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AN EFFECTIVE SCIENCE EDUCATION PROGRAM CAN BE A
DETERRENT TO THE DROP OUT OF HISPANIC FEMALES

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Science Education

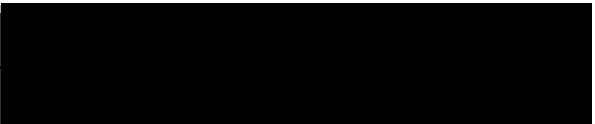
by
Sally Anne Field
September 2005

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ABSTRACT

The common goal of Drop out Prevention programs is to decrease the number of students who drop out of school before graduation. It is assumed that education is an important part of every individual's life. Why then is the drop out rate of the Hispanic community, especially females, more prevalent than that of other cultures and what resiliency methods would be most effective? Many people feel that the lack of academic success is linked to cultural heritage. Early childhood education, family involvement, and mentoring are just a few strategies that have been implemented in many schools across the United States to stop this downward trend.

Inquiry-based science can fulfill the needs of diverse groups of people. Learning styles and environment are major factors in educating the Hispanic female. Peer-oriented, cooperative learning activities are important to the successful engagement of these students. The relationship between the qualities of inquiry-based science and the educational factors of the Hispanic female has a unifying bond. The instructional elements of science education implemented in inquiry-based learning can be a powerful resiliency strategy for Hispanic females.

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TABLE OF CONTENTS

| | |
|--|-----|
| ABSTRACT | iii |
| ACKNOWLEDGMENTS | iv |
| LIST OF TABLES | vi |
| CHAPTER ONE: INQUIRY-BASED SCIENCE AS A RESILIENCY METHOD | 1 |
| Statement of the Problem | 5 |
| Purpose of This Study | 8 |
| Theoretical Bases and Organization | 11 |
| Limitation of the Study | 11 |
| Definition of Terms | 13 |
| CHAPTER TWO: LITERATURE REVIEW | |
| Introduction | 16 |
| Hypothesis | 19 |
| CHAPTER THREE: METHODOLOGY | |
| Introduction | 29 |
| Instrumentation | 30 |
| Data Preparation | 33 |
| CHAPTER FOUR: FINDINGS AND RESULTS | |
| Introduction | 36 |
| Presentation of Findings | 36 |
| Hypothesis | 38 |
| CHAPTER FIVE: SUMMARY | 40 |
| Conclusions | 41 |
| Recommendations | 41 |
| REFERENCES | 45 |

LIST OF TABLES

| | |
|--|----|
| Table 1. Factors that Contribute to Hispanic Female Drop Out | 33 |
| Table 2. Factors of Reform Inquiry Science Education | 34 |
| Table 3. Relationship of Hispanic Learning Styles to Inquiry-Based Teaching | 34 |

CHAPTER ONE

INQUIRY-BASED SCIENCE AS A RESILIENCY METHOD

Might an effective science education program be a deterrent to the drop out rate of Hispanic females? The common goal of all Drop Out Prevention programs is to decrease the number of students who drop out of school before graduation. It is assumed that education is an important part of every individual's life. Why then is the drop out rate of the Hispanic community more prevalent than that of other cultures? The drop out rate of Hispanic males and females is similar, but they drop out for different reasons. The National Science Education Standards (NSES) focus on the comprehensive vision of science education for all students. The content standards describe unifying concepts and processes that are developed over a period of K-12 education. They describe and illustrate the foundation and building blocks of science education and how science plays a role in the everyday lives of all people (National Science Education Standards, p. 20).

U.S. Census figures show that the Latino population is the nation's largest minority group and comprises the student majority in ten of the nation's largest school

districts. The Los Angeles Times reported that nearly half of Latino and African American students in California who should have graduated in 2002 failed to complete their education. According to the Times, Los Angeles Unified School District reported 39% of Latinos and 47% of African Americans are graduating. This is compared to 67% of whites and 77% of Asians (LA Times, pp. A1). Latinas have the highest dropout rate of any other racial or ethnic group according to a report by the American Association of University Women Educational Foundation (Trevino, 2001).

Figures show the drop out rate for Hispanics as twice as many as African Americans and three times as many as whites. Hispanic females have high drop out rates and have the lowest college attendance of any ethnic population (Tinajero, Gonzalez, and Dick 1991). Though the drop out rate of Hispanic males and females is similar, they drop out for different reasons. Males drop out to join the work force, while females drop out to marry or have children (Hale, n.d.). This is their cultural heritage, their responsibility; it is what is expected of them. What programs might the educational establishment promote to lessen the drop out rate of the Hispanic community? What resiliency methods would be most effective in supporting the continuing education of Hispanic females? Might an

effective science education program be a deterrent to the drop out rate of Hispanic females?

