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Spanish Science Resources for a Kindergarten Dual Language Classroom

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SPANISH SCIENCE RESOURCES FOR A KINDERGARTEN DUAL LANGUAGE CLASSROOM

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by

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ABSTRACT

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The high population of English Language Learners (ELL) in the United States has impacted the educational system. Accountability for meeting high stakes tests and state standards has been a constant pressure for many schools that have a high concentration of ELL. School districts have adopted different programs to meet the needs of ELL. These programs focus on making academic content more relevant and comprehensible so students can meet state standards. One of the programs that has proven to be successful in meeting ELL needs is dual language. However, a challenge for many dual language programs that target English and Spanish is the lack of Spanish resources. This project's purpose is to reduce the impact that the lack of Spanish resources has on a dual language program. Ten Spanish science lessons on frogs will be developed to ameliorate the lack of Spanish resources and to help kindergarten teachers better serve their students. Research will be conducted to better understand the aims of this project.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

CHAPTER I

PROJECT BACKGROUND

Immigration has changed the public school population in the United States. By 1980 over 16 million Latinos immigrated to the U.S and entered the public schools. The first language of these Latinos was Spanish. By the 2003-2004 school year, U.S. public schools had 5.5 million English Language Learners (ELL) enrolled (Echevarria & Graves, 2007). Immigration led to the growing population of ELL in the U. S since the 1800's (Digest, 1995). The growing number of ELL in U. S public schools is one of the reasons why teachers and researchers have spent time trying to ensure ELL are able to meet state and national grade level of proficiencies in all academic areas.

Throughout the history of American education, in regards to meeting ELL needs, the educational system has created several programs. ELL receive instruction with the focus of attaining high English proficiency levels. The learning environment is crucial for ELL because teaching needs to reflect the school and community environment. When teachers conect content to students' experiences, then ELL are able to understand academic content (Verdugo & Flores, 2007). ELL's education needs programs that offer students the opportunities to relate content to their life experiences in the community. Many programs have been created with the intent to ameliorate the achievement gap that many ELL have compared to English only students. Those programs are: English as a Second Language (ESL); Pull out and self contained, Transitional Bilingual Education (TBE); Late and early exit, Two- way dual language and One- way dual language programs.

Some of the programs created in an effort to address ELL needs ended up being subtractive. Subtractive programs are the ones where students often lose their primary language, because they do not have opportunities to use it (Echeverria, Vogt, & Short, 2008). Programs that are considered subtractive are TBE (Transitional Bilingual Education) late exit, TBE early exit, content-based ESL and ESL pull out programs (Gomez & Gomez, 2007). These programs fail to fully address ELL students' needs, because they do not provide support in the students' native language (Gomez & Gomez, 2007). An effective program for ELL uses best practices and incorporates the student's native language. Best practices are techniques that can be reliable and are proven to work when addressing students' needs ("Library of Congress", 2009).

Currently, the programs that use best practices are the two-way dual language programs, one-way dual language program and maintenance bilingual program (Samway & McKeon, 1999). Dual language instruction implements best practices for ELL and is proven to be one of the reasons why many ELL are meeting grade level expectations. A dual language program gives ELL the opportunities to learn through best practices. At the same time, dual language programs provide Anglo and Spanish speaking students the opportunity to learn English and Spanish. This means both groups are learning a second language and are not segregated like in ESL programs (Gomez & Gomez, 2007). A dual language program is an additive program because it provides reach opportunities to add a second language to all students' repertoire.

Dual language programs align subjects to Washington State's Essential Academic Learning Requirements (EALRs). Dual Language schools use academic curriculum in accordance with the state standards. State standards are important for dual language

schools because they are held accountable for all students learning as any other program in the state. Dual language schools align instruction and curriculum to state standards (Quintanar, 2004). Teachers are intentional about teaching language and content at the same time. One of the areas in which dual language schools are struggling is having materials in the second language. The case for Spanish Elementary is the lack of Spanish materials.

Statement of the Problem

The United Sates' educational system has failed to address the needs of ELL (Fordham, 2008). NCLB (No Child Left Behind Act) has helped focus more attention on the needs of ELL. This demonstrates that ELL were ignored in the U.S public education system. According to the Washington Summary in Education conducted in 2008, ELL became visible when they started disaggregating data by race and language (Fordham, 2008). The needs of these students were often ignored, but NCLB made schools more accountable for all students' learning. Schools that have a high concentration of ELL subgroups need to address their needs in order to meet Annual Yearly Progress (AYP) (Fordham, 2008).

Dual language programs address ELL needs and all students gain a second language. Most dual language schools are meeting AYP compared to schools that have a high concentration of Hispanic students but do not receive dual language instruction (Gomez & Gomez, 2007). The problem arises when dual language programs have a lack of materials. To be able to implement a dual language program properly, schools need to have the materials in the language that is to be taught. Teaching a second language is not

about directly translating materials, but rather providing students with authentic opportunities where they can develop a second language (Gomez & Gomez, 2007).

NCLB has impacted the amount of time that teachers spend teaching science. Teachers have cut science time to focus on language arts and mathematics instruction (Griffith & Scharmann, 2008). Science plays an important role in the everyday life of a child because it helps the child to build on pre-existing understandings about the world (Donovan, Bradsford, & Pellegrino, 1999).

Assessments in science are needed so students can start taking ownership of their learning. Assessments must tap understanding not to just determine the ability to repeat facts or perform isolated skills (Donovan, Bradsford, & Pellegrino, 1999). In this project, assessments will be carefully developed to measure scientific understanding and Spanish language. Research shows that frequent high quality assessment can have a positive effect on student achievement (Atkin, Black & Coffey, 2001).

