Bilingual Education Methods

Final Report

Roberto Del Busto

ED 690

Educational Technology

San Diego State University

Spring 2001

Abstract

The purpose of this report is to demonstrate that English learner high school students, who are in a bilingual math class that provides instruction in both English and Spanish, have an easier conversion to mainstream math classes than those who are enrolled in bilingual classes that provide instruction only in their native language. The sample population of the study is high school students that are not English speakers. All students will be enrolled in the same math course throughout the academic school year. However, they will be divided in two groups: The first group will receive instruction only in Spanish; and the second group will receive the instruction in English and Spanish. The students will be tested before, during, and after the study in order to evaluate the findings of this study.

Statement of the Problem

As a bilingual teacher at the high school level I have been exposed to different systems of teaching Mathematics to non-English native speakers. Most bilingual instructors teach the subject content area in the students' native language. I used this system about four years ago. Through the years I have changed my teaching approach as far as bilingual classes go. I have included more English in my classes. Bilingual education advocates claim that it is wrong to use both languages when providing instruction to these students because it will supposedly deprive them from maintaining fluency in their native tongue. However, I feel that they need to be exposed to English since there will be a time when they must do the transition to a mainstream Math class. In my opinion (and some of my students') this transition would be smoother if the students were familiar with some of the mathematical terminology that they will use in a regular Math class. Besides, these students also take exams such as the SAT 9, which are conducted in English. Learning the material in English will allow them to perform better on the exam. But, we must never forget the fact that it is also important that they comprehend the material, and an English-only method of instruction can provide a number of obstacles in their learning process.

The Hypothesis

English learner high school students who are in a bilingual math class that provides instruction in both English and Spanish have an easier transition to mainstream math classes than those who are enrolled in bilingual classes that provide instruction only in their native language.

Sooner or later, bilingual students will eventually make the transition to a regular Math class. It can be in the last two years of high school or at the college level. One way or another, they must be prepared for this transition.

Students who are English learners receive two hours of English daily instead of one hour. The purpose of this is to speed up the English learning process. However, there is certain mathematical terminology that the students most likely will not cover in their English class. There are a number of Math-related words that are very similar in both languages, such as ‘circle and ‘círculo’. There are also words that are very different from one language to another: ‘add’, ‘height’, and ‘slope’ in English are pronounced and spelled very differently than their Spanish counterparts: ‘suma’, ‘altura’, and ‘pendiente’, respectively. Words such as these will hardly be used in an English class. Therefore, bilingual math teachers should expose their students to them so they are familiar words by the time they make the transition to mainstream Math class. The use of these terms in English will affect the manner in which a student will adapt to a regular Math class in the future.

Review of Literature

In 1998, California passed an initiative: “Proposition 227” that restricted the use of primary language for educational purposes, and instead provided a transitional program of "structured English immersion." Proposition 227 did not completely eliminate bilingual education in California. However, it reduced the amount of English learners in bilingual classes from 29% to 12% (Gándara, 2000). A school must require a number of parents to sign a petition in order to obtain permission to open a bilingual class. With the threat of initiatives such as Proposition 227, bilingual educators must incorporate more English in bilingual classes to prepare those students for the possibility of being transferred to mainstream classes. Proposition 227 backers have documented that SAT 9 scores among English learners have increased since its implementation (Schirling, Contreras, and Ayala, 2000). However, the question remains: As the English learners increase their SAT 9 scores, are they learning the subject content area efficiently in an English-only learning environment?

In her article: “Learning to Value English”: Cultural Capital in a Two-way Bilingual Program”, Pam McCollum wrote about Dewey Middle School, a school located in Arizona. The school conducts a 2-way bilingual program, which educates both native English speakers and native Spanish speakers in a dual language environment. The program essentially uses a "transfer" approach moving students from their native language to the second language as quickly as possible while advocating the adoption of a world standard of the ethnic language, thus preserving the status quo and existing power relations. Due to their use of heritage languages, maintenance bilingual programs

are essentially seen as non-assimilative in nature. The focal class consisted of twenty-nine students in a two-way maintenance bilingual program where twenty-one Mexican-background and eight Anglo American students studied together. The goal of this bilingual program was to promote bilingualism and biliteracy in both minority and majority group students. All content area classes were taught using an alternate days approach to distribute Spanish and English throughout the curriculum; Spanish as a second language was offered to students with English as a primary language and Spanish language arts to native Spanish speakers. The school fit the same profile as Castle Park High School: About 75 % Hispanic and the rest divided amongst Anglos, African-Americans, and Asians. The experiment conducted in Dewey proved to be a success. The program enabled the students to witness the importance of acquiring a second language. It also allowed students who speak different languages to interact with one another, which is something that I feel bilingual education in California fails to do because separates the non-native English speakers from other students at the school. I feel that LEP students must be encouraged to interact with native English speakers as much as possible.

