STEM Digitalis project

Recommendations for policymakers to promote teaching on advanced STEM topics in both pre- and in-service science teacher education

Intellectual Output O5
Executive Summary

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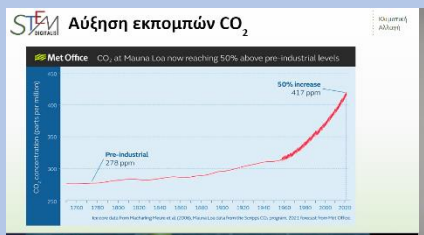
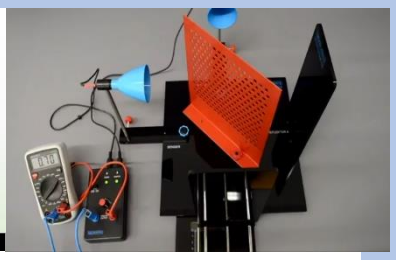
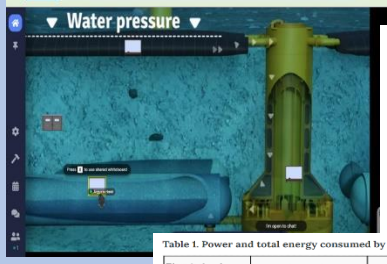
Aim:

The STEM Digital project aims in contributing to digital education readiness in Higher education. The project, through the development of digital scenarios for pre-service teacher training, showcases critical technological features and pedagogies recommended for the design and the implementation of technology-enhanced STEM teaching.







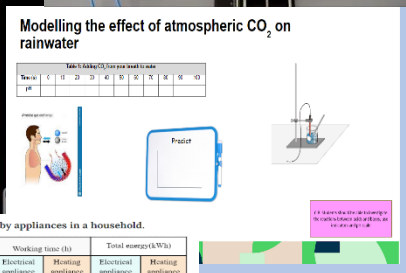


Table 1. Power and total energy consumed by appliances in a household.

Electrical and heating appliances	Power (kW)		Working time (h)		Total energy (kWh)	
	Electrical appliance	Heating appliance	Electrical appliance	Heating appliance	Electrical appliance	Heating appliance
Computer (3)	0.2		70		42	
Electric stove						
TV set						
Ceiling lamps (type I)						
Mobile phone charger						
Oven						
Electric radiator						
Air source heat pump						
Refrigerator						
Washing machine						
...						

Digital scenarios

- Climate Change
- Water quality and footprint
- Interferometry
- Ocean Batteries & Ocean energy farms
- Energy transformation

Implementation

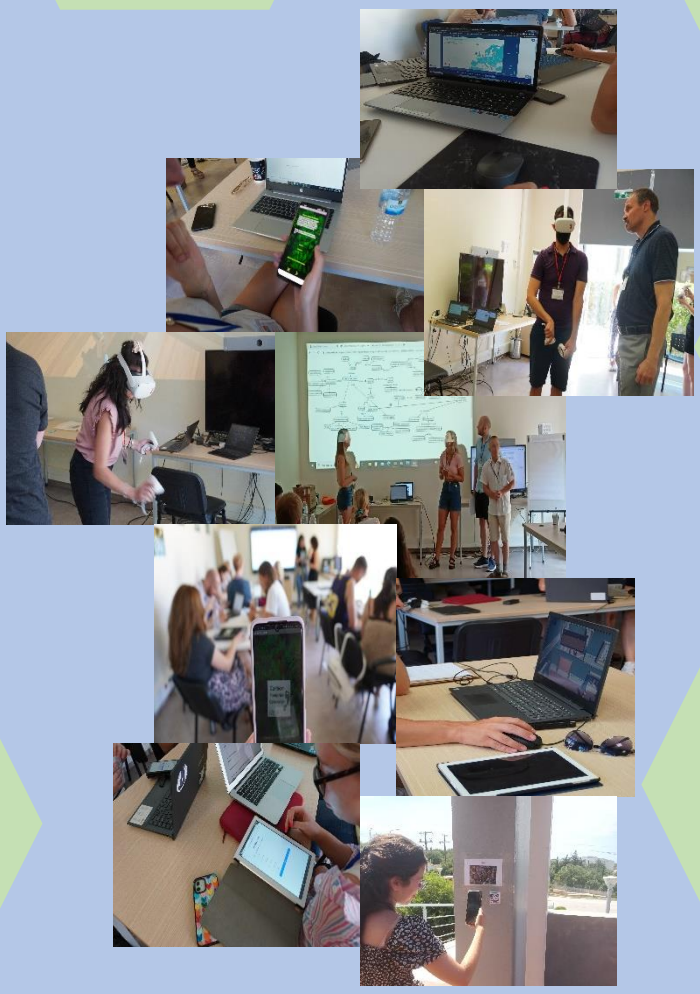
- International summer school for pre-service teachers and teacher educators, organised by the STEM Digitalis partnership
- Local implementations, organised jointly by STEM Digitalis partnerships

Key recommendations: Digital technologies

Open accessible
Available to all students/ teachers

Promoting Inclusivity
Addressing needs and interests of all students/teachers

Customisable
Able to adjust to educational needs and context



Adaptive to participants' level
According to their capabilities and interests

Interactive
Actively engaging the participants

Immersive
Drawing attention and providing an engaging experience

User-friendly
Easily handled and understood to participants

Flexible
Adaptive to blended learning modalities, also portable

Visualisation
including data, graphs, schemes, concept maps, etc.

Key recommendations: Pedagogies with technology

Student-centered
Promoting autonomy and agency

Inquiry-based
Promoting inquiry practices

Problem-based
Engagement with problems and working on solutions

Game-based
Gamification practices, serious games

Groupwork
Promoting collaboration and communication

Assessment
Technology-enhanced assessment techniques and self-assessment

Feedback
Providing adaptive feedback and assistance (teacher/technology)

Blended learning
Appropriate and adjustable for blended learning modalities (synchronous and asynchronous)

Challenges

- Need for expertise
- Deal with failure/bugs
- Need for cross-departmental collaboration
- Self-discipline in asvnchronous modalities
- Limitations of technology- Limitations of content representations
- Workload and time
- Technology as an add-on vs Technology as integral part of the scenario

Conclusion

The STEM Digitalis project provides guidelines for the design and implementation of teacher training programmes for improving digital education readiness. To this direction, the project showcases exemplar digital scenarios in contemporary and real-world topics that can be used for STEM teaching. The project also provides recommendations and research findings from the design and implementation of the digital scenarios in cross-national pre-service teacher education contexts.

Partnership

stemdigitalis-project.eu

DCU Ollscoil Chathair Bhaile Átha Cliath Dublin City University

IDMP PHYSICS EDUCATION

Leibniz Universität Hannover

university of groningen

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