Discussion of Socioscientific Issues in Classrooms to Develop Youth’s Scientific Literacy About Climate Change

JOSHUA LAWRENCE
Assistant Professor of Language, Literacy & Technology
University of California, Irvine

RAUL LEJANO
Associate Professor of Planning, Policy & Design

ALEX R. LIN
Doctoral Student

SUNG JIN PARK
Doctoral Candidate

OBJECTIVES

(i) How do students enrolled in the Word Generation program compare with control students, in terms of their ability to participate in a classroom discussion of socioscientific issues related to the environment and climate change?

(ii) What kinds of understandings about climate change do students enrolled in the Word Generation program show in their essays?

Background

Scholarly Interest
- Science education reforms focus on inquiry-based learning environments that use discussion of socioscientific issues tied to social controversies (e.g., global warming and climate change) to improve students’ scientific literacy.
- Zohar and Nemeth (2010) analyzed survey data from 9th grade students that participated in a program, which provided classroom discussion opportunities to debate about topics related to human genetics. Compared to students receiving only conventional instructions, the treatment group outperformed the control group in every aspect of scientific literacy including scientific knowledge and argumentation skills.

Word Generation
- Word Generation is a research-based program that supports middle school students’ development of academic language skills, by highlighting target words used in brief passages about controversial topics such as federal funding for stem cell research and the environmental concerns related to nuclear power.
- Based on a curriculum featuring 72 different topics, teachers in all major content areas facilitate discussion of the weekly topics in ways that support the development of students’ ability to reason and express differing perspectives.
- Previously published studies have documented Word Generation’s positive effects on students’ reading comprehension, teacher practice and language development for limited English-proficiency students (Lawrence, Capotosto, Braun-Martin, White, & Snow, 2011; Snow, Lawrence, White, 2009).

Methods

Study Design
In 2010, 13 inner-city middle schools in a west coast school district participated in an experimental study of the Word Generation program. Schools were randomly assigned to treatment (7) and control (6) conditions.

Analysis Plan
(i) Survey Analysis
- Survey analysis of students’ discussion abilities (n=4,400) regarding environment topics that were taught in the Word Generation program.

(ii) Essay Analysis
- Narrative analyses of students training essays to assess the extent to which students internalized climate change communication.
- Students wrote essays in response to the question “What should be done to prevent global warming?”

Directions for Future Work

- Compare environment-related reading comprehension scores for students in the Word Generation program with students in the control schools.
- Evaluate the extent to which students’ perception of classroom-based opportunities to discuss predicts their environment-related reading comprehension scores.
- Compare training essays about climate change for students in the Word Generation program with students in a comparable control group.

Preliminary Results

Research Question 1
Word Generation students were given discussion opportunities for the series item (6) about global warming, but not for the series item (8) relating to stem cell research and nuclear power. Control students did not receive discussion opportunities for any of the series items.

- Students in the Word Generation program reported more confidence about their abilities to participate in a classroom discussion about global warming (3.75) than students in the control group (3.66). T-test report this to be statistically significance t (5,365) = 2.58, p < .001.

Research Question 2
Students responded to the question “What should be done about global warming?” (See Figure 2)

- All three students have recognized a need to take action against global warming which validates the effectiveness of the classroom discussion of global climate change (see sequence – main story for supporting evidence).

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Please visit www.wordgeneration.org for more information.