According to Dr. Angela Ginorio, co-author of the Si Puede report, "We need to recognize cultural values and help Latinas harmonize these values with girls' aspirations for education and learning" (Trevino, n.d.). The Si Puede study proposes that educators should:

- ❖ Promote careers that are not racial or gender stereotypes
- ❖ Recruit more teachers from the Hispanic community
- ❖ Educate families about the long-term value of a college education
- ❖ Demonstrate that the worlds of young motherhood and schooling can go hand-in-hand

Many people feel that the lack of academic success is linked to cultural heritage and self esteem. Might an effective science program be an encouraging factor in the Hispanic females effort to build educational self-esteem and future success. Because science engages some part of everyday life, ones ability to successfully maneuver daily tasks builds on their educational abilities.

School atmosphere may also have damaging effects on the development of a Latinas self-esteem and

self-confidence. According to one young Santa Fe Latina, some neighborhoods consider it "anglo" or "nerdy" to do well in school, and that school makes you feel like a dumb Mexican (Headden, 1997, p. 64). Because the students speak Spanish, they are assumed to be gang members and are faced with stereotyping and low expectations. This attitude encourages the girls to cruise with their "low rider" friends and not worry about the future. Somewhere, somehow interventions need to be put in place to change this stereotypical attitude emerging from the schools. Early childhood education, community, family involvement, and mentoring are just a few of the strategies that have been successfully implemented in many schools across the United States to identify this downward trend.

Many of the reforms in science education can address the cultural problems of stereotyping and self-esteem that are faced by many young Latinas. Science education reforms are based on sound teaching principles of concepts and understanding, with more definitive instructional strategies being used. The understanding of a concept is not the regurgitation of information; it is the ability to parlay the idea into practicality. It is not necessarily the breadth of knowledge; it is the depth of knowledge that is most important. Reforms in science education are

emphasizing strategies that are applicable to all students. The main emphasis is on "all," regardless of age, gender, cultural or ethnic background, disabilities, interest or motivation. Equity is an underlying principle for the National Standards.

Whether or not one realizes it, science is an important aspect of everyday life. It contributes to independent thinking and self-esteem for all people regardless of gender or culture. Each day decisions are made that require scientific information or ways of thinking. Students need to be scientifically literate in order to make informed choices or decisions. Whether at home or in the workplace, important decisions are made on a daily basis. Employees need to be able to learn, reason, think creatively, make decisions, and solve problems. These attributes will contribute to their ability to hold life-long meaningful, productive jobs. Understanding science contributes to these skills, and concomitant self esteem and ability to contribute to one's own and others lives (NSES, p. 1).

Statement of the Problem

The perceived gender roles of the Hispanic female have a direct effect on a Latinas choice of careers or

their decision to leave school early. Hispanic adolescents, both male and female, are united by customs, language, religion, and values. Family commitment is of utmost importance in the Hispanic culture revolving around a strong support system and family loyalty. Teachers find this ethic hard to challenge. There is a deep sense of family duty that includes a hierarchical order among siblings, especially the males. Males are considered to be dominant and strong, while the females are considered more nurturing and self-sacrificing (Dunn, 1996).

Many Hispanic females do not perceive the likelihood of doing well in school, therefore are dropping out to start families. They strive to live up to expectations imposed by family and friends, many times opting to give in to the demands of their friends to skip school, and to their companions' urgings to have sexual intercourse (Trevino, n.d.). They feel like they are doing what is expected of them. The most common factors affecting the Hispanic female drop out rate are marriage and pregnancy (Lindner, 2004). The traditional mindset of the Hispanic culture is such that the female is seen as the one who raises the children and is the housewife. Therefore, Hispanic females will dropout of school to stay home and care for their baby.

With the focus on "all students" several strategies become very important in science education. Cooperative learning is especially important in the Hispanic culture. Their cultural role is one of helping, working together, cooperation, not of the so-called "oneness," of several other cultures. Family ties are very strong and reflect positively on ones hierarchical role (Dunn, 1996). Thus, engaging students and community in understanding the role of science in family life and the work place is important. Science content should be presented in a way that shows relevance to ones everyday lives not minuscule information that is of little consequence in today's world. Knowing that students learn best by investigation, inquiry-based strategies should be encouraged. The inquiry process promotes skills such as observation, inference, and experimentation. It teaches the skills necessary to become independent thinkers, not just about our world, but also about everything around us. Inquiry is at the crux of science education. Along with other reforms, these qualities appear to match the needs for drop out prevention.

Purpose of This Study

The purpose of this study is to look at parallel factors between the Hispanic female dropout rate and possible resiliency methods such as retention through inquiry based science education. This type of educational program might provide insight into the many educational possibilities that are open to Hispanic females. Hopefully, through an effective inquiry-based reformed science education program and the awareness of role models in the field of science, Hispanic female students will learn to value their educational opportunities as well as their cultural heritage.

