The Role of Mathematics in Learning Physics

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My Background

• Physics lecturer at undergraduate level in SA, especially students from educationally disadvantaged backgrounds.

• Research interests – nuclear physics; became interested in physics education.

• Worked with “extended curriculum” students.

• Similar level to Swedish “gymnasiet”
Why mathematics?

• In SA only 4 in 100 graduate from high school with a pass mark in mathematics

• We know that the further you go in physics the more mathematical it becomes.

• Research shows that students have difficulties later on in physics, if mathematics is not in place e.g. Christensen & Thompson, 2012
Previous work


- It is this movement between semiotic resources which is critical for the ability to do *physics* (e.g. Lemke, 1998; Van Heuvelen, 1991; Mc Dermott 1990).

- Fluency in *critical constellations*
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A Physics Concept

Airey & Linder (2009)
Potential Research Questions/Methods

• What are the teaching and learning relations between semiotic resources in mathematics and physics?

• Will collect video data of students working with experimental design that potentially encourages transduction.

• Possibility for comparative data collection Sweden/South Africa.
References


