

Promoting teachers' professional development in mathematics education in Finland: examples of recent trends

Vuokko Kangas, Teacher training school, Oulu University

Anna-Maija Partanen, University of Lapland



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



OULUN YLIOPISTO
UNIVERSITY OF OULU

- 1) In-service teacher training in programming
- 2) In-service teacher training in mathematics education



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



OULUN YLIOPISTO
UNIVERSITY OF OULU

In-service teacher training in programming



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



OULUN YLIOPISTO
UNIVERSITY OF OULU

Innokas project

- Funded by the Finnish National Board of Education
- Coordinated by the Learning centre Innokas in the University of Helsinki and Koulumestarin koulu elementary school in Espoo
- Consists of a network of 60 schools where models that support innovative education, especially in information and communication technology, are developed.
- Methods of working include development work at the schools, clubs for children, national competitions in robotics for children, in-service teacher training etc.
- The main goal is to encourage and support children, teachers, and other actors in schools as well as collaboration partners in creativity and innovation, and in utilizing technology in versatile ways.
- Special focus of the Innokas project is on utilizing robotics in supporting teaching and learning.
- <http://www.innokas.fi/about/>



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

In-service teacher training in programming in Lapland

- One-day courses of the **national tour of Innokas project**
- Short **first-aid (1 h) workshops by LUMA-centre Lapland** in different places
- One-day courses organized by the **Regional State Administrative Agencies** and by the **Unit of Continuing Education of the Faculty of Educational sciences** in the University of Lapland. Schools can also buy courses from the university.
- Team of innovative developers and teachers from the Innokas team in Lapland, the Lapland University of Applied Sciences and University of Lapland have been teaching the courses.
- **Courses in the internet**



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

In-service teacher training in Mathematics education in Finland in general



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



OULUN YLIOPISTO
UNIVERSITY OF OULU

Varga-Nemenyi association and the movement of activity based teaching of mathematics

- A method for teaching mathematics to children **developed by Hungarian Tamás Varga and Ester C. Neményi in the 60s and 70s** became to be called **Varga-Nemenyi method**
- Important principles describing the method are that authentic experiences of children make ground for the construction of mathematical concepts, rich use of manipulatives, stepwise progression from the concrete to the abstract, emphasis on **grounding conceptual thinking** of children, emphasis on the use of language in learning and encouragement of children of not being afraid of doing mistakes, debating and being joyful when studying mathematics (Ikäheimo & Risku, 2004).



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

- Varga-Nemenyi association in Finland aims in **promoting teaching and learning of mathematics through the Hungarian Varga-Nemenyi method**. They work to **adapt the method to the present Finnish education** (Webpage of the Varga-Nemenyi association, retrieved on the 31st of June 2016, <http://varganemenyi.fi/koulutus/kurssikalenteri?page=1>)
- Varga-Nemenyi association is active in organizing in-service teacher training courses (in August 2016, alone, they offer 8 courses in different cities in Finland)
- The movement has in general influenced Finnish teaching of mathematics. **Nowadays, other instances, too, arrange courses for teachers in activity based mathematics** (toiminnallinen matematiikka) without directly referring to the Varga-Nemenyi method.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

Math lands

- Math lands in Finland (matikkamaat) are **local pedagogical centers** where teaching of mathematics is developed for students from the pre-school to the upper secondary school. The ten math lands in the country work under the educational agency of a municipality or in a university. Their staff is often teachers working part-time in the math land and part-time at school.
- Math lands **have manipulatives for students to work with or schools to borrow, they organize in-service teacher training courses in their municipality, they develop teaching materials etc.** Each math land works in its own specific way.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

Commercial tool-specific courses for subject teachers in the use of technology

- Traditionally companies importing calculators and computer programs have offered tool-specific courses for mainly subject teachers to help teachers adapt new technology into their teaching of mathematics.
- The matriculation examination at the end of the upper secondary school will be taken electronically by the end of 2019. There will be courses for teachers to learn the use of the particular programs and calculators used in the tests.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

MAOL, The Finnish Association for Teachers of Mathematics, Physics, Chemistry and Informatics

- Annual conferences of MAOL are popular among subject teachers.
- During the schoolyear 2015 – 2016 MAOL organized day-long curriculum meetings for teachers to help them participate in writing the mathematics curriculum at the local level.
- During the beginning school year 2016 - 2017 MAOL is intending to focus on the pedagogical use of ICT.
- <http://www.maol.fi/maol-ry/?L=2>



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

LUMA-centre Finland

- There are 13 regional LUMA-centres, which are organizations in Finnish universities.
- The centres form a network, which is led according to a common strategy.
- The first center was established in 2003 in the University of Helsinki. Funding of the Ministry of Education and Culture increased the number of the centers significantly, and many centers were established in 2014 – 2016.
- A vision for LUMA is to guarantee high quality of competence in mathematics, science, technology and information technology in Finland in the future.
- The most important mission of LUMA is to inspire 3 – 19 years old girls and boys to investigate topics in LUMA-subjects and encourage them to choose to study LUMA-subjects in their studies.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

- LUMA also aims at **supporting future and present teachers' and counsellors' lifelong learning and research on teaching of LUMA-subjects.**
- LUMA-centers try to unite different actors in the field to work for the common aim. They try to follow their slogans: **Joy of comprehendig for all!** and **Together we are more!**
- LUMA centers work in **creative and innovative ways, keeping up-to-date.** One example of that is the **StarT-project.**
- <http://www.luma.fi/keskus/>



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

LUMA-Finland development project

- Program funded by the Ministry of Education and Culture in 2014 – 2019
- Part of the money the ministry gave for LUMA work is directed to **wide and intensive development work, which supports the introduction of the new curriculum and teaching in line with that.**
- The main goals of the program are to **increase the motivation** of 6 – 16 year old children and young people to study natural sciences, mathematics and information technology and **to develop working methods in schools** more child centered, investigative and activity based ways. Also connections to everyday life and working life are emphasized to increase the motivation of children.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

The mathematics subprogramm of the project

- The mathematics subprogram focuses on **investivative/problem based learning of mathematics, use of technology for teaching and working life connections.**
- During 2014 – 2016, 13 projects (and many more in natural sciences and ICT) have done research based developoment work in line with the guidelines of the program. The leaders and participants are often from LUMA-centers in Finland, but also projects outside the centers are included. In spring 2016 few more projects were accepted to the mathematics subprogram.
- It is intended, that during 2017 – 2019 the outcomes from the projects are spread intensively to whole of Finland. Every project is required to make a MOOC-course for teachers and give a workshop for teachers in their topic in the regions of all the 13 LUMA-centers.



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

Reflections

- Many different organizations and people groups arrange in-service teacher training in Finland. Who coordinates it?
- It is often enthusiastic individuals or groups who organize and offer the courses.
- Also commercial companies participate in arranging courses. Is it ok?
- National Board of Education and the Ministry of Education and Culture guide the education offered to teachers through giving money for organizing in-service teacher training.
- It may be that in the future more of the money is directed to municipalities which then order teacher training according to their needs. Do they always know what they need in mathematics education?
- Teachers share ideas and opinions in the social media. Is that teacher training?



LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND



OULUN YLIOPISTO
UNIVERSITY OF OULU