



*Teaching programming
in Finnish secondary
education:
a case study*

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LUMAT Research Symposium 2021

The project

- Partners

Vasa Teacher Training School/Åbo Akademi University

Faculty of education and welfare studies/Åbo Akademi University

Engineering department/Novia University of Applied Sciences

- Goals

Develop and evaluate a curriculum unit of text-based programming (coding) for Finnish upper secondary (lukio) students

Develop and evaluate the unit as a **practical example of collaboration** between secondary and tertiary educational institutions

Develop teaching experience on the **didactics of text-based programming** at the Teacher training school and the Faculty of education



VASA
ÖVNINGSSKOLA

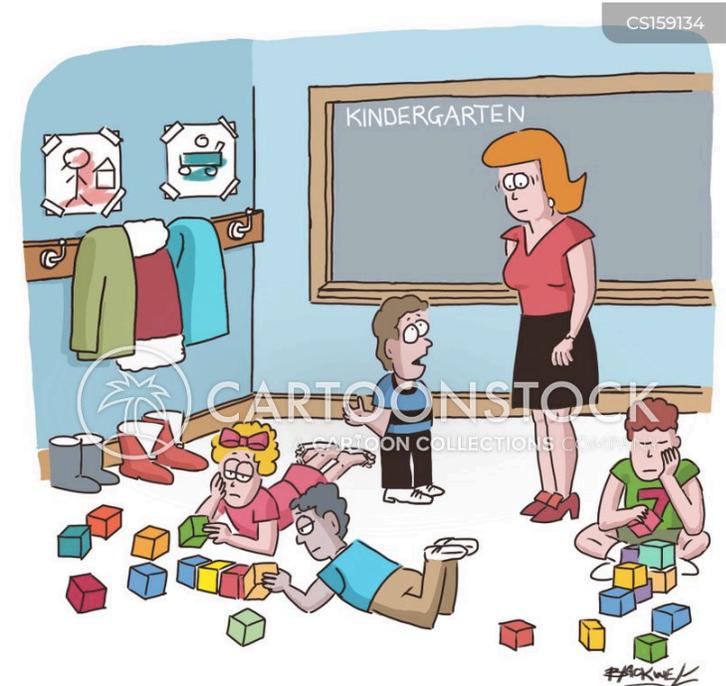


Background

- Everyone agrees that programming is an essential skill for a wide variety of jobs in the future

But not a part of the Finnish secondary education curriculum

- Strong push from regulators to introduce tertiary education study units in secondary education



**"WE'RE BORED WITH THE BLOCKS, MS. JOHNSON...
WHEN DO WE LEARN PROGRAMMING?"**

PROGRAMMING EXPLAINED WITH MUSIC



PHP IS COUNTRY -
IT SUCKS,
BUT IT'S
EVERYWHERE



JAVASCRIPT
IS A
ONE-MAN
BAND -
IT DOES
EVERYTHING
(THOUGH
IT PROBABLY
SHOULDN'T)



C# IS HARD ROCK - IT
USED TO BE PRETTY POPULAR
BUT MOST PEOPLE HAVE
OUTGROWN IT



CSS IS MUMBLE RAP -
ANYONE CAN DO IT AND
IT DOESN'T MAKE YOU
A PROGRAMMER



HASKELL IS JAZZ -
COMPLEX, BUT INCREDIBLY
POWERFUL AND FLEXIBLE -
(IF YOU KNOW
HOW TO USE
IT.)



SWIFT IS U2 - YOU
HAVE IT BECAUSE APPLE
GAVE IT TO YOU



JAVA IS AN OBSCURE
17-CENTURY SYMPHONY
- YOU HAVE TO TAKE A
CLASS TO KNOW ABOUT
IT.



LISP IS BLACK METAL -
NO ONE UNDERSTANDS
IT AND ITS FANS MAKE
PEOPLE NERVOUS



MART VIRKUS '19

What we did

- Phase 1 (19/20): 8 students (and 1 teacher) from Vasa övningskola took part in the course Programmering 1 at Yrkeshögskolan Novia
- Phase 2 (20/21): 6 students from Vasa övningskola took part in the course, this time taught in-house in parallel with and according to the same curriculum as the tertiary students
- Data was gathered through pre- and post course questionnaires with the students as well as informal interviews with the students and teachers
- Phase 3 (21/22): in planning...

