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# Physics teacher education in Finland and reasons underlying the top scores of Finnish students in international assessments



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EASTERN FINLAND

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# Some historical reasons for the “top scores”

- Young society
  - Finnish have taken huge steps towards the high-tech and education-orientated society after the World War II
  - Education has been appreciated highly
    - Education has guaranteed a good job and/or a good position in society
    - Education has seen as an important issue by parents
  - Homogeneous population
    - Children learn basic skills (reading, writing, calculating) quickly

# A Reform of Finnish Education 1970 -

- 1921 Law of Basic Education
  - Children study at least 4/6 years
    - Aims of law did not come true
    - Some continued to vocational education
    - And some to more theoretical education
      - expensive
- Reform 1970
  - Free 9 years long education for all
  - Model from Sweden and influences from East Germany
  - Probably the most important education reform in Finland



1924 - 1926

# Teacher education

## Influences

- From didactical and pedagogical traditions
- Nowadays influences comes also from English-speaking countries
- Universities or even subject departments have much freedom to decide on their teacher education programs
- An unique university training school system
  - Enough resources - expensive
- National Core Curriculum for School Education
  - Define aims and contents at general level, not too strict
  - Trust in teachers' professional competence



# Physics teacher education program in UEF

Applying		Aptitude test: interview and group session	
1. year	Studies on minor subjects etc. math or chemistry	Basic physics – four courses + Basic laboratory practice	
2. year		Intermediate courses in physics - Thermal physics, Optics, Electromagnetism, Quantum physics etc. - Two laboratory courses for teachers	Part of pedagogical studies 25 cp includes first training period at school
3. year		B.Sc. Thesis in Physics 7 cp	

- Students can apply directly to the teacher education program
- Student teachers are doing same courses than forthcoming physicists
- They are “learning” lot of theory and problem-solving
  - Two laboratory courses especially for student teachers
- At the beginning of second year student teachers do their first pedagogical studies and the first training period at university training school
  - Being a physics teacher for the first time!

# Master degree studies

4. year	Studies on minor subjects etc. math or chemistry	Advance level studies on physics (8 cp) etc. material physics Special courses for teachers <ul style="list-style-type: none"><li>•History of physics</li><li>•Conceptual physics</li><li>•Problems on understanding physics</li><li>•Physics as a structural science</li><li>•Quantum physics for teachers</li><li>•Some laboratory practice</li></ul>	Pedagogical studies 35 cp includes three training periods at school
5. year		M.Sc. Thesis in Physics (education) 20 cp	

- Special courses for student teachers
  - Different perspectives to physics
    - Historical, conceptual, philosophical, structural, etc
    - Physics is not an isolated domain of knowledge
  - Students' knowledge need to be re-organised
  - Students face the questions what, why, and how to teach
  - Ideas of all courses have been tested in in-service education



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# Finally

- Graduated teachers have a licence to teach but real maturation comes with years
  - How to find right kind of ingredients for well-balanced maturation?
- Co-operation between three partners is important issue: subject departments, department of applied education (pedagogical studies), and university training school
  - The partners has a common aim – a good physics teacher
  - Some attempts to create a common theoretical framework
- There are different kind of teacher education programs in Finland
  - Some subject departments have special master programs for student teachers and some haven't
  - There is no evidence for the superiority of any program

# *Thank you!*

More information about physics and teacher education research of PERG - UEF:

<http://www.uef.fi/fysmat/fysiikan-opetuksen-tutkimus>

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