The spirit of science education relies on effective teaching. The science education standards (NSES) provide the guidelines for effective science pedagogy for all students. The elements by which teachers are guided are divided into six areas:

- ❖ The planning of inquiry-based science programs.
- ❖ The actions taken to guide and facilitate student learning.
- ❖ The assessments made of teaching and student learning.
- ❖ The development of environments that enable students to learn science.

- ❖ The creation of communities of science learners.
- ❖ The planning and development of the school science programs.

According to the NSES, effective science education programs should enable students to work together as active learners and expand the theory and practical knowledge of science and learning into relevant scenarios. Teachers should assess themselves, as well as their students, to conduct the best possible program for "all" no matter what similarities and differences prevail.

In addition to school science education there are many extracurricular programs available to female students that encourage students to experience science related curriculum.

Programs provided by the Jet Propulsion Lab (JPL) in Pasadena, are on a rotating schedule based on interest. One in particular is "Introducing a girl to Engineering Day at JPL." This is an all-day event presented by women in the science field. Students are in groups of three or four girls with two female engineers to guide the presentation. Discussions revolve around interests, challenges, why and how they decided to become involved in science, but most important, who encouraged them to follow their dreams or aspirations for higher education.

Coca-Cola sponsors a nationwide effort to enlist would-be dropouts as tutors for younger children.

Disney Channel Young Scientist Challenge hosts competitions for science fair projects. Out of the top 40 middle-school scientists in the nation, twenty-two were female. One young woman stated that her parents and some excellent teachers were her mentors. They taught her to question why things are like they are. Until she started working on a science fair project, her interest was waning. Once she started winning, there was no turning back. She loves science and engineering and plans on discovering something very important in her future (L.A. Times, 2005)

The Sally Ride Festival is another means of introducing girls to science in a very non-threatening atmosphere. Festivals are scheduled at different locations throughout the year. One such festival held in 2002 at the University of California Riverside, was attended by thousands of young girls. The event was very organized with students branching out into various presentation areas. Lunch was provided and Sally Ride made a presentation encouraging young females to get involved in science education. The enthusiasm was contagious. Young girls having their picture taken with a real astronaut,

having their books autographed, and meeting students on a college campus made a future in science and a college education appear realistic.

Theoretical Bases and Organization

Inquiry based science teaching and learning are the most effective means for providing opportunities for all students to learn.

Limitation of the Study

Certain limitations in this type of study do abound. It would be interesting to interview Hispanic female students to hear from the students themselves about their aspirations for the future. If culture did not play such a large role in their lives, if they were aware of the programs available to them, or of the numerous Hispanic female role models, would they be more apt to join the educated work force and make a more lasting contribution to society. Hispanic students encounter few individuals that support their interest in science. If they felt supported in a decision to engage in such a nontraditional role would the path be easier to follow. Developing an awareness of science careers enhances students' confidence to not only learn science, but to pursue science related careers (Posnick-Goodwin, 2005).

Another limitation involves gender equity. Would Hispanic females be more confident in pursuing a future in science if they were not invading a male dominant subject area? It would be interesting to separate males and females, provide the same curriculum, and evaluate the outcome. This obviously, would be time consuming, as well as costly for the public sector. Many private schools do offer single-sex schooling. Girls and boys both feel more comfortable in single-sex surroundings. Girls don't have to worry about how they look or how they act. They are not afraid to act smart because the boys will make fun of them. Boys are more comfortable to just "hang with the guys," they understand where each other is coming from (Posnick-Goodwin, 2005). A former high school physics student recalls being the only girl in the class and being ignored by male students and the teacher. It was as if she shouldn't be there, that girls do not perform as well as boys. She also states that it was not very encouraging. This is not a conducive environment to help make decisions regarding ones future. Research has found student-teacher interaction in science classes to be biased toward boys. Differences in treatment contribute to girls' lower self-esteem, self-confidence, and reduced risk taking (Beyond, n.d.).

Another drawback is that there is little information on the specific reasons for the drop out rate of Hispanic females other than marriage or impending childbirth. It seems as if dropping out is a cultural expectation and there are no alternatives. The lack of statistical information regarding females dropping out is also discouraging.

Definition of Terms

Alternative schooling - Alternative schools offer

additional opportunities to obtain a high school diploma or the GED to students with unique learning interests or disabilities, teenage parents, potential dropouts, violent individuals, or court-adjudicated youths and those in juvenile detention systems.

At Risk - Students in danger of dropping out of school

because they are alienated from school, have a low level of achievement, and/or have a range of personal problems. (beyond 22)

Drop out - leave school or an educational program prematurely

Early Childhood Education - An intervention process that teaches strategies to kindle a child's development

and help parents handle discipline and health problems.

Family Involvement - Families become more involved in their children's education when schools build relationships that engage parents as active partners early in their children's education.

