are represented by pseudonyms to maintain anonymity.

Demographic Data

The schools' populations varied from small to large. Table 1, on school demographics, details the schools' size, populations' socioeconomic status, percentage ELL, and the number of Hispanic students commended on the exit-level Science TAKS. School size is reflective of the community's population; the greater a community's population, the larger the school. The smaller schools were more rural. None of the school districts, at the time of the study, had more than one high school.

Table 1.

Schools' Demographic Data

High Schools					
			Population		
				Hispanics	
		Socioeconomic		Commended	Economically
Participating	Size	Status	ELL	(TAKS)	Disadvantaged
Green	162	Low	10.6%	11.0%	83.9%
Blue	967	Low	25.9%	5.0%	87.7%
Rose	1336	Low	32.4%	0.2%	96.3%

Schools are listed from small to large. All high schools had a large portion of students that were identified as economically disadvantaged. The percentage of ELL students varied from 10.6% to 32.4%. All schools listed had 99% Hispanic student population. Table 2 details participants' demographics, which include classification, language used, music ability, size of family, and birth order.

Table 2.

Students' Demographic Data

			Language Spoken					Family	
Participants	High School	Classification	At Home	At School	With Friends	Music	Age	Size	Place
Roberto	Green	Senior	Spanish	Spanish	Spanish	Mariachi	18	4	Oldest
Juanita	Blue	Senior	Spanish	Spanish	Spanish	Mariachi	17	3	Second Oldest
Nazario	Rose	Senior	Spanish	English	Both	Mariachi Band	18	3	Oldest

All students were seniors and were 17 or 18 years of age. Juanita was the second oldest in her family, whereas the other two participants were the oldest.

Case I – Roberto

Roberto was an 18-year-old male student at Green High School, a school of 161 students. He was a senior and ranked toward the top of his class. He started high school during his first year of living in the United States as a freshman. Primarily, he attributed not being in the top 10% of his graduating class to struggles with learning and using the English language. In addition, there was also a cultural difference that hindered his ability for a smooth transition into the educational system in the United States. He ranked 20th but expected to move up before graduation.

He scored "commended," the highest possible ranking, on the science portion of TAKS. He had taken, and was taking, college courses as well as AP courses. According to school records, he was identified as an ELL student. Roberto had three younger sisters that attended elementary school in the same district, and they lived with their parents. The family moved to the United States to seek a better life, which includes an increase in their spendable income and their financial worth. As a result, Roberto and his sisters hope to obtain better educational opportunities.

Roberto, a dedicated high school athlete, had a hard time speaking English. His reading and writing skills were much better than his oral language. He said that he used English in his classes but prefers to speak Spanish owing to his accent. He did speak with certainty and conviction and was committed to his statements as if he had deliberated these thoughts previously and diligently.

Roberto was born in Mexico City, but he and his entire family became legal residents of the United States. Robert started his secondary education in Mexico. His preferred language at home and with friends is Spanish. At school, he spoke mostly Spanish, but used English only when necessary. He expressed that he often asked teachers for the Spanish translation of unfamiliar English words. Ironically, his sisters spoke comfortably in English while playing together at home, although they were highly fluent in Spanish. Roberto had his own room and studied either in his room or on the dining room table. It is evident that his parents made allowances as to where to study, as well as support activities that encourage good grades. Additionally, Roberto studied in the school library. However, he indicated he studied only 1 hour per week. He helped his younger sisters with their schoolwork and nurtured high academic achievement. While in Mexico, Roberto admits that he was an average student; however, when he came to the United States, his view of education and school changed. He now sees education as the path to a rewarding career and therefore to a much better future. He felt that he would continue to help his sisters as long as he lives at home or close to them. Ideally, Roberto's preference was to attend a university such as the University of Texas at Austin or Texas A&M University at College Station. However, as of the time of the interviews, he was targeting a local state university and was contemplating transferring at a later time to finish his bachelor's degree or to work on a master's degree.

Since friends and extended family were farther than the border area, Roberto and his family spent all summers in central Mexico visiting. However, they did not go to Mexico on weekends. Roberto was involved in extracurricular activities. He participated in football, soccer, and track and field. According to Roberto's school administrator, he was captain of the football team. Roberto graduated at age 19. He had been demoted one grade due to lack of

English language knowledge when he moved to the United States from Mexico. He plays guitar, xylophone, marimbas, and piano. He played in the school band and dedicated time to his church.

Roberto's dad was a truck driver. His annual salary was under $30,000. Thus, they were of low socioeconomic status for a family of six. His mother is a stay-at-home mom. They fully support and encourage their children's high academic performance. Roberto stated, "My parents pay for everything I need for school and they encourage me to participate in school activities." They saw education as the conduit to a good rewarding life. Education has more value than just improving life financially; it is a tool to learn how to live better. "My parents say that with a university education I can make a better living," stated Roberto. However, his parents also stated that "to obtain knowledge is to learn how to live better," according to Roberto. His parents also felt that in addition to more educational opportunities for their children, Roberto's dad could make more money in the United States and that their children would be safer.

Roberto credited teachers, not programs or administrators, for the support they provided to foster his high academic performance. He said that there were several teachers in his school who help those students who want to achieve academically.

He preferred classes that were dynamic in the sense that they do different activities each day and vary activities during a class period. Additionally, he preferred teachers who could change gears when they saw students not responding to the lesson and took a different approach even if unplanned and at the spur of the moment. He stated that doing independent problem solving, in class and out of class, in math and physics were his favorite.

Roberto's most motivating factor was intrinsic. He said, "You have to want it and that comes from within." He added that all students have the ability for high academic performance if he or she wants it. Those students who do not have the desire to achieve can be persuaded by

talking to them individually and collectively to convey the benefits of good grades and learning. Roberto suggests that the school should bring speakers who have similar backgrounds as the targeted students. A speaker's ability to "demonstrate the benefit of high academic achievement motivates students to study and work harder," stated Roberto. These speakers as well as teachers should clearly communicate goals and expectations as well as the benefits in economic and personal gratification of high academic achievement. He added that it is the students' responsibility to ask for help from teachers. He also added that teachers were always willing to help, and since they were willing to help outside of class, students should do their part during class.

Most of the staff at Green High School were Hispanic, and most spoke Spanish as needed. Instruction, however, for the most part was in English. One of Roberto's teachers spoke mostly English but did know conversational Spanish. He could speak, read, and write Spanish, yet he only considered himself as fluent in speaking. Teachers used strategies, acquired through training, that are conducive to ELL students. The administration's perception was that all students benefit from these activities, according to previous research and observations. All professional staff, teachers, administrators, counselors, and other support staff, were fluent in English. Even though their entire education had been in English, many utilized Spanish, their first language, as children. Many of the other staff, such as cafeteria workers, spoke English intermittently but utilize Spanish almost exclusively. The school had programs in place to help ELL students with language. Green High School had tutoring every day after school and on Saturdays during the entire school year, but Roberto did not attend. The school also had different programs to help students improve their English reading, writing, and speaking skills, according to Green High School's administrator.

Additionally, the school's population was made up of only 161 students, and only 1 was a non-Hispanic White student. Of students, 83.9% were economically disadvantaged, and 10.6% of the school's population was considered ELL. Green High School was comprised of 99.4% Hispanics. The district had fewer than 600 students, of which 99.5% were Hispanic, 25.1% were ELL, and 87.5% were considered educationally disadvantaged. All schools in the state of Texas were comprised of 50.8% Hispanics, with 16.8% identified as ELL.

Roberto identified factors that he perceived contributed to his high academic achievement. He stated the *empeño* was first. *Empeño* means desire or the want to excel. Therefore, intrinsic qualities, including self-motivation, were the most important factors. He studied only 1 hour per week but spent approximately 10 hours in extracurricular activities.

He stated that the second factor that contributed to his high academic performance was external sources of motivation. For example, extracurricular activities motivate students to study as well as discourage the use of drugs. He admitted that he appreciated and was proud to have received three recognitions for high academic achievement. Additionally, he was looking forward to receiving his high school diploma as well as a car from his parents. These are examples of external motivation. The diploma and car are deferred forms of gratification.

He also stated that parental support, financial and moral, were a key factor in his high academic performance. He got everything he needed through his parents' sacrifice and was grateful for it. He hopes to repay his parents someday. Teachers' support was important as well. They tutored, provided a place to study, encouraged students to perform better academically, and had subject specific as well as meaningful personal conversations. Roberto also stated that teaching methodology was important as it helped students learn and kept classes from being boring.

Other factors included a vision of a worthwhile career, helping others, and having a family. Even though he had not fully decided, he had an inclination toward engineering. His views were that working hard today provides a path to a good university and, at the end, to a good, rewarding career. He accepted and understood that deferring gratification was strategically superior to bolster his intentions of accomplishing his educational and career goals. He wanted to do really well so that he could live well, raise a family, and be successful in life.

Case II – Juanita

Juanita was a 17-year-old female student at Blue High School. She was a senior ranked in the top 10% of a class of 237 students. The school's population was 967 students. Juanita scored "commended" in science, the highest ranking on TAKS, and had previously and at the time of this study, was taking college courses as well as AP courses. According to school records, she was identified as ELL. She and her younger sister lived with guardians who had a daughter who was Juanita's age and attended the same high school. Moving to the United States was a conscience decision she made with her parents so that she and her sister could obtain better educational opportunities.

Juanita, with her small physique, made it obvious that English was her second language, but spoke with determination and commitment. Every word counted and was not just said but also presented with conviction and certainty. Even though at times she left a word out or lacked the expected pronunciation, she often verified her well-constructed concepts with a "yes" or occasionally reiterated some of her previously stated words, confirming that she presented the idea fully and without doubt or equivocation.

Although Juanita was born in Mexico, she was a legal resident of the United States. Her siblings included an older brother and a younger sister. Her older brother went to school in

Mexico, where he attended a postsecondary school, and lived with his parents. Her preferred language at home with guardians, siblings, and parents, as well as with friends, was Spanish. At school, she spoke Spanish; however, in her classes, she spoke English 100% of the time. In her U.S. home, she and her sister shared a room to sleep, which was also their designated place to study. They enjoyed their privacy, which was lacking with a previous guardian.

Juanita had three different guardians during her high school career. The first guardians divorced, so she could no longer live with them. Her parents asked family friends to house them and serve as guardians. Juanita and her sister felt harassed by one of the family members, so she looked for a different guardian. One of her school friends invited her to live with them in what was their U.S. residence at the time of this study. Juanita's plans for college were open. She was willing to relocate upon acceptance into what she considered a good university out of the area. If she did leave, she was hoping to take her sister and serve as her role model and guardian. She felt that her sister was her most important motivation and responsibility.

Unless she had school activities, Juanita would go home to Mexico on weekends and holidays. For her, school was very important, and she participated in various extracurricular activities, such as Robotics Club, UIL Science, and mariachi band. She played guitar and drums. She first started school in the United States as a high school freshman. Juanita was in an age-appropriate grade level as she was scheduled to graduate at the age of 18. She had previously attended school in Mexico.

Juanita's parents lived in a border town in Mexico, just a few miles from Blue High School. Logistically, they were several hours away because of border crossing issues and capabilities. Both her parents received training and education allowing them to work in a laboratory setting. Their collective income was approximately $27,000. Thus, they were of low

socioeconomic status for a family of five. Seeing the compensation and recognition potential of a U.S. education, Juanita and her parents collectively decided to enroll Juanita and her younger sister in schools in the United States.

During the summer after her junior year in Blue High School, Juanita attended a Robotics and Engineering workshop in Michigan at her family's expense. Her physics teacher provided the information for the trip. This teacher was her robotics coach as well as her mentor and advisor. Juanita explained that her performance at the workshop showed her how she could work and compete with anyone in the United States at any level. "Being in that workshop showed me that anything can be learned and I can learn anything," she said.

Additionally, Juanita credited her physics teacher for providing her with a motivating challenge in robotics, which facilitated her inspiration for high academic achievement. When asked if she would have excelled without this teacher, she stated that there would have been another teacher to serve as her mentor and therefore accomplish something anyway. Juanita stated that "you have to want it" intrinsically to achieve it. She felt that at least one teacher should serve as a mentor, not because the teacher has to, but because he or she wants to be a mentor to a particular student. She added that teachers were willing to do this; however, they have too many responsibilities to concentrate on mentoring students. Therefore, it is the student's responsibility to search for a teacher for mentoring purposes.

Most of the staff at Blue High School were Hispanic, and most speak Spanish. Juanita's physics teacher, her mentor and advisor, was fluent in more than one language, however, not in Spanish. Although fluent in English, almost all administrators spoke Spanish. Most of these teaching and administrative staff members were primarily fluent in English, even though many learned to speak Spanish first as children. Many of the support staff, such as cafeteria workers,

spoke English intermittently but utilized Spanish almost exclusively. The school had programs in place to help ELL students with language. Even though Juanita did not attend, Blue High School had tutoring every day after school and on Saturdays during the school year.

A Blue High School administrator stated that "segregation occurs, even though unintentional, in extracurricular activities such as football and soccer." He added that "ELL students were encouraged to join different extracurricular activities than non-ELL students and many did." For example, soccer players were mostly ELL students. These students felt that they did not have the same treatment and privileges as non-ELL students. This was evident after a violation of school policy during senior skip day, a day designated by senior students to be absent from school without authorization. In this situation, ELL students received a harsher punishment for the violation than non-ELL students such as football players. The soccer team members, mostly ELL, identified the harsher punishment as compared to other students. Most were members of the soccer team, which saw members of the football team, get off easy. Members of both teams were equally involved in the incident. They did not challenge the ruling, but they did confide in an administrator that they felt like "second-class citizens." The administrator agreed with them. The decision, even though biased and unintentional, was clearly wrong in the administrator's opinion. Students stated that it made them feel "invisible," according to the administrator. He added that sometimes these things happen, though unintentionally. "The same thing may happen in academics to ELL students with us not knowing," stated the administrator.

Additionally, the school's population was 967 students, of which 87.7% were economically disadvantaged, and 25.9% of the school's population was ELL. With the exception

of two students, all students were Hispanic, at 99.8%. The district had more than 3,200 students, of which 99.7% were Hispanic and 51.5% were ELL.

Juanita identified factors that she perceived contributed to her high academic performance. First, she stated that her responsibility to her sister was the most important factor. Her commitment to help her sister and her demonstration of good behavior, especially in academics, was unwavering. She wanted to make sure her sister was always safe and doing well. Juanita stated that her motivation to do well academically was primarily due to the responsibility she bears for her younger sister. She stated that she wanted to do well and be able to take care of her sister through high school and college, if needed.

The second most important factor that motivated Juanita academically was intrinsic. She was self-motivated. She wanted to do better than others but was not disappointed when others exceed her best, as long as they didn't cheat. A third factor was that she envisioned herself in a worthwhile career and helping others by doing something important, perhaps finding solutions to global warming or in alternative energy. Even though she had not fully decided, she had strong and definite career goals in an engineering-related field. In her view, today's hard work will lead to acceptance into a good university and, finally, a good, rewarding job, where she can do something important that will help others. She was well aware that deferring gratification better enabled her opportunities to accomplish her predetermined goals. She wanted to do really well so that she could be somebody doing something important in life. Although Juanita was keeping her academic and career options open, she was interested in engineering or a related field and saw herself as doing research in the future. She hoped to do something that would help others in a significant way.

Case III – Nazario

Nazario was a 17-year-old male student at Rose High School. He was a senior and ranked ninth in a class of 301 students. The school had 1,336 students. He was in the top 10% of his graduating class and expected to remain ninth in rank. He scored "commended" on the science portion of TAKS and had taken, and was taking, college courses as well as AP courses.

Nazario had three younger sisters of which two were in elementary school in the same district where he attended high school. Their ages were 12, 11, and 1, and they lived with their parents. The family moved to the United States when Nazario was 3 years old to seek a better life. Nazario was in the United States as an undocumented immigrant. He did not have a driver's license but drove a car that he called his own. Because of moving to the United States, Nazario and his sisters hoped to obtain better educational opportunities.

Nazario was a dedicated student. He was president of the National Honor Society (NHS), in which he was a member for 3 years. His English was excellent, and even though his parents do not speak English, he rated his Spanish as mediocre. Based on his English class grades, his English reading and writing skills were excellent. He spoke with confidence and conviction and was able to justify his statements by using examples and verbal illustrations. It was obvious that he had many conversations with different people.

Nazario was born in Reynosa, Mexico. His entire nuclear family lived in the United States. Nazario started his education in the United States in the same district in which he was residing. He spoke Spanish with his parents and English with everyone else. At school, with the exception of a few words in Spanish with janitors and such, he spoke English exclusively. He only used Spanish when necessary in school. He articulated that he had frequent conversations with teachers at his school.

His sisters spoke English as well and Spanish when needed at home. Nazario had his own room and studied either in his room or at school in a classroom with a teacher who helped him in various subjects. He studied about 10 hours per week and helped his younger sisters with their schoolwork as needed to help them excel academically. His 12-year-old sister ranked second academically in her class.

Nazario saw education as the avenue to a rewarding career that would translate into increased spendable income and a much better future. Even though Nazario felt that high academic performance was mainly intrinsic, he intended to help his sisters as long as he lives at home. Additionally, he wanted to attend a good university but was unclear as to where because of his undocumented status in the United States.

Nazario never traveled. He did not go to Mexico and never visited his extended family. Nazario had a busy schedule with extracurricular activities. He was president of the NHS, was in the high school band, played with the mariachi band, ran track, and played baseball. He was also section leader for trumpets in both mariachi and band. In the other activities, he stated that he played the role of a motivator. With these many activities, he dedicated 8 hours per week to extracurricular activities.

Nazario's dad is an automobile mechanic. His family's annual income was approximately $18,000; thus, they were of low socioeconomic status for a family of six. His mother was a stay-at-home mom, and both parents fully support and encouraged their children's high academic performance. Nazario stated that his father did not want to teach him how to do mechanic work so that he would not have an excuse not to pursue higher education. They saw education as the agent to a full, rewarding life, not only to be better financially but also to obtain

knowledge and live a fuller and more interesting life. "My parents believe that my dreams of graduating from a university can come true."

Nazario attributed his high academic achievement primarily to his parents. He had five favorite teachers his senior year, but one in particular helped him study and allowed him to use her classroom to study. He added that music helped him learn. He pointed out that with his experience in band and mariachi, he was able to retain knowledge and learn more easily. He stated, "Things get stuck in my head better." Additionally, music helps in learning how to do things right. In his view, one has to analyze, keep rhythm, and play, all at the same time. With music, one must have discipline and utilize more senses. Therefore, music helps train the brain to handle more information and, as a result, makes learning easier. He added that sports do not provide this ability. In sports, the culture is different. "They think that it is all about sports, but they have to know the basics of high school knowledge to be successful," he stated. Nazario added that sports encourage athletes to pass their classes, but they do not encourage high academic performance.

