Assessment in cognitive domains (chair: Attila Pásztor)

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DIGITAL GAME-BASED DEVELOPMENT OF INDICTIVE REASONING AMONG FIFTH GRADERS

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Inductive reasoning plays a fundamental role in organizing and applying knowledge and strongly relates to general intelligence. Klauer (1990) described inductive reasoning as detecting similarities and dissimilarities between attributes and relations. Based on his definition six inductive reasoning processes could be defined: Generalization, Discrimination, Cross classification, Recognizing and Differentiating relationships and System construction. Numerous intervention programs were developed and carried out providing empirical evidence for the effectiveness of the approach (Klauer & Phye, 2008). However, the effectiveness was usually measured by different intelligence tests, thus there is a lack of knowledge about the modifiability of inductive reasoning processes (Molnár, 2011; Pásztor, 2016). The aim of our study was to develop a digital game-based intervention program based on Klauer's model and to examine the program's effectiveness on the different processes. Altogether 141 grade five students participated in the study from three schools (M_{age} = 11.2 years, SD = .43 years; males: 43.4%). The experimental group consisted of 67 learners and 55 students were in the control group. A newly developed online figurative test was applied to assess students' inductive reasoning (Cronbach's alpha = .90) before and after the training. The instrument comprised 54 items measuring all six processes of inductive reasoning. The intervention program was also based on Klauer's model. It lasted for five weeks and consisted of 120 tasks embedded in mathematical content (20 tasks for each inductive reasoning process). Each task provided instructional feedback for incorrect solutions. The aim of the game was to collect as many bottles of Water of Life as possible to save the Tree of Life. Both the tests and the intervention program were administered via the eDia system (Molnár & Csapó, 2019) in the schools' computer labs. There was no significant difference between the experimental and control groups' inductive reasoning skills before the training ($t = -.230$, $p = .82$). On the post-test, both groups' scores increased significantly ($t = -9.057$, $p < .01$; $t = -3.336$, $p<.01$), but the experimental group performed significantly higher ($t = 2.173$, $p = .03$). The overall effect size of the program was Cohen`s d = .38. All inductive reasoning processes developed significantly except Cross-classification. The largest developmental effects occurred in Recognizing and Differentiating relationships (around half standard deviation) followed by Generalization and Discrimination (one-third standard deviation) and the lowest effect size was found for System construction (d =.20). Possible reasons for the differences could be the complexity of the processes (cognitive

demand) and the content of the tasks. However, further research is needed to understand the detailed nature of the modifiability of the processes.

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