Gender Equity - ensuring that all boys and all girls-- regardless of age, cultural or ethnic background, or disabilities--have the support they need to become successful science students and feel respected and challenged.

Mentor - Mentoring involves a one-to-one supportive relationship between a mentor and a mentee that is based on trust. The mentor is committed to providing guidance and support for the mentee to develop their fullest potential.

Parental Involvement - Assists in socializing parents to expectations of their children in science.

Service Learning - A teaching and learning method that connects meaningful community service experiences with academic learning, personal growth, and civic responsibility.

Resiliency - the ability to thrive, mature, and increase competence in the face of adverse circumstances or obstacles.

CHAPTER TWO

LITERATURE REVIEW

In a society that values education as the key to opportunity, it is essential that there be efforts designed to support the nation's most disadvantaged youths in achieving all they can, and equipping them with the necessary skills and education to become a successful generation.

(Lee, March-April 1990)

Introduction

Students drop out of school for many reasons; some that are beyond the control of parents, schools, and communities. Whether the problem is language, low socio-economic factors, low academic self-esteem, to help out families or start new ones, the students believe there is no other choice. A series of articles published by the Sacramento Bee in July of 1999 indicated the high drop out rate was due to the fact that youth are caught between two cultures, that of school and American Society verse family and Hispanic traditions (Sacramento Bee, 1999). Lack of academic success may be directly linked to these factors. For others though, especially females, there are several strategies that might be implemented to improve their

chances of completing their basic education. These strategies might include early childhood education, family involvement, mentoring/tutoring, focusing on student goals, encouraging school involvement, or even alternative schooling.

The school dropout rate for Hispanic students remains a consistent problem. They enter school later, leave earlier, receive fewer high school diplomas and college degrees than other Americans, and remain among the most undereducated segment of the U.S. population (Hispanic Student, p. 1). This becomes a dilemma as the Hispanic population continues to increase dramatically. The Hispanic population is expected to become the largest minority in the United States, or twenty-one per cent of the population, by the year 2010 (Hale, n.d.).

The drop out rate of Hispanic students is increasing dramatically. Studies show that one out of ten Hispanic students drop out of school each year. They comprise twelve per cent of the high school population, and make up approximately twenty-two percent of the dropouts. Half of the students that drop out of school are of Hispanic descent (Montecel, 1997). Some common perceptions of Latino students:

- ❖ All have little education, most are school drop outs
- ❖ Most are involved in drugs
- ❖ Parents are not interested in their children's education
- ❖ Most are lazy, welfare dependents. (Helping Hispanic, 2002)

According to Professor Hugh Mehan, University of California, San Diego, Hispanic students drop out because they realize that no matter what they do, or how hard they work, they will always be relegated to low-paying jobs. For these reasons, the students' act out or cut class, ignore homework, and eventually drop out of school (Hispanic Student, n.d.). Several other factors that affect the education of Hispanic children include living in poverty, rarely attending preschool, not being read to, and as expected, the language barrier. Hispanics feel that the schools fail to meet their needs. They think schools disrespect their culture, neglect their language problems, and set low academic standards that reduce expectation of their children (Headden, 1997, p. 64). Students can't help but reduce expectations when the standards are set so low. High standards need to be across the board as education is not a "one size fits all" (Headden, 1997). Interestingly,

more children of immigrants are dropping out of school than the immigrants themselves (Duran, 1997). As hypothesized, much of the current research leans toward cultural issues, as well as the language barrier, having a direct effect on the high number of Hispanic students that drop out of school.

Hypothesis

Solutions to drop out prevention are many. Early childhood education is an intervention process that teaches strategies to kindle a child's development and help parents handle discipline and health problems (School Dropout, n.d.). It is common knowledge that preschools help provide children with the necessary academic and social skills to perform effectively in school, but parents also need to make an effort to become involved in their children's academic lives by reading to them. Hispanic families that are economically disadvantaged may send only their male offspring to preschool, being of the impression that the necessity for females to go to preschool is not of importance (Headden, 1997). There are other opportunities for early childhood education that are more cost effective, such as library story time, interactive play groups, and cooperative preschools.

Another strategy that is highly effective is that of family involvement. Schools need to encourage relationships between the parents, teachers, and the students. Family involvement in school sponsored activities such as summer science programs, weekday programs or even a Family Science Night would improve student self-concepts regarding science and math abilities (Ramirez, Laurel, & Rodriguez-Aguilar, n.d.).

The Festival of Books, which is held annually on the UCLA campus, is a perfect opportunity for parents to support and encourage their students reading. This activity provides an opportunity for the entire family to spend the day together looking at books, meeting authors, and for many it is an introduction to a college campus. The Ontario Montclair School District provides bus transportation to the event as an extra-curricular field trip.

