



# GIREP-EPEC

Transforming physics learning via Research & Practice  
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## Designing and Implementing TLSs for Digitally Enhanced Physics Labs: insights from the ADELANTE Project

*Thursday 3 July 2025 15:50 (20 minutes)*

The ADELANTE project addresses challenges in integrating physics labs into secondary education by incorporating smartphones and Arduino microcontrollers into teaching-learning sequences (TLSs) with educational intentionality. Following the Design-Based Research framework, several TLSs were developed, targeting foundational physics topics: motion, energy, forces and fields, waves and particles. These TLSs include inquiry-based lab activities designed to foster scientific practices and student agency. The process of TLSs development leverages teacher communities at two levels: a group of “teacher leaders” had co-developed the TLSs with the researchers, while larger communities of practices are testing the TLSs nationwide to ensure applicability and effectiveness.

### Education level

Pre-service and in-service teacher education

### Physics topic

Full curriculum

### Research focus

Innovative instructional strategies and pathways

### Research method

Practitioner’s Inquiry / Action Research (Qualitative research)

### Organizing preference criteria

Track

**Authors:** Mr TUFINO, Eugenio (University of Padova); Mr BOZZO, Giacomo (University of Calabria); GABELLI, Lucia (University of Padova)

**Co-authors:** Mr ORGANTINI, Giovanni (Sapienza University of Roma); Mr SURACE, Graziano (Sapienza University of Roma); Mrs CARLI, Marta (University of Padova); Mr SAPIA, Peppino Antonio Francesco (University of Calabria)

**Presenter:** GABELLI, Lucia (University of Padova)

**Session Classification:** Parallel oral presentations

**Track Classification:** Laboratory-based physics (LAB)