

Looking for PCK in All the Wrong Places

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Question(s) for Discussion: How do you measure PCK accurately?

Session Description: In this study, we hypothesized that by applying research-based principles to the implementation of professional development, content deepening, and instructional materials, we would see improvements in teacher knowledge and practice and increases in student achievement. Our specific research questions include the following:

1. In what ways does participation in the project influence the participants' development of PCK (specifically, content knowledge (CK), pedagogical knowledge (PK), and context knowledge (CxK))?
2. How is the whole of PCK similar to/different from the sum of its parts (CK, PK, CxK)?
3. How does PCK vary before, during, and after participation in the program?
4. How does student learning change over time?
5. What is the relationship between participants' PCK and their students' learning?
6. What is the relationship between the development of PCK and implementing educative curriculum materials with fidelity?

This study examines the links among teacher knowledge and practice and student achievement. Over two years and across two cohorts, 35 secondary biology teachers implemented one of two biology curricula that were ranked the most educative by an independent review. During the implementation they received extensive professional development. All units were to be taught during the academic year with fidelity. Pre- and post-test measures of teacher PCK were analyzed to compare units for which professional development was provided against units without professional development. Classroom videos have been analyzed for fidelity of implementation and evidence of PCK. Student pre- and post-content knowledge scores were analyzed and correlated to teacher scores. Teacher analyses show a positive gain in teacher's concept-specific PCK measures following participation in professional development relevant to that concept. Teacher content knowledge gains were the strongest when teachers taught the curriculum in their classrooms and then participated in professional development on the topic. There was a positive correlation between teacher scores of content knowledge and their scores on a classroom observation protocol related to reform-based teaching; the correlation was statistically significant for several concepts. While student-gain scores increased in all areas, gains were higher for those topics where the teacher received professional development. We have PCK reflections from our participants in writing, oral interviews, and classroom videos.

In this session, we will ask attendees to use our PCK scoring rubric to evaluate the level of PCK revealed in three data sources from the same teacher about the same biological concept. This triangulation will open up the discussion of the relative value of each source of information as well as a discussion of the challenges of measuring PCK accurately and effectively.