APS April Meeting 2010 (FIP/Fed session on 16th February 2010) pekka.e.hirvonen@uef.fi

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



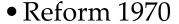
Some historical reasons for the "top scores"

- Young society
 - Finnish have taken huge steps towards the high-tech and educationorientated 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



- 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 Englishspeaking 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

1. year

2. year

3. year

Studies on minor subjects etc. math or chemistry Aptitude test: interview and group session

Basic physics – four courses + Basic laboratory practice

Intermediate courses in physics

-Thermal physics, Optics,

Electromagnetism, Quantum physics etc.

- Two laboratory courses for teachers

B.Sc. Thesis in Physics 7 cp

Part of pedagogical studies 25 cp includes first training period at school

- Students can apply directly to the teacher education program
- Student teachers are doing same courses than fortcoming 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

Studies on 4. year Advance level studies on physics (8 cp) Pedagogical minor etc. material physics studies 35 cp Special courses for teachers includes subjects History of physics three etc. math or Conceptual physics training 5. year chemistry •Problems on understanding physics periods at Physics as a structural science school Quantum physics for teachers •Some laboratory practice 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



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 pekka.e.hirvonen@uef.fi



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