

# FaSMEd in Italy: the use of Connected Classroom Technology to promote Formative Assessment in Mathematics

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## THE ITALIAN CONTEXT

- Mixed ability classes
- Low-achievers identified mainly through the teachers' assessment
- Written national assessment test (Invalsi) in grade 2, 5, 8, and 10

## FASMED TEACHING EXPERIMENTS

The teaching experiments involved **25 classes** (from grade 4 to grade 7) from three different clusters of schools located in the North-West of Italy:

- Istituto Comprensivo di Vinovo (Torino);
- Istituto Comprensivo di Carcare (Savona);
- Circolo Salgari (Torino).

## THEORETICAL TOOLS FOR TASK DESIGN AND ANALYSIS

The two main theoretical tools underlying our design, implementation and analysis are:

- Formative Assessment strategies** (William and Thompson, 2007)
- Functionalities of Technology** introduced within the FaSMEd Project (see <https://microsites.ncl.ac.uk/fasmedtools/theory-for-fa/the-fasmed-framework/>)

Specific **theoretical and methodological assumptions of the Italian team** concern the importance of:

- fostering students' development of ongoing reflections on the teaching-learning processes, so as to **promote metacognition** (Schoenfeld, 1992);
- helping students to **make their thinking visible** (Collins, Brown and Newmann, 1989), in particular by prompting **argumentation processes** on mathematical activities.

## CONNECTED CLASSROOM TECHNOLOGY

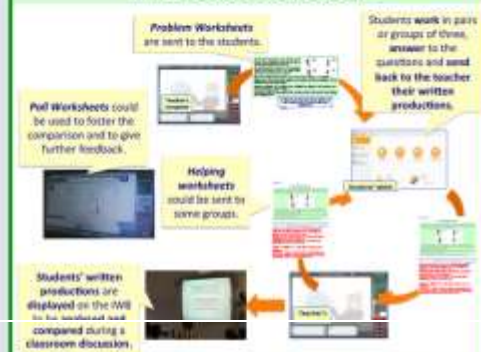
We chose it because it enables to:

- connect** the students' tablets with the teachers' laptop;
- distribute** documents to students and collect documents from the students' tablets
- create** instant polls and immediately show their results to the whole class
- display** the students' written productions through the data projector or the interactive whiteboard.

Each school involved in the project has been provided with **tablets** for the students and **computers** for the teachers, linked to **NVB** or **data projector**.



## TYPICAL LESSON STRUCTURE



(Cusi, Morselli & Sabena, 2016)

## THE DIGITAL WORKSHEETS

- Activities adapted from the **ArAI Project** (Cusi, Malara and Navarra 2011) and the **Mathematics Assessment Program** (<http://map.mathshell.org/materials/lessons.php>).
- Our adaptation consisted in the creation of **sets of digital worksheets**, belonging to **three main categories**:

### PROBLEM WORKSHEETS

worksheets introducing a problem and asking one or more questions

**"The archaeologist Giancarlo"**

On the left margin, in the middle of the sheet, the archaeologist Giancarlo has found some graphs related to the task. He represented the relation in his notebook, writing their heights. This is the page where Giancarlo represented the relation.

Giancarlo's collection consists of a line graph related to the graph. He says: "You can see the height of an object only if you multiply 7 by the number of the time on the axis".

Mathias considers: "It is evident that, dividing the height of the object by 7, you can find the duration of the".

And finally: "What are you saying? The number of days is the result of the division of the height by 7".

**(1) What do you think about Mathias, Matteo and Paolo's statements? Do you agree with them? Explain why.**

### HELPING WORKSHEETS

aimed at supporting students who meet difficulties with the problem worksheets

**"The mathematician Giovanni"**

Matteo's collection consists of some tables, describing the relation between the number of days on the axis of the graph and the height. This is the page where Matteo represented the relation.

**(1) What is the relation between the number of days on the axis of the graph and the height of the object?**

**(2) Represent the relation with a graph. Is it a linear relation or is it a non-linear relation? Justify your answer.**

**(3) What is the relation between the number of days on the axis of the graph and the height of the object? Justify your answer.**

### POLL WORKSHEETS

worksheets prompting a poll between proposed options

Every morning, Tessa goes walking along a straight road from her house to a lake, a distance of 100 meters. The graph shows the distance she covers in one particular day.

**(1) What happens in the period of time between 0 and 1? How do you know it?**

**What is the correct answer?**

**(a) In the period from 0 to 1, Tessa goes to the lake.**

**(b) In the period from 1 to 2, Tessa goes to the lake.**

**(c) In the period from 2 to 3, Tessa goes to the lake.**

**(d) In the period from 3 to 4, Tessa goes to the lake.**

**(e) In the period from 4 to 5, Tessa goes to the lake.**

## THE STUDENTS' PERSPECTIVE

### On the use of poll worksheets:

*I liked doing polls to understand who preferred the idea of somebody or that of somebody else, because it helped me to understand the right or wrong motivations.*

### On the role of helping worksheets:

*The helping worksheets are like saying "since you are struggling with it, or it is wrong, I give you a little help to do it right".*

### On displaying and collectively analysing students' written answers to problem worksheets:

*You hear the opinions of the other students and you understand what was wrong in what you did, and you come back on that point and you learn how to reason.*

## CLASSROOM DISCUSSIONS: THE CORE OF OUR METHODOLOGY



### References:

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