

Note

[1] There are more significant issues concerning the transformation of speech into writing, including orthography, dialectal issues and, for mathematics specifically, notation: for example, no one ever says “2”, he or she always says “two”: unlike with writing, we always *speak* English (or whichever language) words.

References

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Language in use

LESLEY REX

As I read through the transcript, I am most interested in understanding the social and epistemic culture of the classroom this text represents (Rex, 2006). I view the discourse described as language-in-use and seek to make visible how the linguistic and discourse choices of classroom interactants are consequential for student learning (Rex & Green, 2008). Although this transcript offers only a momentary temporal snapshot of the classroom’s lifeworld, it can tell me a great deal about how knowledge-related actions are connected to the social roles and relations that the teacher and students are constructing as they interact (Erickson, 2004; Streeck & Mehus, 2005). Through conversation analysis, I can observe in adjacency pairing: a) how utterances meaningfully position what counts as knowledge and how to display it; b) whose knowledge and moves count in determining the content and direction of the interactions; c) where authority for mathematical knowledge resides and who has the right to broker that knowledge; d) how teachers, through their discursive styles, sustain knowledge-building practices that may clash with or enact the aims of their curriculum.

In the textbook, students read the results of a second-hand investigation and compare it with the results of their own investigation. (“J: Okay, first of all look at their class average and then look at our class average. How do they compare? Cory: Theirs is like heavier or something.”)

Cory provides a comparison; the teacher, Josh, acknowledges (“Okay”) and validates Cory’s answer by providing evidence for his interpretation. In response, students conjecture as to why the Maryland bridge required more pennies. Another student’s first utterance is inaudible, but Josh’s response (“Maybe. Maybe it was thicker”) suggests he had conjectured that the differences in data measures had to do with differences in thickness of the paper used to make the bridge.

I will leave to my mathematical colleagues the question of whether the unnamed student’s response could be considered a thoughtful and substantive conjecture. Instead, I am interested in how the teacher responds. Even without knowing the tone of Josh’s response, his words appear to redirect attention away from S and her conjecture to Josh himself and, by extension, to the textbook. He says he does not know whether in Maryland they used construction paper or a similar heavyweight paper. When a student responds with another observation, Josh ignores it and redirects the class by asking Cory to read on. The implication is that S’s idea, and the direction for answering the question in which she is taking the class, is not worth pursuing.

After Cory has read from the text, the teacher re-reads a sentence. He tells the students where to focus in the Maryland data and how to understand it, before asking Cory to read on. Again, he points to a sentence in the text, noting its importance as a “good definition” and remarks that he will post a vocabulary wall chart. These multiple language forms mark this information as important. They add to the moves the teacher has already made to indicate that text-based data and definitions constitute the mathematical knowledge that matters. Also, by repeating verbatim the definition of a graph model, by audibly planning to post the word and definition on the wall, and by holding students accountable for this vocabulary word, the teacher reifies the abstract concept of “graph model”. He is treating a conceptual definition as a real, tangible object, as though the definition *is* the knowledge. The teacher reinforces this epistemology later in the lesson episode, when he asks the class to “remember what a graph model *is*” and restates the definition from the text.

This episode also can be read as indicating where students are directed to look to locate mathematical knowledge. Looking in the book is communicated as insufficient. Later in the sequence, after pointing out that all their graphed data points “are pretty close”, the teacher asks, “Why do we do this? What’s the purpose of a graph model?” I am interested in his use of “we” in this first question. To whom is he referring? The subsequent interactions point to another focus. The teacher, through his questions and responses, is asking students to figure out *his* answer to the question. Abram makes the first attempt with, “To show the linear relationship,” which the teacher greets with a “yes, but” type of response. Yes, maybe the graph model shows linearity, but that is not what Josh is looking for. His next question tells students it is his reasoning he wants them to understand: “Why did I draw the line?”

Christy’s response is met with, “Well, maybe that’s part of it,” before Josh refers the class back to the specific definition for a graph model in the book, whereupon he makes another attempt to elicit the answer he is looking for by asking Lance directly, “What’s the purpose here?” Again Josh invokes “we”, collapsing the *I* and *we* positions. Why did *I* do something is interrelated with why do *we* ever bother doing this? This move not only reinforces the textbook as the site of sanctioned mathematical knowledge, but it also confirms the teacher as the interpreter of that knowledge in this classroom. In doing so, this move positions both the teacher’s role and what students should expect of him and of themselves. Students are to be readers of the teacher’s actions and

are to read them in relation to the information in the textbook. The mathematical knowledge that counts for them in this moment lies within this interface between what they read as mathematical knowledge in the book and how the teacher has them engage with it.