This project will not only help kindergarten teachers be more effective, but will also help teachers teach Spanish more effectively. Spanish Elementary School has recently obtained a frog unit as part of its science curriculum. All materials and lessons are designed in English. This presents a problem since Spanish Elementary School is a dual language school and science must be taught in Spanish. Another problem that exists is that the frog unit lacks suitable materials for a dual language school. There are no materials in Spanish. Therefore, in order for teachers to effectively teach the frog unit, in a dual language setting, they must have Spanish resources and materials.

Purpose of the Project

The purpose of this project is to create 10 Spanish lesson plans on frogs for kindergarten that will strengthen science instruction at Spanish Elementary. The lessons will align with Washington State Science Standards and use the Focus, Explore, Reflect, and Apply (FERA) template. This project will help teachers deliver their lessons more effectively. The lesson plans will help teachers focus more on teaching the language and academic content rather than making materials.

The lessons will also incorporate language acquisition strategies from the Sheltered Instruction Observation Protocol (SIOP) model. The SIOP model includes cognitive, metacognitive and social-affective strategies. The SIOP strategies are scientifically designed to make academic content understandable for ELL (Echeverria, Short &Vogt, 2008). The strategies used from the SIOP model will allow students to solve problems, self-regulate learning and work collaboratively.

Significance of the Project

The implementation of Spanish materials from this project will allow teachers to teach a frog unit in a dual language setting. This project will allow students to work with materials in Spanish. Students will be able to acquire the Spanish language in a more natural and effective environment by implementing SIOP strategies. The assessment piece will serve as a learning tool for teachers and students. The assessment will inform the teacher about students' learning. From the assessments, students will be able to keep track of their own learning. Translating and creating more lesson plans in Spanish will help teachers be better prepared when teaching the Spanish language. This will help students acquire the Spanish language. When students receive their papers with words in

Spanish, they will be able to find cognates and make the language connection. The language connection in written form is a very critical strategy for students when acquiring a second language. When students receive science papers in English, they fail to notice those cognates. By illustrating commonalities in English and Spanish when using true cognates, students are able to acquire new words more easily (Swanson & Howerton, 2007).

Limitations of the Project

This project can only be used in a kindergarten dual language classroom. It will only provide Spanish materials that are specific to the frog unit. Integrating Spanish books will be difficult because of the lack of Spanish literature. Read alouds and small book sets in Spanish will be another limitation.

Definition of Terms:

The following section describes important terms that will help this project to be more comprehendible.

Additive bilingualism: Refers to situations where both the native language and the second language are supported and developed (Perez, 1998)

Assessment: A formal attempt to determine a student's status with respect to an educational variable of interest (Popham, 2008).

Dual language: Is a form of education in which students are taught literacy and content in two languages. These programs enroll a balance of native English speakers and native speakers of the partner language (Wikipedia, 2009).

English Language Learners (ELL): Refers to students who are learning English as a second or additional language. This term may apply to learners across various levels of

proficiency in English. ELL are also referred to as non English speaking (NES), limited English proficient (LEP) and a non-native speaker (NNS) (Echeverria, 2008).

Essential Academic Learning Requirements (EALRs): The EALRs describe the learning standards for grades K-10 in Washington State. The Grade Level Expectations (GLEs) represent a new degree of specificity being developed for each content area for grades K-10 (OSPI, 2009).

Focus, Explore, Reflection and Exploration Cycle (FERA). This is an approach to teaching science. This approach is designed to help students develop an understanding of scientific concepts and apply their learning to technological contexts (Center for Science Education, 2003).

Formative assessment: Formative assessment describes the formal and informal measurement procedures used by teachers and students during instruction to gather information about learning to directly improve that learning (Popham, 2008)

Life Science: Any science that deals with living organisms, their life processes, and their interrelationships, as botanic, genetics and ecology (Random House Webster's, 2001).

Sheltered Instruction Observation Protocol (SIOP): A scientifically validated model of sheltered instruction design to make grade level academic content understandable for English learners while at the same time developing their English language. The protocol and lesson planning guide ensure that teachers are consistently implementing practices known to be effective for English learners (Echeverria, 2008).

Subtractive bilingual program: A program where the learning of a new language occurs at the expense of the primary language. Learners often lose their native language and

culture because they don't have the opportunity to continue learning or using it, or they perceive the language to be of lower status (Echeverria, 2008).

Project Overview:

This project will be divided into five chapters. Chapter one will examine the background, problem, purpose, significance, limitations, and definitions of the project. Chapter two will focus on the literature review. The review will address the underlying assumptions, questions and problems about the project. Research will be conducted to address the pros, cons, and gaps identified. Chapter three will address the background, procedures, development and implementation of the project. Chapter four will have a written description of the 10 lesson plans. Lastly, chapter five will have a summary of the study and research, procedures, sources and results. It will also address the conclusions, implications, results and recommendations.

CHAPTER II

INTRODUCTION

Common standards for all students have been created to ensure that all students receive an equal education (Rouk, 2000). Even though high standards are good, they create challenges. The changing demographics of U.S. schools has raised the need for adapting curriculum to meet student needs. Immigration has diversified U.S. schools. Schools are faced with new challenges such as how to deal with students who are learning English or do not speak English at all (Rouk, 2000). The number of English Language Learners (ELL) has increased dramatically over the past decades.

Standards for all students focus on academic expectations but not on instructional strategies. It is up to teachers to implement the curriculum so all students can meet the standards. In order for teachers to be able to teach academic standards, they must be informed of effective instructional strategies that meet the needs of diverse learners (U.S. Department of Education, 2010).

Bilingual education can be an effective instructional strategy that helps meet the needs of a diverse classroom. Even though bilingual education offers ELL and mainstream students ways to succeed academically, the lack of resources in Spanish presents a challenge. Without the necessary Spanish resources it is difficult for teachers to teach effectively and for students to succeed academically. Chapter two will focus on the history of standards and bilingual education. It will also explain the opposition to standards and bilingual education. Lastly, chapter two will conclude by explaining effective instructional strategies for ELL and science.

