



Universität
Münster



Engaging Young Minds with Particle Physics

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NETZWERK
TEILCHENWELT

NRW-FAIR
Netzwerk

Particle Physics Outreach in Münster



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KONTAKT Münster



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Fellow Netzwerk Teilchenwelt

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Project Management

Cloud chamber workshop

- 90 minutes duration (typical German school lesson)
 - Phase I: 40 minutes introduction into research + pause
 - Phase II: 45 minutes DIY-cloud chamber with dry ice
- Target group: Students aged 12-16
- More than 25 interventions to date with a reach of over 750 people



Photo: David Borgelt

Based on peer teaching

„In short, peer teaching occurs when students, by design, teach other students.“
(www.teachthought.com)

- Win for the lecturers
 - Appreciation
 - Encouragement
 - Participation
- Win for the class
 - Communication at eye level
 - Role models
 - Non-school intervention
- Win for (particle) physics
 - Demystification
 - Everyday relevance
 - Presumed increase in interest

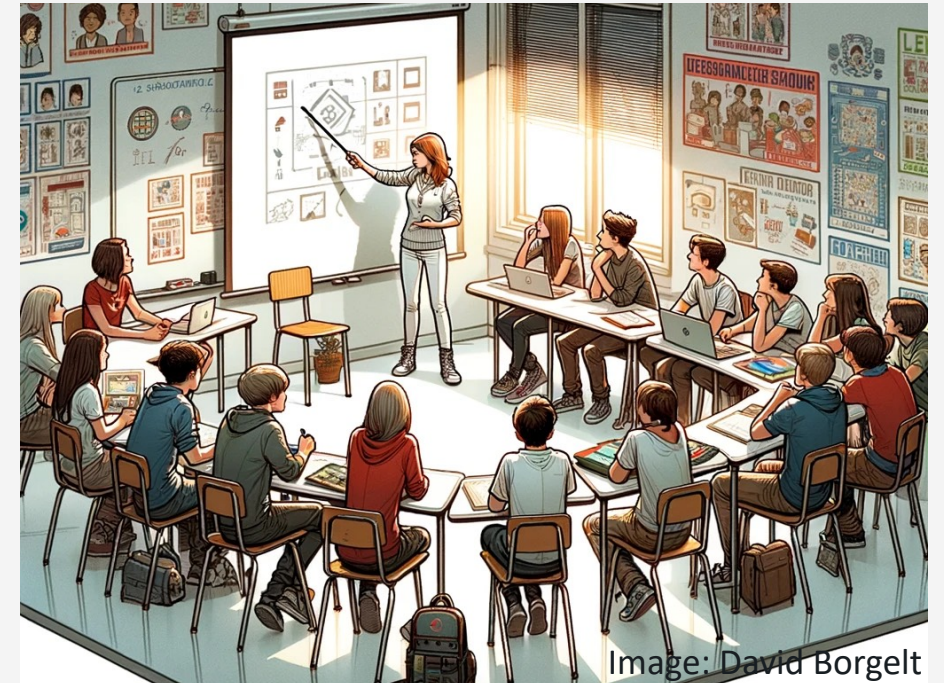
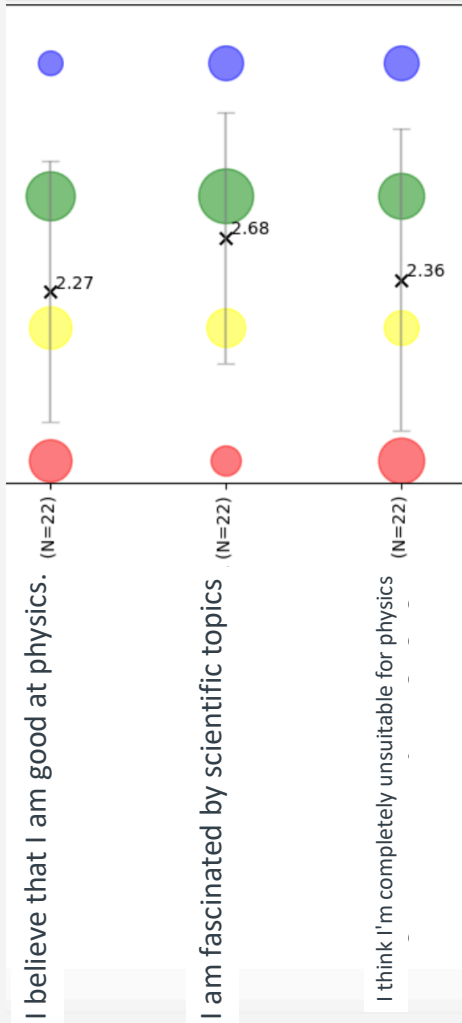


