Understanding the Impact of Supports on Adjunct Mathematics Instructor Knowledge

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This proposal describes findings of an ongoing project designed to support adjunct instructors' teaching of undergraduate Precalculus. We are studying the impact of supports on Precalculus instructors' knowledge through interview and assessment data. Using Shulman's (1987) components for a teaching knowledge base, we discuss shifts in instructors' perspectives.

*Keywords:*Teacher knowledge, Adjunct instructors, Undergraduate mathematics, Precalculus

We know students' persistence in pursuing STEM degrees is heavily influenced by their experiences in undergraduate first year mathematics courses (Pampaka, Williams, Hutcheson, Davis, & Wake, 2012). In this regard, the quality of pedagogy can make a difference in retaining students, as improved instruction may motivate students to learn more mathematics and consider pursuing a STEM degree (Ellis, Kelton & Rasmussen, 2014). Moreover, current trends in higher education are to employ more part-time, non-tenure track faculty to teach introductory courses in science and mathematics (Curtis, 2014). These trends have motivated the field to better understand how institutional policies and practices can improve part-time instructors' professional growth (Kezar & Sam, 2013). This proposal presents findings from a study of Adjunct Mathematics Instructor Resources and Support (AMIRS) to explore the impact on Precalculus adjunct instructor knowledge in an effort to address these issues.

To investigate Precalculus adjunct instructor knowledge, we adapted three components for teaching knowledge base Shulman (1987) argued, allow teachers to develop deeper understanding of their subject: Structures of subject Matter (SOM), Principles of conceptual organization (PCO), and Principles of inquiry (POI). We looked at how supports (e.g. course coordination, summer workshop, PLC meetings) impacted their knowledge through pre- and post-interviews and content assessments aligned with an adopted research-based curriculum. Based on interview data, we found differences in SOM by observing changes in the depth of instructors' content knowledge in terms of thinking about specific structures of precalculus (e.g. tangent being the slope of a curve). Second, although instructors had previous experience teaching mathematics, and therefore prior conceptual webs of precalculus topics (PCO), there is evidence that teachers not only began reorganizing their knowledge but also valued this reorganization as a benefit for their students' understanding. Finally, regarding POI, instructors moved from general to more specific ideas about how students can engage in mathematical inquiry, while also citing opportunities for students to model situations to problem solve, and for students to drive instruction. Currently, we are analyzing results from content assessment to better understand the nature of these changes.

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