History of Standards

Academic standards have a long history (Ravitch, 2010). In 1892, the Committee of Ten was established to develop standards for elementary schools and high schools (Gutek, 1992). In 1918, standards intended to meet everybody's needs in high school. According to Gutek (1992), by the 1940's and mid 1950's the goal of standards switched to meeting personal and social needs. In 1957, the launching of Sputnik I by the Soviet Union raised concerns about science standards used in schools (Borrow, 2006). There was a concern that Russian students were outperforming U. S students. This fear led to the development of stronger academic standards in math and science. In 1983, The National Commission on Excellence in Education released *A Nation at Risk.* The National Commission on Excellence in Education demonstrated the need for educational reform. According to The National Commission on Excellence in Education (1983) 13 percent of 17 year olds were illiterate. They (1983) made some recommendations regarding curriculum content, standards, teacher quality, educational leadership and financial support. In regards to standards, they recommended raising standards to improve the quality of education students received. These recommendations led to improvements in the educational system.

Through each standards movement, science standards have been revised and improved. In 1985, the American Association for the Advancement of Science (AAAS) created *Project 2061* (Barrow, 2006). This project was created to inform educators of the science background students needed to be successful in the year 2061. In the 1980's, *Science for all Americans* was released. This document offered suggestions for standards in mathematics, science and technology education (Hovey, 2005). In 1989, during the

National Education Summit, president George H. W. Bush stated the importance of science and introduced six broad goals that needed to be attained by 2000 (Cavanagh, 2010). The goals were: (1) All children will start ready to learn; (2) High school graduation will increased to 90%; (3) Students from elementary to high school will demonstrate competency in science and math; (4) American students will achieve higher than any other country in science and math; (5) Americans will be literate and acquire the skills to compete in a global economy; (6) School will be free of drugs and violence (Gronlund, 1993). By 1991, *The National Goals Report: Building a Nation of Learners* was published. This led to the development of the National Education Goals Panel. The panel was in charge of reporting national progress annually regarding science and mathematics (Gronlund, 1993). The report stated that science and mathematics expectations were crucial for students to become responsible citizens (Hovey, 2005). The report stated that U.S students needed to demonstrate competency in science. Also the National Education Goals Panel proposed the development of national and state performance standards.

The push for higher standards in science education led to more publications of standards and benchmarks in science (Hovey, 2005). In 1996, the *National Science Education Standards* were published (Barrow, 2006). This document outlined standards for science education which stated what the students should know and be able to do. The No Child Left Behind Act of 2001 (NCLB) required states to develop academic standards in science. It gave states the flexibility to create their own science content standards (Hovey, 2005). NCLB also ushered in a new era of accountability. It required states to

assess science standards and ensure all students met the standards by 2013 (Cavanagh, 2010).

Since NCLB, many states have created or revised their own science standards (Cavanagh, 2010). Washington State has always been committed to ensuring that all students grow to be proficient in science. Hard work and commitment led to the development of Essential Academic Learning Requirements (EALR's) in science (Office of Superintendent of Public Instruction, 2009). The EALR's stated the benchmarks for grades four, seven and eight. To provide grade level guidance the Grade Level Expectations (GLE's) were released. The GLE's were aligned with the EALR's to make standards more clear. To improve the GLE's, the new and revised version for science standards was published in 2008. In 2009, the *Revised Washington State K-12 Science Standards* were approved (OSPI, 2008). The standards were revised to make them more rigorous and also to improve teaching and student performance in science (OSPI, 2008). This document lists the most current k-12 science content standards. The science standard lists all academic content that students need to know. It is stated in the document that standards are not the curriculum but a guide to what teachers need to instruct and what students need to understand (OSPI, 2008).

Opposition to Standards

The arguments against standards have been defined since the NCLB, when accountability was emphasized. Opponents to standards argue that there are no national common standards. Common standards do not distinguish good and bad standards (Graff & Birkenstein, 2008). Common standards need to be selected based on what students should learn. However, it is hard to decide which standards are the ones that need to be

implemented because not everyone's perspective about standards is the same. Also, standards ignore other forms of standardization on different topics such as standards for safety or environment (Graff & Birkenstein, 2008).

Opponents to standards also believe that standards do not drive teaching and learning (Kohn, 2010). Opponents to standards believe that curriculum is more a form of teaching and learning and usually does not align to standards. According to Tanner (2000), teachers spend weeks teaching to high stakes tests to improve scores and the curriculum is ignored. When schools do poor on high stakes tests, schools focus on test preparation then curriculum improvement (Tanner, 2000). Hands on activities are eliminated during test preparation in order to meet standards. Curriculum improvement will help to meet state standards.

High stakes tests based on standards are not appropriate for students who come from disadvantaged backgrounds. Students who come from low socio-economic status families, cannot afford prep courses to boost their test scores on high stakes tests to enter college (Tanner, 2000). If high stakes tests are based on national standards the question is why students need to take prep courses to get better scores. ELL score poorly on standardized tests compared to Anglo students. According to Stillman (2009), most standardized tests assess English proficiency in content knowledge and he believes that these tests assess ELL language proficiency. If students do not have the language proficiency, than they are at a disadvantage when they attempt to understand content knowledge.

History of Bilingual Education

The U.S education system currently seeks to address the needs of all learners. However, the U.S education system did not always have this goal in mind. In the 1800's only certain groups had access to an education and others were excluded or did not have equal access. One example of this exclusion was that Native Americans did not have the opportunity to practice their own language (Gutek, 1992). Bilingual students were one of the groups that did not always have equal access to an equitable education. The history of bilingual education has been filled with many accomplishments but also with many defeats. Ovando (2003) categorizes the history of bilingual education into four major periods: the permissive period (1700's-1880's), the restrictive period (1880's-1960's), the opportunist period (1960's-1980's), and the dismissive period (1980's–present).