As evidenced in Strategies and Successes, programs should be organized so that they involve parents in a comfortable situation allowing them to become engrained in their child's daily routine, academic and otherwise. Parents need to help students understand that the decisions they make can seriously disrupt their ability to finish school, and that they have a definite effect on the

rest of their lives. Being that the family is the basic support group throughout ones life, this is where parents need to encourage and motivate their children to be successful, regardless of their gender. Parent involvement is important, but true involvement is rare (Strategies and Successes, 1995).

Studies conducted by the American Association of University Women found a decline in self-esteem of young girls through adolescence. With impending adolescence females are less confident in themselves, their abilities, and often limit their views of the future. According to several reports ability to "do math and science" is affected by their experiences. Children should be given opportunities that influence their attitudes toward science in a positive way, through a variety of interventions while in elementary school. Interventions at elementary levels increase student efficacy as they enter courses in middle school (Ramirez, Laurel, & Rodriguez-Aguilar).

Beyond Title IX: Gender Equity Issues in School addresses the many difficulties Hispanic females incur while attending school. Students may feel a sense of alienation from school, a lack of success, or that school is not worthwhile. Many times they feel minimized because

they are female, that their teachers have lower expectations of their performance in science, and that they are inferior problem solvers. Probably the most identifiable factor in the Hispanic female drop out is the belief in the traditional gender-role stereotypes. This is where family and teachers have an important responsibility in building self-esteem. According to the study, family and school rather than peers have the greatest impact on the self-esteem and aspirations of young people (Gender Equity, n.d.). Mothers especially, have a strong influence over their daughters that may have a negating effect as they often are poorly educated and exhibit lower expectations of their daughters (Tenajero, Gonzalez, & Dick, 1991). Parents of dropouts tend to view school negatively, are minimally involved, and place little value on school attendance and achievement. Issues critical to remain in school are built around social networks connected to school activities and developing a sense of "belonging."

Duran suggests mentoring/tutoring as another strategy that provides the guidance and support necessary to keep a student from dropping out of school. The classroom teacher usually provides this program to students who have a difficult time reading (Duran, 1997, n.d.). The

traditional one-to-one relationship helps students feel that someone really cares about them and wants them to develop to their fullest potential. Yet Latinos account for only three percent of the teachers from a public school population of 13.5% Hispanics. It is not to say that minority teachers are better teachers of minority students, but they would certainly play a significant part as role models. Perception of self is many times parlayed through the teacher. If students don't see anyone who looks like them, they may not feel that teaching is an attainable goal. Peer tutoring, student-to-student, helps students see other students as a resource, not just a problem. Peer relationships also build social networks connected to school, therefore, developing a sense of "belonging" and involvement (Strategies and Success, n.d.).

Though research shows that alternative schooling is not necessarily as effective as most believe, some programs have wonderful results. One such project, called CaRed "Keep Youth in School," was funded by the children's Bureau, Administration for Children, Youth and Families in 1987. This was a three-year research and demonstration project, targeting 12 to 15 year old minority students who were at risk of dropping out of school. The incentive

program included guest speakers, sports contests, and activities such as camping and mountain climbing. Participants who were doing well in school and participating in extracurricular activities were recognized in a newsletter. Award ceremonies were also held twice a year to recognize outstanding academic improvement. Major corporations, Marriott, Bob's Big Boy, and Roy Rogers, assured the youths of entry-level positions when they reached sixteen (Lee, 1990, p. 4).

Results show that since CaRed's inception in 1986, only six of the ninety-seven participants had dropped out. The eighty-seven active participants established and maintained relationships with their peer mentors and participated in the incentive programs. This project concurred with studies that show a direct relationship between absenteeism and drop out rates. "Keep Youth in School," demonstrated that peer mentors, employment training, and incentive aspects are effective ways of motivating youth (Lee, 1990, p. 4).

Early childhood education, family involvement, mentoring/tutoring, and alternative schooling are effective strategies in decreasing the Hispanic drop out rate. This does not mean these are the only effective means of decreasing the numbers; there are a multitude of

others. These merely act as an umbrella, to help delineate all aspects of the school environment. Though they are encompassed by the above umbrella, attendance, behavior, attitude, and achievement, are all-important elements of school that need to be addressed on a personal level with each student.

Given that a lack of academic success may be linked to cultural values is still in dispute, more in-depth research needs to be completed. Most sources agree that socio-economic level, parents' education, single parenting, diverse background, and language barriers directly affect academics. School personnel need to become more aware of traditions and customs of the Hispanic culture. For example, the male birth order plays a role in the responsibility of a son and might have a direct effect on his schooling, or if a sibling drops out of school one might feel the need to do the same. Daughters, on the other hand, are relegated to more nurturing, maternal roles.

