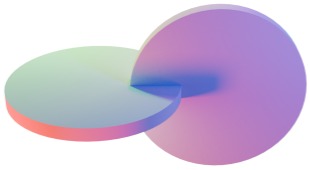

GIREP-EPEC
Transforming physics learning via Research & Practice
LEIDEN, 2025

Contribution ID: **256** Type: **Oral presentation**

Teaching Model-based Reasoning in Physics Undergraduate Classrooms, using Computational Simulations

Friday 4 July 2025 13:20 (20 minutes)

Research on Modeling-based Reasoning (MBR) in physics education indicates that students need to move towards understanding the procedural knowledge of building a conceptual model to explain real world phenomena, and validating this conceptual model against measurement models. We have developed a pedagogical model to teach MBR at the undergraduate level, using a simulation that walks students through the process of building the pendulum derivation, and another simulation that helps in understanding the recursive process of validating the model against results from the experimental model. We present results from a pilot study of this design in a classroom, and an extended design based on these results.

Education level

Age over 18 (excluding teacher education)

Physics topic

Full curriculum

Research focus

Innovative instructional strategies and pathways

Research method

Educational design research (Qualitative research)

Organizing preference criteria

Research focus

Authors: Dr REDIJ, Asmita (Independent Researcher, Former Visiting Fellow, Homi Bhabha Centre for Science Education, Mumbai); Prof. CHANDRASHEKHARAN, Sanjay (Learning Science Laboratory, Homi Bhabha Centre for Science Education)

Presenter: Dr REDIJ, Asmita (Independent Researcher, Former Visiting Fellow, Homi Bhabha Centre for Science Education, Mumbai)

Session Classification: Parallel oral presentations

Track Classification: Instructional strategies & Curricula (INSTR)