

only to a teacher's sense of their students' ideas, but also to knowledge of the discipline. Even more generally, *seeing and pursuing disciplinary connections within and across students' ideas* seems to necessitate knowledge of the discipline. Which brings us to the following point: our analysis highlights the intellectual rigor of the kind of responsive teaching that authors like Ball [15], Hammer [16], and others describe in practitioner accounts. This teaching is more than "observational listening," or "listening with an attempt to hear the child's thinking...with [only] nascent formulations about what is heard and few active attempts to support or extend that thinking" [26]. It involves thoughtfully and flexibly using multiple forms of knowledge, including content knowledge, to extend and refine the nascent science in what students are saying and doing. It may also be the case that responsive teaching draws on *different kinds* of content knowledge than more traditional forms of teaching; this question could be the subject of future, more extensive analysis.

Though not the focus of our analysis, there were instances in Mark's extended episode when his responsive moves seemed *not* to rely on content knowledge but instead to rely on other forms of knowledge, commitments, or dispositions. For example, in line 51, Mark says, "That's good. I like that," in response to Brianna's exclaiming that she's "working it through in [her] mind!," suggesting a commitment to encouraging his students' efforts to try out and make sense of different ideas, or to recognizing productive metacognition at play. In general, many of Mark's other responsive moves throughout the extended episode point to knowledge and commitments other than content knowledge, such as commitments to understanding students' thinking, epistemological understandings about constructing evidence-based arguments, or knowledge of

what it means to "feel like a scientist" [27]. These findings corroborate the recommendations of the RT literature – RT *does* entail a commitment to listening, etc., and the moves served by this knowledge are important to the culture and practices of a scientific classroom community.

To be clear, in claiming that content knowledge supports teachers in seeing and pursuing disciplinary connections within and across students' ideas, we are not claiming that Wallach and Even [14] are *wrong*; certainly content knowledge can over-filter teachers' listening and/or constrain their responsiveness. However, it can also *support* their responsiveness, in the ways we articulate. In other words, the role of content knowledge in supporting the enactment of RT is more nuanced than "it does" or "it doesn't." Which leads us to our final point: in this era of educational reforms, teachers are expected to be "both responsive to students and responsible to [the discipline]" [15]. In such an era, we suggest that teacher education focus both on development of content knowledge *and* on intentional practice in attending to, identifying the disciplinary productivity of, and responding to student thinking. Exclusive focus on the former may contribute to the over-filtering that Wallach and Even warn us about, whereas exclusive focus on the latter may promote a view of teaching as "observational listening."

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