

# RETENTION EFFECT OF RME-BASED INSTRUCTION IN DIFFERENTIAL EQUATIONS

Oh Nam Kwon, Jungsook Park Soyoun Kim Mi-Kyung Ju Kyunghye Shin Kyunghye Cho

Seoul National University

Ewha Womans University

The current research literature offers a number of different learning methods or instructional tools for student retention in many subjects (e.g., Billington, 1994). In this context, this research investigated the retention effect of an RME-based instruction comparatively. For the purpose, the instrument to measure students' understanding was developed and administered to two different groups (i.e., RME-DE and TRAD-DE) at the end of the fall semester 2002 and at the end of the fall semester 2003.

The TRAD-DE is based on the traditional lecture-based instructional method in which students are provided with a set of analytic methods for solving differential equations. On the contrary, our project class, the RME-DE, integrated technology with symbolic, graphical, numerical, and qualitative methods for analyzing a wide variety of differential equations of real-world concern. In the RME-DE, the students were encouraged to discuss key concepts embedded in given context problems and the professor orchestrated the students' interaction to lead to the emergence and the establishment of taken-as-shared mathematical meaning.

The result of the statistical analysis has shown that the RME-DE got statistically higher marks than the TRAD-DE. Especially, the RME-DE was successful in mathematical modeling and in the conceptual questions related to graphical representations. The RME-DE gained not only significantly higher mean scores than the TRAD-DE but also earned the nearly same marks to those that they earned in the test of the previous year.

Based on the result of the analysis, we argue that the RME-DE course can help to increase retention for students' understandings in differential equations. Especially, the ability to form graphical images of mathematical relationships related to the better retention of strategies. In addition, it can be said that the RME-DE students learned and retained the way how to link differential equations with real world situations for mathematical modeling as they were actively working on the relationship between a behavior of a solution to a differential equation and rate of change. These findings provide empirical evidence to adapt the instructional design perspective of RME to mathematics education at a university level.

## Reference

Billington, R. (1994). Effects of collaborative test taking on retention in eight third-grade mathematics classes. *The Elementary School Journal*, 95(1), 23-31