Evaluating Vocabulary Acquisition Techniques for Use with a Ninth Grade Physical Science Course

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Background

St Michael Indian School is located in St. Michaels, Arizona, and has an enrollment of 138 students born in the 2009-10 school year. The school is the only K-12 private school located on the Navajo Reservation. It is a Roman Catholic school founded in 1902. All but three of the high school’s students were enrolled for at least five years of the Navajo Nation. Of the student body, 51% of students qualified for free breakfast and lunch programs and 80% of the students received some type of financial assistance in order to attend St Michael. The 35 students who participated in this project were members of the school’s two ninth grade physical science classes. These students were 23% male and 77% female.

Although the philosophy of the school is to take students where they are and move them forward, the high school course of study is decidedly college preparatory in nature with 98% of the graduates over the past four years having enrolled colleges, universities or trade/technical schools. All St Michael students are required to take four years of science and begin their four years with physical science.

Over the past four years I noted the difficulty physical science students have had in building, retaining, and using a science vocabulary.

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Science vocabulary terms that should be part of an average ninth grade science vocabulary have been missing from many of these students. Additionally, many of our students are considered English Language Learners (ELL). These factors have contributed to making the acquisition and retention of science vocabulary a struggle for many students.

I have employed various vocabulary acquisition techniques during the past four years with little success. As the students must complete four years of high school science courses it is essential that they possess the means by which they can acquire, retain, and use scientific vocabulary.

Focus Statement

The focus of my project is to determine if one of two selected vocabulary acquisition techniques, Vocabulary TV Visualization or Personal Clue Card might lead to greater vocabulary retention among ninth grade students. In addition to the focus question, I explored one sub-question:

• What role will student attitudes toward vocabulary acquisition play in the success of the selected vocabulary acquisition techniques?

Literature Review

If students are to master a discipline, they must first master its vocabulary (Tonjes, Wolpov & Zintz, 1999). Not only must students learn new vocabulary for a discipline, but they must also learn alternate meanings to words they may already know. Science courses expose students to new vocabulary terms as part of the process of learning scientific concepts.

In the movement of scientific vocabulary from working memory into long-term memory, several factors need to be considered. Two of the most important factors are the linking of working memory with prior knowledge and use varied memory activities during learning (Ormrod, 1999).

In learning vocabulary, many different strategies are available for teachers to employ. Two strategies proposed by Edyth Young (2005) are the Vocabulary TV Visualization and the Personal Clue Card. Both strategies allow students to link the vocabulary word or definition to previous knowledge.

If students are to succeed in science courses, they must be able to have the ability to reason and communicate effectively (Neuman, 2006).

According to Young (2005), students who have a well-developed vocabulary. By providing students with the strategies necessary to learn scientific vocabulary, they can progress to the point where they will be able to self-teach vocabulary. Once these strategies are in place the student will be able to think critically, reason, and communicate effectively.

Methodology

The Data Collection Instruments for this project were comprised of pre- and post-treatment surveys (attitudinal and vocabulary), pre- and post- treatment interviews, pre- and post-unit vocabulary quizzes, and summative chapter exams. The baseline for the treatment began with the evaluation of the first four science exams for the current year and three previous years. Pre-treatment surveys and interviews were conducted in support of the sub-question on attitudes toward vocabulary development.

The treatment was divided into three three-chapter units. During the first unit, the students employed the Vocabulary TV Visualization technique. For the second unit the Personal Clue Card technique was used. For the last unit each student was allowed to choose one of the two techniques.

Pre-unit self-evaluation vocabulary surveys and vocabulary quizzes were used to form unit baselines. Post-unit self-evaluation vocabulary surveys and vocabulary quizzes were used to measure progress within each unit. Data from both were triangulated with chapter exams results to gauge the effectiveness of the vocabulary acquisition technique. Additionally, the chapter exams and post-unit self-evaluation vocabulary surveys were used to measure the effectiveness of the vocabulary acquisition techniques.

Post-treatment attitudinal surveys and interviews were conducted to determine if the use of the vocabulary acquisition techniques had an effect on student attitudes towards vocabulary learning.

Data Analysis

A comparison of the first four science exams (Figure 1) suggests that the treatment students are similar to those from the previous three years. The tests for the first unit (Figure 2) using the Vocabulary TV Visualization technique, show the treatment students exceeding those from the previous three years. This trend was repeated during the other units.

Test scores using the Vocabulary TV Visualization technique exceeded those when using the Personal Clue Card. When students were allowed to choose techniques for the third unit, the Vocabulary TV Visualization technique was chosen by 30 of the 33 remaining students. This choice was made, as the chosen technique required more work to create than the Personal Clue Card.

Both interviews and surveys revealed that use of a consistent vocabulary acquisition technique had a positive effect on attitudes towards vocabulary learning in the second year. The data indicates the average test scores for my students increased during each chapter of each unit. This did not always occur in previous years, nor did it occur with the current students on the pre-treatment tests. Many techniques were used during previous years and none used on a consistent basis. Use of a consistent vocabulary appears to assist the students in acquiring science vocabulary.

The TV Vocabulary Visualization did yield the higher test averages. Consequently, two fellow ninth grade teachers plan to use the technique next year. The data indicates the average test scores for my students increased during each chapter of each unit. This did not always occur in previous years, nor did it occur with the current students on the pre-treatment tests. Many techniques were used during previous years and none used on a consistent basis. Use of a consistent vocabulary appears to assist the students in acquiring science vocabulary.

The attitudes of students towards vocabulary learning became more positive during the project. Upon completion of the project, 12 of the 33 students continued to use the Vocabulary TV Visualization technique. A major component of the attitude improvement was the ability for students to track their own vocabulary improvement and that of the entire class. Students were able to view the data comparisons between school years and it told a strong story.

References


