

## Chapter 6

# Laboratory Activities in Primary School Teaching– Learning Sequences (TLS)

### ABSTRACT

*In this chapter some practical activities to do in primary school classes are shown, and these concern classic themes of arithmetic and geometry but also more recent topics in statistics and probability. Naturally, all of them are based on pedagogical-didactic aspects noted in the preceding chapters. In particular, MatCos 3.0 environment is used. A complete TLS, from which the new methodology based on the MatCos programming environment emerges, will be presented. Finally, the simulation software package, DAF, is presented to illustrate the concept and related operations of the fractions.*

*“Scire debet quid petat ille qui sagittam Vult mittere...” ~ (L.A. Seneca- Letter to Lucilio)*

*(The one who wants to see what he desires to send an arrow questioner ought to know...)*

*“Jam vero unum et unum duo. duo et duo quatuor odiosa cantio mihi erat” ~ (s. Agostino-Confessiones- Lib. I Cap. XIII)*

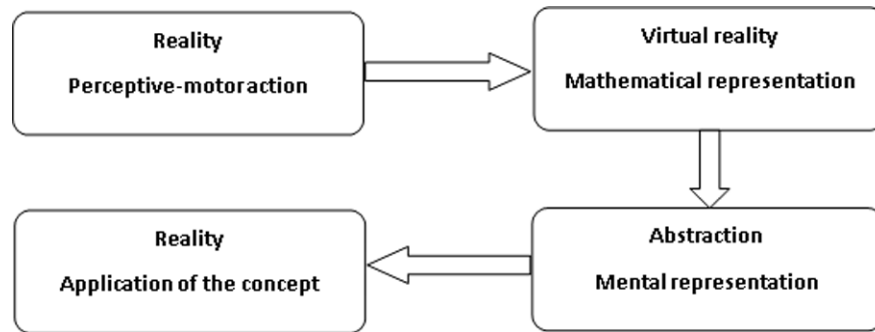
### 1. INTRODUCTION

The purpose of this chapter is to show some ideas about the teaching practice in primary school classrooms, that is the 6-11 year old age group. Naturally, all our considerations are the result of the theories shown in the previous chapters. In primary school the pedagogical-didactic action places the children's experiences in an evolutionary perspective, culturally mediating them within a social and educational

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context, intentionally oriented towards the progressive construction of knowledge and the development of skills. Unlike in the past, the teacher who has to guide this process has to consider new technological tools that she or he must use in the context of precise evolutionary guidelines, to avoid the risk of not fully exploiting their potential, or of developing around them an improvised experimentalism. In primary school, the general didactic intentionality, beyond the acquisition of the basic foundations, is the “*formamentis*”, that is the intellectual formation in all its logical and intuitive, creative and fantastic components. To this end, the use of computers can certainly make a strong contribution, if considered as a tool to explore, verify, conjecture, interact, etc. On the basis of these assumptions, we think that the general didactic methodology should be enclosed in the following diagram (Costabile, Serpe, & Servidio, 2013):

*Figure 1.*



In this chapter we will propose some vertical development paths concerning the main themes within primary teaching, namely arithmetic, geometry, statistics and probability. Naturally the whole takes place from a starting point of the Coding (Miller, 2019) through the MatCos 3.0 software, as shown in the fourth chapter. In this way we pursue a twofold educational objective:

- start programming through mathematical contents suitable for this school age;
- learn mathematics in a more participatory way within a framework of constructivism and problem solving (Goldenberg, 2019).

The teacher obviously does not follow a vertical path of themes during the annual work, but will organize the contents in a harmonious and transversal framework.

## **2. ARITHMETIC**

The natural numbers, the fractions, or the absolute rational numbers, with the relative operations and applications in reality, constitute the first step of mathematical knowledge. Generally, the natural numbers, or rather the “nursery rhyme” of the numbers is acquired by the children in a spontaneous and intuitive way starting from their concrete experience. The situation is different for the concept of fraction, which is difficult for the very young learners, also because the concrete experience is not as easy as for natural numbers. For this reason, the MatCos Project proposes as a support for understanding, or abstraction, a

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