During the permissive period (1700's-1800's), it was acceptable and common for people to speak their native language. Immigration from Europe made the U.S population more linguistically diverse. People from northern Europe maintained their native language and participated in the civil life of the nation at the same time (Ovando, 2003). Various states approved bilingual education. There was no conflict or anti bilingual movement during this period because the goal was merely assimilation. German, Danish, Dutch, Polish, Italian, Czech, French and Spanish were some of the languages that U.S schools used for bilingual instruction during this period. The purpose of bilingual programs at this time was not to help students become bicultural and biliterate, but was used as a form of assimilation through language (Ovando, 2003). By the end of the permissive period, 4% of students received some if not all of their education in German (Ovando, 2003).

During the restrictive period (1880's- 1960's) several different changes in national ideologies led to a period of resistance against bilingualism. At the time there was a movement of nationalism that led to a resistance against bilingual instruction. The movement went even further and people in general were viewed differently if they spoke a different language. During this period many repressive policies were adopted including how Native Americans were educated. Policies against Native Americans were detrimental (Ovando, 2003). The U.S. government wanted Native Americans to become civilized and sent them to reservations. Part of becoming a civilized nation was to immerse Native Americans in English-only programs (Ovando, 2003). Bilingual education was not an option for Native Americans.

The sentiment against foreign ideologies also led to the resistance of bilingual education. As a consequence, the Naturalization Act of 1906 stated that all immigrants needed to speak English (Ovando, 2003). Also when the U.S. declared war against Germany during World War I, there was resentment against Germans. This was another reason German was eliminated in all schools and there was a push for English-only instruction (Ovando, 2003). During the first half of the 20th century homogeneity was emphasized. During this time students of language minority groups were put in submersion classes, so they could assimilate into American society. Despite the emphasis on English- only instruction during this period the Supreme Court ruled in favor of *Meyer* in the case *Meyer V. Nebraska*. This ruling allowed immigrants to keep and practice their first language in 1919 (Ovando, 2003).

During the opportunist period (1960's- 1980's), World War II made the U.S. more aware of the poor foreign language instruction. The launching of Sputnik by the

Soviet Union in 1957 led to the creation and passage of National Defense Education Act in 1958 (Ovando, 2003). Language, math and science skills were critical for national defense. Students were considered part of national defense and were provided with foreign- language instruction (Ovando, 2003). In 1959, the Cuban revolution increased immigration to the U. S. By 1963, a bilingual program was formed to meet the needs of Cuban students. The bilingual programs for Cubans were successful in Florida (Ovando, 2003). These programs were viewed as a way to meet the needs of ELL, so other states who had similar needs with ELL adopted similar bilingual programs.

In 1974, the case *Lau v. Nichols* was an important case that created support for bilingual education (Ovando, 2003). This case was taken to court because of the poor education provided to Chinese students (Trundle, n.d.). Chinese students were not given a solid academic education in the San Francisco Unified School District in California. The students believe that they were not given equal opportunity to succeed because they did not have support in their native language. The ruling allowed students to receive education in their first language so they could succeed academically. During this period immigration kept increasing and so did the ELL population.

The dismissive period (1980's-present) is characterized as an anti-bilingual movement. The conservative administrations of Ronald Reagan and George. H. W. Bush did not agree with bilingual education (Ovando, 2003). Reagan's Secretary of Education, William Bennett, did not support bilingual programs and decided to allocate funding for English only programs. According to Ovando (2003), around the 1990's ELL population increased and programs for ELL decreased considerably. In 1994, California voters approved Proposition 187. The proposition restricted illegal immigrants

access to social and educational services (Ovando, 2003). During this period, anti-bilingual programs became apparent. The NCLB Act of 2001 protects minority languages because education can be given to students in their first language so they can succeed in English. Even though students can receive instruction in their first language, the strongest emphasis is on the side of English acquisition (Spring, 2008). According to Spring (2008) the office of Bilingual Education is now called the Office of English Language Acquisition.

The history of bilingual education, which is still being shaped today, has been filled with controversies and successes. The bilingual programs for Cubans were viewed as a success. On the other hand, the approved propositions against bilingual education in California and Arizona created controversy for bilingual education.

Despite the fact that bilingual education has historically been controversial, many states still continue to implement it (Gomez & Gomez, 2007). Many states have seen bilingual education as a way of improving academic scores and ameliorating the achievement gap among Hispanics and Anglo students (Gomez & Gomez, 2007). Bilingual education programs use students' native language to instruct students.

Opposition to Bilingual Education

Opposition to bilingual education is characterized by many political arguments in different propositions. According to Crawford (1997), opposition to bilingual education is highly political in California and Arizona. Proposition 227 and Proposition 203 represent the recent opposition to bilingual education.

In California, Proposition 227 opposed bilingual education on the basis that minority students were not being successful in bilingual programs. Therefore, it

proposed English- only instruction. Proposition 227 initiated an anti bilingual movement in other states (Galindo, 1997). ELL were not being served appropriately by the bilingual programs in California, so this served as a way to eliminate bilingual education instead of studying and identifying the deficiencies of the approaches used in these programs. The sentiment of bilingual education and illegal immigration merged into one, when Proposition 227 passed in 1998 (Sanchez &Sanchez, 2008). Proposition 227's purpose was to end bilingual education in the state of California.