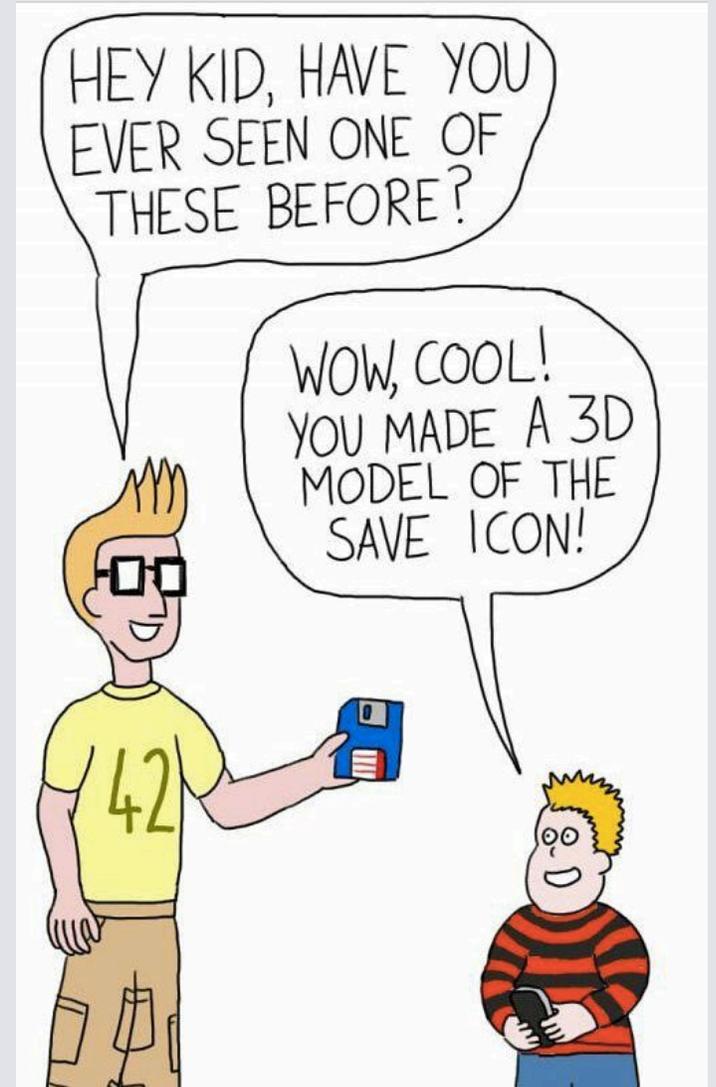
Some results

- The level and content of the course did not pose any problems (and there were surprisingly few technical problems over all!)
- The convenience of in-house teaching within the students' normal schedule in phase 2 made all the difference for reducing the drop-out rate (and no one mentioned any positive motivational effects of mixing with tertiary students in phase 1)
- In phase 1 the university level exam was mandatory and the secondary students who completed the course scored on average higher than the tertiary students
- In phase 2 the university level exam was voluntary, and no students decided to take the exam for ECTS (even though they based on the in-house exam would probably have done very well in the university level exam as well)



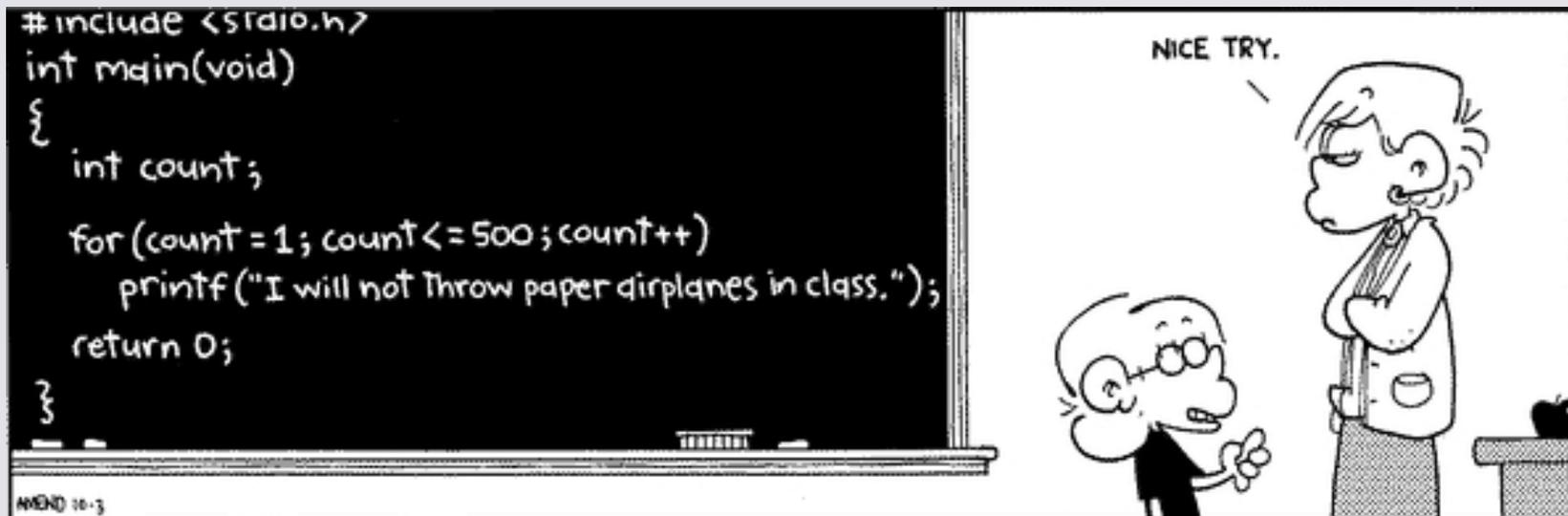
Some conclusions

- Text-based programming (in a “real” programming environment) works well at secondary level
- The biggest challenge for attracting students is the fact that it is not evaluated in matriculation exams
- Collaboration between secondary and tertiary is easy to do on paper, but very difficult to do in a way that actually is beneficial to the students



Final greetings to policy makers

- Make programming a separate subject evaluated in the matriculation exam!
- Be realistic about tertiary studies at secondary level



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