

4 - Digital Resources for Science Teaching and Learning | Empirical

SP - (16529) - VIRTUAL AND VIDEO EXPERIMENTS DURING COVID-19 HOMESCHOOLING: DO THEY HELP OR HINDER LEARNING?

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Short Abstract

Understanding and using scientific concepts is a fundamental aim of science education. This ability can be fostered by conducting experiments in science education, thereby implementing inquiry-based learning scenarios. However, during the Covid-19 pandemic many schools were closed, and students needed to learn from home. Hands-on experiments were hardly realizable in science lessons. Fortunately, digital technologies provide new possibilities and perspectives for conducting experiments by, e.g., making use of virtual experiments (interactive simulations) or video experiments (an experiment recorded on video). Previous research has revealed that combining virtual and hands-on experiments can be particularly helpful for gaining conceptual knowledge. However, it has rarely been investigated so far how inquiry learning without hands-on experiments can be implemented in homeschooling scenarios and whether this helps or hinders learning. In the present study, we investigated (1) whether using virtual and video experiments during Covid-19 homeschooling fostered students' conceptual understanding in physics and (2) whether combining a virtual and a video experiment had a larger effect on students' conceptual understanding than learning with a virtual experiment only. Our results indicate that (1) learning with an inquiry-based approach in a homeschooling scenario can foster students' conceptual understanding significantly, but (2) learning with a combination of a virtual and a video experiment resulted in similar learning outcomes as learning with a virtual experiment only. We conclude that during homeschooling but also as a future educational practice, virtual and video experiments can be recommended to teachers that need alternatives to hands-on experimentation, e.g. for students' homework exercises. If guided appropriately, even a single virtual experiment can provide valuable learning opportunities for students' conceptual understanding.