

Raising Achievement through Formative Assessment in Science and Mathematics Education



Maynooth University
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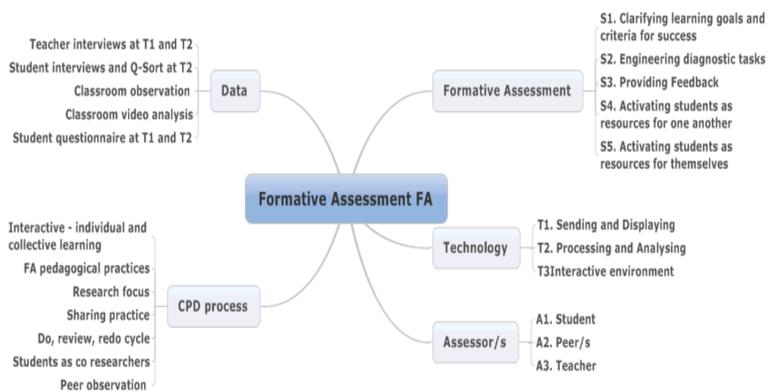


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Introduction

The project involved working with three schools, 13 teachers and over 300 students. Each teacher taught four FaSMEd lessons using a planning, implementing, observing, reflecting and a re-teach cycle.

Overview of the research project and data collected



"If there's someone with a problem and you can explain it to them, you understand it better as well" (XMB_S4)

"I like talking to the teacher just because it's easier, but I like learning with technology as well because you might learn new tricks that the teacher might not have used" (XMA_S15)

"Well they can see what we've done better, it's hard to explain, if we do stuff on technology they can save it they, can see it...it's hard for them to know how we're getting on except by exams." (YSA_S3)

"When he (the teacher) records our answers he'll be able to know what we don't really know and more people can ask a questions rather than just keeping it to themselves and being scared to talk." (XSA_S20)

Mixed views on usefulness of technology

Key findings from the Q-sort and questionnaire

Views of learning:

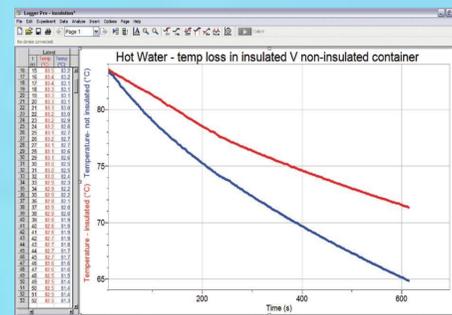
"The best way to learn maths/science is by doing loads of exercises from the book" 52% of Maths students agreed, while 23% of Science students agreed

"Maths/Science means exploring and experimenting"

25% of Maths students agreed while 69% of Science students agreed. There was a significant difference here ($p < 0.001$). Note that 45% of Maths students were not sure about this item.

The Science students were more positive about the use of technology in the classroom, this may be due to more exposure.

There is evidence that students welcome a move from traditional teaching methods.



Insulation lesson, using technology to promote thinking, questioning and investigating

Technology: sending and displaying, presenting and analysing, interactive environment

Online community: Schoology



Educreations



Popplet



Sensor technology

Key findings on professional development

Three key characteristics of the professional development were cited as being significant for the teachers:

- Development of professional skills in a collaborative environment
- Observation and feedback on teaching
- Supporting materials and tools

"I found it (PD) very helpful, particularly the day we were here (in her school) we met up with the other teachers, saw how they were getting on, it was very helpful. It made you reflect I suppose on your own practices" (Maths Case Study Teacher).

While the technology provided useful data and an efficient means of communication, the success of the FA strategies was largely dependent on the skills of the teacher in anticipating misconceptions, selecting appropriate topics for discussion and generating purposeful discussion through effective questioning. The use of feedback from peers and from researchers enhanced this professional learning.

The teacher's professional knowledge of FA and how technology could be used to enhance its use in science and mathematics was increased through the project. The role of developing professional learning communities both in schools and between schools and between schools and the university was central to the success of this project and merits further exploration.



Students engaging in the lesson and having mathematical arguments.



Activating students as instructional resources for one another.