Teachers in Nazario's school helped students by making lessons exciting. Sometimes by simply changing intonation or inflection during explanations, teachers help students to remember and learn. He stated that since he intended to study mechanical engineering, his favorite classes were math and physics. Even though he said he was committed to engineering, he liked music and therefore was not totally decided as to which he would pursue. He also liked English class, and his grades were always good in English.

Nazario credited his parents' support as a motivating factor, as well as intrinsic qualities, in his attaining high academic performance. He said that if you want it and dedicate yourself, you will succeed. A second factor was deferred gratification, according to Nazario. Students

need a goal to aspire to attain. Nazario stated that once committed to that goal, "from the moment you wake up to the moment you go to sleep, you work towards that goal." Motivation comes from within, he added. Students spend more time in school with teachers than at home, and therefore teacher support is also an important contributing factor for high academic achievement, he stated. Nazario also said that students who are not motivated to achieve can be persuaded by allowing them to express themselves. These students can be convinced that they can be one of the very few who can be successful.

Most of the staff at Rose High School were Hispanic, and most spoke Spanish as needed. Instruction, however, was in English. One of Nazario's teachers who mainly spoke Spanish provided instruction in English. She helped by translating words or phrases when it was conducive to learning. Teachers received training on strategies that are conducive for ELL students to learn.

The administration's perception was that all students benefit from these ELL activities. All professional staff, teachers, administrators, counselors, and other support staff, were fluent in English. Even though their entire education had been in English, many spoke Spanish first as children. Other staff members, such as cafeteria workers and custodians, spoke English intermittently but utilize Spanish almost exclusively. The school had programs in place to help ELL students with language. Nazario did not need, nor did he attend, such programs. Rose High School had tutoring every day after school and on Saturdays during the school year, though Nazario did not attend.

Additionally, the school's population was 1,336 students, of which 3 were non-Hispanic White and 1 was African American. The school's Hispanic population was 99.7%, and 96.3% were economically disadvantaged and 32.5% were considered ELL. The district had more than

5,000 students, of which 99.7% were Hispanic and 38.1% were ELL. The district population was 98.8% educationally disadvantaged.

Nazario identified factors that he perceived as contributing to his high academic performance. He stated that his parents' support was first and the desire to excel, an intrinsic quality, was second. He said that students needed to be self-motivated; however, he recognized that external rewards, such as recognition, could motivate students academically. Even though he studied approximately 10 hours per week, he did not include studying as a contributing factor. He placed importance on his musical activities, which he credited with providing him with the ability to learn more quickly and easily and with enhancing his self-discipline.

Another factor was deferred gratification. He envisioned himself in a worthwhile career and with an increase in spendable income to add to his financial security. Nazario had not fully decided on a career but had inclinations toward engineering or music. He felt that hard work would pay off after he graduates from a university.

CHAPTER V

MULTIPLE CASE ANALYSIS

The purpose of this study was to identify, discover, uncover, examine, and document factors that contribute to Hispanic ELL students' high academic performance in high school science in the Rio Grande Valley of Texas. Three high school seniors were the cases in this study. Students, science teachers, and school administrators were interviewed. Each student was interviewed on three different occasions. Teachers and administrators from the same schools as the student participants were interviewed once. The three students were from schools of different sizes, ranked near the top of their classes, and were enrolled in college, university, and/or AP courses. These students scored "commended," the highest rating, on the science portion of the exit-level TAKS, a test required for graduation from high school. All data gathered through this multiple case study were collected in an effort to answer the following research questions:

1. What school or district programs, whether extracurricular, co-curricular, or curricular, identified by selected South Texas Hispanic ELL students, contribute to ELL student academic performance in science?

2. What intrinsic factors do selected South Texas Hispanic ELL students identify as contributing to academic performance in science?

3. What other factors do selected South Texas Hispanic ELL students identify as contributing to their academic performance in science?

Emerging Themes

Several interconnected themes were identified in each of the case studies. Most themes were categorized as students' intrinsic qualities. The three cases were Roberto from Green High School, Juanita from Blue High School, and Nazario from Rose High School. These students were well aware that future rewards and gratification can be obtained through high academic performance in high school. Besides the immediate recognition for their high performance, they visualized the best reward as admission into a university of their choice. They also project good economic and professional attainment once they obtain the expected college education in a science-related field. The identifiable themes were self-motivation, family responsibility, support, self-efficacy, socioeconomic status, career goals, deferred gratification, other intrinsic qualities, extracurricular activities, helping others and gratitude, studying, academic ability, self-esteem, language, extrinsic motivation, teaching methodology, and music.

Self-motivation

The most prolific theme emerging from all student participant interviews was self-motivation, an intrinsic quality. In all three cases, this was the primary factor contributing to high academic performance. Roberto stated that his motivation cames from thinking about the future. Even if he did not like the material, he motivated himself by thinking that the information will somehow be rooted in something he wanted to do in the future. Therefore, he had to understand and study those topics and that subject. Each of the student participants were asked who was responsible for students possessing self-motivation, the most prolific factor.

They all, without hesitation, stated it was themselves and no one else. They credited family, especially parents. Parental support is detailed later in this chapter.

Additionally, Roberto said that *empeño,* strong intrinsic desire, is the most important ingredient to self-motivation. The other two student participants agreed that *empeño* comes from within and that it means a strong desire that comes from within. However, all three student participants stated that the word "desire" was not at the same intensity as *empeño*. Another phrase Roberto added was *hechandole ganas* when referring to students who do not try to do well in school. *Hecandole ganas* means "to put or place effort" or "to try." He was referring to students who do not place any effort and therefore are not motivated to learn.

Roberto stated,

> In Mexico, I did not place that much importance on science. When I got here, I had no idea what they were talking about in my classes. I was told I had to take TAKS. A teacher helped me study. It took two weeks to learn enough topics to understand what they were taking about. Then, I studied on my own. I studied hard and it became personal. If you are to do something, you will do whatever possible to achieve that goal. This is something that you can develop. You can have a simple conversation with your parents and they will motivate you to do your best. They want what is best for you. Also, there was a speaker that came to our school. She had been a military officer. She grew up in a neighborhood called El Rincon Del Diablo, the devil's corner. She said that she now sends funds to that neighborhood so that it will improve. I want to be able to do that.

Juanita was asked specifically about science and self-motivation. She said,

> It is not for everybody, but yes, because I like science. If there is something I can do, it is science. I want to be an environmental engineer so that I can be of help to the world. Perhaps find a solution to global warming or alternative energy. Everybody is going to die, but I want to do something good before I die. Getting good grades makes me feel good. I am not competing with others, but I like to get good grades.

Nazario stated,

> The way I acquire this [self-motivation] is I put it in my every day. Every time I wake up until the time I go to sleep, I know that I have to keep on trying. Nothing in life is easy, you got to keep going for it and you got to strive to achieve it. You have to have the energy, that ability that is in you. No matter how bad your day is going, you have to; you just have to go for it.

Family Responsibilities

Students participating in this study had different degrees of responsibility to their families. Whereas participants did not have familial assigned duties or responsibilities, they all felt obligated to help their younger siblings with academic, extracurricular, and other activities. Student participants also felt indebted to, as well as grateful for, their parents' contributions to their education and well-being. They felt that once they complete their education, it will be their duty to pay their parents back, especially financially. Helping their parents as well as their siblings was also very important to them. These student participants want to perform at a high academic level to enable them to attain the higher education required, preferably in engineering, to obtain a rewarding career so that they can realize their personal expectations of a full, fulfilling life and providing financial support for their siblings and parents. They want to ensure their siblings' educational needs. They expect for their siblings, at minimum, to be as successful they themselves plan to be.

Roberto had a commitment to family. He stated,

> I know I have to take care of them [sisters]. As they grow up, I have to support them. When they enter high school, I have to provide support for them. My parents provided support for me, so I have to provide support for them. When I need help they provide everything I need. So I want to help them. So as gratitude, I want to give back whatever I can similar to what they have given me.

Juanita went on to say,

> Because my parents are in Mexico and we live with a guardian, my sister only has me to take care of her. I do everything in the house where we live with our guardians. I do everything for her. I want her to have a good life. I want to provide the best for her future. I want her to have the best education and the best experiences.

Nazario expressed,

> Academically, I have to figure everything out myself. For my mom, dad, and sisters, I am a source of their knowledge. I think my sisters see the way I am and the vocabulary I use and they want to copy me. I want to be a good brother to them because I don't want to lead them into a bad life. Once I get a masters and a doctorate, it is also important to help out my parents because they are the ones that supported me. Once my sisters are a certain age, I will back off and let them do things on their own. Whenever they need something I will be there to help them out.

Parental, Teacher, School, and District Support

The emerging theme is support. The subthemes are parental support, teacher support, school support, and district support. Each entity, parents, teachers, school, and district, help support students' high academic performance. In all three cases, parents provided financial and moral support. Parents had empathy and a desire for their children to succeed. In two of the three cases, student participants' mothers did not work outside the home. This allowed their mothers to provide parental care for their children's needs. In Juanita's case, both parents worked and lived in Mexico; as a consequence, Juanita and her younger sister lived in the United States with a guardian. In this case, the student did not have home support other than a place to cook, sleep, and do homework during the school week. Roberto's and Nazario's fathers worked as a truck driver and as an automobile mechanic, respectively. In all cases, parents struggled to pay for all of the family's financial needs. All three families had a household income of $28,000 per year or less, however, they did manage to pay for all educational and living expenses.

Parents allowed as well as encouraged their children to make decisions that affect their own future. Frequent communication between student and parent provides clear expectations for present and future at school and at home. In all three cases, the time schedule was almost always structured so that students would meet all sleep and nutritional needs as well as a supportive study environment. Two students had their own room at home. Juanita shared a room with her younger sister. However, Juanita and her sister, like Roberto, had a study area in their room, even if it was not furnished as such. However, Roberto and Nazario had access to other areas of the home to study. In both cases, the kitchen area was used. This was not a viable option for Juanita because of her living arrangement with guardians instead of parents.

Additionally, parents or guardians did not volunteer at school or in school-related activities of any kind. However, parents did provide frequent verbal support as well as the previously mentioned financial support. Students did not get financial rewards for good grades in any of the three cases. Parents did provide a car for one student, Nazario, even though, because of his undocumented status, he did not possess a driver's license. He drove to and from school. Roberto and Juanita walked to and from school, which was not a long distance.

Roberto discussed his parents' expectations of him:

> They expect me to do better than getting 80s. It is hereditary, my dad is intelligent and they expect me to be intelligent. My parents know I can do better. My parents do not contribute anything for my academic success. However, they provide everything I need and everything I request that I may need. My father sometimes helps me with projects. If I have any doubts, they will support me and they are willing to look for anything to help support me academically if needed.

Juanita stated,

> My parents allow me to participate in whatever I want at school. First of all, they let me stay here in the United States to go to school. I was able to go to Michigan to a robotics workshop. My

> parents paid for everything. They paid $500 for a plane ticket. My parents are in debt due to my education. However, they say that education is the best investments so they help me any way they can.

Nazario said,

> My parents, due to their support are responsible for my high academic achievement. They supply whatever I need for school. My parents always tell me to pursue myself, to keep moving forward, and they believe that my dreams will come true one day. My parents trust what I am doing. My mom tells me not to end up like them. She does not want me to be a mechanic like my dad. She wants me to prosper and have things that I can't have right now. I learned from my parents through my youth, they supported me, and taught me to do the right things.

Teachers provided guidance, tutoring, study areas, and resources for students. They had conversations that provided affirmative support, encouragement, and realistic rationales as well as the significance and consequences that are derived from students' high academic performance. In every case in this study, there was at least one teacher whom student participants credited as serving as a mentor, advisor, and/or tutor. At times these students felt a teacher served as an adult friend or parent by providing a shoulder to lean on when difficulties occurred. They credit these teachers, at least in part, for their high academic performance.

Roberto talked about teacher support. He stated,

> In reality, it's been them, teachers, mostly. Teachers pay attention to me at school because they know that I have the desire to succeed. There have been three or four teachers that helped. When I first got here I understood absolutely nothing. I would stay behind and they would explain everything to me in Spanish. After a while I started to understand English and now everything is normal. For example, there was an anatomy teacher. He would help me with everything. He would explain every single thing. I don't think it matters if he had been a female or if he was younger. What matters is that he wanted to help me and I wanted to learn.

Juanita enjoyed the benefit of a friendly teacher and mentor. She said,

> When I first came here, I did not have many friends. I was invited to a robotics meeting and I went. That is where I met the robotics coach and physics teacher. She was very friendly. She informed us about opportunities in science and robotics, including underwater robotics. She told us about engineering camps. I go there because she cares. It is like I don't have a mother here and she is there for me. Thanks to my physics teacher and mentor, I went to a microbiology camp at UTPA, an engineering camp at UT Brownsville, and I compete in UIL Robotics. Later I went to an engineering camp in Michigan, thanks to her.

The Green High School principal stated,

> If students have the right teachers and they push them and use the right language in the content, students will learn. That is how they pass their tests. We support and encourage teachers by giving them a common planning period.

School and district support was not an emerging theme based on student interviews. However, teachers and administrators delineated programs and initiatives that supported ELL students' academic performance. All three schools had afterschool programs to help students academically. Tutoring was offered 6 days per week. However, students interviewed did not attend these tutoring sessions. Teachers and administrators confirmed that tutoring attendance was minimal.

The Green High School teacher stated,

> We group students heterogeneously. Research shows that heterogeneous grouping is better for all students including Hispanic ELL student. We also have a program for limited English proficient students or ELL students. We also have TELPAS [Texas English Language Proficiency Assessment System] that involves listening, speaking, reading, and writing is a school and district wide program that helps these students. It is actually the law that we use ELPS [English Language Proficiency Standards] and every teacher has to have those strategies written on the board with their objectives. In science there are activities that students do not need any language to learn. They use

> electronic devices, such as the LabQuest provided by GEARUP, to do laboratory work. This motivates them.

The Green High School principal stated,

> I audit grade books and check lesson plans and if a student, especially ELLs are failing, I want to know why. What is the teacher doing different in the classroom. I will question them. I also bring students in. I want to know what is going on. All my teachers speak Spanish. There is no excuse. I use the TPR [total physical response] Method, whatever you have to do to make sure a student is learning in the classroom. That is why we have all those SIOP [Sheltered Instruction Observation Protocol] trainings. School District provides a budget just for LEP. We have programs such as *Rosetta Stone.* I will spend money on them. They are part of this school and everyone counts. But it's a push and we push and push and push to get them to succeed, because at the end, they are still accountable for passing any exams they need to graduate.

The Blue High School administrator also said,

> We have tutoring every day after school and on Saturdays. We have THEA [Texas Higher Education Assessment] and SAT classes. We have UIL; however, those are high achievers willing to work. This gives them a solid foundation because of the level of competition.

The Blue High School Science teacher added,

> We have computers with simulations to help them learn. We have nice library facilities that are open in the morning, all afternoon, and on Saturdays for them. We have more computers and we also have the Vernier LabQuest provided by GEARUP. They use the *LabQuest*, a portable computerized data collection system with data gathering probes, to do laboratory experiments.

Finally, friends play a small role in these students' high academic performance. Even though friends had some influence, though, parents were the most prevalent, long-lasting influence. Students, when encountering obstacles, revert back to their parental influence.

Nazario from Rose High School said,

> Parents are more important and how and where you were raised. It does matter who you hang out with. However, the people that are

> going to make you see the importance of good grades are your parents.

Self-efficacy

Participating students assumed their personal academic capabilities were on par, not necessarily better or worse than the capabilities of other students. These students' recurrent contact with teachers enhanced visualization of their own future attainments. They vicariously experienced these achievements by observing and interacting with these adult professionals. Teachers motivated these students to achieve academically through discussions and conversations. These conversations lead to greater efficacy and esteem, therefore helped students work harder and become more aware of the need for high academic performance.

Students were asked that if power was defined as how much control they had in the pursuit of their own future. Roberto stated that he had all the power in the world, and Juanita said she had all the power she wants. Nazario also stated he had all the power because he was in control of his own future. All three were certain of their individual success in the future, which included at least a bachelor's degree, but declared a desire to attempt acquiring at least a master's degree, and one student confided an aspiration to pursue a doctorate as well.

Socioeconomic Status

All three participants were from low-socioeconomic families. However, Juanita's parents were trained in laboratory science. Owing to their citizenship status, both parents work in Mexico and earn approximately $28,000 per year. In the other two cases, Roberto's parents' household income was under $28,000 per year, and Nazario's parents' annual income was less than $20,000; their parents' educational levels were less than high school. Roberto's and

Nazario's fathers' occupations are truck driver and automobile mechanic, respectively, and the other parents were stay-at-home moms.

The Green High School teacher stated,

> Socioeconomic status is not the single drive to academic success. We are 99% economic disadvantaged and we have some smart kids. I do think that a lot of the things that go on in low socioeconomic status homes are due to frustration and their situation. These things do deter.

The administrator at Green High School added,

> Socioeconomics does play a big important factor because some of the students have to work late at night and come in tired. Sometimes they fall asleep in class. That might take away. They are the only earners in the family and there are all kinds of multitude of economic problems. Yes it does play a factor, definitely.

Career Goals

All participating students had tangible career goals. They were all interested in science-related fields. Inclusive of all student participants, their career options included engineering. However, in one case, it was not the only choice.

Roberto stated,

> A student that prepares academically will have a better job. I want to finish college and have a good job. I want to work in a computer-based company because I want to be a computer engineer.

Juanita added,

> For me, I want to be doing research and discovering something that will help people. I want to go to a good university and for that I need good grades. Perhaps in environmental engineering so I can help the world with global warming or finding alternative sources of energy. I want to get a masters in engineering. I want my parents to be proud. I want to be somebody that did something good for the world, for the planet.

Nazario also stated,

> I have the dream to become a mechanical engineer. I want to get a masters and a doctorate in mechanical engineering. I am also interested in music. I want a career in music or I want to design cars. I like to be a leader. I don't like to let people down. In twenty years I might be leading people to do things or telling them what to do for a good cause.

Deferred Gratification

Delaying rewards and resisting a more immediate prize is deferred gratification. Usually the more immediate reward is smaller and of lesser consequence and not lifelong or life-lasting such as a good education. The immediate consequence of such self-control for these students was high academic performance. These students aimed for a good productive life, after a valued university education, a loving family, and the ability to help others with their accomplishments.

