

Frame Analysis As A Way To Understand The Complex Dynamic Of Classroom Teaching Practice

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Abstract. From one moment to the next, what and how a teacher teaches may change. In this paper, I discuss two examples from one teacher, showing shifts in her practice from one moment to the next, within the same activity. These shifts are characterized by different ways in which she assessed her students' ideas and interacted with her students. Common accounts that attempt to explain teachers' practice as the result of a unified set of beliefs, knowledge, and goals (e.g., teacher-type) cannot account for these two examples. While these broad generalizations may be useful for studying broader patterns in large populations, they assume a consistency in teacher cognition that is not borne out by the data. I argue that frame analysis can provide insight into how to think about variability in teacher cognition- namely that consistency is local and depends on what is going on in that moment.

Keywords: teacher attention, teacher cognition, frame analysis.

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TWO VIEWS OF TEACHER THINKING

Two views of teacher learning and the role of context can be discerned in the literature. In one view, the context is something that the teacher manages to the best of her ability. The more expertise a teacher has, the more she is able to flexibly use her ability to enact her central educational philosophy.^{1,2} Sometimes this is evidenced in a teacher's ability to reinterpret curricular or policy messages to align with her core beliefs and attitudes.^{3,4,5} Novice teachers, or ones trying to change their practice, may exhibit more variability in how they think. But this may be because their belief systems are not well formed or they do not have the skills to support enactment of more sophisticated beliefs. For example, they may espouse one view while enact another because they do not yet have the skills to execute the sophisticated beliefs they state.^{6,7,8} Until they develop those skills, those sophisticated beliefs do not play a central role in those teachers' teaching.

The other view takes a more situated view of teacher cognition. Teacher thinking is flexible and sensitive to the context. For example, there is a dynamic relationship between the type of activity and the beliefs, knowledge, and goals a teacher uses to support her teaching; different activities are associated with different ways of thinking about teaching and learning.^{9,10,11,12} Though a teacher may reliably make certain declarative statements about teaching and

learning, what is central to her teaching practice may depend on elements of her cognition and educational philosophy as well as how she thinks about the on-going activity.

The work from this paper aims to contribute to the context-sensitive view of teacher cognition. I focus on two examples from the same lesson of one teacher ninth grade physical science teacher, Ms. M. In each of these examples, Ms. M portrayed two distinct views of teaching and learning. I argue that each of these views are rooted in Ms. M's framing of her interactions with her students.

THEORETICAL FRAMEWORK

A teacher's frame refers to a "set of expectations an individual has about the situation in which she finds herself that affect what she notices and how she thinks to act" (p. 9).¹³ In effect, this is a teacher's definition of the on-going interaction that helps her interpret the events.¹⁴ An underlying assumption I make is that these expectations are constructed from the activation of locally coherent sets of cognitive resources (e.g., beliefs and knowledge). A teacher may have a wide variety of cognitive resources, some of which may be in conflict with each other. Their use is dependent on the local context in which the person is a part. All in all, this is to say that I assume that observations of stability or variability in teacher cognition depends in

part on what is happening in that moment and the teacher's framing helps the teacher define that moment.

I collected classroom data (videos and field notes) and conducted interviews with the teacher. There were two different kinds of interviews: 1) post-observation informal interviews and 2) stimulated recall interviews where I conducted highly detailed interviews about selected classroom episodes.¹⁵

TWO VIEWS OF TEACHING

In this lesson, Ms. M intended to use a short engagement to introduce the new unit on phase changes her students were to study. She planned to have a 10 minute warm-up discussion about what science lay behind the sport of curling. She hoped to use her students' comments to segue into a discussion on energy's role in phases transformations. But, she let the warm-up go longer than she planned (it lasted over 20 minutes) because the conversation was richer than she anticipated. In the end, she did not follow her intended schedule.

Example 1: Framed As A Debate

Early on, Ms. M's students disagreed on whether the melted water on top of the ice facilitated or impeded the curling stone's motion. In an interview, Ms. M said she was concerned that some students did not think "that melted ice causes things to speed up....For some reason I felt like we can't get to where I'd like to get if we don't address the fact that some people think that water on ice slows you down." To help them resolve this, Ms. M asked her students to present and examine the two arguments. Though the first argument presented correctly described how slipping was linked with the thin layer of melted water, Ms. M did not want to stop the conversation there. In an interview, she said, "Because I knew that the class was already split before...I want people to be... able to look at counter arguments. And then you can more definitively come up with an idea or wipe out, like knock out a counter-argument." In the class discussion, Ms. M continued to ask her students about the counter-argument.

- 1 Ms. M: So someone who thinks that it makes it,
- 2 slows it down, tell me why you think it slows it
- 3 down, cause that's our counterargument, right? So,
- 4 so why do you think Melissa?
- 5 Melissa: Well I'm not sure, but like, maybe if it's
- 6 like water then it's like just more stuff to go over.

- 7 Ms. M: Oh, so you're kind of thinking like (Melissa:
- 8 I don't know)...like what would be an example of
- 9 that?
- 10 Melissa: Umm...I'm not sure. (students speak up)
- 11 Like a puddle?
- 12 Ms. M: Like a puddle? How would a puddle slow it
- 13 down—like, what do you mean? Like what's an
- 14 example of that?
- 15 Tiffany: Going into the water, you know, just like-
- 16 Ms. M: Like if something is kind of like—
- 17 Rhonda: Well if you're doing a marble across a table
- 18 or something, it would probably go slower in the
- 19 water 'cause it has more stuff that it's going
- 20 through.
- 21 Ms. M: So it's kind of going deeper in the water
- 22 right? So as it rolls in, it's actually sinking in and
- 23 eventually the water is stopping it. OK.

