Artificial Intelligence (chair: Attila Pásztor)

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DIGITAL SELF-CONCEPT, ACADEMIC USE OF DIGITAL TECHNOLOGY AND GENDER AS DETERMINANTS OF PERFORMANCE IN PROGRAMMING TASKS

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Developing programming skills and the underlying computational thinking skills are considered essential transversal problem-solving skills that schools should teach students as a part of becoming agentic members of a digital society. This paper focuses on students' performance on different programming tasks (code building and debugging) developed during the three-year DigiVOO project investigating the impact of digitalisation on learning situations, learning and learning outcomes in primary education. Similarly, the focus is on the role of the use of digital technologies (learning and teaching), digital self-concept and gender on students' (N = 7817) performance on programming tasks. The research questions were answered using structural equation modeling (SEM). The results showed that the tasks developed, focusing on different aspects of programming, were positively related to each other. However, they seemed to require different approaches from the students based on the trials made during the tasks, which was also assumed to be related to the apparent and varying gender differences. Based on previous research, that, unlike code building, debugging as a computational thinking process may be more challenging with a higher number of trials being related to better success (e.g. Liu et al., 2017). Since girls' approach to problem solving has been found to be more strategic and deliberative (Klinteberg et al., 1987; Meurling et al., 2000), this may be the reason why girls performed better on this task. Boys, on the other hand, have been shown to approach problem solving through trial and error (Funke et al., 2015; Papavlasopoulou et al. 2020). Students' use of digital technology (basic and advanced) appeared to somewhat predict better digital self-concept, but conversely was negatively associated with performance on programming tasks, although more positive digital self-concept predicted correspondingly better task performance. This result differed from previous findings (Fraillon et al., 2020), and before interpreting the results in more depth, it would be worthwhile to examine the implications of the results in more detail by also considering students' use of technology outside of school.