Image: David Borgelt

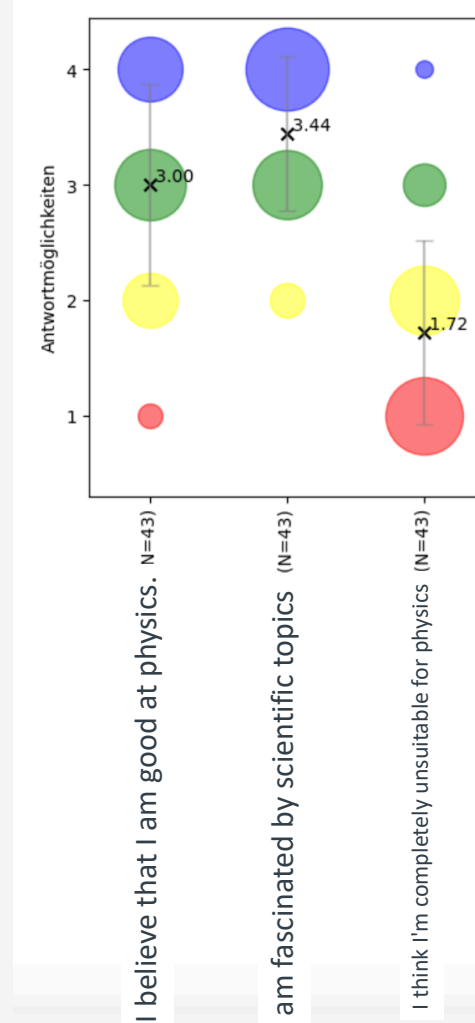
Participation, but not trivialisation!

The difference between students in junior hs and senior hs

Junior

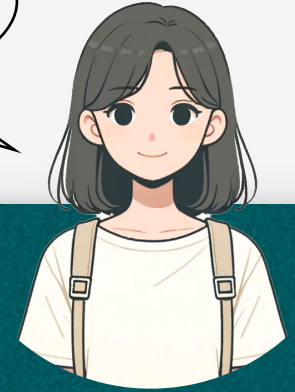


Senior



- Four-point Likert scale
- 1 = Disagree
- 4 = Agree
- Items tested (DOI: 10.1103/PhysRevPhysEducRes.19.010138)