In Arizona, Proposition 203 was another anti bilingual proposition that represented the same ideology as Proposition 227 (Wright, 2005). Proposition 203 also supported English only instruction. This proposition was a movement that had more political interest than meeting ELL needs (Wright, 2005). During Proposition 203, educational policies were representing the current politics. Political policies, at this time, were run with metaphors where important details about bilingual programs were omitted. Ron Unz, a millionaire in California initiated this movement with Proposition 227 and supported Proposition 203 in Arizona as well. He financed the movement and used current research inadequately to support his English only policy movement. Ron Unz had no language acquisition background. His purpose was to dismantle bilingual education (Wright, 2005). Proposition 203 omitted data about the gains that ELL were making in English (Wright, 2005).

Wright (2005) conducted detailed research where many findings indicate that Proposition 227, and 203 were only a political display because it lacked good academic research about second language. There were more personal and political interests than the true care for ELL (Wright, 2005). Even though Proposition 203 was approved, some

schools in Arizona still run some bilingual programs that are supported by parents who believe in quality programs.

Proposition 227 and 203 viewed language as a social problem (Galindo, 1997). Galindo (1997) stated that bilingualism was seen as a problem in these two propositions instead of an asset. Both propositions believe that bilingual education is the cause of low educational achievement that targets the Spanish speaking population. If ELL students are not proficient in English quickly, opponents believe that bilingual education is an impediment for socioeconomic achievement for the country (Galindo, 1997). According to Galindo (1997) there was no information about the basis of bilingual education in these two propositions. Metaphors used in the media by political interests created emotional responses instead of critical responses from voters (Wright, 2005). Research on bilingual education in the U.S, conducted by Ovando, argues that bilingual programs have been predestined without a reasonable examination (2003).

Most bilingual schools in the states of Texas and Washington use Spanish and English as the two languages in the programs. Bilingual programs address the needs ELL and provide enrichment for both groups because everyone learns a second language. Bilingual programs need to be implemented correctly to be successful. Collaboration among teachers, community, parents and administration are important factors for bilingual programs to be successful (Guzman, 2002).

Galindo (1997) suggests that despite personal predispositions about other languages or political affiliation, many people see the benefits of bilingualism and the benefits for ELL. Bilingual programs might not be the key to all the problems in

education. However, the reality is that being bilingual is an advantage for students in the United States, because of the diverse society and its needs (Gomez & Gomez, 2007).

History of ELL

ELL are a big percentage of student population in the United States. By 1980, sixteen million Latino students immigrated to the United States (Echevarria & Graves, 2007). The Latino's first language was Spanish. After this influx of Latinos, also in the 1980's, many legal and illegal immigrants from other countries came to the United States. At the end of the 1980's, people from over 100 different countries were also part of the United States' population (Echevarria & Graves, 2007). These changing demographics led to an increase of ELL.

Having students from more than a hundred different countries, led to more diverse classrooms in the United States. Diverse classrooms had different needs. The ELL population who spoke languages other than English increased from 13 percent to 17 percent by year 2000 (Echevarria & Graves, 2007). By 2005, the population of ELL increased by 68 percent (Thomas & Castaneda, 2009).

The rights of ELL have been an important accomplishment in history. After the Immigration Act of 1965, legislation was approved to assist U. S schools who had ELL (Echevarria & Graves, 2007). The legislation lacked clarity. Some ELL were placed in mainstream classrooms without help while other ELL were placed in ESL or bilingual programs. Even though some ESL and bilingual programs have been implemented to help ELL, they perform poor on high stake tests (Echevarria & Graves, 2007). The NCLB act summary has revealed these results. According to Echavarria and Graves

(2007), they agree that native language is as important as English instruction for ELL to succeed in school.

Multicultural Matters and Bilingual Education

Globalization and immigration have increased the diversity in U.S. schools (Banks, Aul, Ball, Bell, Gordon, Gutierrez, et al., 2007). Diversity calls for an effective multicultural education. Diversity needs to be seen as a rich opportunity for learning. Schools need to prepare students to become effective and reflective about culture and community (Banks et al., 2007). The Center for Multicultural Education in Washington stresses the importance of meeting ELL needs so they can succeed academically. Learning can be enhanced by students who speak a first language other than English if teachers use effective approaches (Banks et al., 2007).

Dual language programs go beyond instruction in two languages, it is also learning about cultures (Gutek, 1992). Students need to use their community and home language so learning can occur (Banks et al., 2007). Cultural learning leads to social change because both groups have a better understanding about their own and each others' values and beliefs. According to Spring (2008), a multicultural education needs to be considered critical for all students. He believes that school needs to teach social justice by teaching students how to overcome discrimination against other cultures.

Cultural instruction occurs in dual language. Students learn about each other's cultures while learning both languages in academic or social contexts. It is imperative that schools relate to students' culture so learning can occur. Many schools are not connecting instruction to social and cultural characteristics (Banks et al., 2007). Dual language programs have strong support from parents and community. Learning not only

occurs in school, it also occurs in the family, community, church, media and popular culture (Banks et al., 2007). All these learning settings represent students' cultures.

A multilingual education needs to provide appropriate curriculum to teach in a diverse classroom. Academic materials need to be balanced and represent the culture taught in a dual language classroom (Banks et al., 2007). Teachers need to use quality Spanish resources and use effective ELL strategies, so students can succeed in schools.

Effective ELL Strategies

ELL need teachers that understand the complexity of second language acquisition so they can be successful in school (Dalham, 2005). One model that it is compatible to the ELL's needs is the Sheltered Instruction Observational Protocol (SIOP). The strategies and principals of SIOP can be used in the mainstream classroom (Dalham, 2005). Another model where ELL can be successful is bilingual education. Bilingual education offers ELL the opportunity of receiving support to learn English while they meet grade level expectations in their first language (L1) (Estrada, Gomez & Escalante, 2009). SIOP strategies can be incorporated into a dual language program to benefit ELL.