Roberto stated,

> My parents are going to give me a car once I graduate from high school. I could get it right now. However, I would need to get a job and that is not my goal. I would have to give up all extracurricular activities and that is not what I want to do. I will get the car and that will provide transportation to go to a good university and get the education I need to be successful. With a good education I can get a job with rewards that will help me provide for my family and my parents.

Juanita also said,

> If I want to get a good job, I have to be successful in school. I have to delay all rewards. On a daily basis, I think about playing video games. I don't have my PlayStation here, but if I did, I would have the motivation to do my homework first and then play video games. I would rather do homework than play video games. By getting good grades, I will be able to go to a good university. I'm thinking of University of Texas in Austin, Texas Tech, or

> Rensselaer Polytechnic Institute in New York. Because of my high academic performance, I was able to travel to Michigan and other places. So I know that I will be able to do well at any university so that I can get a bachelor's degree and then a master's in environmental engineering.

Nazario stated,

> My goals for the future are to graduate from college, have a good family, and be successful. No matter how bad off you are, you can be the poorest of the poor and you can still be successful through education. Education is power and education leads to money. A good reward for high academic performance in high school is being able to go to college. Since my parents weren't from here, I did not have the support. They showed me that it is better to suffer now than to suffer later.

Other Intrinsic Qualities

Intrinsic qualities, such as *self-motivation, self-efficacy,* and *deferred gratification,* have been noted previously. Students showed other intrinsic qualities that did not specifically fall into one of the previously mentioned themes, and these were grouped as *other intrinsic qualities*. These qualities were those internal to each individual. Opposed to intrinsic is extrinsic. These were qualities that categorically came from someone else, such as receiving financial payment for high academic performance. However, achieving a high academic status because the student wants it, because of his or her own internal reasons, is intrinsic. It may be that they love to learn, to interact with and please teachers and/or parents, and competitiveness, or they may feel as though it is the right thing to do.

The Green High School administrator stated, "Sometimes it's in them." They just want to be high academic performers. The administrator also attributed students' motivation as coming from parents.

However, Roberto stated,

> It is extremely important that I could be the first in my family to attend college and graduate from college. That is what my parents want, for me to have a great life. I want to have a college degree. I want to do well.

Juanita said,

> I know science is not for everyone, but I like it. Something I can do is science and I want to be an environmental engineer so that I can be of help to the world.

Extracurricular Activities

School-sponsored and -sanctioned activities are considered to be extracurricular activities. All three students participate in extracurricular activities. Roberto participated in varsity football, track and field, and mariachi band. He played several musical instruments, including guitar, xylophone, and marimba. The school administrator stated that Roberto served as football team captain and that he was a strong competitor in discus and shot put. Juanita was involved in UIL Robotics, UIL Science, mariachi band, and band. Musical instruments that she played included guitar and drums. She was the president of the Robotics Club at Blue High School. Nazario served as president the NHS at his school and was a member of the school band and mariachi band, playing the trumpet.

Student participants stated that extracurricular activities do not make a student better or improve students' grades. The students who are passing all their classes are the ones who want to participate. They maintain good or at least passing grades because they want to continue participating in these extracurricular activities. Failing students seldom join extracurricular activities, and those who do rarely improve their grades.

Roberto said,

> Not all students want to join sports. Students that want to participate will want to pass their classes. If they don't pass, they don't play. You have to find different activities for different students. These activities will motivate them to at least pass their classes.

Juanita is involved in several extracurricular activities. She said,

> I joined robotics because I didn't have many friends. I am now the president of the Robotics Club. I am also in NHS, UIL Computer Programming, and a member of the Society of Hispanic Professional Engineers [SHPE]. If you want to participate in extracurricular you have to have the grades. You have to at least be passing so that you can compete. Sometimes it is very hard for me to go home after eight or nine hours at school because I stay for robotics. I have to cook and do chores but I like it. It is worth it.

Nazario stated,

> Extracurricular activities do not make you a good student. Good students join school clubs and organizations. They are the ones that participate. There may be one or two students that improve based on extracurricular activities, but most are already doing well.

The administrator at Rose High School added,

> Students want to participate in extracurricular activities so that they can get out a bit. They want to go on field trips. They get excited about seeing something new. The mariachi band went to Austin. They were excited to compete and also noticed others that play guitar better than them.

Helping Others and Gratitude

In this study, all three case participants stated the desire to help others. Primarily, they were strongly committed to providing for their families. All three student participants were grateful for the sacrifice their parents made to help them through school. They felt a need to pay their parents back. In addition, there was a sense that besides obtaining a job that pays well, they want to do something that makes a difference. First of all, as previously stated, they were

committed to helping their families. This includes parents, siblings, and future spouses and children. They also wanted to do something important in their work. They wanted to do something that will help others and/or something important to society. Juanita was the most committed. She wanted to help solve global warming and/or develop alternative energy sources.

Roberto stated,

> First of all, I would like to have a good job that requires a college degree. I will help my family economically and hope that everybody in my family from my age down will get a degree. Another motivation is that I want to be somebody in life. Finally, I want to help my parents. I want to be able to help my parents and my sisters in the future. They help me with everything I need. So I want to help them. It is gratitude. I want to give back whatever I can.

Juanita added,

> I want to do research and discover something that will help others. I also want to help my sister. I am responsible for her and for myself. I am responsible for my studies. I want my sister to have the best education and the best experiences. I want to be an environmental engineer. I think this will be very important in the future because there is the greenhouse effect and so much pollution and we are not taking care of our resources and we're destroying forests. We have to do something about it. In order to help other students, they need to hear stories about others like them that have achieved. That will help them see what they need do to be successful.

Studying

Good grades may be perceived as a result of studying, and the more time a person spends on a topic, the more proficient and knowledgeable the person becomes in that topic. Students in this study had the distinction of high academic performance. In all cases, students did not attend afterschool or weekend tutoring and did not spend a lot of time studying. When they do study, it

was at home, at the library in one case, and/or in a selected teacher's classroom. As a resource, they often used a willing and knowledgeable teacher.

Roberto stated,

> I worked hard when they told me about TAKS. I studied and studied and studied because in Mexico I never placed much importance in science. I like to get good grades. For my classes, I study about one hour per week. At home I usually study in my room and at school I study in the library. Other students study less than I do because they have known English longer than me and it is easier for them. Since I have learned more English it is easier for me to maintain high academic grades. Those that try harder will get better grades. If you have *empeño* you will succeed.

Juanita also stated,

> I study about two hours per day up to three hours. I study in my bedroom at home with my sister. At school I go to the library just to go. I am very dedicated and I always do my homework. Those that do not get good grades have other interests and don't want to be in extracurricular activities. I like playing video games, however, I feel bad because I need to do my homework first and then play video games.

Nazario said,

> I study two hours per day, five days per week. I study ten hours per week. At home I study in my bedroom. At school, I usually study in one of my teacher's classroom. She helps me a lot. She helps me in any subject. Whatever I need, she is always there.

Academic Ability

Students perceived themselves academically to be at a comparable level with other students. In all cases in this study, students did not consider themselves better or worse than other students. Students from Blue High School and Green High School stated that students who knew English well had an advantage. However, these case study participants' focus was a desire to perform at high academic levels on every task. This focus provided the motivation to

overcome any deficiencies due to language, status, or any other circumstance. They had proven to themselves and others that they were able to learn and be successful. However, they felt that, just like learning English, it is incremental or a one-step-at-a-time type of learning. They knew that they mastered some concepts. If they encountered difficulties learning other concepts, they were not deterred from their motivation to learn. Because of their academic experiences, they are persistent.

As students have good experiences, they become positive, and that increases their efficacious ability to learn. Roberto stated,

> In reality, something that I just learned is that I can recall things very easily. I can record in my mind what I study. The more I study the less I forget and I will always remember it.

Owing to her situation, Juanita encountered some difficulties taking a college-level class. However, she overcame that situation. She said,

> I was taking a very rigorous course. It was U.S. History. I am not very good in that. My grade was 96 at the end because of all the effort I put into it. I got kind of sick with muscular spasms due to all the stress. It is too much, being single and doing everything for two people.

Nazario stated,

> I have the same amount of work as other students. However, some may not be motivated due to their parents, friends, and drugs. They get tired of school and think it is boring. You have to have the ability to want it.

Self-esteem

Students in this study had healthy self-esteem. They assumed to be different than other students because of language, culture, and attitudes toward everyday events. However, they did not presume to be any less capable or of lesser worth than any other student. Their proof is

academic performance. Nazario had adjusted well to the dominant school culture and had lived in the United States the longest. Of all the cases, he is the only study participant without U.S. legal residence status. He demonstrated leadership qualities as NHS president and in band. Roberto had adjusted well with friends and activities. However, he was worried about his speaking accent. He spoke Spanish with friends and with teachers whenever possible. He was also a leader. He served as captain of the football team. Juanita was somewhat isolated and did not have many friends. However, many students knew who she was and said hello when passing by her at school. She was also a leader and served as president of the Robotics Club. All three students were in excellent standing academically at their schools. Nazario stated that he liked being at school and that he spent more time at school than at home.

Learning English and Language Barriers

Hispanic ELL students encounter many barriers. Language acquisition is necessary for learning in school. Not knowing the language used in the classroom creates learning disadvantages. In science, concepts often build on previously learned concepts, so a student may accrue a backlog of unlearned concepts. Expectations may be lowered for these students in an effort to raise their proficiency in the English language. English proficiency usually means conversational English and not scientific terminology, which is needed for scientific conceptual development. When translating content, in an effort to improve language, science concepts are simplified and underlying meanings are overlooked.

All students in this study spoke exclusively Spanish at home with parents and siblings. Roberto and Juanita spoke mostly Spanish with friends at school as well. Nazario spoke mostly English with his friends at school. All parents spoke Spanish exclusively. However, Roberto's father, as a truck driver, travels and did know how to get by with limited English. He never

spoke English at home. They all communicated totally in English with teachers at school. When they encountered other staff members, such as cafeteria workers and custodians, they spoke Spanish exclusively. Roberto and Juanita have an accent. Their English was understandable. Their word usage was good, and pronunciation was easily understandable, however, tense on occasion was incorrect.

Students with accents are often considered to be unable to learn. They are often viewed as less intelligent compared to other students and are often made fun of. Roberto stated,

> Due to my accent, it is embarrassing to speak English. Sometimes my words get away from me and I don't pronounce words very well. That is kind of embarrassing. I even make fun of myself sometimes. When I first got here to the U.S., I was to enter as a sophomore. Instead, due to my English, they put me in ninth grade.

Juanita, as she learns English better, wonders why others do not use proper English. She stated,

> I see many persons misuse English. They speak bad words, not only in English but also in Spanish. I really don't like that. Its culture I guess. I think it is important to speak correctly. I am here because I wanted to come, not because my parents wanted me here.

Nazario stated,

> There is a bias against language. People just disagree with Spanish, but they don't know that Spanish is more efficient and more complete than English. There are accents in Spanish so that you can pronounce words exactly as they are meant to be pronounced. In English you think a word is pronounced a certain way, but it is not. The name Sean is a good example.

The Blue High School administrator stated,

> Language is not necessarily a failure or success. I see that these kids can achieve and later in life you see them as very successful individuals. Language is just a way to communicate. It becomes a barrier in schools because we test in English.

The Green High School teacher indicated that most ELL students are not successful. He said,

> I act out everything. I can't give it to them in Spanish so we have to act it out and draw it. We have so many stage plays so that they can act it out to get the concept. They really appreciate it but the reality is that no matter if the teacher is Spanish speaking or not, these kids (ELL) are not succeeding. There was a physics question, "the ball went off the cliff." They didn't know what cliff was. If you want to have someone to be able to function and work more successfully in the United States, they need to have the context around the language.

Extrinsic Motivation

Students in this study did not receive monetary benefits for high academic performance. However, they did get motivating praise from parents and teachers. Once in a while they got recognition at school. Whereas they admitted to feeling good to get these types of external stimuli, it was not the reason they functioned at a high academic level.

Other than school recognition, the only external motivation uncovered in the interview process was with Roberto. He stated,

> I have gotten reward and recognitions at school. However, my parents promised me a car for graduation. I will use it for college. Getting a car can be motivation for some to try harder in school. Just thinking about it helps me get motivated to get good grades. I get good grades anyway. There are other ways to motivate students. Get speakers that came from similar background as students and they can tell about their experiences. That will give *empeño* to students.

Teaching Methodology

Each teacher possesses a unique style of teaching. However, school districts provide teacher training in an attempt to increase high academic performance. In an effort to address the schools' academic problems with ELL students, school districts encourage and sometimes

obligate teachers to use certain teaching strategies, activities, and programs. Some of these programs include teaching strategies such as SIOP. Computer-based programs, such as *Rosetta Stone*, *Plato*, and *Study Island,* are also used. Blue High School had several of these programs, which targeted all students, not just ELL students. These programs were housed and managed in the school library. Administration stated that they encourage ELL students to use them. However, the student interviewed from Blue High School stated she never used the programs and was not familiar with them.

Teachers were also encouraged to differentiate instruction. They were asked to use different methods and media to teach. At Blue, Green, and Rose high schools, teachers were required to write content and language objectives on their boards. Teachers also used different methods to ensure all students participated equally and at random. Some teachers had a deliberate participation structure to allow all students access to class involvement.

The Blue High School administrator stated,

> We are hoping that teachers look at the objectives and say "exactly how am I going to address language today." It is not just the content, but the language that requires teaching and learning. Teachers have to be cognizant that students are reading aloud, allow them to communicate in the classroom, have discussions, and make presentations.

Roberto stated,

> It is better to do different things each day in class. For example, one day we may read, the next we may do a lab, and the following day we may have worksheets. We need to have different ways of doing things.

Music

Students in the three case studies were musicians. Roberto played guitar, marimba, and xylophone. Juanita played guitar and drums. Nazario played trumpet. All three students played

with the mariachi band at their respective schools. Juanita and Nazario played with the school band as well. Delia from Brown High School, who withdrew from the study, was not in band and did not play any instruments. As in extracurricular activities, high academic performing students may be inclined to play musical instruments and join band. Music, like other extracurricular activities, may not necessarily assist in improving academic performance.

Nazario credited music, at least in part, for his high academic performance. He inferred that discipline, as well as a definite measure of right and wrong in music, contributed to high academic performance. He stated,

> It is easier to learn if you play music. Not just because you know how to play, but because you learn discipline and have to read your notes. They are not going to let something wrong slide. You have to play right. The way I see it, you have to do your work at school right also. Music helps knowing how to do things right. It helps because you are more than one thing at once. You are analyzing, playing, looking ahead, moving your fingers, moving your feet, and you are also keeping beat. So you are multitasking just by playing.

Students' interviews generated several themes, as shown in figure 5 below and expounded on earlier. However, the teachers' and administrators' interviews produced fewer themes and more explanations of each theme. New themes were not identified in the teachers' and administrators' interviews.

Cross-Case Analysis

The cross-case analysis was limited to three student participants. Delia, even though some data were obtained, was not interviewed. Therefore, the analysis is primarily based on three cases, Juanita, Roberto, and Nazario. In all three cases, student participants were seniors in three different South Texas high schools at the time interviewed. This cross-case analysis sought to identify factors that contributed to Hispanic ELL students' high academic performance.

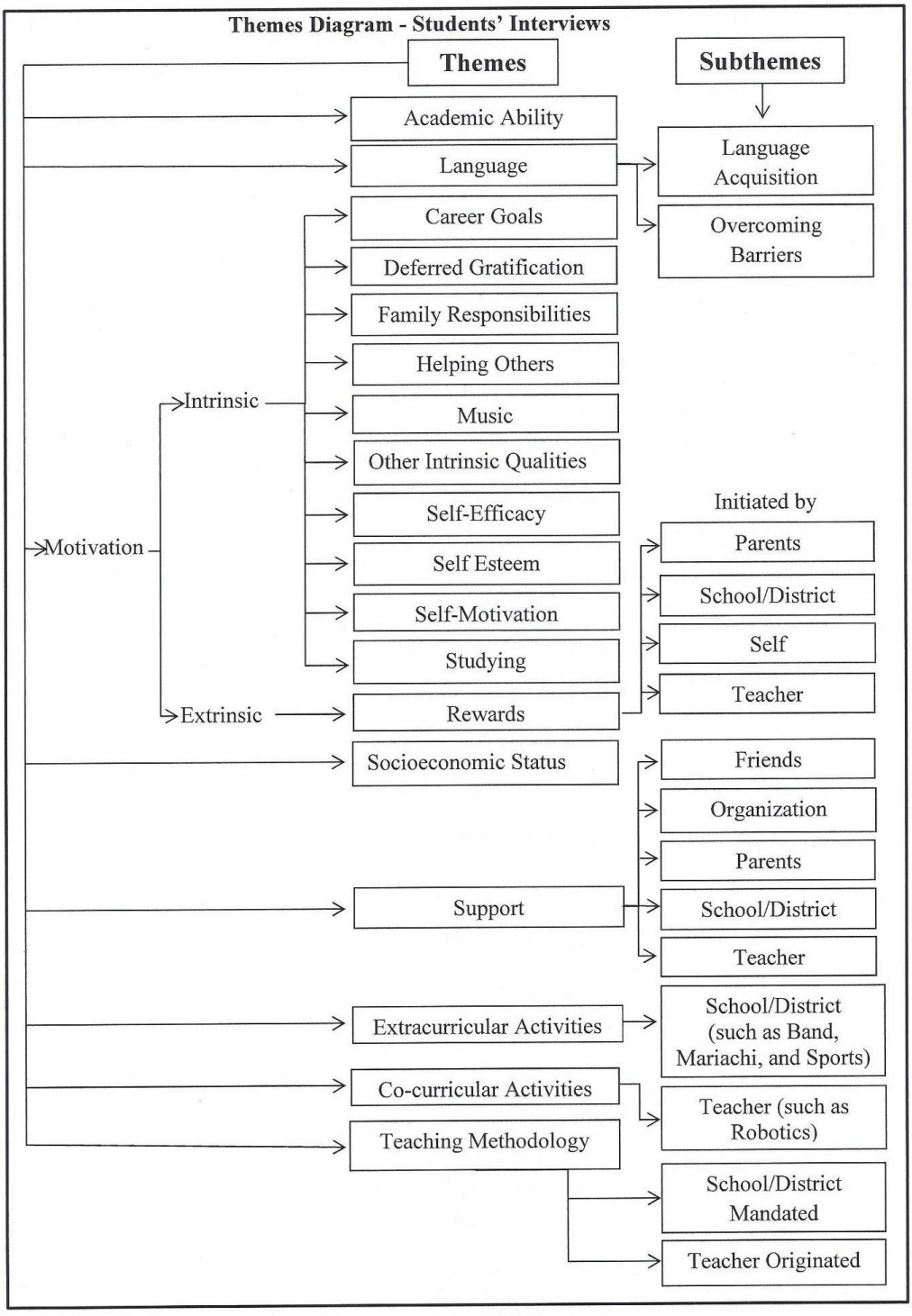
Teacher and administrator interviews were used to add to the students' case studies as well as to further examine data from students' interviews. Transcripts from all interviews were analyzed and are discussed in this section.