Another area of concern in the education of Hispanic students is that of learning styles. All students need to experience success and those chances are better when they learn in their preferred mode. Knowledge of learning-style preferences might increase academic achievement and more

positive attitudes toward learning. Investigations (Dunn, Griggs, & Price, 1993; Jalali, 1988; Yong & Ewing, 1992) comparing various ethnic groups from elementary through college levels identified twenty-one elements of learning, grouping them into five categories; environmental, emotional, sociological, physiological, and psychological. The environmental category included sound, temperature, design, and light. Elementary and middle school students prefer cool temperatures and formal design. Emotional learning styles are represented by responsibility, structure, persistence, and motivation. Though Yong and Ewing found middle school adolescents conforming, a 1988 study by Sims reported Hispanic third and fourth grade students the least conforming of the ethnic groups studied. Both studies agreed that the Hispanics required a higher degree of structure than the other groups (Dunn & Griggs, 1996).

Dunn and Griggs shared information on social patterns as a focus of the sociological learning style. Hispanic students required more sociological variety than either African Americans or Caucasians. Males tend to be authority oriented, while females were peer-oriented. Physiological learning style elements relate to time of day, food and drink intake, perception, and mobility.

Caucasian and African Americans strength lies in auditory and visual learning, while the Latinos' strongest perceptual strength was kinesthetic. As Caucasians exhibited a high need for mobility, Latinas' had a higher need for mobility than their male counterparts. Psychological learning relates to global versus analytical processing. This learning style is based field dependence/independence. Latinos are definitely more field dependent, meaning they are more group-oriented, cooperative, and less competitive than field independent individuals (Dunn & Griggs, 1996). This cooperative role relates back to their cultural roots. If teachers are aware of the different learning styles they can vary their instructional techniques to provide a meaningful and successful learning experience for the students (Gender Equity, n.d.).

Education is the means by which children of immigrants enter the economic mainstream of our society. As a nation of immigrants, our schools should give children from all cultures and backgrounds the opportunity to learn science effectively and successfully (Duran, 1997). Based on our countries best traditions and values, equal access to a quality education is a right that all citizens enjoy. These rights provide the opportunity for

all students to enhance their learning, their self-esteem, and their ability to become a contributing member of society.

When adults see that students who they thought would drop out of school are, when given the opportunity, inspirations and positive leaders to their peers, motivated learners to their teachers, sources of pride to their parents and contributors to their communities, a transformation occurs. They begin to see what is possible for all children. They begin to question their beliefs about students who may look different from them or speak another language. (Montecel, 1997)

CHAPTER THREE

METHODOLOGY

The purpose of this section is to describe how the study was organized and conducted.

Introduction

This is a qualitative study of the educational dropout rate of Hispanic females and the potential for reformed inquiry-based science education to alleviate the risk of Hispanic females dropping out of school. Many issues, from infancy to adolescence, are involved in the resolution to dropout of school. Information on Hispanic female drop out was obtained from journals, magazines, books, newspaper articles, Internet connections, telephone communications, conference attendance, and personal communication with Hispanic females in the work force. Also included in the study methodology is correspondence from former students that share their accomplishments who then return to address students on the importance of completing their education. The range of dates of the sources is from 1987-2005.

Instrumentation

The study was structured into three different categories that addressed Hispanic female drop out in the literature. Issues of relevance were discussed in the categories of 1) cultural heritage and reasons for leaving school, 2) school atmosphere, and 3) resiliency. The major resiliency method addressed in this study is inquiry-based science. Various strategies used in inquiry-based science might help alleviate the dropout problem.

Information concerning cultural heritage was gathered and sorted into subsets delineating the different aspects of the culture. The subset of educational issues was a focal point of this study, especially that of the Hispanic female. In an attempt to discover what motivates Latina students, it has been found that cultural heritage is one of the dominant factors. The traditional expectations of Hispanic youth, especially female, are tremendously dominant. Studies report that marriage and pregnancy expectations of Hispanic females are one of the primary reasons for dropping out of school.

The second category regarding school atmosphere was obtained from a collection of periodicals concerning learning traits and conditions that are relevant to learning styles of Latino students. Attendance at Senate

Bill 65 Conference, drop out prevention workshops, also promoted school and classroom atmosphere, as an effective method in realization of student needs. Based on research Hispanic students prefer: peer-oriented learning, kinesthetic instructional resources, a high degree of structure, variety as opposed to routines, and a field-dependent cognitive style. Classroom atmosphere should emphasize the learning styles and environments that are preferred by Hispanic students and try to match instructional resources to meet individual needs.

The third category, resiliency methods, also plays a major role in drop out prevention. Conferences with JPL education assistants, as well as attending the Sally Ride Festival with several students, provides dramatic evidence that different strategies, play different roles in the minds of our youth. Many articles and editorials discuss the need for smaller classes that allow the students to be involved in more relevant learning experiences. Helping parents become more involved in their child's education makes the student feel valued and important. The Hispanic culture is traditionally a proud culture. Students enjoy being able to create positive images for their parents.