The diverse student population in the U.S. led to sheltered instruction to meet students' needs (Echevarria & Graves, 2007). Statistics clearly address the lack of academic gains of ELL in this country. According to Echevarria, Vogt & Short (2008) only 30% of ELL of all secondary schools in the U.S. read proficiently. The educational system needs ELL to be successful in schools (Echevarria et al., 2008). ELL need a model of instruction that implements strategies that make academic content more comprehensible. SIOP was created to implement high quality sheltered lessons for ELL (Echevarria, et al., 2008).

The goal of SIOP is to make academic subjects more comprehendible by using different research based strategies that work for ELL. SIOP offers teachers effective techniques to teach academic content to ELL while developing the students' language ability (Echevarria et al., 2008). Since the strategies target a second language the teacher can implement the same strategies in a culturally diverse class when teaching another language through content (Echevarria et al., 2008).

SIOP strategies include all the language processes and modalities such as listening, speaking, reading and writing. SIOP lessons provide a high level of student engagement. Teachers consider the affective needs (Echevarria, et al., 2008). Some of the affective needs are cultural background and learning styles. According to Echevarria, et al. (2008) the teachers who use the SIOP model create a non-threatening environment where students feel comfortable taking risks with language.

In the SIOP model, supplementary material are used to make content more comprehendible. Some of those supplementary materials can range from hands on manipulatives to adapted text (Echevarria et al., 2008). Supplementary materials help students make connections from previous experiences to new learning (Echevarria et al., 2008). When students have the opportunity to get involved in activities that use manipulatives, then students are able to make better connections between their L1 and L2. Students learn language better through meaningful use in a variety of contexts (Gibbons, 2002)

Adapting content is another SIOP strategy used to make content and language more comprehendible. Some examples used to effectively adapt content are graphic organizers, outline level study guides, highlighted text, jigsaw, marginal notes, and native

language text support. According to Echevarria and Graves (2007), adapting content and concepts need to be done in a way that does not lower academic expectations for ELL. Adapting content helps ELL learn in different ways (Echevarria & Graves, 2007).

SIOP strategies help ELL students self reflect and become better learners when taught effectively. By using these strategies students have the opportunity to monitor their own thinking. Students are also able to self-correct any misunderstood information (Echevarria et al., 2008). When students employ social and affective strategies they are able to work in cooperative groups. According to Echevarria et al., 2008, these strategies need to be taught through explicit instruction such as modeling and scaffolding.

SIOP emphasizes content and language objectives. The focus of language and content objectives is a crucial component for ELL success (Echevarria et al., 2008). Teachers need to display and state the content and language objectives at the beginning of the lesson. This will constantly keep students focused on content and language they should be learning. Using teaching objectives is important, so that students understand classroom activities and lessons (Marzano, 2009).

Scaffolding is another important component of the SIOP model. ELL benefit from this strategy because it supports students' understanding (Echevarria et al., 2008). The SIOP model employs verbal and procedural scaffolding. Some examples of verbal scaffolding are paraphrasing students' responses, reinforcing conceptual definitions, providing correct pronunciation by repeating students' responses, slowing speech, increasing pauses, and speaking in phrases. Procedural scaffolding techniques include: 1) Using explicit teaching, modeling, practice opportunities and independent application; 2) One on one teaching, coaching and modeling; 3) Small group instructions with mixed

ability levels; and 4) Partnering or grouping students (Echevarria et al., 2008, p.101). Scaffolding is not just about helping students but taking them beyond so they can acquire higher levels of critical thinking. Scaffolding is the assistance that ELL need to advance academically because it helps them to acquire new skills, concepts or levels of understanding (Gibbons, 2002, p. 10).

Dual language programs offer several strategies that make ELL successful in school. First, dual language programs offer ELL students a curriculum that is aligned with appropriate standards (Lindholm, 2005). The curriculum is academically challenging and integrates higher-order thinking strategies (Lindholm, 2005). When ELL are able to understand the process of critical thinking and problem solving, then they are challenged and acquire higher order thinking skills. Teachers can use Bloom's Taxonomy to promote higher order thinking skills in the classroom (Echevarria et al., 2008).

Dual language programs stress cooperative group work that benefits ELL and native English speakers. This simple strategy works for ELL because they have the opportunity to work with a bilingual partner. Bilingual partners support each other in English or Spanish depending on the subject. In math the Anglos help the ELL with English. When it is science or social studies time, the ELL supports the Anglo student with Spanish. They work cooperatively in activities and provide support on the target language depending on the subject taught. In dual language programs ELL are not segregated from mainstream classrooms (Thomas & Collier, 2004). Research conducted by Thomas & Collier (2004) suggests that minority groups such ELL have the opportunity to work and learn from mainstream students. Both students groups in dual language programs benefit in the classroom (Thomas & Collier, 2009). ELL receive support in their L1 and Native

English students acquire a second language (Thomas & Collier, 2004). Dual language programs offer enrichment education to ELL and native English speakers through group work. Research suggests that students, who work cooperatively, learn more (Roger & Johnson, 1997). Cooperative group work not only benefits students academically but also socially. According to Roger and Johnson (1997), when students work cooperatively, they are more positive about each other despite differences in skills or ethnic background. Dual language programs integrate students in activities through group work and classrooms are not segregated. Dual language prepares students to work in a multicultural society.

Besides the inclusion of ELL in the mainstream classroom, dual language promotes English acquisition (Freeman & Freeman, 2004). Language acquisition stages are crucial for teachers to understand the language process in dual language programs. Based on Krashen's Theory of Second Language Acquisition, ; 1) ELL acquire a second language when they understand messages in and out of school; 2) Students go through a natural order when acquiring a second language; 3) Students monitor their spoken or written language to be able to understand and produce language; 4) Teachers need to provide comprehendible input orally and written that students understand; and 5) Teachers need to be aware of the student's affective filter so they can relax and engage in the lesson (Freeman & Freeman, 2004, p. 35-39).