Intrinsic Qualities

High school student participants considered intrinsic qualities as fundamental to high academic achievement. Students will not realize good grades and successful course completion unless students deliberately work toward those goals. The main intrinsic qualities included self-motivation, family responsibility, parental support, helping others, and self-efficacy.

Other themes or factors were uncovered in students' interviews. Extrinsic motivation was exposed in only one case. Roberto was looking forward to receiving a car after graduation from high school, however, that was not a determining factor in his high academic performance. He stated that other students may be motivated by extrinsic rewards from school or parents. Figure 5 denotes themes and subthemes identified during data analysis of the interviews.

Figure 5. Themes Diagram from Student Interviews



Self-motivation was the most cited theme among the three cases. This stands true individually as well as paired or collectively for all three student participants. Even though Juanita specified that her responsibilities to family, especially to her 13-year-old sister, was the primary factor contributing to her high academic performance, the data exposed self-motivation as an additional vital factor.

Family responsibility was also a crucial factor when all three cases' data are combined. Interview data from Roberto at Green High School indicated that other intrinsic qualities, in addition to self-motivation, contribute to his high academic performance. Self-motivation was not enough according to the data. In his estimation, a student has to want it. A student has to have *empeño,* a strong desire to work, study, and learn to achieve. Data, as well as the perception of Nazario at Rose High School, indicated that parental support was another important factor that contributed to high academic performance. He stated that parents are the ones who guide their children. They nurture and support good habits and talk, give advice, and communicate expectations.

Another vital factor, based on data from interviews, was parental support. Support can originate from the school, the district, parents, teachers, friends, or organizations.

Roberto at Green High School said that teacher support was essential to high academic performance. He stated,

> Very often it happened that they were teaching and when I first got here they would talk and I would understand absolutely nothing. After they finished I would go talk to them and they would explain everything to me in Spanish. After a while I started understanding English. Now it's normal. There was one teacher in anatomy. Two weeks before the exam, the teacher would prepare us. In those two weeks I learned plenty. In reality, I did not have a good idea about science, but with that teacher, I learned a lot.

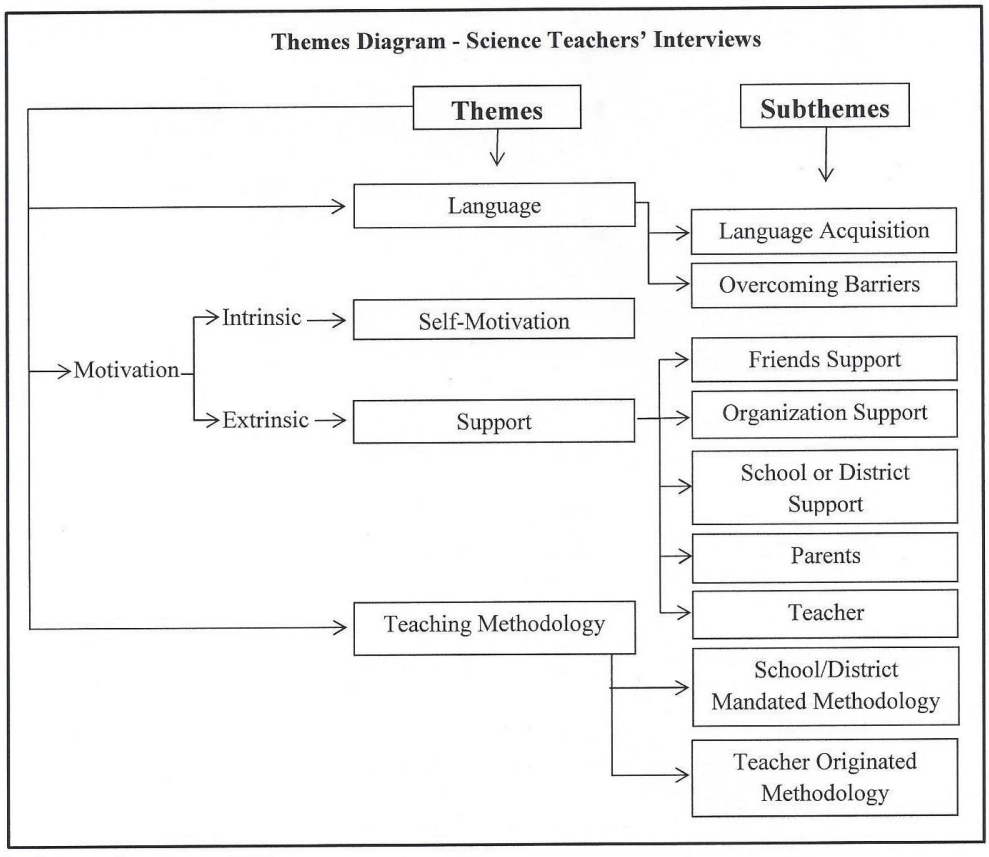
Juanita stated,

> When I came here I didn't have so many friends. When I joined robotics, she [physics teacher and robotics coach] was very friendly to me and then she also talks to me about some opportunities in science and robotics. That's how I went to robotics camp in Michigan, microbiology at University of Texas Pan American [UTPA], and engineering camp at University of Texas at Brownsville.

Language Acquisition

Two of the three teachers interviewed indicated that language was the most important factor, and the Green High School teacher indicated teaching methodology as the most important factor that contributes to high academic performance. The teacher stated that if we as teachers do the right thing, students will learn.

Figure 6. Themes Diagram from Teacher Interviews



Students noted that intrinsic qualities are by far more dominant for high academic performance. Teachers also identified self-motivation as an intrinsic factor or theme that is imperative for Hispanic ELL students to possess for high academic achievement. Teachers identified themes that place more responsibility on themselves, as opposed to student participants' interviews, which allocated the responsibility for high academic performance to students.

The Green High School science teacher stated,

> We are 100% Hispanic and economic disadvantaged and have a lot of ELLs. Hands-on is universal. A student that doesn't speak the language can use the devices and because they are more tech savvy and a lot of us aren't. That's one thing the helps motivate them.

Support and Language Barriers

School administrators' and teachers' interviews indicated that the most prevalent contributing factors to high academic performance were district support and overcoming language barriers. Both factors are inherent contributors to high academic performance. It is important to note that students generally take for granted what has been built in the past, such as school buildings, educational and extracurricular programs, and teacher training. They are generally unaware of budget restraints, federal laws, policies, and rulings that affect them directly. From students' point of view, school districts' student support goes virtually unnoticed. However, districts fund programs that students value, such as sports, music, and academics. Continued funding for these purposes is essential for students' high academic achievement (Gingiss & Boerm, 2009).

Two of three administrators stated that school district support was a central contributor to high academic performance. District support includes programs such as computer-based

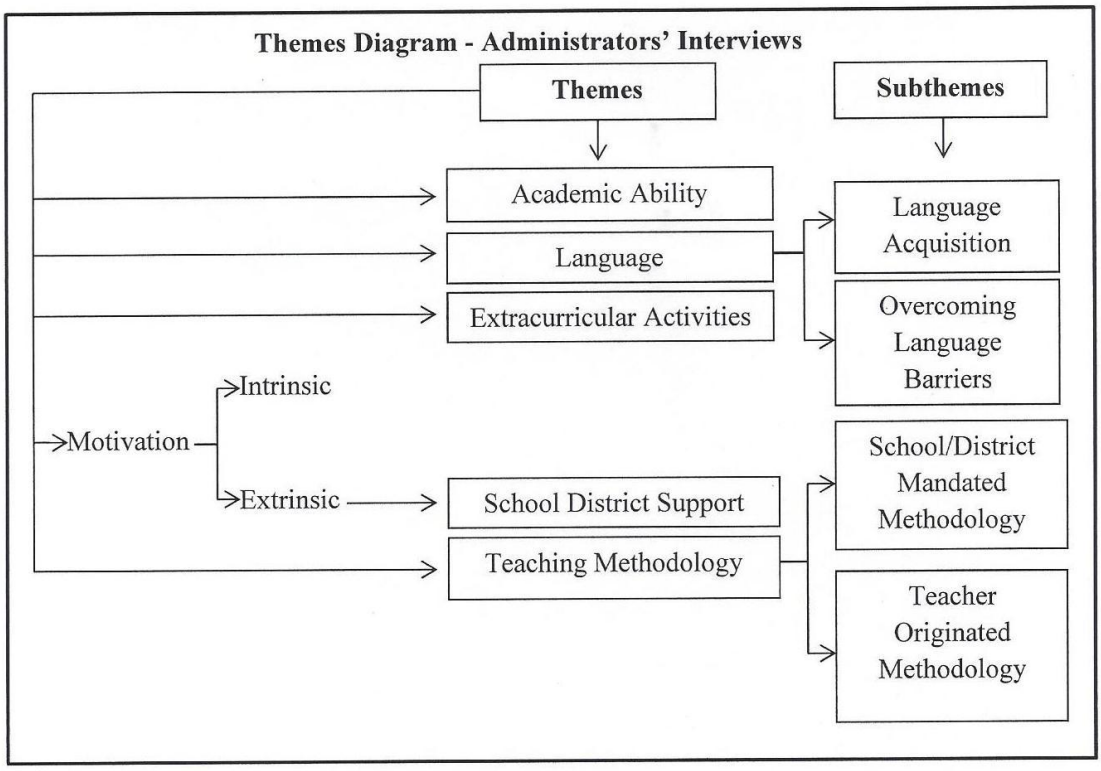
learning, development of pertinent curricula, and language learning assistance. A third administrator indicated that overcoming language barriers was imperative for high academic performance. Language barriers are different than learning English. Students may learn conversational English but may lack subject-specific terminology and therefore may not pick up on context clues or dual word meanings, or there may be a cultural dissimilarity that presents an obstacle to learning. Students must have conceptual fluency as well as knowing the language. Students who have demonstrated learning ability in academics can achieve high academic performance.

The Blue High School science teacher stated,

> Initially, language will create a knowledge gap because of language barrier. Once they pick up the language, they are like any other student, you are going to have those that struggle and those that pick it up very fast. If you are talking strictly from a language perspective, those that have a higher level of fluency in their native language achieve greater success. They make the transition faster.

At Blue High School, the administrator indicated that the district-initiated curriculum was also a vital factor. The administrator at Green High School specified that teacher-initiated teaching methodology was the most important contributing factor. Rose High School's administrator indicated that overcoming language barriers was among the most important factors. Additionally, the administrator at Blue High School indicated that curriculum was important, and the teacher's data at the same high school indicated that mastering the English language was important. The Blue High School teacher presented the curriculum as the second most important factor contributing to high academic performance.

Figure 7. Themes Diagram from Administrator Interviews



Summary of Findings

Students,' teachers,' and administrators' views of contributing factors to high academic performance are distinctive. Each of these entities, students, teachers, and administrators, contemplates its own experiences and resources on which to base their conclusions. Administrators and teachers are genuinely looking for solutions to complex phenomena. Improving academic performance of ELL students is critical in the U.S. economy. The increasing number of Hispanic ELLs will give rise to major problems in this country. A lack of education will result in lower household income. Therefore, the increasing number of aging and low-socioeconomic-status individuals needing services, added to the lower earning capabilities of the general employable population, will lessen the tax base per capita. As a result,

governmental entities will not be able to provide services at current levels. Science teachers and administrators urgently struggle to implement the best teaching methods and school district programs to ease the problem of ELL students' low academic performance. If teaching methodology or school district programs worked as stated by these educators, ELL students would be academically high performing in larger numbers.

Every educator aims for students to maintain a high level of academic performance. It is obvious that not mastering the English language hinders learning opportunities for ELL students. Schools and districts, as per teachers' and administrators' interviews, are well aware of ELL students' academic performance.

School administrators stated that the school districts were the essential element for ELL students' high academic performance. However, teachers did not. Teachers, as well as administrators stated that teacher-developed teaching methodology was an essential factor contributing to high academic performance. Students agreed that teaching methodology is important and indispensable; however, students' intrinsic motivation or self-motivation is requisite and fundamental to high academic performance.

Administrators and teachers find it is less demanding and less complex to regulate and improve academic performance by relying on a minimal amount of factors. It is also more manageable. This is evident by comparing the three themes diagrams in this chapter. In addition, administrators and teachers, as experts in their fields, perceive that they know students' needs and reason they should be able to find solutions to any deficiency in student learning. Therefore, their perception is that they ought to have solutions to all problems in their schools. They focus on factors that they perceive to be within reach. In some cases it does help, especially teacher-instigated teaching methodology. Student interviews also revealed that

teachers are an important part of high academic performance. Their support, teaching methods, and willingness to help are crucial for high academic performance.

Students in this study portray the solution to ELL students' high academic performance as a complex phenomenon. Again, this becomes evident based on a comparative view of the themes diagrams. However, these students feel that intrinsic qualities are what formulate their performance at the highest academic levels in their schools. These students offer some suggestions as to how this can happen with other ELL students.

In the following chapter, a summary and conclusions are presented. In addition, it also proposes recommendations for future research and rationalizes implications of this study. For educational practitioners in key roles, suggested actions for implementation are stated.

CHAPTER VI

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to identify, discover, uncover, examine, and document factors that contribute to Hispanic ELL students' high academic performance in high school science in the Rio Grande Valley of Texas. This was a multicase study, where four students were selected from different high schools in the Rio Grande Valley of Texas. However, one student withdrew in the early stages of the study, and therefore this is a three-case study. Additional participants in this study were one school administrator and one science teacher from each of the selected high schools.

Statement of the Problem

Few studies have investigated Hispanic ELL students' high academic performance, especially in science. This study focused on that problem. According to the results of TAKS, the state exit test, Hispanic ELL students have low performance rates every year. Hispanic ELL students also show the greatest population growth (TEA, 2009, 2010b), and Hispanics will be the majority by at least 2040. Hispanics are currently the least educated of students and possess the highest dropout rate in Texas (Murdock, 2007; Murdock et al., 2003).

If Hispanic ELL students do not perform better academically, the status of the United States as a world power will be threatened. The demand for low-skill, cheap labor continues to attract additional Hispanic immigrant families into the United States. This leads to lower overall earning power among Hispanics and thus economic inequality, which will translate into reduced

tax revenues per capita, therefore creating the biggest economic challenge facing America in its history (Parrado & Kandel, 2010). The United States will no longer be able to provide defense around the world and will lose its service and technological competitiveness (Parrado & Kandel, 2010).

In this study, I proposed three research questions:

1. What school or district programs, whether extracurricular, co-curricular, or curricular, identified by selected South Texas Hispanic ELL students, contribute to ELL student academic performance in science?

2. What intrinsic factors do selected South Texas Hispanic ELL students identify as contributing to academic performance in science?

3. What other factors do selected South Texas Hispanic ELL students identify as contributing to their academic performance in science?

Summary of Findings

Research Question 1

The following is a summary of findings as they relate to Research Question 1 of this study: What school or district programs, whether extracurricular, co-curricular, or curricular, identified by selected South Texas Hispanic ELL students contribute to ELL student academic performance in science?

Extracurricular activities. Schools and school districts implement a variety of programs to educate students. Some of these programs support and improve high academic performance. Many are extracurricular programs such as sports and music. Co-curricular programs include clubs and competitions such as UIL Robotics and UIL academic competitions

in a variety of subjects, including drama and career and technology education (CATE). Teachers as well as districts implement strategies and methodologies to improve academic performance among Hispanic ELL students. However, students stated that teachers more than administrators made a difference by the way they teach and by supporting students by translating words and concepts as needed. Teachers serve as mentors for these students. It is the teacher chosen by the student who is more effective. The student feels comfortable and has confidence that the teacher has the student's interest in mind. One district had a mentoring program in which the student stated it was where he went to do homework, and everyone else wasted time.

As stated by Nazario, many good students with excellent academic records participate in sports and band. However, Juanita and Roberto, two of the three students interviewed, stated that good students join these extracurricular activities and already aim for high academic performance. They added that students who are unmotivated academically, in general do not participate in extracurricular or co-curricular activities because of failing grades and lack of interest. However, one of the interviewed students said that allowing students to choose which extracurricular activities to bring into the school would motivate lower performing students to raise their grades to participate.

Co-curricular activities. These activities or courses are more aligned to the school's curriculum. They afford an enormous benefit to students academically, to their self-esteem, and toward their career explorations as well as goal setting. These activities, such as robotics and other UIL academic competitions, motivate students to perform at higher academic levels. Students gain knowledge without the pressure of academic assessment, and it is enjoyable and exciting for them.

Students who are willing to participate in extracurricular or co-curricular activities may raise their grades so as not to risk failing and thus being unable to participate. The self-selection of students into curricular, co-curricular, and/or extracurricular activities promotes a culture of enriched academic achievement. In addition, some of the co-curricular and curricular programs develop and mature students' ability to visualize an academically enriched path, leading to high levels of learning and university degree attainment.

Music. These programs were advantageous to high school students. Nazario stated that any music program provides students with immediate feedback on their performance, which carries on to other parts of their lives, including academic performance. He added that music programs provide contact with professionals who are committed to students' learning and expert performance. In some cases, the brutal honesty of erroneous performance serves to strengthen students' character and allow them to overcome their weaknesses, thus nurturing their self-esteem and self-motivation.

Teaching methodology. Students, teachers, and administrators identified teacher-initiated methodologies in the classroom as an important factor that contributes to high academic performance. For the most part, students do not eagerly accept school district–mandated or one-size-fits-all methodologies. Teaching methods or strategies have to be an integral part and within the scope of the teacher's expertise and lesson delivery mechanisms so that students will feel comfortable that the teacher is totally committed to teaching using that methodology (Jones & Chen, 2012). Teaching has to come from the teacher's own intrinsically valued methods. Roberto felt that some teachers are willing to place their soul, hard work, and full commitment on the table so students can learn. If teachers are told what to do and how to do it, students may

interpret this as the school or district assuming that teachers have a lack of commitment to lessons and teaching and therefore it is not worth investing time and effort into learning.

Academic ability. Students' academic ability is an important factor that contributes to high academic achievement, according to teachers and administrators. However, high academic achieving students felt that, in general, everyone has similar levels of academic ability. This ability can be developed if one devotes time and effort. Determining uses for knowledge conveyed in the classroom during instruction, especially future uses, will strengthen academic ability. If the student determines that there is a need to learn any concept, the student will learn enthusiastically.

