ABSTRACT

This thesis reports on an empirical study in developing an instructional sequence on decimals to promote Indonesian pre-service teachers' content and pedagogical content knowledge on decimals. The study was situated in the context of the current reform effort in adapting Realistic Mathematics Education (RME) theory and looked into the role and issues of incorporating RME tenets into the design of activities for teacher education in Indonesia.

The study was carried out in two cycles of teaching experiments involving 258 pre-service primary and secondary teachers in one particular teacher training institute in Indonesia using Design Research methodology. After the first cycle of 4 lessons, activities and test items were refined for trialling with a new cohort in the following year.

Findings from the two cycles signified the importance of revisiting and improving pre-service teachers' content and pedagogical content knowledge of decimals. This study found that pre-service teachers' knowledge on decimals were characterised as fragmented, with strong reliance on rules without understanding, and strong association with fractions. Pre-service teachers in both cycles made substantial improvement in both content and pedagogical content knowledge and they gained their first experiences of working with physical models and working in groups with class discussion. The nature of pre-service teachers' knowledge of decimals highlighted a challenge in attending to the guided reinvention tenet of RME.