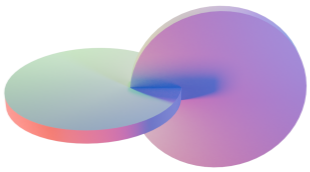

GIREP-EPEC
Transforming physics learning via Research & Practice
LEIDEN, 2025

Contribution ID: **236** Type: **Oral presentation**

Key Design Principles for Enhancing the Transfer of Mathematics to Physics in Upper Secondary Education

Tuesday 1 July 2025 15:50 (20 minutes)

Abstract. The transfer of mathematics to physics remains challenging in secondary education. This presentation focuses on four factors hindering transfer: compartmentalized thinking, mismatch in pedagogical approaches, differing teacher beliefs, and a lack of mathematical proficiency. Key design principles for enhancing this transfer include limited intervention in physics textbooks, involving activation of prior mathematical knowledge, applying mathematics in a rule-based manner rather than relying on ad-hoc strategies ('tricks'), and providing strategic hints to guide students effectively towards solutions. These design principles strengthen students' transfer of mathematics to physics and support insight in the underlying mathematics rather than using 'tricks'.

Education level

Age 15-18 (Secondary education)

Physics topic

Other

Research focus

Active learning

Research method

Educational design research (Qualitative research)

Organizing preference criteria

Track

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Session Classification: Parallel oral presentations

Track Classification: Interplay of mathematics and physics (MATH)