On The Job Learning: Graduate Student Instructors’ Development of Knowledge for Teaching

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Teacher Knowledge and its Origins

- Teacher knowledge of various sorts correlates with particular reform-oriented teaching practices (Carpenter et al., 1989, 1988) and student achievement (e.g., Fennema et al., 1996; Franke et al., 2001, 1997).
- K-12 teachers acquire such knowledge via professional development and on-the-job.
- College instructors must rely primarily on on-the-job opportunities to acquire such knowledge, but very little is known about how knowledge develops through practice.
- Research on the origins of teacher knowledge can inform the design of professional development

Our research questions: Do graduate student instructors develop knowledge for teaching while doing the work of teaching? If so, how does that knowledge development occur?

Research Design

Participants
7 physics doctoral students serving as TAs
Variety in amounts of teaching experience

Data collection
Task-based interviews
Data collection
Variety in amounts of teaching experience
7 physics doctoral students serving as TAs
Participants

Interview format
60-90 minutes long
Task-based interviews

A Research-based Task and a Common Student Difficulty

Case Study: Jacob develops a nuanced understanding of this common student difficulty

Although he solved the problem correctly, Jacob is a bit uncertain about its correctness after considering an example of student work.

Jacob makes use of content knowledge in order to see connections between what the student has done and relevant physics ideas.

Jacob does further work in trying to see connections between the student solution and his own, but is not immediately able to do so.

Content knowledge that we had not observed: Jacob use before helps to re-ground his own understanding of the physics and to see connections between the two solutions.

This same content knowledge plays a role in how Jacob develops new pedagogical content knowledge and its significance for understanding acceleration.

Findings

- We offer an existence proof that it is possible for novice college physics instructors to develop new knowledge of student thinking doing teaching-related activities such as attending to student work.
- For Jacob, solving the problem was relatively straightforward, but interpreting and evaluating student work was significantly more complex.
- The process of carrying out this work and developing new pedagogical content knowledge made extensive use of content knowledge.

Implications and Future Work

- Professional development for college instructors can likely make use of the opportunities that arise as instructors engage in teaching-related work.
- Jacob’s case raises questions about the specific role that content knowledge plays in developing pedagogical content knowledge.
- We are continuing to examine factors that enable or inhibit the development of this knowledge both in created and more authentic teaching settings.

Literature cited