

Professional Learning Communities in STEM Teaching *Kathleen Fulton, National Commission on Teaching and America's Future; Ted Britton, WestEd*

Question(s) for Discussion: What does research tell us about how working in a professional learning community affects teachers' content knowledge, pedagogical content knowledge, implemented instructional practices, their students' achievement, and teachers' job satisfaction and retention?

Session Description: Through a two-year (2008-2010) NSF Knowledge Synthesis project, researchers from the National Commission on Teaching and America's Future and WestEd are evaluating existing knowledge about STEM teachers in professional learning communities (PLCs), both prospective teachers and classroom teachers across grades K-12. Our guiding questions examine knowledge about the relationship of these and other PLC attributes to effects on the following: teachers' content knowledge and pedagogical content knowledge, implemented instructional practices, their students' achievement, and teachers' job satisfaction and retention. We have broken research to date into the groups described below:

- **Type 1 - Elaborated Empirical Research:** This category includes mostly articles in peer-reviewed journals for primary research or dissertations, published since 1995. These articles have gone through a Standards of Evidence (SoE) process developed to provide researchers with a method of systematically rating each study's methodological integrity and evidentiary utility, with the ultimate goal of characterizing the strengths and limitations of each study.
- **Type 2 - Other Research:** Type 2 articles include empirical and descriptive studies published (including online) in venues other than peer-reviewed journals (e.g., books, chapters, articles in non-scholarly publications) as well as empirical research reports having less specified methods than articles in peer-reviewed journals, including recent conference presentations. The research in this category was analyzed using a modified version of the SoE process described above.
- **Type 3 - Published Expert Knowledge and Advice:** To ensure breadth of opinion regarding STEM professional learning communities, we developed a list of major professional organizations and other education resources for STEM teaching and learning. Their websites were searched for white papers, policy statements, official positions, and research on professional learning communities among STEM teachers. Our research yielded one additional category we call "model building," which includes articles describing PLC design and implications of implementation decisions.

In year two of the project, we also will be working with an online panel of expert practitioners to test assumptions and have the benefit of their reflection on the assertions we present based on the collected knowledge. Fulton and Britton will provide an overview of findings to date for each knowledge type, and a preliminary integration of findings across them. Because this research is still in process, we will be sharing only preliminary analyses. A major objective of the session is to learn from other NSF grantees of their experience with professional learning communities and STEM teaching, to expand our knowledge base.

Session attendees will:

- hear about the operationalized definition of "professional learning community" and the process used to determine which articles should be included in the analysis;
- see the preliminary analysis of each type of research and what conclusions we might be able to draw in the synthesis;
- discuss the preliminary findings with the principal investigators; and
- learn about the next steps that will deepen this knowledge synthesis.