

## REASONING ABOUT TELLING IN REHEARSALS OF DISCUSSIONS: CONSIDERING WHAT, WHEN, AND HOW TO “TELL”?

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*Telling is often set in opposition to student-centered approaches to teaching. However, current research supports a more nuanced approach that considers what, when, and how one might tell. Using a practice-based approach, we investigate the ways in which rehearsals of leading discussions offer opportunities for secondary pre-service teachers to learn about telling. Through analyzing video of 13 rehearsals with seven pre-service secondary teachers, we found that learning opportunities fell into three categories: unlearning a reliance on telling, reasoning about the role of telling, and learning strategies for telling. This study demonstrates the potential of rehearsals to support novices to connect ideas about telling to the work of leading discussions.*

Keywords: Classroom Discourse, Instructional Activities and Practices, Teacher Education-Preservice

Research on mathematics instruction in the US has repeatedly documented that many US mathematics teachers use telling and lecture as predominant ways to teach (e.g., Stigler & Hiebert, 2009). Simultaneously, over the past decades, there have been many efforts to shift instruction away from the teacher as “teller” toward instruction that supports collective sense-making, a form of instruction shown to better support student learning (e.g., Boaler & Staples, 2008). As teachers work to move their practice away from a reliance on telling, they may come to think that they are not supposed to tell anything (Chazan & Ball, 1999). Scholars highlight the need to move beyond dichotomies that set telling in opposition to student-centered approaches; instead, they call for an account of telling that considers *what* might be told, *when*, and *how*. There is general agreement that socially constructed knowledge, such as particular terminology or notation, needs to be told as students are unlikely to re-invent these in ways that align with canonical notation (e.g., Hiebert et al., 1997). Lobato, Clarke, and Ellis (2005) argue for a reformulation of telling as “the set of teaching actions that serve the function of stimulating students’ mathematical thoughts via the introduction of new ideas into a classroom conversation” (p. 101). They focus on the function of teachers’ actions, the actions’ conceptual (over procedural) content, and the relationship to other actions over time. This highlights that teachers also must decide *when* to make new contributions. Timing matters in what students are able to learn from telling, with evidence supporting telling after experience with the content (e.g., Schwartz & Bransford, 1998). Telling might also involve naming or otherwise making explicit something mathematical that students had constructed (Selling, 2016) or co-constructing an explanation with students (Leinhardt & Steele, 2005). This suggests that, in addition to unlearning a reliance on telling (Philipp, 1995), teachers need opportunities to learn about this nuanced reformulation of telling.

One place to examine dilemmas of telling is in the work of leading discussions (Chapin, O’Connor, & Anderson, 2013). A discussion is sometimes viewed as antithetical to telling, as one of its goals is to support students in collective sense-making; however, teachers may make contributions or tell in crucial moments in ways that actually deepen the discussion (Lobato et al., 2005) or help steer toward the point (Sleep, 2012). Alternatively, when challenged to respond to student thinking, teachers may fall back on telling if they are unsure how to respond or handle an error. We focus on ways to support novice teachers in learning about telling in the context of leading discussions.

### Theoretical Framing

We build on a practice-based approach to teacher education. One strategy for supporting novice teacher learning of core instructional practices is through the cycle of enactment and investigation (Lampert et al., 2013). Novices work on a practice, such as leading discussion, through learning about the practice, rehearsing it in the methods class, enacting it with students, and analyzing and reflecting on their enactments. The cycle is built around instructional activities (IAs) that bound complex practice in order to support novice learning. Rehearsals represent a key set of learning opportunities as teacher educators can provide in the moment feedback around the core practice. Efforts to work on telling in teacher education, such as working with pre-service teachers around instructional explanations (Charalambous, Hill, & Ball, 2011), have highlighted that telling productively is challenging for new teachers. As novices learn to lead different types of discussions (Kazemi & Hintz, 2014), they must reason about what, when, and how to tell within these discussions in a way that stimulates student understanding. We investigate the ways in which rehearsals of leading whole class discussions offer opportunities for novices to learn about telling and its potential roles in classroom discourse.

### Methods

We investigate this question in the context of a mathematics methods course for secondary teachers that we designed and co-taught. The two-semester course was organized around a set of core practices, including leading discussions. The novice teachers were concurrently in field placements in urban secondary classrooms (See Baldinger, Selling, & Virmani, 2016 for more details about context). The novices participated in two cycles of enactment and investigation around leading discussions. The first cycle (weeks 4-7, fall) focused on discussions in which students share, compare, and connect strategies for solving problems (Lampert et al., 2013). The second cycle (weeks 6-10, spring), focused on discussions in which students work to clarify and define mathematical ideas (Kazemi & Hintz, 2014). The data sources include video of all rehearsals, debriefs at the end of each rehearsal, and a final debrief after all rehearsals.