Another article that I found helpful was “No Habla Inglés” (Brock, McVee, Shojgreen-Downer, & Dueñas, 1998). This article deals with the study of a Spanish-speaking child on a predominantly English-speaking class. There were 36 students in the class. Twenty-seven students were bilingual in English and Spanish. One student (the focus child, Adriana) spoke only Spanish. The remaining of the class spoke only English. One of the authors, whom did not speak Spanish, was the teacher. This particular school did not have a bilingual program, which is why this situation took place. Typically, in

districts where quality bilingual programs are not available to English language learners, children have been removed from the regular classroom to receive English as a Second Language (ESL) instruction in separate classrooms with other English language learners. This "pullout" approach for educating English language learners has undergone significant criticism from many educational scholars in the English language learning community (e.g., McLaughlin, 1985).

Although Adriana was assisted by some of her fellow classmates whenever she was having difficulties with the language, it would have been very helpful for her if her teacher have been able to communicate with her in Spanish. If the teacher had been able to do this, she could have gained first-hand knowledge about Adriana's need for more instruction in order to understand the nature and the purpose of the tasks that she was asked to complete. Thus, it was not merely the differences in languages that impacted Adriana's literacy learning opportunities, but the differences in the school literacy practices in which the languages were embedded (Cazden, 1988; Gee, 1996).

Mary Brenner's "Development of Mathematical Communication in Problem Solving Groups by Language Minority Students" establishes the difference between two bilingual math classes. Teacher A taught the class using only Spanish, and Teacher B used both Spanish and English. The author mentions that the students that received Spanish–only instruction lacked the English terminology of the Math concepts. Hence, making it difficult for them to make the transition when the time comes. Granted, most of the terms translate easily, (i.e. circumference and circumferencia). There are key terms that are very different across languages, (i.e. slope and inclinación). Students need to learn

these terms in English as well as in Spanish because they need to know them when they make the transition to a mainstream class.

Teacher B had a difficult time getting the students to participate in classroom discussions in English. For many language minority students in California, particularly Latino students, the small group format may prove to be a comfortable and culturally appropriate instructional format. Kagan (1986) and Losey (1995) find evidence in the literature that Mexican American children function well in cooperative situations as opposed to more individualistic or competitive settings. In addition, they may be more likely to participate in small group discussions than large group discussions, particularly when the language of large group interaction is English. However, students loved getting involved in discussions as long as they were done in Spanish. At times, Teacher B would communicate with them in English during discussions, while the students would answer in Spanish. For the teacher, classroom discussion is also useful because it provides information about how well the students understand the content of the day's lesson (Pimm, 1987; Secada & De la Cruz, 1996).

Even though the author stated that there is a significant difference between both groups of students in regards to learning Mathematical terms in English, there are certain issues that need to be taken into consideration. Although 30 % of Teacher B's students made the transition to mainstream classes, as compared to only 12% of Teacher A's students, this study was conducted during the last six week of the school year, which unfortunately is not enough time to determine if there is a significant difference between both methods. This study is the closest example that I have found to what I want to investigate. It provided me with a great deal of information about using both methods. I have

experienced some of the information in it. As I mentioned before, due to time constraints and also the fact that both teachers were first-year teachers, it is difficult to measure if this study was accurate.

Conclusion

It seems to me that in the field of education, when it comes to dealing with bilingualism in the school, people tend to go to both extremes. Some embrace the idea of bilingual education being carried out in the students' native language, and only on their native language. Others, on the other hand, feel that non-English speakers should be mainstreamed into regular classes the minute they arrive to this country, creating a "sink-or-swim" type of situation. When I first started this study several months ago, I felt that the right method to teach bilingual classes is still out there. Now, I believe that there is no right method of bilingual education. I have learned that different students possess different types of learning styles. It is impossible to find out the perfect method or technique to fulfill every student's educational needs. As bilingual educators we must concentrate on the methods that do not work and try to avoid employing them. Teachers with different teaching techniques reach different students with different learning styles. It is not any different in bilingual education. We, as educators, need to investigate and talk to other fellow bilingual educators and try to find out what are they doing, and if it is working or not. I chose these articles because one deals with the effects of Proposition 227 on bilingual education, two of them provide the different ends of the spectrum of bilingual education, the last article establishes the type of comparison that I am trying to pursue in my research. The fact is that after conducting this review I still feel that English learner high school students who are in a bilingual math class that provides

instruction in both English and Spanish have an easier transition to mainstream math classes than those who are enrolled in bilingual classes that provide instruction only in their native language.

Methods

Subjects

The subjects of this research will be 60 high school students between the ages of 15 and 17 from Chula Vista, California. All 60 students were born in Mexico or another Spanish-speaking country and have been in the United States for only two years at the most. All 60 students will be English learners and will study the same Math subject during the academic school year. The students will be divided in two groups:

Group A: Bilingual class, taught in Spanish only.

Group B: Bilingual class, taught in Spanish and English.

Instruments

As mentioned before, the students will be divided into two groups. Group A students will be enrolled in a Basic Algebra course where the instructor will use only Spanish vocabulary when teaching the material. Group B students will take the same Basic Algebra course as Group A did. The only difference is that the instructor will use both English and Spanish when providing instruction. To measure the performance of the students after the course, the following criteria will be taken into consideration:

- Results on standardized exams, such as the SAT 9 (Stanford Achievement Test). This test is based on mathematical standards provided by the State of California Education Department. The test determines whether or not the

student has matched the requirements demanded by the State. It is also used as method to evaluate high schools' performance. The test is given only in English.

