



# Facilitating Pre-Service Teachers' Development of Professional Practices Through Boundary Spanning Activities

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## Challenge

- In order to enact effective science instruction, beginning teachers need to learn how to use curriculum materials (CMs) using reform-based lenses (i.e., addresses learning goals, builds students' knowledge and practices through lesson sequences).
- But, pre-service teachers (PSTs) hold their own goals and visions for teaching that are not parallel to reform-based visions. Thus, we need to provide opportunities for PSTs to resolve and reconcile their own and reform-based goals as they develop their curricular practices by helping them "span boundaries." **Boundary spanners** are tools or experiences that can mediate and bridge differences between distinct Discourses.<sup>1</sup>

## Light & Shadows CM Analysis Task – A Boundary Spanning Experience

Curriculum materials analysis task scenario:

- New 2<sup>nd</sup> grade teachers who needs to teach light & shadows
- Asked to consider district's relevant learning goals of "explain how shadows are made" and "develop awareness of the need for evidence"
- Given a set of lessons and worked in groups to discuss if lessons meet learning goals

## Participants, Data Collection, and Analysis

- 4 sections of elementary science methods course
- Pre-service teachers: 4<sup>th</sup> year students in 5 year elementary TE program
- Videotaped introduction, 2 groups of PSTs working on task, and wrap-up in each section
- Data analysis was iterative process to identify emergent themes and Discourses in talk

**Research Question** How well did the Light & Shadows Curriculum Materials Analysis Task serve as a boundary spanning experience mediating and bringing together the Discourses of the PSTs and reform science teaching?

## Findings

### The PSTs' brought their own goals and Discourse to the task

PSTs integrated discussion of their own visions and goals into the task, especially when considering lesson strengths and weaknesses. PST Discourse goals evident in their talk included classroom management (including time management), having fun, motivating and real world connected lessons; preventing and fixing students' science misconceptions; and having hands-on and student-centered lessons, and addressing literacy and math integration.

*"So, at a minimum you're spending an hour on this[taking students outside to measure shadows], but it's going to be more like, ya know... there's probably going to be at least another twenty, thirty minutes added to that."*

*"Yeah, that's true and getting them all organized each time."*

*"Yeah, just for... for one point when you could do so much more."*

### The PSTs drew on reform-based science education goals and Discourse

PSTs also took on reform goals in robust way (e.g., whether lesson meets the learning goals)

*"Well, they're making their own shadows and so in making shadows, like, you have to learn how it can be made."*

*"It's definitely doing that one[learning goal], but is it going through the evidence one?"*

*"Oh wait, hey... this one would [meet the evidence learning goal] 'cause they're using evidence, 'cause they're compiling their evidence."*

## Findings (continued)

### The Task successfully spanned the two Discourses

The PSTs crossed boundaries between the two Discourses. **PST Discourse in red** and **reform science Discourse in green**.

*"I don't like this activity as much. I mean, it's not set up a well as the other one."*

*"If this is 2<sup>nd</sup> grade, this is pretty difficult stuff to talk about...."*

*"I think this would be fun to do like at the end. I mean some of this stuff."*

*"It will show that a shadow can happen like if light can't pass through something."*

*"That shows one of the big ideas about needing light to be blocked. That's almost like what we were saying needs to be done before the other one. We're talking about how shadows are formed."*

*"But I would never do this in a classroom to try to teach them about how shadows are made."*

*"I mean it does address the learning goal."*

### Pre-service teachers engaged in extended conversations around their own and reform-based goals/Discourses

Extended conversation occurred frequently – particularly for activities PSTs liked (that met some of their goals such as hands-on, literacy-based, etc.), activities they wanted to modify to fit either their goals or reform-ones, activities for which there was a conflict between their goals and one of the learning goals, or activities in which there was conflict in meeting both learning goals.

**Interpretations** The task may have been "spanning boundaries" because:

1. It was perceived as **authentic** by PSTs (matched their vision of important "picking and choosing lesson-planning practice"). Also, in the current context, PSTs are easily convinced that they will be held accountable for helping students meet the learning goals and should learn to address learning goals in their teaching.
2. Task had **clear and relevant purpose to PSTs** who wanted to find activities and think about their future teaching.
3. Task was **comprehensible yet problematic**. The lessons were not easily categorized with 2 learning goals, and lessons were chosen to appeal directly to PSTs interests/goals such as literacy and math integration. Also, how could a curriculum designed by the state to address state standards not address state standards?
4. **Required negotiation** and consensus among participants to complete task.

## Discussion and Implications

- **PSTs may have refined and expanded their sense of the teaching-planning practice and began to develop their professional knowledge and use of CM** through their active engagement and negotiation within the boundary spanning experience.
- Consistent success with task across sections suggests that **this and similar tasks can help PSTs begin to envision importance of principled and critical use of CMs** and to develop beginning knowledge and practices to participate productively with CMs
- This task may have been **successful by establishing an authentic task purpose and context, orienting task around mutual goals (PSTs and reform) that were comprehensible but problematic, and requiring negotiation among participants**.

## Reference

- <sup>1</sup>Buxton, C., Carlone, H., & Carlone, D. (2005). Boundary spanners as bridges of student and school Discourses in an urban science and mathematics high school. *School Science and Mathematics, 105*(6) 302-312.