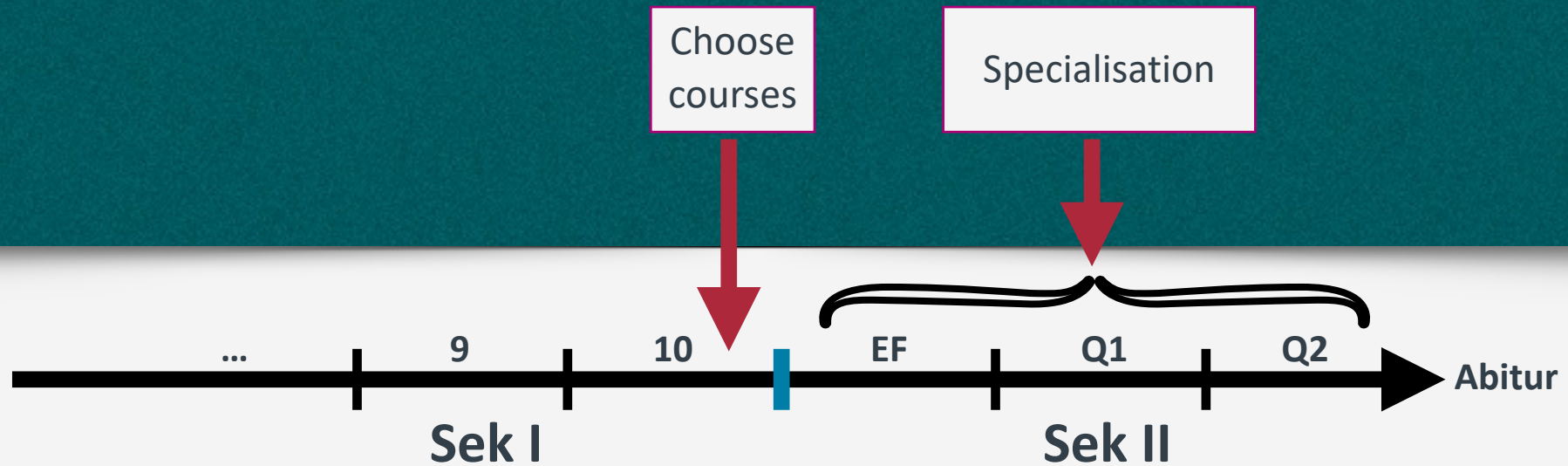
"Nobody likes physics"
Quote: Anonymous



The problem for young people is...

- Physics is rather unpopular
- The subjects for Senior High School and the Abitur are usually chosen at the age of 15/16
- A new choice is possible, but unusual/impractical

-> Physics is rarely chosen again and is therefore no longer a career prospect.



The situation 10 years ago (2014)

- Huge differences between federal states
- Natural science courses are:
 - Physics
 - Chemistry
 - Biology
 - Geography

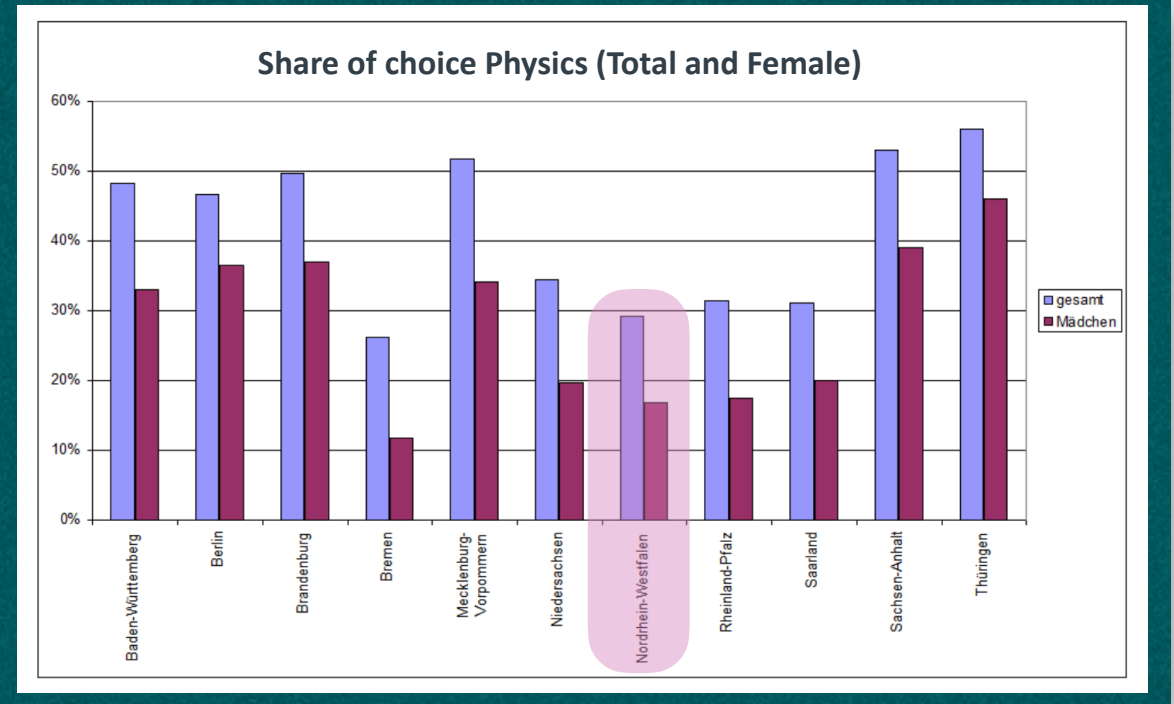
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Baden-Württemberg	59%	48%	41%	
Bayern	49%		36%	
Berlin	38%	21%	32%	(*)
Brandenburg	82%	68%	41%	(*)
Bremen	21%	20%	49%	
Mecklenburg-Vorpommern	48%	33%	38%	(*)
Niedersachsen	25%	17%	35%	
Nordrhein-Westfalen	28%	22%	41%	
Rheinland-Pfalz	23%	8%	17%	(*)
Saarland	58%	45%	39%	
Sachsen-Anhalt				keine Wahl
Thüringen	90%	86%	51%	
Bund	44%	33%	39%	

Table 8-1: Electoral behaviour within 12-16 yo students.

