How can we foster students' interest in physics?

*Setting physics in the **right contexts** is associated with **higher interest** of students*

Investigating High School Students' Types of Interest in Physics

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Empirical Background

Past studies (e.g. HOPE, PISA, and IPN) distinguish between **2 types of interest** (1 and 2) **covering 2 broad context categories** (a and b)

(Levrini et al., 2017; Drechsel et al., 2017; Rost et al., 1999; Sievers, 1999)

1. **Students that are highly interested** only in (a) **natural phenomena**, the relation to **humans**, and the **relevance for society**
2. **Students that are generally** and **highly interested**, even in (b) purely **scientific** and **technical** contexts

Research Design

Online questionnaire in German language to assess

- **Interest in Mechanics**
  11 items from a past study
  (IPN; Häußler et al., 1998)
- **Interest in Particle Physics**
  11 items modelled on the mechanics items

Cross-cohort study: German-speaking students (N=1214) aged 14-16 years (May - September 2021)

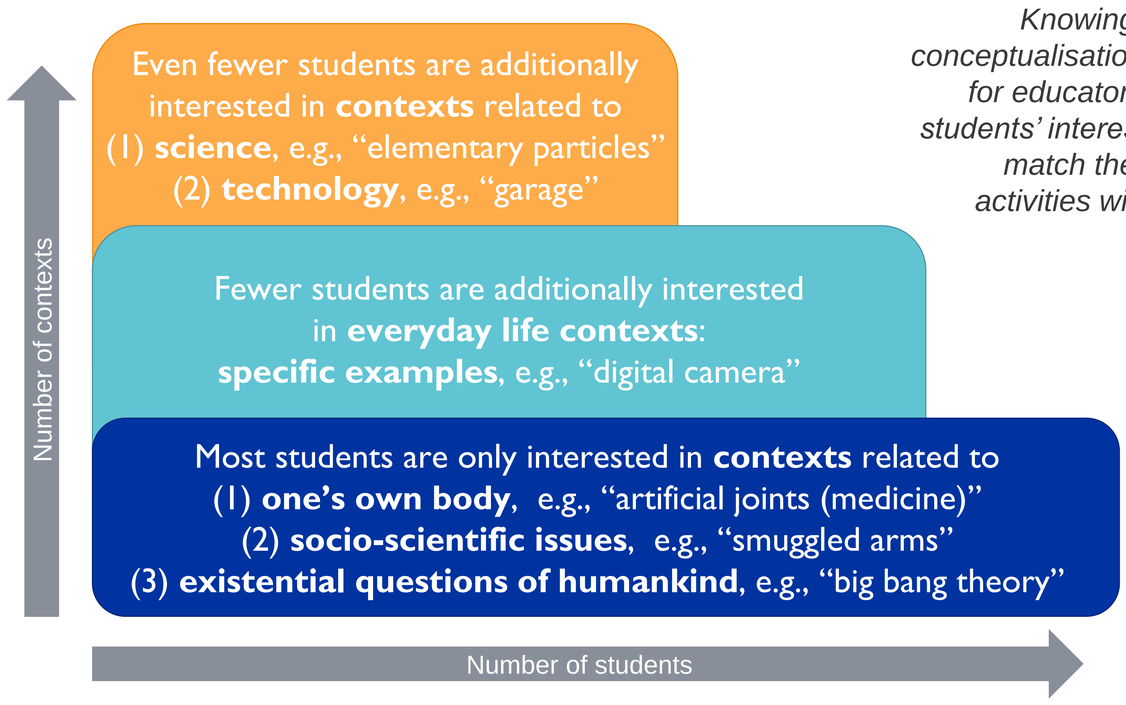
- **Different German-speaking countries represented**
  Austria (N=798), Germany (N=233), and Switzerland (N=183)
- **Both sexes equally represented**
  Girls (N=595), boys (N=529), prefer not to say (N=90)

Analysis method: Mixed Rasch rating scale model

Questionnaire – Exemplary Items

	How interested are you in doing the following?	My interest in it is ... very high	high	medium	low	very low
Mechanics	Getting insight into the artificial organs (e.g., heart as blood pump) and joints used in medicine today **(Item 7)**	○	○	○	○	○
Mechanics	Building different pulleys out of ropes and rolls **(Item 8)**	○	○	○	○	○
Particle Physics	Getting insight into the workflow in a medical diagnostic centre **(Item 7)**	○	○	○	○	○
Particle Physics	Building a particle detector out of your own mobile phone **(Item 8)**	○	○	○	○	○

Conceptualisation of Interest



Knowing and understanding this conceptualisation of interest is important for educators trying to increase their students' interest. In particular, they can match the design of their learning activities with this conceptualisation of interest.

