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Applying Cognitive Load Theory in mathematics education

To characterize the quality of teaching mathematics in a country is not an easy task. Outside of Hungary you may hear very often: “The Hungarian way of teaching mathematical problem solving world-famous thanks to Georg Pólya.” Maybe they know of some excellent mathematicians: J. Neumann, P. Halmos, E. Szemerédi, L. Lovász. It is true, but does not say anything about the real situation of Hungarian mathematics teaching today. To characterize it, we will analyze, in details the PISA 2012 mathematics test results and one university mathematics test, taken at the start of higher education studies. Further basing on these studies, we narrow our attention to students who continue their education at universities and, colleges. This is the top 20-25% of a year. The article tries to answer a question: How can we prepare these students more effectively for their studies and, for their future jobs? Our statement is: use of open problems is taking one step forward to help more students be more successful in mathematical problem-solving. After some theoretical consideration, we analyze the tests of different students, as well as their ideas, and make some suggestions on how to take steps forward to reaching more students in Hungary to teach mathematical problem solving. Finally, we summarize some suggestions about how to spread the research results into the mainstream of teaching Hungarian mathematical problem solving.

Keywords: Cognitive Load Theory, problem solving, open problems