In an interview, Ms. M explained that she wanted her students to discuss in a specific way, "I used that phrase, our counterargument, very explicitly. Y'know, I was just trying to get them to think about yes, we're in a discussion but there are different sides." Also in that interview, she said that during this part of the discussion, she purposefully sought out responses that were supported by examples from students' every day experiences. We can see Ms. M doing just that as she pressed her students for examples to support the counter-argument (lines 5, 6, 8, 9, & 11). Initially, Ms. M did not understand how her students thought about the counter-argument but had expected to ultimately show the class how the counter-argument was incorrect. She did not expect to contribute to an explanation for why the counter-argument was right, as she did at the end of this snippet. Through listening closely to her students' meaning, she saw that both sides of the disagreement were correct. They just referenced two different scenarios. In the end, Ms. M and her students determined that the ratio of the water depth to the stone size determined if the stone would slide on the water's surface or slipped into the water and experienced drag.

Ms. M framed this interaction as a debate. In this debate, the students were expected to examine the warrants for the arguments. Though she ultimately expected to help them come to the correct understanding, her role here was to help her students flesh out their thinking. She assessed what they said based on how understandable and supported their arguments were. Associated with this frame is the view that helping her students examine their own ideas, irrespective of correctness, was important for their learning.

Example 2: Framed As A Review

Later in the warm-up, Ms. M asked, “What property of the stone makes it so hard to predict where it’s going to land?” One student, AJ, responded by talking about friction. However, friction was not the answer Ms. M intended. While AJ insisted on discussing friction, Ms. M tried to remove friction from the conversation so they could focus on the target concept, inertia. Below is an edited version of the discussion.

- 24 Ms. M: If it was just the same everywhere and there
25 were no brushes and they just let it go. And the ice
26 was completely the same smoothness
27 everywhere....What would happen? ...
28 AJ: It would stop.
29 Ms. M: Why, why do you think it would eventually
30 stop?
31 AJ: Nothing can go on forever.... Friction. It still has
32 friction.
33 Ms. M: ... So, friction will eventually stop it, but if
34 there were no friction at all, what would happen to
35 the stone?...
36 AJ: Actually, no it wouldn’t because the air would
37 stop it...
38 Ms. M: There’s a little bit of air resistance, right?
39 What is the property of objects that keeps them
40 going?
41 Overlapping student voices: Kinetic energy. Their
42 energy.
43 Ms. M: Well kinetic energy is related to the energy
44 they have that makes them moving—
45 Female Student 2: That law.
46 Ms. M: What is that law? Objects in motion?
47 Akeem, what is it?
48 Akeem & students: Inertia.
49 Ms. M: (fortissimo) Inertia! Right? Inertia! (normal
50 volume) What is inertia saying, Akeem?
51 Akeem: An object that is in motion will stay in
52 motion unless [acted upon by?] another object.
53 Ms. M: Or an outside force, right? So an object in
54 motion stays in motion unless acted on by an outside
55 force.

When AJ said the object would come to a stop, Ms. M was surprised because that was not the answer she expected. The answer she expected needed to reference inertia. Though Ms. M acknowledged the points about friction, she tried to restrict the conversation so it could be ignored (lines: 21, 22, 24, & 25). It becomes apparent in the latter part of the transcript that Ms. M was aiming for the concept of inertia. By removing friction, Ms. M was able to guide

her students to review the canonical definition of inertia they had covered earlier in the year.

In an interview, she said, “They do physics first semester [and chemistry?] second semester... (I brought up inertia because) I really think it was just to connect with [??] the first semester.” Here, she expected her students to know the standard definition of inertia and apply it to this situation. In an interview, she explained that she was also focused on having her students use established terms. Ms. M said, “I was trying to bring in kinda just standard scientific words, phrases.... There’s certainly value in understanding things at the gut level away from scientific vocabulary (but) scientific vocabulary is still important to be able to use.”

Ms. M frame this interaction as a review of a concept. Since inertia was a concept the class already covered, she expected her students to be familiar with the definition and its application. Ms. M assessed her students’ statements based on how well her students’ statements matched the target concept. Her role here was to help remind her students of the correct terms if they had forgotten them because it is assumed they already understand inertia since they covered it previously. Associated with this frame is the view that helping her students correctly connect canonical definitions and terms to phenomena was important for their learning. In contrast with the first example, how her students thought about real world phenomena was not as critical to their learning, especially if their statements did not produce the intended answer to the question.

DISCUSSION

These are two examples from the same teacher during what was nominally the same activity (the warm-up) from the same lesson (an introduction to phase changes). In these examples, Ms. M displayed two distinct views of teaching and learning, which is indicated by how she assessed her students’ statements. In the first example, she was focused on how they explained their ideas. In the second, she was focused on how close her statements hit the target concept. Each view is situated in a network of expectations. There is local coherence between what they are doing and how she thinks about what is going on in each interaction. But the coherence does not necessarily extend beyond the interaction. As we can see, the network of expectations, or Ms. M’s frame, is dynamic, shifting from one moment to the next.

Though her frames were constrained by elements of Ms. M’s cognition, it was not wholly determined by it. Her thinking changed in the two examples. Nor can we say it was determined solely by the larger

activity structures, such as the warm-up exercise for an introduction to the phase changes topic. For example, it is not wholly clear how reviewing inertia furthered the aim of connecting energy to phase changes nor how it helped keep the class on its curricular schedule (the class fell behind schedule and needed to make up work the next day).

In addition to implications for research, there is also an implication for how we consider teacher education. This suggests that models of teacher education solely focused on changing teacher beliefs and knowledge may not be effective. Usage of particular cognitive resources depends on contextual factors. Not only do we need to help teachers develop their cognitive abilities, we need to consider other contextual factors that support reform oriented teaching practice.

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