Learning English and language barriers. The faster students acquire the English language, the less effort it takes for ELL students to learn. Teachers and administrators identify language acquisition as one of the most important factors contributing to high academic achievement. Schools place computer-assisted learning programs in their libraries and computer laboratories for student use. The student participants did not identify this as an important factor. They know the importance of not just learning English but learning English as well or better than native English speakers. However, these students do not see it as an important factor because they are certain that they are on track to mastering the English language, and they do not allow language to impede learning.

Language barriers are more difficult for students to overcome. Teacher expectations are often lowered for ELL students in an effort to raise their proficiency in the English language (Estrada, Gomez, & Ruiz-Escalante, 2009). When translating, content may be simplified to the point that the proficiency of science concepts is lost. Additionally, students with accents may

not want to expose themselves to ridicule from other students or themselves and therefore will not practice speaking in English, further obstructing learning.

Research Question 2

The following is a summary of findings as relating to Research Question 2 of this study: What intrinsic factors do selected South Texas Hispanic ELL students identify as contributing to academic performance in science?

The students expressed several intrinsic factors, or themes, that contribute to high academic performance in science.

Self-motivation. In all three case studies, self-motivation was a primary factor contributing to high academic performance in science. Students are motivated to perform academically when they think about their future and how they can achieve a good life. Additionally, *empeño* was identified as a key ingredient to self-motivation. *Empeño* is an intrinsic quality, which means a deep-rooted or burning desire to succeed or accomplish a goal. Another phrase was *hechandole ganas* when referring to students' need to work toward a goal. *Hecandole ganas* means "to put or place effort" or "to try." *Hecandole* is "to put in" or "to place into." *Ganas* means "to want" or "to desire." *Empeño* is the intrinsic quality, and *hechandole ganas* is the action taken to achieve a goal. In this case, the goal is high academic performance in science.

Family responsibilities. Participating students considered their responsibilities to parents and siblings as a fundamentally indispensable obligation as a member of the family. In two of the three case studies, parents did not have the background to help their children academically, and none of the parents mastered English to assist with students' classwork. In the other case, the student lives with a guardian who lacks an educational background as well. In all

three cases, the student participants felt obligated to and desirous of helping their younger siblings academically and otherwise. It is imperative that students have genuine responsibilities that help others. Having responsibilities, such as tutoring younger students, on which these younger students' performance depends, will help them comprehend the consequence of high academic performance as well as being responsible individuals in everything they do.

Self-efficacy. Participating students' perceptions of their future were a vision of achievement. Students must be able to see their capacity to produce a desired result through high academic performance in science. Ideally, students viewed employment, family, and ability to influence change in the world around them by participating in solutions to significant problematic challenges. Teachers must have frequent and sincere conversations with students about a variety of topics. These conversations lead to greater efficacy and therefore help students work harder toward high academic performance in science.

Career goals. Students need explicit career goals so that they can navigate through a specific plotted avenue. This will enable students to use high academic performance as a core basis to realize those goals.

Deferred gratification. It is imperative for students to envision attaining more valuable rewards by forgoing immediate compensations. Students must be impressed that lifelong rewards are attainable, more valuable, and manageable with effort and determination. The immediate consequence of such self-control is high academic performance in science. The rewards for which these students aim are a good productive life after a valued university education, a loving family for whom they can provide, and the ability to help others with their accomplishments.

Helping others. In all three cases, participants stated a desire to help others. Primarily, they were strongly committed to providing for their families. They were grateful for their parents' contributions to their lives. They helped their siblings academically, with child care, and their parents with other needs they may have had. Second, the participants wanted to have meaningful employment where they could find solutions to important, pressing problems to benefit society.

Self-esteem. The three students in this study's cases had a healthy self-esteem and were high academic performing students. Teachers and administrators can help raise students' self-esteem by providing students with meaningful responsibilities and providing the skills to successfully meet them. Teachers and administrators can help provide students with a safe and positive environment while at school. Administrators need to provide a positive and professional work environment for teachers. High academic performing students are involved in extracurricular and co-curricular activities. These activities are scheduled by administrators, teachers, or student leaders. These activities reinforce formal time organization skills and provide students with the opportunities to improve time allotment skills. These skills transfer to other activities, which results in the students following daily schedules, an essential ingredient for high self-esteem. This was a quality in all three cases in this study.

Studying. Even though students in this study did not attend tutoring, they studied as needed. All students need to learn how to study. It is difficult to impose minimum study time limits, but students should have the skills to study as needed. Once students possess study skills, they have the opportunity to experience success. This success can contribute to improved academic performance.

Other intrinsic qualities. Students possess other intrinsic qualities that researcher did not detail in this study. Each student is different and has individualized intrinsic qualities. Some students may be competitive with a friend or with everyone else or with himself or herself, or it may just be the right thing to do. Districts and school administrators, as well as teachers, must develop methods to explore students' intrinsic qualities and use those to help students' self-motivation. For this to happen there must be more communication between educational professionals and students, individually and in small groups. Teachers need to give students respect for their views and allow them to change their minds at their own pace. Speakers, presenters, and field trips to provide positive learning experiences will galvanize students to realize their potential via high academic performance in science.

Research Question 3

The following is a summary of findings as relating to Research Question 3 of this study: What other factors do selected South Texas Hispanic ELL students identify as contributing to their academic performance in science?

Parental support. As stated by student participants, parents provide clothing, shelter, and other financial needs. Parents do not need to pay their children for good grades. They did, however, communicate positive verbal and nonverbal affirmation for high academic performance. In all three cases, parents had empathy and a genuine interest in their children's achievements in activities, with emphasis on high academic performance. They provided verbal pictures and career goal suggestions for their future by obtaining a solid academic background.

In all three cases, parents promoted good decision making by allowing their children to make choices that affect their own future. Frequent communication with student participants allowed parents and child to clearly understand what was at stake as well as expectations for the

individual at home, at school, and in the future. Students in all three cases had a structured daily schedule. Parents should encourage the use of time organizers so that students will have structure and should nurture their children's academic, physical, and nutritional needs. All three student participants had a study area at home. It was not necessarily ideal in these three cases, but they did have an area to study. Parents must also afford a supportive study environment at home.

Teacher support. In all three cases in this study, students stated that next to parents, teachers were the most influential in their lives. Teachers should have high expectations and academic rigor for all students. Study participants, mainly administrators, stated that the more professional, knowledgeable, and informed teachers almost always perform more effectively. Teachers should grow professionally through university coursework, research, or continuing education to improve in the knowledge and skills needed to be an effective instructional leader. Teachers should study student learning and outcomes to be able to target every student's academic needs. Instruction must be varied, and expectations and grading must be clear. All classroom policies must be fair and constructed with the expectation that all students will perform at as high an academic level as they are capable. They should genuinely believe in students' abilities and capabilities. Respect for students as individuals is a necessary ingredient for students' self-esteem, self-efficacy, and learning. Instruction should be well prepared, designed, and organized for high-quality teaching and learning. Learning objectives should be specific and clear. Assignments in or out of class should be meaningful and related to learning objectives.

Finally, teachers should foster genuine positive relationships with professionals but also, more important, with students. Teachers are role models, even when not expected, and must be willing to be mentors to their students.

District and school support. Districts and schools need to foster a collegial atmosphere to provide better teaching and learning activities. Students, parents, teachers, and administrators are not competing for authority. High academic achievement is a team effort. Administrators must respect teachers' abilities to teach. Collegial collaboration needs to occur without threat, coercion, or fear of a negative judgment or appraisal. As problems arise, schools should seek clear solutions to achieve well-defined aims and goals for high academic performance.

Other Findings Related to This Study

The number of Hispanic immigrant students is increasing (Murdock, 2007). Many come to the United States with limited English language skills, thus increasing the number of ELL students in South Texas schools. In an effort to meet AYP under the provisions of NCLB, a federal education law, students in some schools are exited from language acquisition programs or transferred to other schools. The goal is for schools' ELL student population to fall below a 10% threshold to circumvent the negative effects of not meeting AYP and to avoid being labeled a low-performing school. School reporting documents record ELL students as LEP. Any school whose subgroup population is less than 10%, such as ELL or LEP, is not counted toward AYP. All demographic groups and subgroups with a school population of 10% or more are required to meet AYP, which includes the minimum passing rate on Texas state-mandated tests.

School districts and schools make well-intended decisions to increase students' academic performance, however, their purchase of computer-assisted learning programs as well as tools for teachers are often not fully utilized. Several computer-based learning programs were placed in

the three case study schools, and students stated that they were not used. Teachers did not know if they were used, and administrators stated that they were expensive and available to students. School administrators as well as teachers try to control students' learning. In some of these schools, teachers with high percentages of failing students are called in to meet with an administrator to determine why grades are low and how they will improve. However, the result is a compromised level of rigor and inflation of grades. Administrators need to make academic performance a team effort and not an administrative demand. Students need to be responsible for earning grades in a fair and reliable manner.

In all three cases, students came into the United States after they had started school. Two of the three case study participants started high school in Mexico. One of these was demoted from 10th to 9th grade because of a lack of English language proficiency. Schools expressed the existence of ELL students with a lifelong residence in South Texas. However, they were unable to locate any one of these students with high academic performance. They may exist, but not in large numbers. There are, however, high academically performing Hispanic students. Many speak and master both English and Spanish and therefore are not considered to be ELL.

ELL students are often placed in programs to help them with language and academic concept acquisition. The result is a piecemeal approach to learning that provides many avenues for students to forgo participation and thus not benefit from these programs.

ELL students are often grouped not only in classes but also in extracurricular activities. If the student does not get out of his or her area of comfort, the student will continue to interact with mostly ELL students. For example, in sports, ELL students play soccer and non-ELL students play different sports.

ELL students are more likely to receive harsher punishments and treatment than non-ELL students. In one case at least, it was divulged that ELL students received harsher punishment for an identical infraction at the same time and date. ELL students brought this occurrence to the attention of an administrator. However, these students conceded that it was too late to change the punishment. The administrator admitted to this unintentional practice and that it exists in many schools without administrators' awareness, for the most part.

An additional finding related to this study is that the less contact adults have with students, the less they really know about the school's population. Administrators work with diligence to provide as many opportunities as financially possible, not realizing that many of these programs fail to realize their intended purpose.

All administrators who interviewed in this study are intelligent, articulate, and well intentioned. However, most, not all, possess leadership styles that are more authoritative and in certain instances coercive. They are quick to say they are the boss and that certain things will happen and others will not be tolerated. Teachers are closer to students' reality and act accordingly.

Conclusions

After a comprehensive examination of the data gathered for this study, the following conclusions were made about factors that contribute to the high academic performance of Hispanic ELL science students in the Rio Grande Valley of South Texas.

Responsibility contributes to high academic performance of students. Students are responsible for their own academic performance. They also consider themselves responsible for their siblings, mainly academically, but also as caregivers, and they assist their siblings with normal growing-up experiences such as sports and other activities. Additionally, they feel

responsible for the future welfare of their siblings, parents, and future families. They want to provide for them in gratitude for what their parents did for them. Being responsible and able to contribute to their own decisions for their future gives them a sense of value, belonging, and self-reliance. Meeting self-imposed responsibilities allows them to be self-directed, prepares them to be good time managers, and hones organizational skills.

Student participants' fulfillment of family responsibilities led to greater academic achievement, which is likely from parental expectations (Yamamoto & Holloway, 2010). Students with parents who hold higher academic expectations generally have better grades, score very well on achievement tests, and are more persistent than those whose parents have lower expectations (Davis-Kean, 2005; Pearce, 2006; Vartanian, Karen, Buck, & Cadge, 2007). Parents also use attained sociocultural skills and expect older children to contribute to familial duties, including assisting younger siblings with academic tasks (Chanyoung & Orazem, 2010). This promotes parental expectations and aspirations that lead to higher academic performance (Yamamoto & Holloway, 2010).

Self-motivation is also a contributing factor. High academic performing students have a vivid and realistic view of a future based on high academic performance. They do not make excuses, and their accomplishments are earned with hard work. They also exhibit a positive attitude and outlook of the future. High academic performing ELL science students maintain career goals necessitating postsecondary education. Career goal setting assists students in maintaining motivation and encourages the pursuit of high academic performance. There is strong corresponding evidence between high academic performance and motivation, with students' relations with teachers, peers, and parents (Hoy, Tarter, & Woolfolk-Hoy, 2006). Students with greater intrinsic motivation are more likely to use metacognitive strategies and

self-regulation to achieve their academic goals (Motlagh, Amrai, Yazdani, Abderahim, & Souri, 2011; Wentzel & Wigfield, 1998).

School culture and climate are also crucial in students' self-motivation. Practices such as tracking, comparative evaluations, and ego, instead of an academic goal-oriented school culture, undermine students' self-motivation (Anderman & Maehr, 1994; Anderman & Young, 1994; Maehr & Midgley, 1986; Trautwein, Ludtke, Marsh, Koller, & Baumert, 2007). In some cases, minority students who fail to achieve in the dominant social academic culture are considered a success and are better accepted by members of the minority group due to the defiance of the dominant culture (Ogbu, 1985; Preparata, 2013). This was not the case in this study. Parents and students in these case studies possess the goal of high academic performance.

Academic intrinsic motivation and high academic performance are related. Self-motivation is a predictor of academic performance, especially in elementary students (Gottfried, 1990; Lozano, Garcia-Cueto, Lozano, Pedrosa, & Llanos, 2011; Suarez-Alvarez, Fernandez-Alonso, & Muñiz, 2014). It is necessary to keep students interested and motivated starting in elementary school so that they can be high academic performers.

Deferred gratification is an additional factor that contributes to high academic performance. It is one of many strategies students use for high academic performance (Bembenutty & Karabenick, 1998; Casey, Somerville, Gotlib, Ayduk, Franklin, Askren, & Shoda, 2011). These students are more interested in how they will live in the future than in how they live today. They purposefully sacrifice to meet their present aspirations of high academic performance to fulfill future academic and career goals for personal advancement as well as the advancement of their current and future families. Deferred gratification in this study is considered as a student's conscience and deliberate choice (Cantor & Langston, 1989;

Duckworth & Kern, 2011). Some researchers view deferred gratification as an outcome of other strategies that students may utilize (Duckworth & Kern, 2011; Garcia, McCann, Turner, & Roska, 1998; Snow, Corno, & Jackson, 1996).

Concepts related to delayed gratification include self-discipline, willpower, self-control, and impulse control (Dollinger, 2012). This is sometimes referred to as part of emotional intelligence (Goleman, 2006). Implementing delayed gratification strategies is evident when planning for the future by investing, saving money, studying, or improving skills that may improve employment opportunities (Dollinger, 2012). The ability to defer gratification is influential in predicting academic performance (Duckworth & Seligman, 2005). However, there are other variables, some not addressed in this study, which may affect high academic performance, such as self-esteem, self-efficacy, energy level, and resiliency (Duckworth & Seligman, 2005; Wolfe & Johnson, 1995).

Helping others is an important factor. Participating students have a strong desire to help others directly or indirectly. They want to help their parents, siblings, and future families. They also want to work in an industry, science related, that will provide opportunities to solve significant problems, such as global warming, alternative energy, or fuel-efficient vehicles. Students who serve others are likely to benefit. Youth who are more at risk or marginalized are more liable to benefit the most (Scales, Roehlkepartain, Neal, Kielsmeier, & Benson, 2006).

Once students experience the rewards of helping others, such as feeling connected, feeling empowered, or experiencing a sense of belonging and accomplishment, they want to continue. When students sense they are genuinely participating, contributing, and in control of real-life experiences, including in school and community, they make more meaningful and positive decisions that may lead to academic success (Scales et al., 2006; Zeldin, 2004).

High academic performing students possess self-efficacy. They view themselves as the managers and in control of their own learning (Zimerman & Kitsantas, 2005). They believe that they can accomplish their predetermined goals. This comes from successes in academics, extracurricular and/or co-curricular activities, music, and leadership. Other intrinsic qualities exist. High academic performing students want to thrive. Even though each student rationalizes that similar motivations and intentions drive the student toward high academic performance, there are some qualities that are different in each one. It may be competiveness to please parents or teachers or to outdo other students. These qualities can be developed by allowing students to express themselves and by providing speakers, presenters, and field trips to help students develop a personal rationale for high academic performance.

Self-efficacious students place more responsibility on themselves than on teachers for their learning (Zimmerman & Kitsantas, 2005). When undertaking difficult academic tasks, more efficacious students are more apt to participate with greater concentration and persistence and with fewer unfavorable emotional consequences than less efficacious students (Bandura, 1997). Self-efficacy is a valid predictor of student motivation and learning. It can improve academic performance (Zimmerman, 2000), positive past performance can raise self-efficacy, and self-efficacy is highly important for future performance (Elias & MacDonald, 2007). It also improves academic listening, which is a skill essential for academic learning (Graham, 2011). For these reasons, self-efficacy can be the basis for interventions and treatments to improve academic performance (Lane & Lane, 2001; Lane, Lane, & Kyprianou, 2004; Podsakoff & Farh, 1989).

Parental support is an important protective factor (Mash & Wolf, 2002) in high academic performing students. In all of the cases in this study, parents did not pay their children for their

grades. Neither monetary nor other material rewards were given for high academic performance. Parental support consisted of food, shelter, clothing, and paying financially for education-related events and materials. Parents also had frequent, respectful, open, and in-depth communication with their children. Observable conversations were positive, and all parties affirmed receipt of other conversers' points in a positive and almost reverent manner, pausing to analyze and think before responding. Education and future goals were discussed frequently in all cases.

Parents make decisions for the family, and children are expected to abide by them. Communication is frequent and open and is the basis for defining and maintaining harmonious relationships, for resolving differences, and for relaying future or current behavioral expectations as well as a means to inform, educate, and socialize (Jowkar, Kohoulat, & Zakeri, 2011). All family members are encouraged to participate and all family members have equal opportunities and importance, with the exception of parental authority.

Parents did not participate with school activities of any sort in any of the cases. Georgiou and Tourva (2007) stated that if parents feel they can somehow control academic achievement, they get involved with school. Parents who feel their child's academic performance is beyond their control and due to factors external to them do not participate with school activities (Georgiou & Tourva, 2007). This is opposed to the cases in this study. Parents, according to all indications from student participants, aspire to, implore, and stress high academic performance. Students seem to accept that parents have some control and want to please them. However, they do admit that parents are not prepared educationally and in one case geographically to feel that they can contribute to the school or their child's educational needs. They are efficacious of a positive educational influence on their children from home.