*Heise, H., Sinzinger, M., Struck, Y., & Wodzinski, R. (2014). *DPG- Studie zur Unterrichtsversorgung im Fach Physik und zum Wahl- verhalten der Schülerinnen und Schüler im Hinblick auf das Fach*. Bad Honnef: Deutsche Physikalische Gesellschaft.

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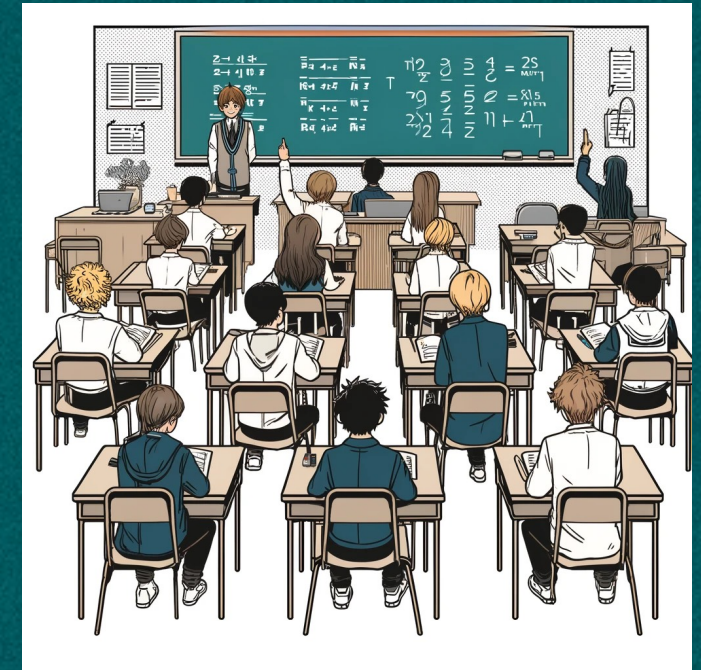
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Today's situation

- We conducted an informal survey within 15 years old girls
- In general high interest in STEM related subjects (about 80%)
 - Especially in Nature and Space
- Just a few students plan to keep on studying physics (about 20%)



Our approach

- Learners revise our presentations
- Parts of lectures taken over by them
- Joint representation of physics at public events
- Special support (e.g. workshops at CERN, Talks at conferences)



Working together to target specific groups

Another product: Y-Phi

- Young learners who helped with outreach wanted to get more involved
- We created a group to do activities together
- Name: Y-Phi (Young Physicists)
- To date 7 highly motivated girls aged 15-18



...instead of a summary

Mir hat es sehr gefallen diese
 Kammer zu bauen und danach auch
 zu wissen was da eigentlich passiert
 ist. Im theoretischen Teil bin ich
 manchmal nicht ganz mitgekommen,
 aber es war sehr informativ und
 habe auch viel mitge...

Ich fand den Vortrag interessant.
 Besonders mochte
 Vortrag wurde sehr visuell vorgetragen. Trotzdem
 habe ich nicht immer alles verstanden. Insgesamt
 habe ich viel neues gelernt

Appreciate visual presentation

I didn't always understand everything

Highlight: - dass wir selber
 was machen konnten
 - die Ergebnisse zu

ich fand alles sehr
 gut!
 Highlight: mit Trockeneis
 experimentieren
 Strahlung und Teilchen
 sehen

Highlight:
 - Ich fand die Präsen...
 es war super dass wir auch
 gemacht haben.

Do things by yourself

Did something active

low: Theorie
 high: letztes Experiment

Highlight:
 - Am Anfang wurde sehr schnell die Sachen
 erklärt und man konnte nicht ganz folgen.
 mehr erklären was ein Alpha-Teilchen ist.
 Fachbegriffe benutzen

Explain more [...]

Use fewer technical terms

Thank you!



@teilchenwelt.ms

...further course of the project here!