

Reframing science activity in the sheltered classroom

What this research was about and why it is important

This paper examined written and spoken interaction in an eighth-grade sheltered science classroom, which enrolled only English learners across multiple levels of English language proficiency. The study looked at the extent to which linguistic (e.g. spoken and written language) and extralinguistic (e.g. images or gestures) communication contributed to language and science learning. The paper suggests that two dialogs were actually operating simultaneously throughout the unit on surface tension, each one enlisting the available classroom resources to carry out quite different purposes.

What the researchers did

- The data included:
 - Video-recordings of 50-minute science lessons throughout a semester (4 days a week).
 - Copies of all written products and visual products were collected for students who had submitted signed consent and assent forms.
 - All written and/or visual materials distributed by the teacher.
 - Intermittent informal interviews were conducted with the teacher to obtain views about classroom processes that were taking place.
 - A detailed exemplar (on the topic of surface tension) of the interactional patterns that took place throughout the study.
- The researcher examined the multimodal activity in the classroom to locate patterns in the use of oral language, written language, images, gestures, eye contact, movement, and classroom or science materials.

What the researcher found

- Although they employed the same set of semiotic resources, the teacher and students did not necessarily interconnect or enact mutually recognizable processes. The teacher discourse cued the students to read the available social and pedagogical resources in a way that awarded them a behavioral identity in the classroom, but this did little to help them develop their own understandings about surface tension. As a result, the use of scientific language was confined to the teacher discourse. The students complied with the behavioral requirements of the teacher discourse, but its underlying conceptual agenda was neither communicated nor recognized.
- In response, the students reframed their discourse to foreground peer identity; in other words, the students began their own dialogs when the ongoing activity did not engage them in linking the science observation with relevant language and concepts. The teacher discourse, however, shifted frames late in the investigation, requiring the students to conceptually engage with the content through written language. The students were able to partially link their science activity with the concept of surface tension, but the learning trajectory had not explicitly incorporated key language into their own investigative activity. As a result, they did not develop a conceptual identity in English or their L1.

Things to consider

- The bifurcation of a classroom science discourse is not the result of language issues alone but also a result of the pedagogical situation in which the students find themselves as English Learners. There is an essential need for teacher awareness of the centrality of the students' first language to identity and the role of that identity in the classroom discourse.
- Semiotic resources may differently engage the identities of the teacher and of English Learners. Semiotically responsive pedagogy creates a bridge from the concrete to the abstract, opening up multimodal space for observation, interpretation and language use so that English Learners can build a conceptual identity in classroom science discourse.
- Language choice is a resource for making meaning that emerges from and expresses the identity of the speakers. It thus functions as a communicative mode. Students need the space to enlist that mode in building and expressing their conceptual, behavioral, and peer identities in sheltered classrooms.

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