Teacher support is an important part of students' high academic performance. In every case in this study, students had one or more teachers who provided feedback on school work and goals and who provided a place to study. Teachers also contributed information on career requirements and expectations. These teachers, according to participating students, enjoyed teaching, have a positive attitude, are respectful, and possess a genuine empathetic concern for their students. They build relationships with students and accommodate students' individual learning styles (Usman, 2012). In addition, these teachers are very knowledgeable and willing to devote time and effort to afford students the realization of high academic performance. They also conversed with them frequently, respectfully, and in a sincere and meaningful manner. Sometimes conversations were profound, but often they were lighthearted.

Teachers' motivation plays a crucial role in students' academic performance (Usman, 2012). Schools that practice tracking, conduct comparative evaluations, and allow ego to infringe on management style, instead of providing an academic goal-oriented school culture, undermine teachers' self-motivation (Anderman & Maehr, 1994; Anderman & Young, 1994; Carter, 2006; Eaker & Keating, 2008; Maehr & Midgley, 1996).

Behavioral and emotional contributions to learning are necessary for students' academic success (Mih & Mih, 2013). Teachers must support students' psychological needs through interpersonal relationships (Reeve & Jang, 2006). Students in this study took charge of their own learning. They have academic autonomy and teachers provide learning autonomy support (Mih & Mih, 2013). Supporting students' autonomy is aided by finding classroom activities that provide opportunities for students to further commit and self-motivate to develop academic learning capacity (Reeve, Deci, & Ryan, 2004). Student recipients of teacher motivational

resources have opportunities to become highly engaged in academic learning and have increased aspirations to graduate (Harde & Reeve, 2003).

Students' high academic performance is more than just good school attendance. Students must be engaged in classroom activities (Mih & Mih, 2013) fostered by supportive teachers. Teacher practices and support, such as listening and providing opportunities for student interaction, are contributory factors that enhance academic performance by helping to align the students' goals with the school's academic goals (Mih & Mih, 2013).

Teaching methodology or pedagogy is an important part of students' high academic achievement. Students in this study stated that varied activities were effective in facilitating their learning, not necessarily entertainment-type teaching but a variety of activities, such as worksheets one day and lecture another. Additionally, teachers who exhibit a genuine interest in teaching and lesson delivery are more effective. When students perceive that teachers are not quite dedicated to their lessons, students struggle to learn (Mih & Mih, 2013). This is important so that administrators, without coercion, will allow teachers to plan, design, and deliver their own lessons as well as to collaborate with colleagues so that good teachers can overcome the challenges of antiacademic factors (Wingert, 2012).

Teacher methodology, classroom and school environment, teachers' qualifications, and attitudes are conducive to students' academic performance (Usman, 2012). The way students perceive teacher methodology contributes to students' self-perception. If teaching methods contribute to students' self-perception, it will encourage academic performance (Mih & Mih, 2013). Supporting students' academic motivation will facilitate persistence, resilience, choices, and comportment (Wentzel & Wigfield, 1998), all necessary traits for student academic performance.

Extracurricular and co-curricular activities are effective tools in maintaining or improving students' high academic performance (Fredricks, 2012). Prior research supports that there are benefits resulting from student participation in extracurricular activities such as increased grades, motivation, and graduation (Bohnert, Fredricks, & Randall, 2010; Feldman & Matjasko, 2005). However, students participating in this multicase study accentuated that it was their observational as well as personal experience that extracurricular and co-curricular activities rarely afford improved academic performance to failing students. They ascertained that failing students do not participate. Students who are already passing their classes participate and therefore maintain or improve their grades to continue to be able to partake in that activity. Two students, as well as an administrator, added that passing grades is a characteristic of students who participate in most extracurricular and co-curricular activities. There was some concern with grades and football players. Co-curricular activities such as robotics and music, according to participants, are the most effective because in these, learning takes place. The topical information often connects to, contributes to, or correlates directly with academic subject matter.

Academic, co-curricular, or academic-related activities tend to assist students in viewing careers beyond their high school science classes. For example, students who participate in various science activities and competitions tend to look beyond demanding science classes and aspire to be in science-related careers (Aschbacher, Ing, & Tsai, 2013). Also, students who participate in extracurricular leadership roles tend to have higher admission and interview scores, while nonparticipants have higher GPAs (Kiersma, Plake, & Mason, 2011). In addition, students with frequent participation in extracurricular activities tend to perform at a higher academic level (Fredricks, 2012). This may be due to more contact with teachers, which increases their self-efficacy, self-esteem, sense of belonging, and motivation to achieve academically.

Extracurricular participation can also improve students' noncognitive skills to become more apt to work toward a teacher-defined goal as well as increased self-efficacy (Covay & Carbonaro, 2010; Farkas, 2003).

Physical exercise–based extracurricular activities benefit students' health (Coe, Peterson, Blair, Schutten, & Peddie, 2013). In a study associating physical extracurricular activities or fitness, academic achievement, and socioeconomic status, it was concluded that fitness was positively related to academic performance regardless of socioeconomic status (Coe et al., 2013).

Research contradicts findings in this study. Low socioeconomic status generally means low academic performance. In this study, all cases exhibited high academic performance and they were all of low socioeconomic status. Many families of low socioeconomic status tend to not support students in their academic endeavors. They are inclined to allow their children to opt out of harder science subjects (Aschbacher, Ing, & Tsai, 2013). Low socioeconomic status is a strong predictor of academic performance (Suarez-Alvarez, Fernandez-Alonso, & Muñiz, 2014; Suleman, Aslam, Sharkir, Akhtar, Hussain, & Akhtar, 2012). However, it does not have to be a determinant factor.

Parents who presume to be in command of their child's academic performance tend to be more involved with school activities (Georgiou & Tourva, 2007). However, parents of students participating in this study did not participate in any school-related activities. Whereas in most cases, low socioeconomic status prevents individuals from gaining access to learning resources (Suleman, Aslam, Hussain, Shakir, Khan, & Zaib-un-Nisa, 2012), parents of participants in this study sacrifice financially and utilize their time to provide an avenue for their children to participate in music and other extracurricular activities. They also have frequent family conversations placing huge emphasis on high academic performance.

Theory Development

No single factor is responsible for high academic performance of Hispanic ELL students in South Texas. There are multitudes of contributing factors. A theory must concentrate and explain or generalize how or why a phenomenon occurs (Creswell, 2007; Yin, 2009). In this study, the phenomenon is high academic science performance among Hispanic ELL students in the Rio Grande Valley of Texas. This study shows several significant factors that explain how and why high academic performance occurs among these Hispanic ELL students. These combinations of factors should be considered in building or adding to a theory of high academic performance.

Students have to want to perform at a high academic level, must believe and visualize themselves as performing at a high academic level, have self-efficacy, and possess the stamina to carry their high performance through the end of the academic program, whether it is a single grade level or year or their 4-year high school program. Stamina and other factors may come from parental and teacher support. If parental support is missing, then teacher support increases in importance. There should be other support mechanisms at school. Administrators should assign clerical and other paperwork to assistants or clerks and liberate counselors from paperwork so that they have more time with students. Students must be informally assigned a staff member, preferably a teacher, to serve as a mentor. The mentor will provide academic support, such as tutoring, a place to study, and conversation on careers and general topics of interest. Students should feel as if they can come to their mentor at any time or for any reason.

Students must feel that they are part of a system that will work for them and with them. If they visualize themselves in an important productive career, they may strive to qualify for that career and be motivated to work at a higher academic level. As the student participants in this

study show, they must be willing to defer gratification to achieve a higher socioeconomic status. As they perform at a higher academic level, their self-esteem will surge. In keeping with rigor and high expectations for all students, teachers must employ teaching methodologies that work with ELL students as well as all other students.

Even though the students in the three case studies are of low socioeconomic status, it is not a contributing factor or a deterrent to high academic performance. These students perform at the highest levels. High school students tend to have strong peer influence (Darensbourg & Blake, 2014; Walter, Vaughn, & Cohall, 1993); however, students in this study did not demonstrate this type of influence.

Finally, students must be given meaningful responsibilities. Perhaps targeted students can tutor underclassmen. If these students feel responsible for helping younger students raise their grades, they may be inspired to raise their own grades.

Implications

Data collected suggest that each entity listed in this chapter has distinctive responsibilities to better educate Hispanic ELL students. Following are implications specific to governing bodies, universities, school districts, administrators, parents, teachers, and students.

Governing Bodies

Federal and state governments must continue to require reporting of ELL students' academic performance. Schools and districts have an incentive to circumvent equity and productivity of ELL students due to conflicts of interest in today's accountability system (Darling-Hammond, 1997; Fuhrman & Elmore, 2004). Some districts or schools select courses of action that deceptively produce outcomes that are inconsistent with a true analysis of ELL

student progress (Darling-Hammond, 1997). Governmental investigative branches need to study motives and procedures used to exit ELL students out of language acquisition programs and reasons for out-of-school transfers of ELL students. Federal and state governments need to make sure that districts make every effort to teach every student and not circumvent the law.

Additionally, appropriate funding levels must occur to ensure effective teacher retention, especially in schools with high ELL populations, and for school districts to provide funding for school professionals to foster relationship building between counselors and teachers with ELL students (Darling-Hammond, 1997). This requires smaller class sizes. Smaller class sizes will significantly improve ELL students' academic performance (Fan, 2012). State agencies should also develop avenues of communication to allow information to be exchanged by different schools to compare programs that may be effective in increasing academic performance among ELL students. Schools should also utilize funding to provide continuing education to school leaders so that they can examine and implement more effective leadership styles, develop better techniques, and become better managers of ELL-populated schools.

State governments must change testing requirements so that assessing students, especially ELL students, will provide choices that measure knowledge and conceptual understanding by utilizing various methods of assessment. One size does not fit all. Each student should decide, with guidance from parents and counselors, if the student is taking an academic or career and technology curriculum to expand choices and options. In an effort to avoid tracking, students should be allowed to change programs at any time. To increase ELL student academic performance, test results need to assess student learning and not school accountability (Brown, Peterson, & Irving 2009).

The state of Texas needs to mandate and fund more stringent standards for teacher and administer certification. Adequate funding is needed to incentivize teachers and administrators to acquire higher education in their fields of specialty (Bishop, 1988; Darling-Hammond, 1997) so they can better serve a diverse population. These incentives will route additional training needed to ensure that teachers develop skills to better serve students, especially ELL students. Administrators must be trained to develop leadership skills that nurture a positive and professional environment conducive to teaching and learning (Marzano, Waters, & McNulty, 2005) of Hispanic ELL students.

Universities

Many university teacher preparation programs do not prepare teachers adequately (Fuller, 2014). Colleges and universities need to ensure that preparation programs train teachers, not only in pedagogy and strategies, but also in building healthy relationships with Hispanic ELL students and colleagues. Teachers need to be trained to mentor students, especially ELL students, as well as learn how to build collegial relationships. Colleges and universities should assure that teachers are well versed in their respective academic content and their ability to explain it.

High school teacher preparation programs at the university need to ensure that new teachers learn specific content knowledge required to teach effectively (Ball, Lubienski, & Mewborn, 2001). New research on effective teaching approaches to a diverse population should be examined and utilized with the appropriate academic content (Hoy & Hoy, 2009). For the most part, teacher training programs as well as professional development are generalized instead of content specific. To ensure high academic performance among Hispanic ELL students, there

should be group-specific training, such as in the science department, among biology teachers, or by grade level.

School Districts

School districts must provide opportunities for school personnel, including administrators and teachers, for continuing education so that they can improve in content and leadership to optimize students' high academic performance (Ball, Lubienski, & Mewborn, 2001). When hiring teachers and administrators, school districts must hire those who enjoy being with and respect students as well as demonstrate a high degree of professionalism and a genuine concern for Hispanic ELL students' high academic performance. Empowered collaborating teachers are more likely to remain in the teaching profession in the same school (Van Petegem, Creemers, Rossel, & Aelterman, 2005), which provides stability and maintains a positive school climate for ELL students.

School district expenditures affect student academic achievement (Webber & Ehrenberg, 2010). School districts should not buy computer or other programs for Hispanic ELL students that are not effective or utilized. They should allow all stakeholders, especially teachers and students, to participate in all decisions involving acquisitions of instructional or related material.

All instructional and professional staff should be afforded the opportunity to improve their professional skills as well. Teacher in-service training should be meaningful and subject specific (Ball, Lubienski, & Mewborn, 2001) with a cultural component to address Hispanic ELL students' needs. Principals must enhance their professionalism (Pang, 2007) and must be required to attend continuing education that includes leadership styles, interpersonal relationships, ethics, and professional behavior.

As students face an extremely competitive working environment (Anderson & Vandehey, 2006), counselors need to work more closely with Hispanic ELL students. Academic performance has been shown to increase when students spend more time with their counselors (Whiston & Aricak, 2008). Districts must provide competent clerical staff to assist counselors' work, as long as it does not require professional counseling skills. Such work can include class schedule changes, counting of credits, and tabulating student GPAs for ranking.

High parental expectations play a crucial function in their children's high academic performance (Yamamoto & Holloway, 2010). Parental education programs need to be implemented district wide so that parents, especially those of low socioeconomic status and Hispanic ELL students' parents, can participate. The aim of such programs should be to build parental self-efficacy in an effort to increase academic performance (Suleman et al., 2012).

Low socioeconomic status is a strong predictor of academic performance (Suarez-Alvarez, Fernandez-Alonso, & Muñiz, 2014; Suleman et al., 2012). Improving the socioeconomic status of families tends to improve academic performance. The school district should actively seek to improve the low socioeconomic status of students' families by utilizing its resources to create jobs and training programs (Suleman et al., 2012). This should improve academic performance of family members, especially families of low socioeconomic status and of Hispanic ELL students.

High Schools

Schools must adopt, develop, and actuate programs that systematically intervene to prevent failure of Hispanic ELL students and implement measures that accelerate learning opportunities for all students. Only one student in these case studies was demoted one grade; students were never separated or tracked and were able to improve their academic science

performance. Hispanic ELL students should not be tracked or separated for the purpose of catching up. Research-based data must be utilized (Marzano, Waters, & McNulty, 2005) to make decisions, plan, develop, and expand learning opportunities for all students.

Schools must allow counselors to regulate their time to ensure more meaningful and professional conversations with Hispanic ELL students. Schools with more counselors per student have increased graduation rates and reduced discipline problems (Lapan, Gysbers, Stanley, & Pierce, 2012). School climate and school culture must be continuously assessed and improved so that schools will be physically and emotionally safe, positive, caring, and professional. Schools should be institutions for academic excellence, where all staff model and foster attitudes that reflect the positive and lifelong consequences of learning. Teachers and parents must share leadership and contribute to decision making and assist in responsibility support systems for solving problems and to improve the school environment (Dary & Pickeral, 2013).

School Administrators and Principals

School administrators' leadership role is essential to success and student academic performance (Cizek, 1995). School administrators should consider different leadership styles so that they can better serve and facilitate instruction to a diverse population. They should oversee schools' operations based on real data and be a cheerleader for teachers, especially those who teach Hispanic ELL students. Additionally, school administrators should not hesitate to replace ineffective and unprofessional staff after they exhaust all assistance and improvement interventions.

Administrators perceive that their responsibility is to manage the everyday operations of a school. However, based on Hispanic ELL student participant data, it is the climate and culture

that need to be managed daily. Support staff should be trained to run and operate the school's daily activities at optimal capacities. However, it is the school's leadership, starting with the principal that controls or contributes the most to the school's climate and culture (Sahin, 2011). This type of leadership has to include support for and input from students, teachers, support staff, and parents. This support includes a positive attitude and a high degree of professionalism and sensitivity in every situation with all students, staff, and parents. All school professionals should demonstrate respect, genuine concern for others, and high ethical standards. The leadership style is a key element in student learning (Sahin, 2011).

Parents

Parents' expectations play a crucial role in students' high academic performance (Yamamoto & Holloway, 2010). This is especially true for Hispanic ELL students. Parents need to acquire knowledge and skills to provide a healthy attitude and guidance for their Hispanic ELL children toward academic performance. They should be provided opportunities to learn how to create a family environment that advocates students' learning and character growth. Parental support at home, including emotional support, encouragement, and educational decision assistance, will increase the probability of high academic performance (Peterson, Rubie-Davies, Elley-Brown, Widdowson, Dixon, & Irving, 2011).

Schools often have programs and organizations for parental involvement. Participating in such programs allows children to see their parents' raised expectations. High expectations encourage high academic performance (Yamamoto & Holloway, 2010). Furthermore, parents' high academic expectations of Hispanic ELL students can defend against the effect of low teacher expectations and increase aspirations to attend college (Yamamoto & Holloway, 2010).

Teachers

Teachers should seek continuing education to hone their teaching ability and increase content knowledge. They need to be able to manage their own classes and pedagogy to stimulate an intellectual climate, so that every student is challenged and inspired to produce high-quality work. A high standard of rigor should be maintained for all students, including Hispanic ELL students, so that lesson content and delivery are engaging and effective. Teachers need to continue to increase content knowledge to be able to teach effectively (Ball, Lubienski, & Mewborn, 2001). Teachers need to be viewed as experts in their respective fields. Ongoing examination of new research and effective pedagogy should be examined and utilized in the classroom (Hoy & Hoy, 2009).

Teachers need to better communicate with Hispanic ELL students and empathize with them and be genuine and caring. Teachers should create opportunities for Hispanic ELL students to have caring relationships that may result in personal growth, a sense of belonging, and increased academic performance (Berberet, 2002; Bruce & Stellern, 2005; Gay, 2000; Noddings, 2003; Osterman, 2000).

They need to create and uphold a classroom and school culture of excellence, professionalism, and high standards, ethics, and caring (Rogers & Webb, 1991). Teachers must hold themselves accountable for providing a positive learning environment as well as for building positive relationships with students and colleagues. Teachers' relationships with Hispanic ELL students show that they care. Students are more inclined to accept the teachers' curricula and teaching methods as an extension of their relationship, which helps build communication and trust (Bernstein-Yamashio, Noam, & Gil, 2013), especially Hispanic ELL students, who may feel alienated because of language and/or culture differences.

Teachers should be highly professional. They should respect students as they expect to be respected. Teachers must foster a safe and academic environment that revolves around and targets students' high academic performance. Teachers should be knowledgeable and passionate in their respective fields so that students will get excited and motivated to learn. Teachers should continue training in their fields and always be prepared for the classes they teach. Teachers must be willing to spend time reteaching topics in a manner that students will understand. Hispanic ELL students may require instruction in Spanish.

Students

Students should have opportunities for high academic performance and should be assessed so that they can earn meaningful and fair grades. Students must take responsibility for their own learning to perform better academically (Peterson, at el., 2011). Students must be allowed to perform at a high academic level or fail under a fair, honest, and rigorous system of teaching, assessment, and grading. Students should accept the responsibility to learn, have input in the lesson delivery, and choices of classroom activities and assignments to improve academic performance (Lengnick-Hall & Sanders, 1997).

