

# Formative Assessment in Mathematics using technologies (the FaSMEd Project); Learning from, & with, teachers

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# FP7 European Union research project

- ▶ Science in Society (Research in the role of teaching methods and assessment methods in addressing low achievement in the field of Mathematics, Science and Technology) Collaborative Project
- ▶ Purpose: To research the use of technology in formative assessment classroom practices that allow teachers to respond to the emerging needs of learners in mathematics and science.

**Timescale 3 years (January 2014 - December 2016)**

# Partners

- University of Newcastle upon Tyne, UK (Coordinator)
- The University of Nottingham, UK
- Ecole Normale Supérieure De Lyon, France
- National University Of Ireland Maynooth, Ireland
- University Of Duisburg-Essen, Germany
- University Of Turin, Italy
- Freudenthal Institute, University Of Utrecht, The Netherlands
- African Institute For Mathematical Sciences Schools Enrichment Centre , South Africa (Stellenbosch)
- University College Of Trondheim, Norway
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# Objectives:

- ▶ A *design research* project
- ▶ To adapt and develop existing research-informed pedagogical interventions (developed by the partners), suited to implementation at scale, through:
  - ▶ fostering high quality interactions in classrooms that are instrumental in raising achievement;
  - ▶ Expanding our knowledge of technologically enhanced teaching and assessment methods addressing achievement in mathematics and science

# Outcomes:

1. Offer approaches for the use of new technologies to support formative assessment.
2. Develop sustainable teaching practices that improve achievement in Mathematics and Science.
3. Produce a toolkit for teachers to support the development of practice and a professional development resource to support it.
4. Disseminate the outcomes.

# FaSMEd in Newcastle

- ▶ 3 secondary schools (3-6 mathematics teachers in each school)
- ▶ A community of enquiry approach using existing formative assessment lesson plans developed from the Maths Assessment Project in the USA (please see: <http://map.mathshell.org/lessons.php> )
- ▶ Plan - do - review cycle over a typically three week period
- ▶ Focus on exploring how technologies could be incorporated into these lessons to improve the formative assessment process for students and teachers
- ▶ Technologies used: iPads (either one used by class teacher and shared with specific students for feedback or class sets used in pairs) and Chromebooks; Apps including ShowMe and Reflector; software including Socrative, Classflow and Googledocs; mini whiteboards, post it notes and lollipop sticks.

# Teachers' feedback

- ▶ It takes time – to get used to the materials and to alter the rhythm and pace of learning and teaching
- ▶ Finding the requirement to carry out a preliminary assessment before teaching very useful (although time consuming)
- ▶ The increased amount of focused discussion peer/peer and teacher/student is valuable
- ▶ There is beginning to be a change in the 'learning ethos' and some classes of students are becoming more confident problem solvers
- ▶ The topics are accessible and 'grounded'

## Further comments

- ▶ The technology adds another layer of complexity, but some benefits are being recognised

*I am, by nature, a technophobe. By pushing my boundaries in engaging with this task I have explored pedagogical approaches that I might have otherwise not. This certainly would not have happened on my own. The mutual support of other colleagues, sharing both successes and the failures is crucial. (teacher)*

- ▶ Some voices questioning whether all this 'fuss' is making a significant impact on learning: 'Would they have learned as much, more efficiently, if I had taught them in my traditional way?'

- ▶ *By far the most beneficial thing for me has been the tasks and although I have a thought process in mind as to how the lessons might go I have not always foreseen where they actually end up going. It has improved my questioning skills because I have had to think like the pupils and try and identify their thought processes and develop these rather than guiding them the way that I have wanted to go.*
- ▶ *The use of Socrative helps me to access the views/ideas of all students. Students like the anonymity of seeing their responses without other students knowing who made them. They feel more able to explain their ideas and to express themselves. This helps to promote whole class discussion.*

# What next ...

- ▶ Researchers have carried out interviews (with teachers and students), lesson observations and received feedback from teachers (oral and written reflections) on activities and methods trialled.
- ▶ Each partner country will submit two case studies based on the research with teachers
- ▶ These case studies will inform the Teacher Toolkit and Professional Development Resource produced by the FaSMEd project.
- ▶ Disseminate the outcomes of the project to the European and global community.