

Li, R. & Liu, M. (2008). The Effects of Using A Computer Database Tool on Middle School Students' Cognitive Skill Acquisition in A Multimedia Learning Environment. In R. Kobayashi, (Ed.) *New Educational Technology*. Hauppauge, NY: Nova Science Publishers, Inc.

### Abstract

The purpose of this study is to examine the potential of using computer databases as cognitive tools to facilitate learners' acquisition of higher-level cognitive skills and promote learning in a multimedia problem-based learning (PBL) environment designed for sixth graders. Two research questions were: 1) Can the use of a computer database tool facilitate sixth-graders' acquisition of higher-level thinking skills? and 2) Do the sixth-graders perform better after their use of the computer database tool? Three treatment conditions were used in this study: a customized computer database tool for the PBL environment under investigation, a paper version of the database tool, and no database. Six intact classes with a total of 98 sixth-graders were randomly assigned to each of the three treatment conditions. The findings showed that sixth-graders who had access to the computer database tool received significantly higher transfer test scores on such cognitive skills as categorizing, differentiating, and analyzing/evaluation. In addition, the computer database groups scored significantly higher on the achievement test than the other two treatment groups. These results suggested that the sixth-graders' acquisition of higher-level cognitive skills were enhanced by their use of this computer database tool. The paper-based database tool did not, however, contribute significantly to students' acquisition of cognitive skills. Further research is needed to confirm these results and to investigate the effects of using standardized as well as customized computer database tools to support learning in various settings.

(Keywords: cognitive skills, cognitive tools, computer databases, problem-based learning, multimedia)