Recommendations

Schools must find better and more effective ways to educate Hispanic ELL students. Longitudinal, cross-sectional, and experimental studies should be conducted in diverse areas to enhance current and past research and to find methods, conditions, and strategies to effectively influence academic performance. Qualitative and quantitative studies should be conducted to formulate a variety of measures to enable the academic performance of these students.

Future Research

Further research is needed that includes more students, other languages, and other areas in the United States. Studies should compare the number of years that students and families have lived in the United States with high academic performance in science and other subjects. Bilingual students' academic performance should be measured and compared to that of monolingual students. Also, researchers should study the impact such factors as self-esteem and self-efficacy of parents and students have on academic performance.

Schools, districts, and/or researchers should conduct studies and experiments to objectively measure the impact on academic performance by increasing students' responsibilities and service learning and providing a suitable teacher mentor, as well as investigating other contributing factors delineated in this study. Schools and districts should also work with parents to provide them with skills that promote, inspire, and motivate students' intrinsic qualities.

If districts,' schools,' and teachers' persistent approach in offering programs and methodology worked, ELL students would already be inspired to learn at high academic levels. However, students have a better approach of being responsible for themselves. Give them meaningful responsibilities and inspire them to challenge themselves academically. All educational entities need to provide avenues to incentivize intrinsic qualities that support and sustain high academic performance.

Academic extracurricular activities, especially music, should be investigated as a possible positive impact on high academic performance. Although not necessarily causal, numerous studies indicate that students taking music courses perform academically better in all other subjects (Cabanac, Perlovsky, Bonniot-Cabanac, & Cabanac, 2013). Teacher support is an important part of students' high academic performance. In every case in this study, students had

one or more teachers who provided feedback on school work and goals and provided a place to study. Teachers also provided information on career requirements and expectations. These teachers, according to participating students, enjoyed teaching, have a positive attitude, are respectful, and possess a genuine empathetic concern for their students. In addition, these teachers are very knowledgeable and willing to devote time and effort to afford them the realization of high academic performance. They also conversed with them frequently, respectfully, and in a sincere and meaningful manner. Empathetic teachers should be assigned to a group of ELL students to serve as mentors, to provide a place to study and build positive relationships, and should measure the results.

Students need to be respected. They need to be shown, not just told, what to do. Speakers whom students view as authentic role models that delineate a path and demonstrate the promise of high academic performance must be obtained with regularity. They can deliver messages that inspire high academic performance. Administrators, teachers, and other school personnel need to talk with students in a realistic fashion and demarcate the promise of high academic performance, especially in science.

Since school leaders have an instinctive nature to serve, servant leadership (Greenleaf, 1977) should be investigated as a viable style so that they can instill in teachers and staff the desire to serve student learning (Gabris & Simo, 1995). Servant leadership develops and encourages others to improve their skill set and accomplish their own professional goals, and it advances high academic performance, which is the goal of the community (Liden, Wayne, Zhao, & Herderson, 2008).

Future studies should identify influences on intrinsic and extrinsic motivation, such as environment, parental expectations, and rewards, and how they affect academic performance.

Other factors may contribute to high academic performance and may be discovered and should be examined and utilized to affect these students.

Other Recommendations

With the guidance of school personnel, such as teachers and counselors, students should have the opportunity to make school-related decisions that affect their lives. Personnel should provide ELL students with opportunities to listen and interact with speakers and presenters to whom they can relate as role models. They should also provide students with field trip opportunities to widen their scope of possibility for future career and life choices as well as the prerequisites to achieve them. Schools and districts need to concentrate on increasing academic performance instead of finding methods of circumventing the law, such as with school transfers or prematurely exiting students from ELL status.

Student practicums or service training may help high academic performance. Practicums have been shown to provide several positive outcomes such as creating personal and professional connections, a better understanding of duties and responsibilities of employment, working with supervisors, experience in working as part of a team toward a common goal, and the ability to reflect on their performance and create goals for their own future (Ferrier-Kerr, 2009).

Summary

On the basis of this multicase study, factors that contribute to Hispanic ELL high academic performance in high school science in the Rio Grande Valley of Texas are intrinsic. Students in this study are self-motivated and have a clear vision of their future careers, which requires the acquisition of a university education in a science or science-related field. They have a strong affinity to family, have vital parental support, and are willing to delay gratification for

their high academic achievement. These students aspire to help others and retain a healthy self-esteem and persuasive self-efficacy.

All student participants were from a low socioeconomic status. They also stated that one or more teachers had helped them and described these teachers as role models and mentors. These teachers provided a place to study as well as expert academic and personal advice as needed. These students attended class with the dominant English-speaking population. They were never removed from their classes for language acquisition instruction and were able to improve and function with high academic performance. They also enjoyed, benefitted from, and appreciated receiving special help in Spanish, their dominant language.

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

APPENDIX A

INSTITUTIONAL REVIEW BOARD FOR HUMAN SUBJECTS IN RESEARCH
THE UNIVERSITY OF TEXAS - PAN AMERICAN
1201 West University Drive • Edinburg, Texas 78539-2999 • (956) 381-3002 Office • (956) 381-2940 Fax

NOTICE OF APPROVAL
Institutional Review Board for Human Subjects (IRB)
FWA#00000805

TO: **Antonio Elizondo**

FROM: **Institutional Review Board for Human Subjects in Research**

DATE: **December 21, 2012**

RE: **IRB# 2011-111-12; "Factors that Contribute to Hispanic English Learners' High Academic Performance in High School Science in the Rio Grande Valley of Texas: A Multicase Study"**

The IRB protocol referenced above has been reviewed and APPROVED.

Basis for approval: Expedited, Category #7

Approval expiration date: December 3, 2013

Recruitment and Informed Consent: You must follow the recruitment and consent procedures that were approved. If your study uses an informed consent form or study information handout, you will receive an IRB-approval stamped PDF of the document(s) for distribution to subjects.

Modifications to the approved protocol: Modifications to the approved protocol (including recruitment methods, study procedures, survey/interview questions, personnel, consent form, or subject population), must be submitted in writing to the IRB at irb@utpa.edu for review. **Changes must not be implemented until approved by the IRB.**

Approval expiration and renewal: Your study approval expires on the date noted above. You will receive a continuing review (renewal) form from the IRB approximately 2-4 weeks before approval expiration, which should be completed and returned immediately. If you will be interacting with subjects or working with individually identifiable private information, you need to have active IRB approval. Failure to return the form will result in your study file being closed on the approval expiration date.

Data retention: All research data and signed informed consent documents should be retained for a *minimum* of 3 years after *completion* of the study.

Approved by: _____ Date: 12/21/2012
Dr. Patricia Gonzales
Chair, Institutional Review Board

cc: **Dr. Sayed Sadiq Shah, Vice Provost for Research and Sponsored Projects**

APPENDIX B

LETTER TO SUPERINTENDENTS

APPENDIX B

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

FACTORS THAT CONTRIBUTE TO HISPANIC ENGLISH LANGUAGE LEARNERS' HIGH ACADEMIC PERFORMANCE IN HIGH SCHOOL SCIENCE IN THE RIO GRANDE VALLEY OF TEXAS: A MULTICASE STUDY

Investigators:

Antonio Elizondo
Principal Researcher
1104 West 8th Street
Weslaco, Texas 78596

Karen Marie Watt, PhD
Research Supervisor
University of Texas Pan American
Edinburg, Texas 78539

Background: We are conducting a research study in partial fulfillment of a doctoral degree in educational leadership at the University of Texas Pan American. This research study is being conducted by Antonio Elizondo, doctoral candidate and supervised by Dr. Karen Watt, UTPA Professor. The main purpose of the study is to discover factors that contribute to the high academic performance of Hispanic English language learners in science in the Rio Grande Valley of Texas. Students selected for this research study are English Language Learners that have shown high academic achievement in science by scoring "commended" on the Texas Assessment of Knowledge and Skills exit level test, ranked in the upper quadrant of their academic class, and are college bound.

Procedure: Antonio Elizondo, principal researcher (PI), will deliver consent forms to school district superintendents in Hidalgo and Cameron Counties. As these forms are returned, high school principals in those districts will be contacted to determine if any students are eligible for this study. Eligible students, as determined by district or school personnel based on research criteria, will be contacted by PI through designated school staff such as counselors to inform them and parents of the study and provide the necessary consent forms. One student in four different high schools will be selected for the study. PI will provide consent forms so that school staff can send home to inform parents about the research project and for their signature if they decide to allow their child, if under 18 years old, to participate. These minor aged students will be given assent consent forms as well so that they can also decide if they want to participate. The PI will acquire signed consent form from student and parent through the school staff. Students 18 years of age and over will be given an informed consent form for their review and signature. All aspects of the research study will be explained prior to signing. Interviews will be scheduled and start within a few days after obtaining signed consent forms. All interviews will be held at the students' schools during the school day. If any interviews are conducted after school or weekends, parents will be informed of child's late arrival and to arrange to transportation if needed. Each interview will last less than an hour, will be audio recorded, and transcribed. Emerging themes will be identified. PI will interview students a second and third time to focus on further identifying emerging themes with clarity and specificity. Additionally, the second and third interview will serve to clarify any issues or concerns, especially those that students may have. Students will be given an opportunity to review transcripts and will be allowed to make changes so that their voice will prevail. Once student interviews have taken place, a science teacher and an administrator from the same schools will be interviewed

individually and separately. Questions will be based on students' interviews. Factors that contribute the high academic performance of Hispanic ELL students in science will be identified.

Risks or Possible Discomforts Associated with the Study: There are no anticipated risks associated with your participation in this study.

Benefits of Participation: Participants will not derive any known direct benefit. However, there will be a contribution to a possibility of identifying factors that may contribute to high academic performance of Hispanic English language learners in science. This may lead to helping other students to perform academically at a higher level. A major aspect of this research project is to construct a theory explaining why some Hispanic English language learners perform at a higher academic level in science when the majority do not.

Voluntary Participation: Participation in this study is voluntary; participants may discontinue participation at any time without penalty. If for any reason a participant decides to discontinue participation, simply inform the researcher of the decision to stop.

Anonymity and/or Confidentiality: All data collected, notes, audio recordings, artifacts if acquired, identities, and any other data in any form will be stored by the PI at the University of Texas Pan American, EDCC 2.504, Edinburg, Texas. All data will be in a secure locked cabinet under the PI's control. PI will be the only person with access to the cabinet. Pseudonyms will be assigned to schools, students, and school personnel. Districts will be identified as "South Texas School District" only. Schools will be given names such as alpha, beta, gamma and delta high schools. Students will be assigned pseudonyms as well. These names will be real people names, to be determined, but not their own. All communications will be in person. Coded data will be electronic and also be stored in locked cabinet in the same location.

Who to Contact for Research Related Questions: For questions about the research itself, or to report any adverse effects during or following participation, contact the researcher, Antonio Elizondo at 956-821-1848, aelizondoz@broncs.utpa.edu, or at 1104 West 8th Street, Weslaco, Texas 78596. You can also contact my dissertation research supervisor Dr. Karen Marie Watt at the University of Texas Pan American, Edinburg, Texas 78539, 956-655-7072, or at watt@utpa.edu

Video and Audio Taping: All interviews will be audio taped so that every word and meaning can be acquired by the researcher, a transcript will be made available to interviewees for review. Interviewees will be allowed to make changes to previous comments so that their intended meaning prevails. All audio recordings will remain in possession of researcher under lock and key until it is deemed not needed and will be erased and disposed. All recordings will be kept confidential and in a secure location.

Who to Contact Regarding Your Rights as a Participant: This research has been reviewed and approved by the Institutional Review Board for Human Subjects Protection (IRB). If you have any questions about your rights as a participant, or if you feel that your rights as a participant were not adequately met by the researcher, please contact the IRB at 956.665.2889 or

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

irb@utpa.edu. You are also invited to provide anonymous feedback to the IRB by visiting www.utpa.edu/IRBfeedback.

By signing below, you indicate that you are voluntarily agreeing to allow your district to participate in this study and that the procedures involved have been described to your satisfaction. The researcher will provide you with a copy of this form for your own reference. In order for your district to participate, you must be at least 18 years of age and authorized to provide such consent for your district.

_____ ____/____/_____
Participant's Signature Date

_____
Print Name

_____ ____/____/_____
Antonio Elizondo, Principal Investigator Date

APPENDIX C

RESPONSE FROM SUPERINTENDENTS

APPENDIX C

April 18, 2012

Antonio Elizondo, Doctoral Candidate
University of Texas Pan American
1104 West 8th Street
Weslaco, TX 78596

Dear Mr. Elizondo,

I herewith grant permission for you to conduct research at the Blue Independent School District. I understand that the title of the research project is "Factors that Contribute to Hispanic English Language Learners' High Academic Performance in High School Science in the Rio Grande Valley of Texas: A Multicase Study." I further understand that this is to identify factors that contribute to Hispanic English Language Learners' (ELL) high academic performance in high school science. Perhaps other students can benefit from this study. I also understand that high school students and staff will be interviewed for about 40 minutes. Students will be interviewed on three different occasions prior to single interviews with a science teacher and a school administrator. These interviews will be audio recorded and transcribed. School district, schools, students, and staff will be given made up names (pseudonyms) to maintain anonymity.

Additionally, I understand that Blue ISD was selected because of it location in the Rio Grande Valley as well as ELL performance on exit level TAKS. Furthermore, Blue ISD supports research that may enhance our students' high academic performance. Upon completion of the study, the results will be shared with me.

I do herby grant permission for Mr. Antonio Elizondo to conduct research in our school district. In addition, I grant permission for Mr. Antonio Elizondo to conduct interviews with students and staff, and to analyze data and results of this research project.

Sincerely,

Superintendent of Schools
Blue Independent School District

IRB# 2011-111-12

APPENDIX D

INFORMED CONSENT DOCUMENT

APPENDIX D

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

FACTORS THAT CONTRIBUTE TO HISPANIC ENGLISH LANGUAGE LEARNERS' HIGH ACADEMIC PERFORMANCE IN HIGH SCHOOL SCIENCE IN THE RIO GRANDE VALLEY OF TEXAS: A MULTICASE STUDY

Investigators:

Antonio Elizondo
Principal Researcher
1104 West 8th Street
Weslaco, Texas 78596

Karen Marie Watt, PhD
Research Supervisor
University of Texas Pan American
Edinburg, Texas 78539

Background: We are conducting a research study in partial fulfillment of a doctoral degree in educational leadership at the University of Texas Pan American. This research study is being conducted by Antonio Elizondo, doctoral candidate and supervised by Dr. Karen Watt, UTPA Professor. The main purpose of the study is to discover factors that contribute to the high academic performance of Hispanic English language learners in science in the Rio Grande Valley of Texas. Students selected for this research study are English Language Learners that have shown high academic achievement in science by scoring "commended" on the Texas Assessment of Knowledge and Skills exit level test, ranked in the upper quadrant of their academic class, and are college bound.

Procedure: Antonio Elizondo, principal researcher (PI), will deliver consent forms to school district superintendents in Hidalgo and Cameron Counties. As these forms are returned, high school principals in those districts will be contacted to determine if any students are eligible for this study. Eligible students, as determined by district or school personnel based on research criteria, will be contacted by PI through designated school staff such as counselors to inform them and parents of the study and provide the necessary consent forms. One student in four different high schools will be selected for the study. PI will provide consent forms so that school staff can send home to inform parents about the research project and for their signature if they decide to allow their child, if under 18 years old, to participate. These minor aged students will be given assent consent forms as well so that they can also decide if they want to participate. The PI will acquire signed consent form from student and parent through the school staff. Students 18 years of age and over will be given an informed consent form for their review and signature. All aspects of the research study will be explained prior to signing. Interviews will be scheduled and start within a few days after obtaining signed consent forms. All interviews will be held at the students' schools during the school day. If any interviews are conducted after school or weekends, parents will be informed of child's late arrival and to arrange to transportation if needed. Each interview will last less than an hour, will be audio recorded, and transcribed. Emerging themes will be identified. PI will interview students a second and third time to focus on further identifying emerging themes with clarity and specificity. Additionally, the second and third interview will serve to clarify any issues or concerns, especially those that students may have. Students will be given an opportunity to review transcripts and will be allowed to make changes so that their voice will prevail. Once student interviews have taken

place, a science teacher and an administrator from the same schools will be interviewed individually and separately. Questions will be based on students' interviews. Factors that contribute the high academic performance of Hispanic ELL students in science will be identified.

Risks or Possible Discomforts Associated with the Study: There are no anticipated risks associated with your participation in this study.

Benefits of Participation: Participants will not derive any known direct benefit. However, there will be a contribution to a possibility of identifying factors that may contribute to high academic performance of Hispanic English language learners in science. This may lead to helping other students to perform academically at a higher level. A major aspect of this research project is to construct a theory explaining why some Hispanic English language learners perform at a higher academic level in science when the majority do not.

Voluntary Participation: Participation in this study is voluntary; participants may discontinue participation at any time without penalty. If for any reason a participant decides to discontinue participation, simply inform the researcher of the decision to stop.

Anonymity and/or Confidentiality: All data collected, notes, audio recordings, artifacts if acquired, identities, and any other data in any form will be stored by the PI at the University of Texas Pan American, EDCC 2.504, Edinburg, Texas. All data will be in a secure locked cabinet under the PI's control. PI will be the only person with access to the cabinet. Pseudonyms will be assigned to schools, students, and school personnel. Districts will be identified as "South Texas School District" only. Schools will be given names such as alpha, beta, gamma and delta high schools. Students will be assigned pseudonyms as well. These names will be real people names, to be determined, but not their own. All communications will be in person. Coded data will be electronic and also be stored in locked cabinet in the same location.

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Video and Audio Taping: All interviews will be audio taped so that every word and meaning can be acquired by the researcher, a transcript will be made available to interviewees for review. Interviewees will be allowed to make changes to previous comments so that their intended meaning prevails. All audio recordings will remain in possession of researcher under lock and key until it is deemed not needed and will be erased and disposed. All recordings will be kept confidential and in a secure location.

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Expires: 12/03/2013
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irb@utpa.edu. You are also invited to provide anonymous feedback to the IRB by visiting www.utpa.edu/IRBfeedback.

By signing below, you indicate that you are voluntarily agreeing to participate in this study and that the procedures involved have been described to your satisfaction. The researcher will provide you with a copy of this form for your own reference. In order to participate, you must be at least 18 years of age. If you are under 18, please inform the researcher.