Results

Mechanics

- **100% of the sample** (Groups 1_M and 2_M) have a **similar interest profile!**

Particle Physics

- **79% of the sample** (Groups 1_{PP} and 2_{PP}) have a **similar interest profile!**
- **21% of the sample** (Group 3_{PP}) have a different interest profile and are **highly interested in Particle Physics!**

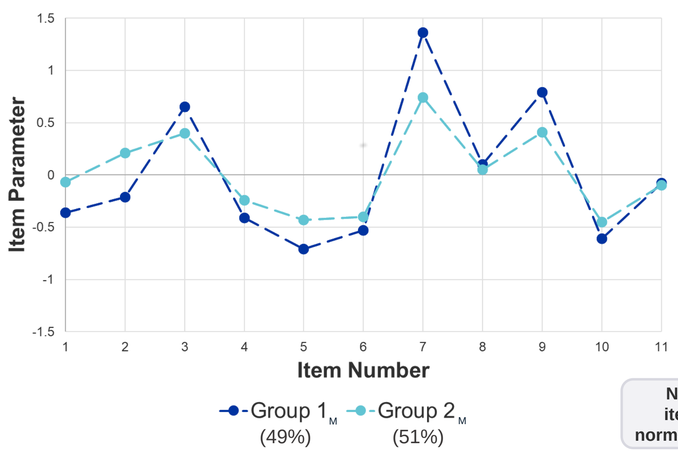
Physics? Only in the **right contexts**!

For particle physics, the group 3 describes the type of students that loves physics. With our measurement instrument this physics lover type of students could only be found for particle physics.

Physics!!!

For mechanics and particle physics, both groups 1 and 2 describe one single type of interest, the type of students that is only interested in physics set in the right contexts.

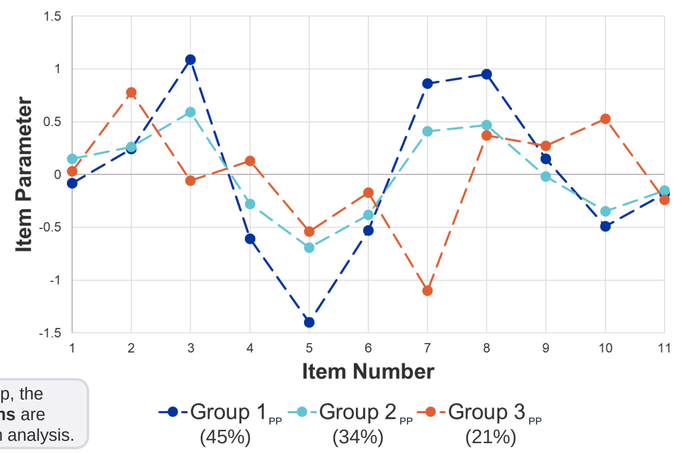
Mechanics Interest Profiles



more interesting

NOTE: For each group, the **item parameter means** are **normalised to 0** in Rasch analysis.

Particle Physics Interest Profiles



The x-axis shows the 11 items, the y-axis shows the item parameter for each item, that is, how interesting each item is. The dotted line between the data points helps to see the pattern that tells us how interesting different items are relative to each other within a group. We call this pattern the interest profile.

Literature:

Drechsel, B., Carstensen, C., & Prenzel, M. (2011). The Role of Content and Context in PISA Interest Scales: A study of the embedded interest items in the PISA 2006 science assessment. *International Journal of Science Education, 33(1)*, 73–95. https://doi.org/10.1080/09500693.2010.518646

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Student group photo created by lookstudio - www.freepik.com

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