Inquiry-based science appears to offer a major resiliency strategy by meeting the retention of Hispanic

females. The National Science Education Standards (NSES) highlight the need to give students the opportunity to learn science. The standards are based on the premise that science is an active process, therefore what better way to engage students than by using inquiry-based learning strategies. Inquiry-based learning is a method of exploring physical and natural phenomenon in a way that students learn scientific principles. In this type of learning students have the opportunity to find answers to questions that engage them in an area of learning determined by the teacher and explored actively by the students. They will come away with a deeper understanding of the science concept; learn more, as well as becoming more skilled in problem solving. Teachers using the inquiry method of instruction require students to support their claims, encourage questions, and inspire students to discuss subjects in depth. While they work together with their peers, students are learning cooperatively, using hands-on techniques, researching, interpreting, and solving problems, but most important, they learn by doing.

Current issues addressed in the teaching of Hispanics have to do with their many learning styles. Looking at the specific strategies of inquiry-based instruction it is evident that this type of instruction might play an

important role in the educational outcome of the Hispanic community.

The literature reported factors that contribute to Hispanic female drop out. The literature also reported the factors related to inquiry-based science. By comparing the factors that contribute to the Hispanic drop out rate and the factors of inquiry science education, a relationship between the two is apparent as shown by the following charts:

Data Preparation

Table 1. Factors that Contribute to Hispanic Female Drop Out

| LESS EMPHASIS | MORE EMPHASIS |
|--------------------------------|--------------------------------------|
| Traditional gender stereotypes | Gender equity in education |
| Male dominance | Female self-confidence |
| Low academic expectations | building self-esteem to perform well |
| Social expectations | Available options |

Table 2. Factors of Reform Inquiry Science Education

| LESS EMPHASIS | MORE EMPHASIS |
|--|---|
| Treating all students alike | Understanding and responding to individual interests |
| Focusing on student acquisition of information | Focusing on student knowledge, ideas, and inquiry process |
| Presenting scientific knowledge through lecture, test, and demonstration | Guiding students in active and extended scientific inquiry |
| Testing students for factual information at the end of the unit or chapter | Continuously assessing student understanding |
| Supporting competition | Supporting a classroom community with cooperation, shared responsibility, and respect |

Table 3. Relationship of Hispanic Learning Styles to Inquiry-Based Teaching

| LESS EMPHASIS | MORE EMPHASIS |
|-------------------------------------|--|
| Negative cultural influence | Inquiry based teaching strategies that fit diverse student needs |
| Auditory and visual learning styles | Kinesthetic oriented activities |
| Independent field strategies | Field dependent, cooperative strategies |

This is a qualitative study of the educational drop out rate of Hispanic females and the potential for reformed inquiry-based science education to alleviate the risk of dropping out of school for Hispanic females. The data in the literature presented factors that contribute to Hispanic female drop out. The literature also reported factors involved in inquiry-based science. By organizing the data from both Hispanic female influence and inquiry-based science a relationship emerges that indicates the inquiry-based science can be a powerful resiliency strategy.

CHAPTER FOUR

FINDINGS AND RESULTS

Introduction

The more/less emphasis comparison as shown in the methodology section clearly shows how the qualities of inquiry-based science teaching is directly related to improving science education for a diverse school population, especially that of the Hispanic female. Topics in the more emphasis column will implement the needs of the learning styles of these students. Through the use of cooperative learning, kinesthetic oriented activities and continuously assessing student learning, students build a sense of responsibility to their peers as well as themselves. By guiding individual interests with the inquiry process, a comfortable environment that promotes confidence and self-esteem will promote educational success.

Presentation of Findings

Findings of the study confirm the role cultural beliefs play in a teenager's decision to dropout of school. The decision to dropout is affected by language, gender, learning styles, socio-economics, demographics, familial expectations, peer pressure, and religion, while

other issues such as marriage and pregnancy are the primary reason for Hispanic females to dropout of school.

While language is an obvious barrier to academic success, it is not the only one. Many Hispanic children live in poverty, they rarely attend preschool, and their parents, often illiterate or poorly educated, seldom read to them. These young Hispanic children are starting school with a significant disadvantage. Some students in Mexico attend schools in remote areas, with overcrowded classes that are sometimes limited to primary grades. When they come to America, parents don't require much from American schools because of the weak academic traditions they are accustomed too (Headden, 1997).

Strong family loyalty and allegiance often puts Hispanic students in conflict with the behavioral styles of mainstream USA. Rejection of ethnicity and attempts to conform to Anglo culture many times result in problems with self-image. Research indicates that teachers and counselors should be aware of the cultural characteristics and preferences that enhance the learning of Hispanic students. More specifically, the students prefer a cool environment, conformity, and peer-oriented learning. They have a field-dependent cognitive style, like variety as opposed to routines, and they prefer resources that are

kinesthetic in nature (Dunn, 1996). These preferences surmise a correlation to hands-on, inquiry-based learning.