_____ ____/____/_____
Participant's Signature Date

_____
Print Name

_____ ____/____/_____
Antonio Elizondo, Principal Investigator Date

APPENDIX E

PARENTAL INFORMED CONSENT DOCUMENT

APPENDIX E

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

FACTORS THAT CONTRIBUTE TO HISPANIC ENGLISH LANGUAGE LEARNERS' HIGH ACADEMIC PERFORMANCE IN HIGH SCHOOL SCIENCE IN THE RIO GRANDE VALLEY OF TEXAS: A MULTICASE STUDY

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Karen Marie Watt, PhD
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irb@utpa.edu. You are also invited to provide anonymous feedback to the IRB by visiting www.utpa.edu/IRBfeedback.

By signing below, you indicate that you are voluntarily agreeing to allow your child to participate in this study and that the procedures involved have been described to your satisfaction. The researcher will provide you with a copy of this form for your own reference. In order to allow your child to participate, you must be at least 18 years of age. If you are under 18, please inform the researcher. Additionally, you are acknowledging that you are the legal guardian or parent of this child.

_____
Student's Name

_____ ____/____/_____
Parent's Signature Date

_____
Print Name

_____ ____/____/_____
Antonio Elizondo, Principal Investigator Date

APPENDIX F

INFORMED ASSENT DOCUMENT

APPENDIX F

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

FACTORS THAT CONTRIBUTE TO HISPANIC ENGLISH LANGUAGE LEARNERS' HIGH ACADEMIC PERFORMANCE IN HIGH SCHOOL SCIENCE IN THE RIO GRANDE VALLEY OF TEXAS: A MULTICASE STUDY

Investigators:

Antonio Elizondo
Principal Researcher
1104 West 8th Street
Weslaco, Texas 78596

Karen Marie Watt, PhD
Research Supervisor
University of Texas Pan American
Edinburg, Texas 78539

Background: We are conducting a research study in partial fulfillment of a doctoral degree in educational leadership at the University of Texas Pan American. This research study is being conducted by Antonio Elizondo, doctoral candidate and supervised by Dr. Karen Watt, UTPA Professor. The main purpose of the study is to discover factors that contribute to the high academic performance of Hispanic English language learners in science in the Rio Grande Valley of Texas. Students selected for this research study are English Language Learners that have shown high academic achievement in science by scoring "commended" on the Texas Assessment of Knowledge and Skills exit level test, ranked in the upper quadrant of their academic class, and are college bound.

Procedure: Antonio Elizondo, principal researcher (PI), will deliver consent forms to school district superintendents in Hidalgo and Cameron Counties. As these forms are returned, high school principals in those districts will be contacted to determine if any students are eligible for this study. Eligible students, as determined by district or school personnel based on research criteria, will be contacted by PI through designated school staff such as counselors to inform them and parents of the study and provide the necessary consent forms. One student in four different high schools will be selected for the study. PI will provide consent forms so that school staff can send home to inform parents about the research project and for their signature if they decide to allow their child, if under 18 years old, to participate. These minor aged students will be given assent consent forms as well so that they can also decide if they want to participate. The PI will acquire signed consent form from student and parent through the school staff. Students 18 years of age and over will be given an informed consent form for their review and signature. All aspects of the research study will be explained prior to signing. Interviews will be scheduled and start within a few days after obtaining signed consent forms. All interviews will be held at the students' schools during the school day. If any interviews are conducted after school or weekends, parents will be informed of child's late arrival and to arrange to transportation if needed. Each interview will last less than an hour, will be audio recorded, and transcribed. Emerging themes will be identified. PI will interview students a second and third time to focus on further identifying emerging themes with clarity and specificity. Additionally, the second and third interview will serve to clarify any issues or concerns, especially those that students may have. Students will be given an opportunity to review transcripts and will be allowed to make changes so that their voice will prevail. Once student interviews have taken place, a science teacher and an administrator from the same schools will be interviewed

individually and separately. Questions will be based on students' interviews. Factors that contribute the high academic performance of Hispanic ELL students in science will be identified.

Risks or Possible Discomforts Associated with the Study: There are no anticipated risks associated with your participation in this study.

Benefits of Participation: Participants will not derive any known direct benefit. However, there will be a contribution to a possibility of identifying factors that may contribute to high academic performance of Hispanic English language learners in science. This may lead to helping other students to perform academically at a higher level. A major aspect of this research project is to construct a theory explaining why some Hispanic English language learners perform at a higher academic level in science when the majority do not.

Voluntary Participation: Participation in this study is voluntary; participants may discontinue participation at any time without penalty. If for any reason a participant decides to discontinue participation, simply inform the researcher of the decision to stop.

Anonymity and/or Confidentiality: All data collected, notes, audio recordings, artifacts if acquired, identities, and any other data in any form will be stored by the PI at the University of Texas Pan American, EDCC 2.504, Edinburg, Texas. All data will be in a secure locked cabinet under the PI's control. PI will be the only person with access to the cabinet. Pseudonyms will be assigned to schools, students, and school personnel. Districts will be identified as "South Texas School District" only. Schools will be given names such as alpha, beta, gamma and delta high schools. Students will be assigned pseudonyms as well. These names will be real people names, to be determined, but not their own. All communications will be in person. Coded data will be electronic and also be stored in locked cabinet in the same location.

Who to Contact for Research Related Questions: For questions about the research itself, or to report any adverse effects during or following participation, contact the researcher, Antonio Elizondo at 956-821-1848, aelizondoz@broncs.utpa.edu, or at 1104 West 8th Street, Weslaco, Texas 78596. You can also contact my dissertation research supervisor Dr. Karen Marie Watt at the University of Texas Pan American, Edinburg, Texas 78539, 956-655-7072, or at watt@utpa.edu

Video and Audio Taping: All interviews will be audio taped so that every word and meaning can be acquired by the researcher, a transcript will be made available to interviewees for review. Interviewees will be allowed to make changes to previous comments so that their intended meaning prevails. All audio recordings will remain in possession of researcher under lock and key until it is deemed not needed and will be erased and disposed. All recordings will be kept confidential and in a secure location.

Who to Contact Regarding Your Rights as a Participant: This research has been reviewed and approved by the Institutional Review Board for Human Subjects Protection (IRB). If you have any questions about your rights as a participant, or if you feel that your rights as a participant were not adequately met by the researcher, please contact the IRB at 956.665.2889 or

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UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

irb@utpa.edu. You are also invited to provide anonymous feedback to the IRB by visiting www.utpa.edu/IRBfeedback.

By signing below, you indicate that you are voluntarily agreeing to participate in this study and that the procedures involved have been described to your satisfaction. The researcher will provide you with a copy of this form for your own reference. In order to participate and you are under 18 years of age your parent or legal guardian must agree to let you participate.

_____ ____/____/_____
Participant's Signature Date

_____
Print Name

_____ ____/____/_____
Antonio Elizondo, Principal Investigator Date

APPENDIX G

DOCUMENTO DE AUTORIZACION DEL PADRE

APPENDIX G

Approved by:
UTPA IRB
Expires: 12/03/2013
IRB# 2011-111-12

FACTORES QUE CONTRIBUYEN AL EXITO ACADÉMICO EN CIENCIA DE ESTUDIANTES HISPANOS PRINCIPIANTES DEL IDIOMA INGLÉS A NIVEL DE SECUNDARIA EN EL VALLE DEL RÍO GRANDE DE TEXAS: UN ESTUDIO MULTICASO

Investigadores:

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Karen Marie Watt, PhD
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University of Texas Pan American
Edinburg, Texas 78539

Antecedentes: Estamos llevando a cabo un estudio en cumplimiento parcial para un doctorado en liderazgo educativo en la Universidad de Texas Pan American. Este estudio será llevado a cabo por Antonio Elizondo, candidato doctoral y supervisado por la Dra. Karen Watt, profesora de UTPA. El objetivo principal del estudio es descubrir factores que contribuyen al alto rendimiento académico de Hispanos principiantes al idioma inglés en ciencia en el Valle del Rio Grande de Texas. Estudiantes seleccionados para este estudio de investigación seran estudiantes principiantes del idioma inglés que han demostrado alto rendimiento académico en ciencia por puntuación en la prueba Texas Assessment of Knowledge and Skills (TAKS), clasificado en el cuadrante superior de su clase académica, y preparado para asistir al colegio o universidad.

Procedimiento: Antonio Elizondo, investigador principal (PI), entregará formularios de consentimiento para superintendentes de distrito escolar en los condados de Cameron y Hidalgo. Como estos formularios son devueltos, los directores de escuela secundaria en esos distritos serán contactados para determinar si existen estudiantes elegibles para este estudio. Los estudiantes elegibles, según determinado por el distrito o escuela basado en criterios de la investigación, serán contactados por PI a través del personal designado por parte de la escuela para informar a los padres del estudio y proporcionar los formularios de consentimiento necesarios. Un estudiante en cuatro diferentes escuelas secundarias será seleccionado para este estudio. El PI proporcionará formularios de consentimiento para que el personal de la escuela pueda enviar a casa e informar a los padres acerca del proyecto de investigación y para obtener su firma si deciden permitir que su hijo o hija, menores de 18 años de edad, participe. Estos estudiantes menores de edad se les dará formas de consentimiento de asentimiento para que también pueden decidir si quieren participar. El PI adquirirá la forma de consentimiento firmado de estudiantes y padres a través del personal de la escuela. Estudiantes de 18 años o mas de edad, se les dará un formulario de consentimiento informado para su revisión y firma. Todos los aspectos de la investigación se explicarán. Entrevistas serán programadas y comenzaran dentro de unos días después de obtener formularios de consentimiento firmados. Todas las entrevistas se llevarán acabo en las escuelas de los alumnos durante la dia escolar. Si las entrevistas se llevan a cabo después de la escuela o los fines de semana, los padres serán informados para organizar transporte si es necesario. Cada entrevista durará menos de una hora, serán audio grabados y transcribidos. Se identificarán nuevos temas. El PI entrevistara a los estudiantes un segundo y tercer tiempo para concentrarse en seguir identificando temas emergentes con claridad y especificidad. Además, la segunda y tercera entrevista servirá para aclarar los problemas o preocupaciones, especialmente aquellas que pueden tener los estudiantes. Se les dará

oportunidad a los estudiantes para revisar las transcripciones y podrán realizar cambios para que su voz prevalezca. Una vez que se logren entrevistas de estudiantes, un profesor de ciencias y un administrador de las mismas escuelas secundarias serán entrevistados individualmente y por separado. Preguntas para administadores y profesores se basarán en las entrevistas de los alumnos. Se identificarán factores que contribuyen al alto rendimiento académico de los estudiantes hispanos principiantes al idioma inglés en ciencia.

Riesgos o posibles molestias asociadas con el estudio: No existen riesgos previstos asociados con su participación en este estudio.

Beneficios de la participación: Los participantes no obtendrán ningún beneficio directo que es conocido. Sin embargo, será una contribución a la posibilidad de identificar factores que pueden contribuir a alto rendimiento académico para estudiantes Hispanos principiantes del idioma inglés en ciencia. Es posible que por este estudio se puede contribuir a ayudar a otros estudiantes a realizar académicamente un nivel superior. Un aspecto importante de este proyecto de investigación es construir una teoría que explique por qué algunos estudiantes Hispanos principiantes del idioma inglés realizan un nivel académico superior en ciencia cuando la mayoría no lo hacen.

Participación voluntaria: La participación en este estudio es voluntaria. Participantes podrán suspender la participación en cualquier momento sin penalización. Si por cualquier motivo un participante decide suspender participación, simplemente tiene que informar al investigado de esta decisión.

Anonimato y confidencialidad: Todos los datos, notas, grabaciones de audio, artefactos si adquirió, identidades, y cualquier otro dato de cualquir forma se almacenarán por el PI en la Universidad de Texas Pan American, EDCC 2.504, Edinburg, Texas. Todos los datos estarán archivados en un gabinete seguro bloqueado bajo control del PI. El PI será la única persona con acceso al archivador. Seudónimos se asignarán a las escuelas, estudiantes y personal escolar. Distritos se identificarán como "South Texas School District" solamente. Las escuelas se les darán nombres tales como alfa, beta, gamma y delta. A los estudiantes se les asignarán seudónimos. Estos nombres serán de personas posiblemente reales, pero no sus propios. Todas las comunicaciones serán en persona. Datos codificados serán electrónicos y también serán almacenadas en gabinete bloqueada en la misma ubicación.

Contacto para preguntas relacionadas con investigación: Este estudio fue revisado y aprobado por la Junta de revisión institucional para protección de sujetos humanos "Institutional Review Board" (IRB) de la Unversidad. Para preguntas o informes acerca de sus derechos como participante en esta investigación, o si tiene experencias adversos, puede contactar al investigador, Antonio Elizondo en 956-821-1848, aelizondoz@broncs.utpa.edu, o en 1104 West 8th Street, Weslaco, Texas 78596. También puede contactar a la supervisora de investigaciones de este estudio Dra. Karen Marie Watt en la Universidad de Texas Pan American, Edinburg, Texas 78539, 956-655-7072, o en watt@utpa.edu

Grabación de Audio y vídeo: Todas las entrevistas serán audio grabado para que cada palabra y significado sea adquirida por el investigador. Una transcripción estará disponible a los

entrevistados para su revisión. Se permitirá realizar cambios por entrevistados a los comentarios anteriores para que prevalezca su significado. Todas las grabaciones permanecerán en posesión del investigador bajo llave y clave hasta que se considere no necesarios y serán borrados y eliminados. Todas las grabaciones se mantendrán confidenciales y en la misma ubicación segura.

Contacto con respecto a sus derechos como participante: Esta investigación ha sido revisada y aprobado por la Junta de revisión institucional para protección de sujetos humanos (IRB). Para preguntas acerca de sus derechos como participante, o si siente que sus derechos como participante no fueron adecuadamente satisfechas por el investigador, póngase en contacto con el IRB en 956-665-2889 o irb@utpa.edu. También están invitados a proporcionar comentarios anónimos a la IRB visitando www.utpa.edu/IRBfeedback.

Al firmar este documento, está aceptando voluntariamente permitir a su hijo o hija participar en este estudio y que se han descrito los procedimientos para su satisfacción. El investigador le proporcionará una copia de este formulario para su propia referencia. Si usted es menor de 18 años de edad, por favor informe al investigador. Además, están reconociendo e indicando que usted es el padre o que esta legalmente actuando como el padre de este niño o niña.

_____
Nombre del Estudiante

_____ ____/____/_____
Firma del Padre Fecha

_____
Nombre Escrito

_____ ____/____/_____
Antonio Elizondo, Investigator Principal Fecha

APPENDIX H

INTERVIEW QUESTIONS

APPENDIX H

Questions will include the following:

1. What factors contributed to your success in the Science TAKS?
2. Are there teachers who have contributed to your success in high school science?
3. Have your parents contributed to your success in high school science?
4. What factors have contributed to your mastery and proficiency in science at a higher academic level?
5. If you were to name one factor that contributed most to your success in science, what would it be?
6. Who is the person most responsible for that one factor?
7. Has any school or school district provided any assistance through programs, trips, or activities that have contributed to your success in science?
8. How has the school curriculum helped your success in science?
9. Now that we had this discussion, can you pinpoint one or two factors that have contributed to your success in science?
10. Who is most responsible for these one or two factors?
11. If we define *power* as being in control of one's own future, how much power do you have?

APPENDIX I

INTERVIEW PROTOCOL

APPENDIX I

Name_____ Date_____

Pseudonym_____

Interviewer_____ Location_____

INTRODUCTION

I want to thank you for taking the time to talk to me today. I will be recording, taking notes, and later, I will transcribe what we say today. I will be asking you to review the transcription with some of the notes I make regarding my interpretations of what you say. It is important that my writing represent your views and meanings. The transcription will be verbatim, so be prepared to see any "uhs" or "ahs" that you say. If I use any quotes in the final written paper, those "uhs" or "ahs" will not be there. It is important that the transcription be verbatim so that I do not paraphrase something you have said with an incorrect interpretation.

What I am interested in finding out in this study are the factors that have contributed to your success in high school science. I am interested in how your experiences may help others be successful. You have or have had a chance to review the questions I am going to ask you today and give them some thought. I really want to know your perspective, so please feel free to discuss your views. I may ask you some additional questions that you have not reviewed as we go along to clarify for me what you mean. I will be writing notes during this interview to help me keep focused on our topic. Are you ready to start?

Question	Notes
Tell me about yourself. (Probes: what you're doing now, personal life, work life)	
How would you define academic success?	
How do you believe you fit that definition? (Probe: examples)	
Describe how you achieved your current successful role as a science student. (Probe: how, when, where)	
How important do you think it is to be successful in science? (Probe: Explain, give examples)	

Question	Notes
What role do you believe your parents played in your success? (Probe: Did you have a person that helped you at some time? who, when, how, where? Explain the impact that person made. Explain how the impact came about.)	
What impact, if any, did your parents have on your success? (Probe: Who else had an impact? Teachers, friends, other school personnel?)	
What skills do you possess that enable you to be an effective student? (Probe: Which were learned? Intrinsic? Developed?)	

Question	Notes
When I say the word *bias*, what experiences come to mind? (Probe: in school, life, anywhere) How do you approach challenges? (Probe: Examples)	
Tell me about some of your experiences that have made you successful as a student of science. (Probe: positive, negative, humorous, etc.)	
How important is getting a college degree? (Probe: is this why you worked toward being successful in high school science?)	
Do you have additional information that I may not have asked about in this interview?	

BIOGRAPHICAL SKETCH

Antonio Elizondo was born on April 28, 1950, in Mercedes, Texas. He attended St. Joan of Arc Catholic School, kinder thru 8th grades and Weslaco public schools 9th thru 12th grades, graduating with a high school diploma in May 1968. He received a Bachelors of Arts in 1984, Masters of Science in Interdisciplinary Studies in physics in 2005 and a Doctorate in Educational Leadership in 2014 from the University of Texas Pan American.

Antonio Elizondo taught high school physics from 1989 to 2013 where he was department chair from 1995 to 2013. He was a college physics professor from 2008 to 2013. He served as president of the Texas Section of the American Association of Physics Teachers (TSAAPT) in 2002 and is an active member of American Association of Physics Teachers, TSAAPT, National Science Teachers Association, Science Teachers Association of Texas, and Rio Grande Valley Science Association. He was the recipient of the National Tandy Technology Scholar Award in 1993, Outstanding Physics Teacher Award from TSAAPT in 1997, and was awarded the RGVSA Outstanding Secondary Science Teacher Award in 1998 and 2012.

Antonio Elizondo resides with his wife Aminta in Weslaco, Texas. He has two daughters, Mariza and Anita, and two granddaughters, Isabela and Elisa.