Preservice Elementary Teachers’ Lesson Plan Modifications: Models, Modeling, and Metamodeling Knowledge

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Introduction
Scientific modeling involves:
- Constructing, using, evaluating, and revising scientific models
- Knowledge about models and modeling practices, termed meta-modeling knowledge (MMK) (Schwarz & White, 2005)
and plays:
- An increasingly important element of K-12 science education (Windschitl et al., 2008a)
Preservice elementary teachers are:
- Mindful of lesson plan alignment with national and state science education standards
- Developing skills to effectively analyze and modify science curriculum materials (Davis, 2006; Schwarz et al., 2008)
- Often unfamiliar with scientific modeling and modeling-based pedagogies (Windschitl et al., 2008b)

Research Questions
1) When preservice teachers experience scientific modeling, what sorts of ideas about modeling are evident in their science lesson plans?
2) When preservice teachers plan science lessons, do they freely incorporate ideas about scientific modeling? If so, how do they use these ideas in their teaching plans?

Research Study Context
- Participants: Preservice elementary teachers enrolled in an elementary science teaching methods course at a large Midwest university
- One, 3-hour methods course session dedicated to scientific modeling
- Data sources: Pre/posttest items, Interviews, Germ transmission lesson plan analysis & modification, Reflective teaching 2 (RT2) assignments

Findings
Prompted lesson plan analysis and modification
- When prompted, preservice teachers add or make MMK explicit for students, make generic changes to the lesson plan, and add scientific modeling practices to the activity.

Unprompted lesson plan analysis and modification
- 12 of 50 preservice teachers taught lessons that explicitly or implicitly involved scientific modeling
- 12 of the 12 discussed scientific modeling in ways that were consistent with modeling instruction
- Lesson plan modifications involved the addition of modeling practices and/or MMK

Connections to Construct maps
- Preservice teachers’ ideas about scientific modeling in lesson plans align with Construct maps: Allston—See Change map L2

References