In previous classroom research (Rex & McEachen, 1999), I explored how teachers signaled and students read expectations for displaying subject-matter knowledge so it could be recognized and validated by the teacher. Those displays that are recognized and validated by the teacher in this episode involve reading verbatim, comparing average weights and guessing what the teacher is thinking. Students' knowledge displays that are recognized and not validated include a conjecture about reasons for consistent differences in average weights, a conjecture about the mathematical purpose of a graph model and a conjecture about the mathematical purpose of drawing a line on a graph model. The single instance of a student's unrecognized knowledge display occurs when S attempts to elaborate her conjecture about the thickness of the bridge in the Maryland experiment. Josh's decision not to recognize this elaborated thinking could be read as a signal to S and the other students that this is not how to display knowledge about mathematical thinking.

My aim, by describing what occurred in the ways that I have, is to see ordinarily invisible dimensions and relations that could inform practice, by pointing out for teachers their discursive choices and their interactional trajectories. With only one short transcript, I cannot know whether this knowledge-building social condition is a normative practice in this classroom. Nevertheless, this episode illuminates the interrelated social and epistemic practices in action on this particular day.

References

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Textbook positioning

BETH HERBEL-EISENMANN

Textbooks have a pervasive presence in mathematics classrooms and can impact what and how teachers teach and students learn. I am interested in the teacher-student-textbook relationship, because the teacher, students and textbook are all potential sources of knowledge in relation to learning. The ways in which the teacher and students draw on, use and refer to the textbook influence its position and

privilege as a source of knowledge. And, through this "positioning" (see Wagner & Herbel-Eisenmann, 2009), language choice also allows the teacher and students to position themselves and one another. Although there are many interesting aspects related to the positioning and repositioning of the textbook and the teacher in this transcript, here I narrow the scope of my focus by concentrating on one aspect raised earlier in this composite piece: direct reading from the text.

When the textbook is read from, it is authorized to do things and say things in particular ways and thus amplifies the authority of the textbook as a source of knowing. Most research on authority in classrooms focuses on teacher authority and briefly mentions that the textbook may play a role in authority relationships in classrooms (Amit & Fried, 2005; Haggarty & Pepin, 2002; Hamm & Perry, 2002). None of this research, however, has seriously considered the interactions among the teacher, textbook and students in their inquiries, perhaps because, as Olson (1989) has claimed, textbooks "are taken as the authorized version of a society's valid knowledge" (p. 238).

Josh began the interaction by calling on a student to read from the textbook. After Cory read a section of the textbook (lines 2-5), Josh re-read a portion of what Cory had just read (lines 6-8). Reading directly from the text, especially with little or no interpretation (and then a re-reading) of it, privileges the wording of the textbook. The teacher did not authorize the text, but rather from his position *in* authority, he deferred to the text as authoritative, tacitly suggesting that his students should also defer to the textbook's authority. In this case, the textbook was authorized to introduce and define particular mathematical terms.

When a teacher reads from a textbook or a student is called on to read from the textbook, the talk in the classroom is similar to talk that occurs in church rituals when the congregation is asked to read from or repeat a text. As Olson (1989) has pointed out:

ritual utterances radically restrict the linguistic options at the lexical, syntactic, and intonational levels [...] [providing] limited options [...] for dissent. [...] [a] speaker [...] is not speaking his own words but the words of elders as a spokesman or messenger. (p. 235)

These practices authorize the textbook as the authority because a ritualized form of reading requires a person to speak words that do not originate with him- or herself, but rather with someone else. It is one of the most controlling ways in which students are restricted from speaking the form of the words they might choose.

Josh called on Cory to read from the book a second time (line 13). Josh further privileged the textbook's definition of graph model when he said that the book gave a "good definition" and provided a *third* reading of the graph model definition (lines 20-21). Both Abram and Christy attempted to answer Josh's questions about the purpose for finding a graph model. When their answers seemed to be not quite what Josh was looking for (*e.g.*, "I could maybe see that...", line 28, and "Well, maybe that's part of it", line 32), he directed students' attention to the specific page number in the book and instructed students to "Read that last paragraph to yourself" so that they could answer his question appropriately.