

The Effect of Computerized Cognitive Training on The Working Memory and Mathematics Achievement of Low Achievers

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Abstract

Computerized cognitive training is recognized as an appropriate tool in enhancing working memory in individuals with and without physical limitations. Previous researchers have examined the application of computerized cognitive training in stroke patients, children suffering from ADHD, and older adults. Presently, there is a lack of controlled studies regarding computerized cognitive training in low-achieving primary school students. The goal of this study was to examine the interactions among working memory, computerized cognitive training and academic achievement. Specifically, the study sought to determine whether low-achieving primary school students would significantly improve their mathematics achievement (as measured by the Grade Four Literacy Test) and working memory capacity (as measured by the Automated Working Memory Assessment) through computerized cognitive training on working memory. A random pre-test post-test control-group experimental study was conducted to test the research hypotheses. The experimental group received progressive computerized working memory training. The control group received basic computerized working memory training. Training for both groups of student was conducted the same time each day by the class teacher at the participants' school. The duration for practice was one hour per day, five days per week for five weeks. The working memory capacity of the experimental group was compared to the control group. Both experimental and control groups subjects showed improvements in working memory scores from the baseline pre-test to the post-test. Analysis of the multivariate tests suggests that there was significant difference (Wilks Lambda $F = 2.880$, $p = .045$) between the group receiving progressive computerized working memory training compared to the group receiving basic computerized working memory training. The mathematics achievement of the experimental group was compared to the control group immediately after completing

training. Both the experimental and control group students showed improvement in post training mathematics scores. However, the difference between control and experimental group improvement was not significant ($F = 2.719$, $p = .085$). The end-of-term mathematics (six weeks after completing training) scores of the experimental group was compared to the control group. Both the experimental and control group students showed improvement in their end-of-term mathematics scores. However, the difference between control and experimental group improvement was not significant ($F = 2.719$, $p = .085$).

Keywords: Computerized cognitive training