Hypothesis

As described in the methodology, inquiry-based learning is a method of exploring physical and natural phenomenon in a way that students learn scientific principles. In this type of learning students have the opportunity to find answers to questions that they pose about a topic. They will come away with a deeper understanding of the science concept; learn more, as well as becoming more skilled in problem solving. Ohio researchers confirmed that inquiry-based approaches might improve scores, even among girls and minorities. Hands-on activities with different types of equipment may strengthen female students' confidence and understanding. Strategies that complement successful learning should be instrumental in science education, especially for Hispanic females. Traditionally, females and minority students have not performed well in science and are more likely to opt out of science after middle school.

Students' interests in careers involving science develop between fifth and sixth grade. Middle school also plays an instrumental role in guiding students career

aspirations. Promoting inquiry-based science related activities would develop more positive attitudes toward science careers. This is a crucial time to develop confidence, academic awareness, and the ability to succeed in the mindset of young Latinas.

Often times Hispanic youth follow the same occupational preferences of their parents. Tradition edicts daughters do not need an education, but a good husband. The cultural expectation of the female is to be a good wife, have children, and be nurturing (Sacramento Bee, 1999).

CHAPTER FIVE

SUMMARY

Many Hispanic females have a difficult role in society. Due to cultural traditions, their path in life is somewhat limited as opportunities to advance are met with resistance in the countenance of familial and social expectations. Though the Latinas nurturing role in life is highly revered by the Hispanic culture, it does not lend well to opportunity or potential academic achievement. Ways to motivate young Hispanics to aspire to reach their potential and fulfill their dreams is unquestionably in need of repair. As stated in the review of literature the lack of role models is detrimental to the young Latinas image. Hispanic female role models can be great motivators for young women, as they have the ability to instill self-confidence and courage in the mindset of young girls. Providing a vision of opportunity to fulfill their dreams will give Latinas incentive to break traditional barriers to accomplish their goal.

The methodology section discussed the categories of cultural heritage, school atmosphere, and also resiliency methods that would be beneficial to the Hispanic female. As the instructional strategies that inquiry science are

based on replicate the needs of the Hispanic female, implementation of this method of instruction should be apparent to the educational community.

Conclusions

In response to the main objective of this study, an effective science education program can be a deterrent to the drop out rate of Hispanic females. With science reform and the content standards emphasizing the inclusion of "all" students, inquiry-based learning meets the cultural needs of the Hispanic female. The social and cooperative attributes of the Hispanic female fit well into inquiry-based strategies, as do the physiological aspects of mobility. Inquiry-based learning is about questioning, problem solving, and cooperative learning, which also fit nicely with the peer-oriented learning style of the Hispanic female.

Recommendations

If the emphasis in education is really on "all" students, individual needs must be met. The specific needs of each student should be looked at during the middle school years. During the adolescent years, students tend to progress or regress. Female students are trying to fit in with the group, especially socially. The traditional

cultural values of the Hispanic female make decisions regarding school and family expectations difficult to formulate. These needs can be met with an effective inquiry-based science program. Exploring and defining problems, together with critical thinking skills play a major role in the foundation of inquiry-based learning. These same skills are necessary to complete daily activities and to contribute as a responsible citizen in society. If Latinas had the opportunity to attend activities, workshops, or expos related to science, they just might envision themselves as capable of accomplishing more specific goals. Hispanic female role models would demonstrate how attainable their goal really is.

Cultural issues are still the mainstay of the Hispanic female drop out rate, but there are possible remedies to help alleviate this problem. There are several viable recommendations pertaining to cultural heritage, school atmosphere, and resiliency methods that would be to the advantage of the Hispanic female.

Cultural heritage is probably the most difficult to overcome. Heritage involves tradition and tradition is often times hard to change. Parents have to understand that their daughter's education is just as important as their son's. That she also has the ability to become a

contributing member of society. Parents need to realize that education is important to all children, regardless of their gender.

Schools also need to be more pro-active in the dilemma of the Hispanic female. Learning styles and classroom atmosphere are not the only school situations that need to be addressed. Opportunities for mothers-to-be to complete their education need to be addressed so that they have a choice in the situation. Schools need to instill in the parents the idea that education is important and to encourage their daughter to complete high school.

Last, but not least, is the resiliency factor. There are a multitude of resiliency methods that are practiced daily across the country, but none of them deal specifically with science. Science is a curriculum area that appeals to most students, regardless of ethnicity. The questioning, exploring, hands-on activities, and cooperative learning are just a few of the instructional strategies used to engage students in learning situations. The learning styles of the Hispanic female are directly correlated with inquiry-based science. Inquiry-based science education should be implemented in all schools not

just to learn science, but also to enhance "all" students' abilities to cope with life's daily challenges.

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