

De-emphasizing science vocabulary with English language learners

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How can science instruction be responsive to English language learners?

An influential model—Sheltered Instruction

- Combines language objectives with “content” objectives, e.g., science
- Esposes ensuring comprehensibility, attending to cultural backgrounds, explicitly teaching linguistic structures; & hands-on inquiry (Janzen, 2008; Dong, 2002; Schleppgrell, 1998)

In particular, how can instructors support ELLs in acquisition of scientific vocabulary?

Ongoing debate: Should vocab be taught explicitly or implicitly? Front-loaded to support ELLs?

Contrasting approaches to introducing Vocab

- Explicitly, before content (Camino & Camino, 2004; Colorado, 2007)
- Explicitly, before, during, & after instruction (Short, Echevarria, 1999, p 20)
- Implicitly, during and after inquiry (Hart & Lee, 2003; Lee, et al., 2006; Settlage, Madsen & Rustad, 2005)

Must Sheltered Instruction front-load vocab?

“...We advocate specific vocabulary instruction, and it can come where it makes the most sense.” (Echevarria, 2005, p. 61, emphasis added)

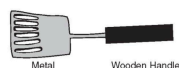
Where does it make the most sense to introduce vocabulary for ELLs? And how can we decide that?
In this poster, we argue for the use of **micro-analysis of classroom interaction** to inform this long-standing debate

Case 1 – Explicit focus on vocab disrupted scientific sensemaking

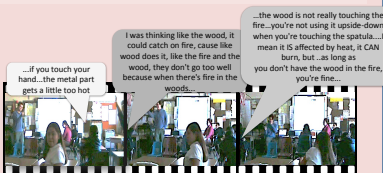
Ms. D asked Mr. L to show her class how inquiry can help them do well on the State test. He contrasted two mindsets to test-taking:

“You either know it or you don’t”
VS.
“When in doubt, you can figure it out”

They applied this latter perspective to a practice question:



Which property of wood makes it a good material for the handle on a cooking tool?



(above) Mr. L asks “What makes sense and why?”

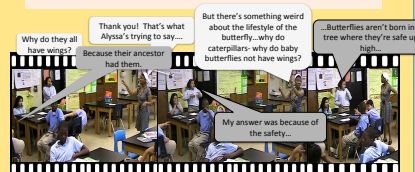
(below) Ms. D asks “What’s the most important word in the question?”



After another two minutes of this, Ms. D decided to drop the vocabulary emphasis. Her in-the-moment decision agreed with our later analysis that **focusing on vocabulary disrupted sense-making**.

Case 2 - If we throttle back on vocab, kids can tell us when they need vocab...

Inquiry Question: “How did birds, bats, and butterflies all come to have wings?”

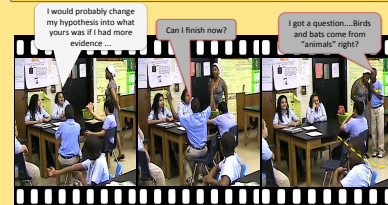


(above) Ms K highlights Allyssa’s idea that wings stem from common ancestry, but then request an explanation of why baby butterflies don’t have wings – unlike baby birds and bats. Allyssa’s ‘rescue’ emphasize safety.



(above) ELL student Theo offers an alternative to Allyssa’s ‘common ancestry’ idea.

(below) Theo spontaneously solicits Ms K’s assistance with vocabulary to help him express his response to Allyssa’s challenge.



Theo got out of his seat in order to privately solicit vocabulary in the service of making an argument to respond to Allyssa.

Instructional supports: Engaging ELLs in “doing science”

Some educators foreground the doing of science, rather than the learning of English (Rosebery, Warren, Conant, 1992). They argue that categorizing students by what they don’t know affects the kind of science they are asked to do.

Along these lines, Hammer & van Zee (2006) advocate centering instruction around eliciting, attending to, and building upon the productive intellectual resources that students bring to bear.

By contrast, other researchers recommend explicit vocabulary instruction as a core support for scientific inquiry among ELLs (Lee, Penfield, & Maerten-Rivera, 2009)

Our perspective: Instruction must prioritize helping students epistemologically frame their activity as collaborative sense-making about the natural phenomena. Any (de)emphasis on vocabulary should serve this end.

Our case studies show that frontloading vocabulary is not (always) needed to scaffold sense-making.

Research Methods: Video Analysis of Classroom Interactions

Previous studies have relied on interviews (Rosebery, Warren & Conant, 1992), questionnaires (Lee, Adamson, Maerten-Rivera, Lewis, Thornton, Leroy, 2008), field notes and/or teachers’ recollections (Short, 1999) as their primary data source. Video analysis of classroom interactions can support rich, in-depth accounts of student learning in context (Jenny et al., 2010; Scherr, 2009)

Background on Our Research Context: The (MSP)² Project

The Math and Science Partnership and The Minority Science Pipeline, (MSP)², is an inter-institutional long-term initiative centered in Prince George’s County, MD that aims at increasing the number of underrepresented minority students who remain in the ‘pipeline’ towards becoming professionals in math and science fields. Our branch of this endeavor centers on cultivating among students and teachers at the earlier stages of said pipeline (grades 4 – 8), an appreciation for the free-form, collaborative sense-making that is inherent to our take on the nature of scientific inquiry.

Conclusion

Removing the instructional “support” of front-loading vocabulary can help students (re)frame their classroom activity as sense-making, leading to inquiry in which the students help decide when and how to emphasize vocabulary.

Implications

• Researchers must examine classroom interactions to make claims about the effects of different instructional moves in different circumstances, for fostering inquiry and vocabulary growth.

• Teacher educators can engage teacher candidates in analyzing cases to realize that no “best” teaching method exists.

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