

## Early Years Mathematics: Semiotic and Cultural Mediation

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*There is nothing so practical as a good theory* (K. Lewin)

*There is nothing more theoretically rich than a good practice* (A. Stetsenko)

In my talk I wish to report about a longlife experience as the mathematical advisor in the teacher development program of the Modena municipal pre-primary schools until 2013 and the extension to municipal toddler centres educators from 2013 to today. In each three-years cycle, I have worked with two pedagogists and a group of 30 pre-primary school teachers and 30 toddler centres educators, highlighting the intended continuity in education for kids aged 0-6.

During a long process started in the eighties, we have got the following results:

1. Contribution to the preparation of the national standards (*Orientamenti*) for pre-school mathematics (1991, with periodic update up to the last ones in 2012) exploiting Bishop's idea of *mathematical enculturation* (Bishop, 1988) with the six "universal" activities: counting, locating, measuring, designing, playing, explaining;
2. Elaboration of the *Theory of Semiotic Mediation* (Bartolini Bussi & Mariotti, 2008), to interpret and design activities for pre-school kids, extending the already known development for primary and secondary schools;
3. Collection of a very large set of annotated activities on numbers and space, designed and implemented in the pre-schools with a special focus on the notion of *cultural artefact*.

The elaboration of the theoretical framework is the result of a collective agency, involving *at least* teachers, pedagogists and myself. The collection of good practices was intertwined with the continuous adjustment of the theoretical framework (whence *the above epigraphs*).

The rich documentation is mostly in Italian (e.g. Bartolini Bussi, 2008<sup>1</sup>; for international literature see Bartolini Bussi, 1990; Falcade & Strozzi, 2009; Bartolini Bussi, 2013).

When, in 2013, the program was extended to toddler centres, a problem showed immediately: how was it possible to interpret semiotic mediation for pre-linguistic kids, as Vygotsky is supposed to rely "on narrow linguistic interpretations of verbal meanings as the only mediators of the mind" (Arievitch & Stetsenko, 2014, p. 217). This very paper authored by Arievitch & Stetsenko suggested how to build a comprehensive theoretical framework, by means of which also the design and the observation in toddler centres found sense and were greatly enriched.

In my talk I shall summarize this comprehensive framework and report and analyze some original examples of mathematical enculturation for kids aged 0-6.

### References

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<sup>1</sup> See also the multimedia: <http://memoesperienze.comune.modena.it/bambini/pagine/home.htm>