IMPLEMENTATION:

RESEARCH QUESTIONS:
1. How effective is the enhanced science program model in developing science achievement and science academic English for monolingual English students and for English Language Learners, ELLs, whose first language is Spanish?
2. Do student characteristics interact with program type (treatment or control), and/or teacher characteristics to predict academic success in science for monolingual English students and for ELLs whose first language is Spanish?

PURPOSE: Investigate the effectiveness of a 2-year experimental study of an enhanced instructional science model on the science academic language development and science achievement in English of Grade 5 and Grade 6 students.

CONTEXT AND PARTICIPANTS:
Economically disadvantaged Spanish-speaking ELLs and non-ELLs in an urban school district in Southeast Texas.

DESIGN: 4 intermediate campuses (2 experimental, 2 control)

FINDINGS SUMMARY:
Science: For both ELLs and non-ELLs, treatment students significantly outperformed control students on district science benchmark tests in grades 5 and 6, and researcher-developed science assessment in 6th grade.
Reading/English Language Arts: For both ELLs and non-ELLs, treatment students significantly outperformed control students on district reading benchmark tests. Further, ELLs in treatment condition demonstrated a faster development than their control peers on standardized English language measures.

6th grade science assessment
The research team developed science assessment for 6th grade. Prior to the intervention, the instrument was piloted among 25 students with an internal consistency of .70. The test consists of 36 multiple choice questions with a compilation of questions from 2009 TEA 5th grade science release TAKS and the 6th grade EduSmart software. Drafts were sent to project science specialist for feedback. Results suggested that treatment students outperformed control students on post-test after pre-test performance is adjusted, with an effect size (partial eta squared) of .083 for non-ELLs, and .294 for ELLs.

6th grade district science benchmark tests
Results indicated that treatment students outperformed their control peers (passing rate) on 5 out of 6 tests among ELLs with an average effect size (Cramer’s V) of .271; treatment students outperformed control peers on 4 out of 6 tests with an average effect size of .156 among non-ELLs. More importantly, the difference was more evident in 6th grade as compared to 5th grade between treatment and control ELLs.

6th grade district science benchmark tests
Results indicated that treatment students outperformed their control peers (passing rate) on 2 out of 4 tests in both grades among ELLs with a median effect size (Cramer’s V) of .148; treatment students outperformed control peers on 4 out of 6 tests with an average effect size of .156 among non-ELLs. More importantly, the difference was more evident in 6th grade as compared to 5th grade between treatment and control ELLs.

PRODUCTS:
- MSSELL Website
- 22 Week Lesson Plans – Grade 5
- 21 Week Lesson Plans – Grade 6
- Family Involvement in Science (FIS) take-home activity booklets
- EduSmart Supplemental Leveled Questions
- Academic Oral and Written Language in Science (AOWLS)

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Woodcock Language Proficiency Battery-Revised
There is no statistically significant difference between treatment and control non-ELLs during the 2-year project implementation. However, a statistically significant difference was observed between treatment and control ELLs on Oral Vocabulary and Passage Comprehension.

Classroom Observation
Observations using the Transitional Bilingual Observation Protocol, TBOP, indicated that treatment classrooms displayed more dense language content (conceptually demanding content, critical thinking) when compared to control classrooms.

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