Failure and Success Rates of Language Minority Students in a Biology Class
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Introduction

In September 1998, as part of our English as a Second Language (ESL) department's academic duties, two colleagues and I were asked to become resource teachers in an applied biology course.

A substantial percentage of our school population is language minority and most of these students were having difficulties in the sciences. The particular course I was to resource in, an applied biology class, had a failure rate of 64% during the 1997-1998 school year. As an ESL teacher, I started to look at science as a culturally/academic embedded language. Language acquisition theories suggest that if one is to be successful acquiring a language, one must receive understandable instruction to become literate (Krashen, 1987).

Research Question

I had questions on the causal effects of these failure rates: Were there mismatches in the delivery and assessment of content (teaching style) and the students' styles? Was biology a "foreign" language to these students? Krashen's Input Hypothesis posits that for the acquisition of a second language (in this case English/Biology) to occur, the input must be comprehensible and a step beyond (1 + 1) of the student's present level of linguistic competence (Krashen, 1987). Our students had to become scientifically literate. The National Science Education Standards' definition of this type of literacy is: "Scientific literacy means that a person can ask, find or determine answers to questions from curiosity about everyday experiences . . . being able to read with understanding articles about science and to engage in social conversations about the validity of the conclusions ..." (National Research Council, 1996).

Background of the Study

The study took place during the first three quarters of the 1998-1999 school year at Falls Church High School. Our school is very diverse, with language minority students being a sizable part of our academic community. Language minority students as a group were having a difficult time earning passing grades in these applied biology courses. Our department was approached by an administrator and asked to become resource teachers in these classes. About 90% of the students in class were language minority and of these, only two had exited the ESL program. Our goal was to improve the success rates for these students. The data collected during this study is based on the quarterly
grades, students, self-evaluations and a language profile for the class that I developed.

Methodology/Intervention

After observing the class for a period of time during the first quarter, some recommendations were made: 1) The use of KWL charts at the beginning of new material to assess existing knowledge of the subject; 2) The use of an overhead to model note taking and to give visual reinforcement; and 3) Student generated vocabulary flash cards.

As the semester progressed more strategies were implemented to shift from a teacher centered lecture class to a student centered interactive class. More ESL teaching strategies and techniques were offered and most were implemented. Among these were: 1) The use of student: generated visuals; 2) Self-assessment forms on tardiness, homework and reading; 3) Journal entries; 4) More graphic organizers; and 5) Content area word puzzles to improve the vocabulary.

Teacher resourcing became, in instances, "team teaching" with the students reading the textbook out loud during class, whole class word definition games, and rewording and recycling of subject matter. I offered after school tutoring to interested students and provided bilingual dictionaries during the tutoring sessions.

Our department developed assessments that would tap the students' strengths. Among these were: 1) Self- evaluation forms; 2) Oral descriptions of lab procedures (i.e. Plant cell show and tell); and 3) Reworded practice tests & quizzes. It was interesting to see the honesty in the students' responses to the self- evaluation forms (see enclosed examples).

Results/Findings

By the end of the third quarter there was a considerable drop in the failure rate of the class. Interestingly, there was also a drop in "A's" and "B+'s" (see chart below). This unexpected development may have been caused by the progression from a basic introduction to biology in the first quarter, to linguistically demanding and subject specific units of instruction at the end of the third quarter. The failure rates (F grade) dropped each quarter, from a baseline of 52.6% in the first quarter to 42.11% in the second quarter and 25% in the third quarter. Two charts are included to illustrate the changes that occurred during the research. Chart one shows success/failure rates by quarter.
Success/failure by quarter

First Quarter

- Passed 47.37%
- Failed 52.63%

Second Quarter

- Passed 57.89%
- Failed 42.11%

Third Quarter

- Passed 75%
- Failed 25%

The second chart shows grade distribution by quarter.

By the end of the third quarter it seemed that most students had a basic grasp of this new biology language. When asked in an informal manner outside the classroom, they were able to explain concepts of biology and to talk about a variety of content related topics.
Implications for Teaching

During the 1994-1995 school year there were close to 3.2 million limited English proficient students in the U.S. schools. These students comprised almost 7% of the total k-12 student population (NCBE, 1997). The increased diversity of our school system presents us with challenges and opportunities that often intermingle and become one and the same. Society has given us the challenge and the opportunity to provide quality instruction with rigorous academic content to all students so they can become successful members of society.

Among successful teaching approaches in a diverse classroom, one suggests that instruction should focus on students' creation of meaning about content in a collaborative and interactive environment (ASCD, 1995). This research has focused and benefited my teaching practice. It has given me the chance of working with mainstream content area teachers. It also has opened a window of opportunity that allows the flow of instructional ideas among departments. Being involved in this research assures me that we can help students acquire scientific literacy and become successful learners. To do this students should be exposed to a variety of teaching techniques and teachers should model a variety of learning strategies that address their learning needs.
References

