

Fostering Digital Competences and Energy Literacy Through Physics Education

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Apstrakt. In the context of digital transformation and the pressing challenges of sustainability, it is essential to promote digital competences, energy literacy and systems thinking among students. This study explores the potential for integrating these essential skills into physics education through the strategic use of simulations. Based on a document analysis of the current high school physics curriculum, we highlight opportunities to incorporate interdisciplinary topics and innovative teaching methods that promote digital competency and energy literacy. Using the online simulator En-ROADS as a specific example, we show how such tools can be directly linked to fundamental physics concepts such as thermodynamics, energy transfer and conservation laws, while making connections to broader topics such as sustainability, policy making and global systems. We explore how these activities enhance students' digital competences including data interpretation, scenario modelling and collaborative problem solving.

The results of this study emphasize the importance of integrating simulations into physics education, not only to enrich subject knowledge, but also to develop skills that are essential for future challenges. This integrated approach fosters students' understanding of the complex relationships between science, technology and society, preparing them to become informed and responsible contributors to a sustainable digital future.

Acknowledgments

This research is the result of the project Natural Science and Mathematics Content in the Development of Digital Competences project (Recovery and Resilience Plan) co-funded by Republic of Slovenia, the Ministry of Higher Education, Science and Innovation, and the European Union – NextGenerationEU