Applying a Cognitive Theory of Learning to Teachers’ Knowledge Development

Keisha Varma (keishavarma@berkeley.edu)
Freda Husic (husic@berkeley.edu)
Marcia Linn (mclinn@berkeley.edu)
School of Education, University of California - Berkeley
4649 Tolman Hall Berkeley, CA 94720 USA

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Introduction
This poster presents evidence of teacher learning following participation in targeted professional development, an approach designed to support teachers as they use technology enhanced science modules in their inquiry instruction. The modules were developed at the center for Technology Enhanced Learning in Science (TELS). Teachers receive support during iterative cycles of planning, enactment and reflection as they implement the modules in their classrooms. Targeted support provides the type of support that teachers need when they need it. This approach insures successful module implementation and supports teacher learning.

Targeted professional development is based on the knowledge integration theory (Linn & Hsi, 2000, Linn, et al., 2006). Knowledge integration emphasizes the links between new and existing ideas as evidence of teacher learning (Davis, 2004; Davis & Varma, in preparation). When new ideas are encountered, teachers re-evaluate and re-organize their knowledge to incorporate the new ideas. As they do this, they form links among the ideas in their repertoires. Teachers who participate in targeted professional development is should develop an integrated understanding of inquiry instruction, student learning and technology-enhanced modules.

![Figure 1: Targeted professional development model.](image)

Method
Middle and high school teachers enacting TELS modules participated in 26-item interview. Twenty-six teachers participated in year one and 36 teachers participated in year two. Interviews were transcribed verbatim and coded for content and evidence of knowledge integration.

Results
During year two, more teachers show evidence that they are reflecting on student learning. Figure 2 (a) shows that in year two more teachers used the on-line assessment tools to measure student learning. Figure 2 (b) shows that they are engage in interactive, formative assessment that allows them to change their teaching practice to meet the learning needs of their students.

![Figure 2: (a) Percentage of Teachers Using On-line Assessment Tools. (b) Percentage of Teachers Engaging in Interactive Assessment](image)

Discussion
This research documents the development of teacher knowledge using a cognitive framework that shows the content and the quality of their knowledge structures. The knowledge integration framework shows the nature of teachers’ ideas about teaching, assessment, and student learning. Ongoing research is examining the relationship between teachers’ knowledge integration and student learning data.

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