

THE DIGIPHYSLAB PROJECT: DIGITAL PHYSICS LABORATORY WORK FOR ON-CAMPUS AND DISTANCE LEARNING

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KEYWORDS: experimental work, laboratory course, undergraduate students, digital technologies

EXPERIMENTAL WORK AND COVID-19

With the emergence of the COVID-19 in spring 2020, physics teaching at university level needed to be rapidly transformed into a distance learning mode all around the world. While lectures and tutorials could rather easily be substituted with video conferences, self-study materials, or recorded videos, transforming a hands-on laboratory course into distance learning is much more challenging facing its traditional structures, manifold learning objectives, and the essential use of typical laboratory equipment (Hut et al., 2020; Jelacic et al., 2022; Werth et al., 2021).

DIGITAL TECHNOLOGIES AS A PROMISING APPROACH

A promising approach to develop laboratory courses especially, and to offer these courses in a distance learning mode, is to use digital technologies like smartphones. Smartphones are widely used, often cheaper than traditional equipment and allow convenient data collection and analysis by utilising built-in sensors. Thus, smartphones provide an affordable opportunity to conduct experiments beyond the laboratory. Additionally, they can enhance inquiry-based learning processes due to the reduction of students' extraneous cognitive load (Becker et al., 2020).

THE DIGIPHYSLAB-PROJECT

The DigiPhysLab-project (Lahme et al., in press), co-funded by the European Union, follows this approach of utilising digital technologies like smartphones for physics experiments by developing 15 high-quality, competence-centered experimental tasks that can therefore be implemented either in on-campus or distance learning settings. All developed tasks are linked to a theoretical framework for design principles of experimental tasks and evaluated with students at the participating universities. The task instructions and further materials are published as open educational resources on the project website (www.jyu.fi/digiphyslab). In the presentation, the framework, the tasks, and the evaluation scheme are presented, and the usability of the tasks is discussed.

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Proceedings of the IUPAP International Conference on Physics Education, ICPE 2022 5-9 December 2022, page 20, ISBN: 978-1-74210-532-1.