Effective Strategies for Teaching Science

FERA Learning Cycle

FERA (Focus, Explore, Reflect, Apply) science learning cycle helps ELL to make sense of academic content by making content more meaningful. The FERA cycle is used

to address all students' needs in the classroom (Center for Inquiry Science, 2006). The FERA cycle is an approach for teaching science. The focus stage is where the students reveal previous knowledge about the topic. Working with students' previous understandings is essential for all learners despite their age (National Research Council, 1999). The explore stage is where the students work on a scientific investigation. When conducting investigations, teachers need to help students distinguish their previous ideas from scientific concepts (National Research Council, 1999). In the reflect stage, students record their observations, findings and conclusions. Reflection helps students examine their understandings. In the apply stage, students apply new learning to real life situations (National Science Resource Center, 2009). Learning does not come from acquiring facts, instead learning needs to include the mastery of concepts, so people can apply new learning to new problems (National Research Council, 1999). The use of the FERA cycle increases students' scientific understandings (Center for Inquiry Science, 2006). ELL do not need to be proficient in English in order to learn about science (National Research Council, 2008, p. 103). Students from different backgrounds can learn science when they are provided with a good environment and work with materials, observe and experience the scientific processes (National Research Council, 2008, p. 103).

Formative Assessments in Science

Formative assessments are different from summative assessments. The purpose of formative assessments is to improve instruction and provide feedback to students and teachers (Fisher & Frey, 2007). According to Stiggins (2005), it is important not to underestimate the power of feedback because it has a big impact on student learning. On

the other hand, the purpose of summative assessments is to measure student competency at the end of a unit or course that does not necessarily provide feedback. Formative assessments are very important because they are ongoing assessments that can be done by observations in the classroom (Fisher & Frey, 2007). The use of frequent formative assessment helps students monitor their own learning (National Research Council, 1999).

Checking for understanding is a form of formative assessment. When teachers check for understanding in any content area, they can help students clarify misconceptions during the learning process (Fisher & Frey, 2007). Checking for understanding promotes good teaching, student metacognition, deepens assessment and is aligned with best practices (Fisher & Frey, 2007). Teachers also benefit from this practice because they have a better understanding of students' needs and are able to plan more effectively.

Formative Assessment Classroom Techniques (FACTs) are practical strategies for science assessments. According to Keeley (2008), FACTs help students to openly share their ideas in science. FACTs help students to think critically about their own ideas and scientific concepts. FACTs techniques inform teachers about students' ideas from different backgrounds (Keeley, 2008). Knowing about the different ideas or misconceptions from different students helps the teacher reflect on future teaching techniques to make sure all students' understandings are clarified during the lesson. The uses of ongoing formative assessment lead students to deepen their understanding about science concepts (Keeley, 2008). According to Keeley (2008), metacognintion is a practical strategy that helps students analyze how new knowledge relates to previous

knowledge . Some examples of FACT's techniques are Know, Want to know, what I Learned (KWL) chart, paint the picture, sticky bars, data match and think- pair- share.

Another effective way to use formative assessment in the classroom is by using probes in science. Probes are a form of formative assessment. Probes tell the teacher the misconceptions that students might have. This helps the teacher make adjustments to instruction (Keeley, Eberle & Farrin, 2005). According to Keeley, Eberle and Tugel (2007) probes are formative assessments for learning. Formative assessments probes assist student thinking and provides important feedback to the teacher (Keeley et al., 2007). When science probes are administered before the lesson, students discuss their ideas about a topic while the teacher observes and makes a list of misconceptions that helps the teacher decide on future teaching practices. When probes are administered after instruction, they help the teacher to self assess their teaching practices (Keeley et al., 2007). According to Keeley et al. (2007), probes also help teach a culture of ideas not a culture of answers. Students discuss the probes and share their ideas without being afraid of giving a wrong answer. Instead, students have the opportunity to investigate and sort ideas based on everyones' feedback (Keeley et al., 2007). Probes engage students in investigation through scientific inquiry, discourse, and reflection (Keeley et al., 2007).

Summary

The constant pressure for improving score on high stake tests has presented a need for aligning the curriculum to standards. The changing demographics of U.S. schools through out the years has impacted teachers' instructional techniques. Immigration has played a big role in changing demographics. Immigration defined a new era for U.S. schools because many states now have a larger population of ELL. Programs

such as dual language have been implemented to meet ELL needs. Instruction models such as SIOP are also used to address ELL academic needs. Bilingual programs and instruction strategies are as important as assessments so students can succeed. Assessments are a crucial part for all teachers because they inform teaching and learning in any classroom. Implementing bilingual programs and using proven strategies that help ELL is crucial so all students can succeed academically in U.S. schools.

Chapter III

BACKGROUND OF THE PROJECT

Spanish Elementary School has a lack of resources in Science. The unit chosen to create more resources is the frog unit. The frog unit is new to the curriculum and Spanish resources do not exist. The resources will help teachers to teach Spanish more effectively. At the same time, all the materials will have a positive impact on students because it will help them do more hands on activities and cooperative work while learning the Spanish language and science concepts.

Project Development and Procedure

The need for more resources in Spanish Elementary was the purpose for creating this project. The science unit only has 5 activities in all. Spanish Elementary needs more structured lessons since the frog unit needs to be implemented for at least a month and a half. The science curriculum is taught in Spanish, so the materials in English are not meeting the needs of the dual language program. The 5 activities provided for the frog unit are not enough for the students to learn science in Spanish. This project will provide teachers at Spanish Elementary with adequate resources to teach Science. The materials developed in this project will help kindergarten teachers teach more effectively because the resources will be in Spanish. Resources in Spanish will not only help teacher teach the Spanish language more effectively but also students will receive a more appropriate education as they acquire a second language.

