PLAYFUL FOSTERING OF INDUCTIVE REASONING THROUGH MATHEMATICAL CONTENT IN COMPUTER-BASED ENVIRONMENT

Attila Pásztor
Doctoral School of Education, University of Szeged

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The development of thinking skills is one of the main purposes of formal education (*Resnick*, 1987). Over the last decades there has been an increased interest in content-based methods for enhancing students' reasoning with the integration of subject matter knowledge into learning tasks (*Csapó*, 1999). Computer-based learning environments offer new opportunities to fulfil these aims with the possibility of providing instant feedback, personalized instructional support, motivating learning environment (*Csapó*, *Lőrincz* and *Molnár*, 2012; *Wouters* and *Oostendorp*, 2013) and also allow us to train students in larger groups without the need of permanent teacher presence.

The aim of this study is to investigate the effectiveness of a training program which develops inductive reasoning strategies through tasks embedded in mathematical content; and to identify certain groups of students for whom the training program is favourable.

Third and fourth grade students (N=88, age 9-10) participated in the training. The control group was matched based on pre-test scores, grade and gender from a total 240 of students. The training program was based on *Klauer*'s model of inductive reasoning and on his concept of Cognitive training for children (*Klauer*, 1989). The instrument consisted of 120 computerized learning tasks with various embedded mathematical content (e.g. recognizing and discriminating relations or attributes through mathematical operations, number series and units of measurements). In case of failure, instructional support was provided in order to guide the learning process. In groups of 20, students participated in a 5 week long training taking place in their schools' ICT room. The effectiveness of the training was measured with an inductive reasoning test comprising 43 figural, non-verbal items (Cronbach's α=.83). Both the training and the assessment were carried out through the eDia platform (Electronic Diagnostic Assessment System).

There was no significant difference on the pre-test scores between the two groups, while on the post-test the experimental group significantly outperformed the control group ($t(174)=-2.288$, $p=.02$). There was no significant group difference with regards to gender ($t(86)=-0.520$, $p=.83$) or grade ($t(86)=-0.425$, $p=.85$.) The effect size of the training program was d=.33. Results showed that the training program was more effective for low achievers (d=.42) compared to average (d=.25) and high achievers (d=.32).

The findings demonstrate an example of integrating mathematical content and reasoning strategies through learning tasks in a computer-based environment. The training program proved to be gender independent and easy to use on large-scale without the need of permanent teacher presence. However, further research is necessary to measure the effectiveness of the training program with regards to the acquisition of content knowledge.

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