

Chapter 13

The Use of Videos in the Training of Math Teachers: Formative Assessment in Math Teaching and Learning

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ABSTRACT

The purpose of this chapter is to present a systematic observational research on the math teachers' assessment practices in the classroom. This research is a specific phase of an international project (FAMT&L - Comenius Multilateral Project) and it is aimed to promote the use of formative assessment in teaching mathematics to students aged from 11 to 16. The observational study is carried out by a plan of systematic observations of teachers' behaviour in the classroom with the help of video recording. Thanks to a specific tool of video analysis (a structured grid), developed using indications from international literature and experiences of teacher training in the five Partner countries involved (Italy, France, Holland, Switzerland and Cyprus), we managed to gather many different indicators on good and bad practices for the formative assessment of mathematics teachers. Furthermore, the analysed video will be used in in-service teacher training courses in order to promote a correct use of formative assessment and to improve achievements in learning mathematics.

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FRAMEWORK ON FORMATIVE ASSESSMENT IN MATHEMATICS TEACHING AND LEARNING¹

Assessment in classroom has always been a key tool in order to promote, or to hinder, democratic values at school. An education system that does promote quality and equity for the learning achievements of its students, uses assessment as a key element to qualify the action of teaching in a democratic way, both at the beginning and during the process of teaching-learning; moreover it will consider the differences among the students and their possible learning difficulties as opportunities to make the teaching actions flexible in order to reach goals of quality for all (Vertecchi, 1976; Grandi, 1977; Weeden, Winter, & Broadfoot, 2002).

As we can read in Crahay and Issaieva (2013), it has to be a kind of assessment which adheres to a principle of equality of achievements (Bloom, 1968; Black & Wiliam, 1998; Guskey, 2005), hence to an idea of “fairness” in teaching, by offering more to whom possesses less.

This need of fairness in achieving the competences for citizenship (OECD, 2012; 2015; Eurydice, 2012) is more evident in every education system when considering basic competences and at high and junior high school level, before the completion of the compulsory cycle of studies. In particular, relevant problems appear in the field of math teaching, with important gaps in the conduct of the specific teaching-learning processes.

ASSESSING MATHS LEARNING: A DIDACTIC AND A SOCIAL PROBLEM

In Italian school practice, the assessment of Mathematical learning has been and in fact is yet traditionally oriented to a summative function, performed by means of written open tests (only recently the use of multiple choice tests is increasing) and oral-at-the-blackboard interrogations. Hence, it focuses primarily on students’ *products* (results of calculations, presentations of proofs, ...). On the other hand, formative assessment, as it will be detailed below, requires being careful mainly of students’ *processes*. In this sense, we may say that in Italy math teachers have no formative assessment tradition, and in fact there is no systematic presence of it in pre-service training, and it is sporadic also in in-service training.

It must be noted that assessment, in math, has a crucial role in determining students’ beliefs and attitudes, which in turn influence students’ achievements (Di Martino & Zan, 2002; Bolondi & Ferretti, 2015). Therefore recovering a formative dimension for assessment is a strategic goal for maths teacher and it may become a fundamental tool for switching all the didactic focus from the contents (the mathematical objects) to the actors (the students).

Maths activity in the classroom involves many components: discourses, technologies, visual representations; it is performed through explorations, work on specific tasks, explanations. Formative assessment takes place in this complexity of actions. Then it is important to train teachers to observe significant elements of this complexity, and for this purpose video analysis is a natural tool.

As examples of situations that are worthwhile to analyse, we may list:

- Administration of a written task, with discussion about it (the content, the form);
- Administration of a written task, with explanation of the objectives of the activity;
- Administration of a written task with the explicitness of the evaluation criteria;
- Individual interview with the use of tools of observation and interaction;

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