**Table 1: Data Sources for the Two Cycles of Enactment and Investigation**

<i>Instructional Activity</i>	<i>Rehearsal Data</i>	<i>Debrief Data</i>
Strategy Sharing: Number Talks - Fall Semester	6 novice teacher discussion rehearsals	6 rehearsal debriefs 1 final debrief
Defining and Clarifying Mathematical Ideas:Sorting Task (Baldinger et al., 2016) - Spring	7 novice teacher discussion rehearsals	7 rehearsal debriefs 1 final debrief

The video data were analyzed in two phrases. First, we developed detailed content logs (Derry et al., 2010) of all rehearsals and debriefs. We then identified all interactions that explicitly or implicitly addressed “telling”. *Explicit opportunities* were interactions among teacher educators (TEs) and novices in which telling was brought to the collective attention of the group (e.g., a TE coached about an alternative to telling, a novice reflected on what he/she learned about telling). *Implicit opportunities* were instances when a rehearsing novice made a contribution to a discussion but it was not highlighted in the moment. This paper focuses on the explicit opportunities. Next, we coded the explicit opportunities inductively to characterize the different types of opportunities to learn about telling (e.g., unlearning a reliance on telling). Lastly, all opportunities were recoded with the final codes.

## Findings

Both cycles of enactment and investigation offered explicit opportunities to learn about telling in mathematics discussions. These arose in both rehearsals and debriefs and were distributed across different rehearsals. The opportunities fell into three distinct but related categories: opportunities to unlearn a reliance on telling, opportunities to reason about telling, and opportunities to learn strategies for telling. We use vignettes to illustrate each category.

### Unlearning a Reliance on Telling

Novices had opportunities to recognize and problematize a reliance on telling in discussions. One example of this occurred in Victor's (all names are pseudonyms) rehearsal of a strategy sharing discussion around a multi-digit addition problem. During Victor's rehearsal, one TE, playing a student, asked why Raul had subtracted in his strategy. Victor immediately responded with a lengthy explanation. After he finished, the TE interrupted as a coach saying, "You just did a beautiful job of explaining to us but is there any way you could have gotten one of us to do the work instead?" The TE asked him to go back and replay the episode, at which point Victor asked, "would anyone like to help [TE] out and explain why Raul decided to take 2 away from 17?" In his debrief, Victor reflected that he had learned about "when to throw it back to the class and when to lead the discussion myself". Another novice, Julia, commented on this moment in the general debrief, saying she had "learned the value of having students restate other students' answers instead of explaining it myself". This highlights how rehearsal afforded a moment for a novice to experience his tendency to tell in discussions, to problematize it as potentially taking over the work from students, and to discuss potential alternatives.

### Reasoning about the Role of Telling

Both cycles offered opportunities to reason about the role of telling in discussions and when to tell. One example occurred during a sorting task rehearsal about quadrilaterals. The first two cards (a rectangle and a parallelogram) surfaced disagreement among the "students" around whether a shape had to have right angles in order to be a quadrilateral. One TE, playing a coach, suggested moving the conversation to sharing non-examples of quadrilaterals. At this point, Carl, one of the "students", paused the rehearsal to ask about how and when in the discussion one might address or resolve this disagreement. This opened up an opportunity for discussion around telling or otherwise resolving this definitional issue. One TE contributed that it would be productive to address this ambiguity, if it persisted, after the class had more opportunities to grapple with and argue about what makes a quadrilateral. The other TE suggested a strategy for how to record the disagreement to show that the issue had still not been resolved, while not directly addressing the disagreement in the moment. This illustrates how the common problem of practice of responding to errors and disagreement that surfaced in rehearsal offered opportunities to consider when one might tell socially constructed knowledge (e.g., definitions).

### Strategies for Telling

There were also opportunities to discuss strategies for making mathematical contributions to a discussion. For example, in Raul's rehearsal of a strategy sharing discussion, only a few different strategies were shared. During his debrief, Raul reflected on being surprised that so few had emerged. In response, one TE suggested contributing a new strategy by framing it as a strategy used by a student from another class and asking the students to comment on or interpret the strategy. The other TE described how this technique allowed the teacher to introduce a new idea while avoiding positioning the teacher as the mathematical authority in this moment. This illustrates how a common problem of practice that arose in the rehearsal helped construct a moment to surface and reason about strategies for telling.

### Discussion

These vignettes illustrate how rehearsals of whole class discussion in secondary methods classes can provide numerous opportunities to explicitly address the complex issue of telling. Novices not only had opportunities to unlearn a reliance on telling, they also had opportunities to reason about the role of telling and develop strategies for productive telling. This set of learning opportunities is not intended to be a comprehensive list of what might be learned through rehearsal; however, this study demonstrates the potential of rehearsals to offer opportunities to address telling in a nuanced way by situating work on telling inside a discussion. The novices were able to connect ideas about telling to the problems of practice they experienced while facilitating classroom discourse. This study extends prior research on rehearsals (Lampert et al., 2013) and on preparing teachers to tell (e.g., Charalambous et al., 2011) to highlight the value of addressing telling within work on other instructional practices. Future research might examine how particular discussion structures might afford different learning opportunities around telling in rehearsals. Additionally, how might explicitly addressing telling in rehearsals influence the ways in which novice teachers tell (or do not) when leading discussions in K-12 classrooms? Finally, in this study we saw that TE moves were often integral to surfacing issues of telling. Future research could TE moves that create and capitalize on problems of practice around telling.

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