

LESSON PLAN STUDY AND THE GROWTH OF UNDERSTANDING OF SCHOOL MATHEMATICS AMONG PROSPECTIVE HIGH SCHOOL TEACHERS

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The focus of this preliminary study was to examine the growth of prospective teachers' understanding of high school mathematics while engaged in "lesson plan study" [LPS]. The tasks of LPS were used as research tools to examine pre-service teachers' growth of understanding of what and how to teach high school mathematics. It is the intent to show the importance of engaging pre-service teachers in the conceptually rich mathematical tasks of LPS as the tasks relate to teaching high school students. Two frameworks were used in this study to examine the growth of mathematical understanding. One provided a frame for the growth of understanding (Pirie & Martin, 2000) and the other provided a frame for the school mathematics (Berenson, Cavey, Clark, & Staley, 2001). In this study, prospective teachers were asked to connect their lessons on rate of change to ideas of ratio and proportion. Four to five weeks were needed to complete one cycle of LPS and included the following tasks:

- Preliminary LPS Interview – Individual (20 min.). The pre-service teachers fold back to their primitive knowledge of algebra 1, linear functions, and slope to begin **making their images** of rate of change.
- Lesson Planning – Individual (45 min.). This activity promotes **collecting other ideas** of rate of change, and teaching activities to modify and change images of content and pedagogy.
- Post Planning LPS Interview – Individual (30 min.). Through explanations, pre-service teachers clarify their images to begin **having images and noticing properties** related to the content and pedagogy of LPS.
- Preliminary Group Interview – Group of 4 (10 min.). Pre-service teachers review their notes from the individual lesson planning to **formalize** their understanding.
- Lesson Planning and Post Planning Interview – Group of 4 (90 min.). Pre-service teachers share their LPS images and recursively **collect and make new images of** their understanding of what and how to teach rate of change.
- Lesson Plan Presentations – Four Groups (30 min each). Listening to the ideas of other groups, the pre-service teachers collect additional understanding at the **formalizing and observing** level of understanding.
- Written Lesson Plan – Individual (Variable time). Each pre-service teacher writes a final plan, **formalizing** the ideas **collected** over five weeks of LPS.

Berenson, S., Cavey, L., Clark, M., & Staley, K. (2001). Adapting Pirie and Kieren's Model of mathematical understanding to teacher preparation. *Proceedings of the Twenty-fifth Conference of PME*, (pp. 2-137-2-145), Utrecht, Netherlands.

Pirie, S.E.B., & Martin, L. (2000). The role of collecting in the growth of mathematical understanding. *Mathematics Education Research Journal*, 12(2) 127-46.