

ZMATH 2016f.00979

Zander, Steffi; Wetzels, Stefanie; Bertel, Sven

Rotate it! – effects of touch-based gestures on elementary school students’ solving of mental rotation tasks.

Comput. Educ. (Exeter) 103, 158-169 (2016).

Summary: Mobile devices with touch screens, such as tablets are increasingly used in classrooms. Pragmatic advantages are seen in high mobility during computer-based learning due to a high portability of mobile devices and an easy online access to learning applications at places in and outside classrooms. From a psychological perspective, it is of special interest to examine how different modes of interaction with learning materials (e.g. through apps on tablets) affect performance and motivation. For example, touch screens can afford rather natural gestures and embodied interaction. For various contexts, the use of gestures to interact with information presentations (e.g. with 2-D and 3-D visualizations) has been shown to be beneficial for solving spatial tasks. It is of interest whether use of gestures can also improve learning from dynamic visual information presented on touch-based devices. We present and discuss a study in which we focused on the question of whether, for elementary school students, solving spatial tasks can be enhanced by using touch-gestures on mobile devices. Two conditions of spatial rotation tasks were compared using a within-and-between subject design: an interactive, touch-based app allowing to physically rotate objects and a paper-based, static version. Elementary school students worked with both conditions, though in different orders. Findings suggest that the app-based, dynamic version improves task solving significantly with regard to success rate, mental and temporal efficiency. However, results clearly show that effects mostly exist only after children had first completed the paper-based, static trial of tasks in which they needed to mentally rotate the objects. The results indicate an additive, enhancing effect of the touch-based, dynamic interaction mode especially for children who already are capable of solving the tasks by using mental rotation processes.

Classification: G20 C30 U70

Keywords: elementary education interactive learning environments; media in education; simulations

doi:10.1016/j.compedu.2016.10.007