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CROSS-NATIONAL DIFFERENCES IN STUDENTS' EXPLORATION STRATEGIES IN A COMPUTER-SIMULATED INTERACTIVE PROBLEM-SOLVING ENVIRONMENT: LOGFILE ANALYSES

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Since the turn of the millennium, reports on individual differences in students' performance across nationalities have strongly influenced educational policies (see e.g. OECD, 2010); however, very little is known about cross-national individual differences in students' domain-general thinking skills (Wüstenberg et al., 2014). The purpose of this study is to examine cross-national differences in students' exploration strategies in a computer-simulated problem-solving environment and to detect similarities and qualitative differences in the way Hungarian and Chinese students explore a problem environment. In a sample of N=187 Chinese and N=835 Hungarian students (aged 12), we administered problem-solving items via the eDia platform (Molnár & Csapó, 2013) developed within the MicroDYN approach. The internal consistency of the test was high in both countries (Cronbach's alpha: CN: .90, HU: .84). Logfile analyses indicated that the use of a theoretically effective strategy (the strategy which extracts all information required to solve the problem; see Molnár & Csapó, 2018) did not always lead to high performance. Chinese students employed theoretically effective strategies – including the most effective VOTAT (vary-one-thing-at-a-time) strategy – more frequently than Hungarian students. Based on the information extracted, they were better able to find the right solution to the problems, they managed to represent the information that they had obtained from the system more effectively, and they made good decisions in the problem-solving process compared to their peers in Hungary. Using latent class analyses, we identified four qualitatively different class profiles: (1) 37.5% of the Hungarian students and none of the Chinese students were among the low-performing students; (2) 45.5% of the Chinese students and 28.4% of the Hungarian students were intermediate performers on the easiest problems but low performers on complex ones with a very slow learning effect. (3) The proportion of Chinese proficient strategy users (51.5%) was much higher than that of the Hungarians (34.1%). (4) A small group of Chinese students (3.1%) proved to be rapid learners. These students started out as non-performers in their exploration behaviour, showed a rapid learning curve afterwards and reached the top performers' proficiency level of employing the VOTAT strategy by the end of the test. There were no rapid learners detected in the Hungarian sample. To sum up, Chinese students showed a significantly higher learning effect than their Hungarian peers. Limitations of the study include the low sample size for both counties; furthermore, repetition is required for validation. These results indicate the differences between Hungarian and Chinese students' exploration behavior in an interactive problem-solving environment and highlight the importance of explicit enhancement of problem-solving strategies as a tool for applying knowledge in a new context during school lessons.

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