- The academic grades received in the Math course taken the year following the study. Students' performance in Geometry in the 2001-2002 academic school year will determine how successful the students were at making the transition to a mainstream class.
- Students will also take a test that will be carefully designed by their instructor. Content validity will be represented during this study. This test will be given a number of times, which will indicate the level of stability.

Materials

Each student will need a copy of the Algebra 1 textbook by Houghton and Mifflin. Each student enrolled in Group A will need a Spanish study guide supplemented with the Algebra 1 textbook; and a copy of the textbook Algebra con Baldor, which is a standard Math textbook used in most Latin American countries. Each student in Group B will be required to use a Spanish/English dictionary for the course. The VAX program: A software program that enables school counselors to search information about students. A counselor will provide assistance on this study by using the VAX to gather data needed for this study.

Experimental Design

All of the 30 students will be ranked based on their English level, then by their previous academic scores. The odd-numbered students will be placed in Group A, and the even-

numbered students will go to Group B. This draft-type system is necessary in order to make sure that the students in the experiment are evenly distributed between the two groups.

The groups need to be formed in the manner previously mentioned in order for this research to avoid any bias. Both groups need to be as evenly matched as possible. The data will be collected during the school year that follows the study, except for the standardized test scores, which is the first type of data used to measure the experiment, will be collected during the summer following the experiment. The scores will be sorted by each of the pre-designed groups in order to determine the mean, median, range, and standard deviation. A *t* test will be employed to determine whether the means of the two groups are significantly different from each other.

The second type of analysis will be a test that the students will take midway through the first semester following the study. The test will be in English and will contain material from the Algebra course that they took the previous year. The results will also be measured by gathering the final grade of the first semester following the study. Teachers, that will teach students that participated on the study the year after the study, will be given a form to record information about the students.

Procedure

Both classes study the same curriculum, however Group A receives instruction in Spanish without English. The textbook is in English, but they seldom use it. The instructor relies on the Spanish study guide that comes with the textbook package. The instructor also uses a textbook in Spanish to supplement material and word problems.

Some of the assignments from the textbook are translated to Spanish for the student to understand. All homework assignments and tests are in Spanish.

Group B students use the same textbook as students who take regular Algebra classes. All assignments and tests are in English. The class is taught mainly in Spanish. However, Mathematical terms are also introduced in English. Certain topics are taught in English. Students are encouraged to ask questions in either language. The instructor needs to be very aware of whether or not the students comprehend the material when addressed in English.

References

Brenner, M. E. (1998). Development of Mathematical Communication in Problem Solving Groups By Language Minority Students. Bilingual Research Journal, V 22.

Brock, C. H., Mc Vee, M. B., Shojgreen-Downer, A. M., & Dueñas, L. F. (1998) No Habla Inglés: Exploring A Bilingual Child's Literacy Learning Opportunities in A Predominantly English-Speaking Classroom. Bilingual Research Journal, V 22.

Cazden, C. (1988). Classroom discourse: The language of teaching and learning. Portsmouth, NH: Heinemann

Gándara, P. (2000). In the Aftermath of the Storm: English Learners in the Post-227 Era. Bilingual Research Journal, V. 24

Gay, L. R., & Airasian, P. (2000). Educational Research: Competencies for Analysis and Application. Prentice Hall, Inc.

Gee, J. P. (1990/1996). Social linguistics and literacies: Ideology in discourses (second ed.). London: The Falmer Press.

Hoyles, C., Sutherland, R., & Healy, L. (1991). Children talking in computer environments: New insights into the role of discussion in mathematics learning. In K. Durkin, & B. Shire (Eds.), Language in mathematical education (pp. 162-175). Bristol, PA: Open University Press.

Kagan, S. (1986). Cooperative learning and sociocultural factors in schooling. In Bilingual Education Office (Ed.), Beyond language: Social and cultural factors in

schooling language minority students (pp. 231-298). Los Angeles: Evaluation, Dissemination and Assessment Center, State University of California, Los Angeles.

Losey, K. M. (1995). Mexican American students and classroom interaction: An overview and critique. Review of Educational Research, 65, 283-318.

McCollum, P. (1998). Learning to Value English": Cultural Capital in a Two-way Bilingual Program. Bilingual Research Journal, V 22.

McLaughlin, B. (1985). Second language acquisition in childhood: Volume 2 school-age children. Hillsdale, NY: Lawrence Erlbaum Associates, Publishers

Pimm, D. (1987). Speaking mathematically: Communication in mathematics classrooms. NY: Routledge.

Schirling, E., Contreras, F., & Ayala, C. (2000). Proposition 227 – Tales from the Schoolhouse. Bilingual Research Journal, V. 24

Secada, W. G., & De La Cruz, Y. (1996). Teaching mathematics for understanding to bilingual students. In J. L. Flores (Ed.), Children of la frontera: Binational efforts to serve Mexican migrant and immigrant students. ERIC Clearinghouse on Rural Education and Small Schools.