

# TECHNOLOGY ENHANCED MATHEMATICS TEACHING III

*Place and time:* In MP102 on Friday, Jan 5, at 10:30–12:00  
*Organizers:* Simo Ali-Löytty (Tampere University of Technology)  
Terhi Kaarakka (Tampere University of Technology)  
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Abacus material bank: history, present, future  
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**Abstract.** Abacus, based at Aalto University, is a project which aims to facilitate use of use computer aided assessment of mathematics and natural science assignments in higher education. It started as collaboration of the seven Finnish technology universities but it has since then evolved into a major international project. It is based on problems predominantly implemented by using the STACK automatic assessment system. The project is motivated by the fact that a serious obstacle to the use of STACK has been the lack of available learning materials and associated support services.

In this presentation, we discuss the history of the Abacus project, the present state of the material database and the collaboration network, and give an overview of our future plans.

See also: <http://abacus.aalto.fi>

Abacus materiaalipankin Stack-tehtävien monipuolinen  
hyödyntäminen

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**Abstract.** Tässä esitelmässä käydään läpi muutamia esimerkkejä Tampereen teknillisellä yliopistolla, Tampereen yliopistolla ja Tampereen teknillisellä lukiolla laadituista ja käytetyistä materiaalipankki Abacuksen STACK-tehtävistä. Esityksen painopisteinä ovat STACK-tehtävien monipuolinen hyödyntäminen yliopiston matematiikan massakursseilla muun muassa substanssiosaamista integroivien tehtävien muodossa sekä uudet graafiteorian STACK-tehtävät. Esitelmässä kerrotaan myös STACK-tehtävien hyödyntämisestä yliopiston ja lukion välisessä yhteistyössä.

Esitelmän ensimmäiseen osaan liittyen on kirjoitettu artikkeli “Substanssiosaamisen integroinnin vaikutus asenteisiin ja motivaatioon yliopistomatematiikassa” <http://urn.fi/URN:NBN:fi:ttty-201711082121>.

*Yhteistyökumppaneina Lauri Hella, Antti Saarinen ja Valteri Pinkkilä.*

# Replacing final exam by digital self-assessment

JOHANNA RÄMÖ (*University of Helsinki*), `johanna.ramo@helsinki.fi`

**Abstract.** We present a novel teaching model DISA, in which the final exam is replaced by digital self-assessment. The model suits large university courses with hundreds of students.

In the DISA model, students practise self-assessment skills throughout the course and receive automated feedback on these exercises. Their self-assessment is based on learning objectives given by the teacher. Those objectives concern both mathematical and general skills.

In the DISA model, there is no final exam. Instead, at the end of the course the students do a final self-assessment which determines their grades. To prevent obvious cheating attempts, students' assessment is validated automatically against the tasks they have completed during the course.

In the autumn 2017, we conducted a comparative study whose participants were students of a first year linear algebra course. All the participants of the course were taught according to the DISA model, but at the end of the course half of the students did a final self-assessment, which determined their grades, and the rest took a final exam. Preliminary results show that there were differences between these two groups, the self-assessment group reporting a higher level of self-efficacy and deep approach to learning.

*Joint work with J. H. Nieminen and J. Häsä.*