Project Implementation

This frog unit will be implemented in a kindergarten science classroom in a dual language program. Spanish elementary has blocks of science at least 3 days a week. Lessons can be implemented during these blocks. The 10 science lesson plans are created only for the frog unit. The lessons are aligned with the new Washington science standards that were approved in 2009. The lessons will be used to meet ELL needs because they are incorporated with sheltering techniques. ELL will benefit from these lessons, as well as second language learners who are learning Spanish. The SIOP components in the lessons make content accessible for all students no matter if they are ELL or second language learners. Every lesson has an assessment piece. The assessments are crucial so students check their own understandings about science. The assessments serve as tool for teachers to adjust their teaching based on the misconceptions or questions that the students might have about science.

CHAPTER IV

A WRITTEN SUMMARY OF THE PROJECT

The concern for the lack of resources in science in Spanish led to the development of this project. The project consists of 10 lesson plans about frogs that follow the guidelines of SIOP. Every lesson plan is aligned with the Washington science standards. Also, every lesson plan has Spanish materials that were created to meet the needs of the dual language program at Spanish Elementary. Another component that this project deals with is assessment. The assessment can be done before, during or at the end of the lesson. The assessment piece is very important for teachers to reflect upon their teaching and the students' needs.

The lesson plan template provides sheltering techniques that help ELL make content more comprehendible. Every lesson incorporates various sheltering techniques. The first two components that are very important are the content and language objectives. The language and content objectives are displayed and explained during each lesson. The language and content objectives help the students reflect and understand the purpose of the lesson. Vocabulary and materials are provided for each lesson. The vocabulary and materials section serve as a quick tool for teachers to implement the lesson effectively. The SIOP features are listed so teachers can reflect when planning the lesson so effective ELL techniques can be taught intentionally.

The FERA checklist is added to these lessons so teachers can reflect upon what is the focus of the science learning cycle. This quick checklist will provide teachers with a way to teach science in a more intentional way.

Every lesson has an assessment part. Specifically, the type of assessment used in each lesson is formative assessment that can range from checking for understanding informally to using kindergarten probes. Probes in kindergarten can be matching games or questions with visuals where students do not have to write but circle their understanding about a science concept. Probes are assessment tools. The assessment piece will serve as a way to help teachers focus on science concepts that students do not understand or have questions about. Formative assessments are a way to see the students' misconceptions about science. Based on the misconceptions, teachers can adjust instruction so every student has the opportunity to clarify their misconceptions based on student and teacher feedback before, during or after the lesson. Assessments will help create a community of learners where students respect all answers and take risks. The teacher guidance in finding the right answers will help students think about their own thinking and change their misconceptions based on feedback or observations.

CHAPTER V

SUMMARY

This project is the compilation of research done on standards, ELL, bilingual education, and science. The ten lesson plans on the frog unit were developed to assist bilingual teachers who teach Science in Spanish in a bilingual setting. All strategies implemented in the lessons help students develop a higher level of thinking and problem solving in the real world. Students from mainstream classrooms and ELL serve as a language support for each other when acquiring a second language during the lessons. Therefore, the lessons are developed so students can work with partners to acquire a second language and master concepts in science. SIOP features are added to assist all students with the acquisition of language and academic content. The assessment piece in the lessons is formative assessment that helps inform teachers about student learning.

Conclusions

The ten frog lesson plans will assist kindergarten teachers in any dual language school where Spanish and English are the two languages of instruction. The lesson plans take students to a higher level of thinking because effective strategies for language and content are implemented intentionally. The strategies are taught through a variety of activities where students work in partners, small groups and individually. The lessons include activities where students can work cooperatively to develop thinking skills, and explore the world through science. Therefore, the activities make the lessons relevant and engaging for students. The lesson will help kindergarteners grow because their background knowledge is activated and science is taught from a real life perspective.

Implications

The lessons are developed for a kindergarten classroom only. The materials in the lessons only target Spanish so they cannot be implemented in any other dual language program that targets a different language. The lesson plans lack science literacy in Spanish. Some books in English are used to provide the visuals so students can understand the concepts while the teacher does a book walk in Spanish. The goal of the ten lesson plans is to create resources for the frog unit that challenge students to learn Spanish language and science concepts.

Recommendations

Recommendations for this unit include parent communication. Parent communication is key to students becoming life long learners. Parents need to understand the learning does not only occur in school but at home. Therefore, informing parents about the unit being taught in the classroom helps them to be aware of what concepts students are going to be learning. For a dual language program, parent communication is crucial because acquiring a second language does not only occurs in school. Parents need to be aware that any vocabulary taught in the classroom needs to be practiced at home so students can learn Spanish more fluently. A letter at the beginning of the unit explaining the goal of the unit will serve as resource for parents to encourage students to practice Spanish and share the academic concepts they learn at school. Weekly newsletters are also recommended so parents know week by week the skills and vocabulary taught so they can practice it with their child.

Another recommendation is to form a partnership with the school district were time to create instructional materials in Spanish can be allowed. Often times the districts

offer science trainings where instructional science materials in English are developed. The partnership with the school district will make any the dual language program more successful because dual language teachers will be able to developed and use adequate materials. This will enable teachers to meet student needs more successfully.

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APPENDIX A

Frog Unit

TABLE OF CONTENTS

Page

A Written Summary of the Project

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Please note:

This content has been redacted due to copyright concerns.

Appendix A: All pages for the "Frog Unit" have been redacted, except for the title page on page 44, table of contents on page 45, and the summary of the project on pages 46 – 47.