Role of technology in promoting formative assessment practices in science classes

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France and Ireland
Presentation overview

1. Introduction to FaSMEEd project
2. Framework for Analysis
3. Examples from France
4. Examples from Ireland
5. Evidences - findings
Raising Achievement through Formative Assessment in Science and Mathematics Education (FaSMEd)

This three year, €1.9M project, concluding 12/16

Working with partners across eight countries, researchers will look at how technology can be used in formative assessment by teachers to help raise attainment levels among students.

In each country this involves researchers working with a cluster of schools with a focus on the use of FA and technology to improve interactions in the classroom.
FaSMEEd partners are:

- University of Newcastle Upon Tyne, UK - Coordinator
- The University of Nottingham, UK
- Ecole Normale Superieure De Lyon, France
- Maynooth University, Ireland
- University of Duisburg-Essen, Germany
- University of Turin, Italy
- University of Utrecht, The Netherlands
- African Institute for Mathematical Sciences Schools Enrichment Centre, South Africa
- University College of Trondheim, Norway
Framework for analysis

- Formative assessment is considered as a teaching method where:

  “evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited.” (Black & Wiliam, 2009, p. 7)
## Framework for analysis

- **From a 2D model...**

<table>
<thead>
<tr>
<th></th>
<th>Where the learner is going</th>
<th>Where the learner is right now</th>
<th>How to get there</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher</strong></td>
<td>1 Clarifying learning intentions and criteria for success</td>
<td>2 Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding</td>
<td>3 Providing feedback that moves learners forward</td>
</tr>
<tr>
<td><strong>Peer</strong></td>
<td>Understanding and sharing learning intentions and criteria for success</td>
<td>4 Activating students as instructional resources for one another</td>
<td></td>
</tr>
<tr>
<td><strong>Learner</strong></td>
<td>Understanding learning intentions and criteria for success</td>
<td>5 Activating students as the owners of their own learning</td>
<td></td>
</tr>
</tbody>
</table>
Framework for analysis

... to a 3D model:

- The actors (teacher, student, class or peers)
- The formative assessment strategies
- The properties of technology
Session 3 maths

Participants

Student

Peer/group

Teacher

Funct. of tech

Interactive environment

processing & analysing

sending & sharing

FA strategies (Black & Wiliam)
Session 8

physics

Participants

Student

Peer/group

Teacher

Funct. of tech

Interactive environment
processing & analysing
sending & sharing

FA strategies (Black & Wiliam)
Session 9 physics

- Participants
- Student
- Funct. of tech

- Maths & Science teachers

FA strategies (Black & Wiliam)

- Interactive environment
- Processing & analysing
- Sending & sharing
Formative assessment and technology in France

Clickers (Student response system)
Beamer

Tablets  One Note

IWB  Maple TA
Interactions with teachers

- Different contexts: one school is 200km far from Lyon, the others are in the suburbs
  - Several 3-4 days visits following the class
  - Short meetings with teachers
- Journal
- Interviews after the lessons
- Questionnaire about teachers' background
- Observations: videos and pictures
(all videos available for research use on demand [https://ife.ens-lyon.fr/fasmed/](https://ife.ens-lyon.fr/fasmed/))
Case study 1: Thomas and his grade 9 maths class

- School context: low secondary school of a small town in South-East of France (Gap)
- Grade 9 class (students’ age: 13-14), composed of 22 students with an average school level

Time-distance activity
Case study 2: Lisbeth and Thomas and their Physics and maths grade 7 class

School context: located in a disadvantaged area of the suburbs of Lyon

Grade 7 class of students (11-12 years old) with an average school level in the context of this school and a great heterogeneity

Time – temperature activity
Irish case studies
Interactions with teachers and students

Professional development sessions to plan and review lessons

Lesson observation - video and field notes

Interview with teachers pre and post intervention (December 2014 and May 2015)

Interview with students pre and post intervention (December 2014 and May 2015) including a Q-Sort activity

Student questionnaires distributed to all participating students in May 2015
Formative assessment and technology

Online Learning Community

Logger Software

Educreations

Popplet
Using *Educreations* in investigations in science
Using *Educreations* in investigations in science

**Worksheet 2**

- Log in to educreations
  - msmooneympps@gmail.com
  - Science
- Complete worksheet 2
  - A’s read the questions
  - C’s login and save the video
  - B’s and D’s write the answers

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1. Yes
2. Chemical Energy can be transferred into a different energy to create adrenaline from sugar rush.

3. You might need a treadmill and Lucozade Sport.

4. Get on a treadmill for 10 mins then pause then drink Lucozade Sport. See the amount of energy it gives you.
Insulation experiment using iPads

Due: Friday, February 13, 2015 at 11:59 pm

In your pairs please leave both of your names and answer the following questions:

1. Write 2 things you enjoyed about the experiment
2. Write 2 things you have learned from the experiment
3. Write 1 thing you would change to make the experiment better

Posted Wed Feb 11, 2015 at 9:57 pm

There are no discussions

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06A Science: MPPS

Wriggle

Viktorie Zelinska

Experiment by Pierce, Viktorie, Darragh and Itamar
Conclusion: We have successfully found out that the non insulated cans graph was steeper than the insulated cans. The lowest point the non insulated can reached was 84.9 degrees Celsius. The lowest point the insulated can reached was 74 degrees Celsius.

Thu 12 Feb 10:16 Liked

Yvonne Greave

Our experiment
Maya, Jade and Yvonne
We successfully measured the temperature of an insulated can and a non insulated can. We plotted them on graphs and it showed that the insulated can kept the heat of the boiling water in for longer. The end temperature of the insulated can was 79.2 degrees celsius and the end temperature of the non insulated can was 69.3 degrees celsius

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Schoology
Mr. Dixon

Some pictures of the updates from my ichology page.

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Ms. Moeen

Here are some of the pre and post assessment sheets from the insulation task.

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Laura Gilmour

Hi! I completed the Maths graph activity and here are some of the results. Before we started most of us weren’t sure what was going to happen. The kids responded well to the activity. They took a few minutes to get into...

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Aliuskas, Zigmas

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating</th>
<th>Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present...</td>
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<td>3</td>
</tr>
<tr>
<td>Content</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Question...</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Summ...</td>
<td>4</td>
<td>4</td>
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</table>
Evidences - findings

Both case studies highlighted that technology isn't a necessary condition for implementing FA strategies, but an *astounding accelerator* or *amplifier* of FA strategies.

Students had a very positive attitude to using technology.
Evidences

The dynamics within the three dimensional model show:

- the technological property of “sending and sharing” can be observed in four different FA strategies.
- “processing and analysing” data leads teachers to clarify and share their teaching intentions and the criteria for success as well as to activate students as instructional resources for one other.

Finally technology helped teachers to enroll in a complete FA process.
Evidences

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.
Questions

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majella.dempsey@nuim.ie

Toolkit will be available on the FaSME Ed website....soon!