

## **What Knowledge Mediates Teachers' Appropriation of High Leverage Practices?**

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**Question(s) for Discussion:** What is the relationship between high-leverage instructional practices and teachers' specific science content knowledge and PCK? What are the implications of these relationships for teacher-development practices?

**Session Description:** This project focuses on the preparation of elementary science teachers in a one-year post-baccalaureate program. Our program was designed to help pre-service elementary teachers (PSETs) learn about and apply a small set of high-leverage practices (instructional practices that have been shown empirically to have positive effects on student learning) (Grossman & MacDonald, 2008; Lampert, 2005). In particular, our program helps PSETs use the Learning Cycle as a lens to select, sequence, and modify available instructional materials such that elementary students have opportunities to learn both descriptive and explanatory knowledge through participation in inquiry (or inquiry-like) experiences (Anderson, 2003; Hanuscin & Lee, 2008).

We began our work by developing learning experiences for PSETs that could lead to their application of these high-leverage practices (Cartier, et al., 2008). Concurrently, we developed an instrument, the Task Selection & Sequencing tool (TSS), for assessing PSETs' use of the high-leverage practices (Singer-Gabella, et al., 2009). Through multiple iterations and refinements, we have shown that the TSS is a reliable measure of the complex practice of instructional planning using the Learning Cycle model. Based on data from three cohorts, we have shown that there is a range of performance on the TSS, but that overall, PSETs struggle most with (1) organizing/sequencing the learning goals such that descriptive knowledge is developed first and in support of new conceptual/explanatory knowledge; and (2) selecting and sequencing tasks that provide opportunities for students to explore prior to developing explanations (consistent with the Learning Cycle model). This has led us to explore the relationships between PSETs' application of the high-leverage practice (or sub-practices) and their underlying knowledge. In particular, we are drawing from Ball, Thames, and Phelps' (2008) "knowledge needed for teaching" framework to capture and define this relationship. One early finding is that specialized content knowledge seems to be a useful construct for distinguishing the knowledge of high-performing PSETs (those who score highly on the TSS) versus lower-performing PSETs. Our objectives for this session are as follows:

- Share the TSS (including specific examples and information about coding and reliability sufficient for participants to use the instrument).
- Summarize our findings with respect to how PSETs apply the high-leverage practices related to use of curriculum materials and the Learning Cycle model.
- Present our developing theory of the relationship between specific types of teacher knowledge and their application of high-leverage practices.
- Explore with participants the promise of the knowledge needed for teaching framework (Ball, Thames, & Phelps, 2008) for understanding this relationship.

In this interactive session, formal presentation will be limited to description of the TSS and summary of results. Primarily, participants will interact in small groups, examining samples of data, and engaging with/critiquing the coding protocol related to teacher knowledge types. We will close the session with a whole-group discussion, including compilation of tools and approaches for examining the relationships between particular high-leverage practices and teachers' underlying or developing knowledge.