

RECOVERING A POSITIVE ATTITUDE TOWARD MATHEMATICS IN FUTURE ELEMENTARY TEACHERS

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For the first time, in Italy, future elementary teachers follow university courses, where, however, the mathematical and scientific formation is confined in a few terms. Moreover their mathematics is usually badly structured and felt as extraneous. So, we believe that the crucial task is to help students to recover a sense in doing mathematics, namely, to radically modify their conception of this discipline and to transform their initial hostility into motivation and interest.

History tells us that mathematical notions were invented and gradually sharpened in order to give sense and structure to reality. There is a continuous link among the observation of phenomena in the physical world, their representation in mathematical form, the development of mathematical structures and of scientific language, and again an outcome in the comprehension of real world (Israel, 1996). Moreover the two processes of mathematical abstraction and formalization and of physical modelization appear as different sides of the same coin.

Our teaching activity utilizes this relationship between mathematics and physics, as a powerful didactical resource, both from the cognitive and the motivational points of view. So, the abstraction process comes from two problematic contexts: the first one concerns mathematical “objects”, their properties and behaviours, as for example in (Tall, 1992) and (Arcavi, 1994); the second one starts from everyday experience or simple physical phenomena (Polya, 1954). In both cases special attention is devoted to the development of mathematical language, which expresses and supports the development of scientific knowledge.

This strategy naturally brings to view mathematics as an activity (Freudenthal, 1991), and moreover makes the abstraction process from reality to mathematics resonant with natural cognitive processes (Guidoni, 1985).

A special metacognitive tool is what we call the “logbook”: in this personal diary each student records her/his individual understanding percouse (exercises, achievements, personal comments, etc.). The awareness of the growth in knowledge turns out to be a source of intrinsic satisfaction (Bruner, 1996).

In the communication, we will report some examples of our activity and of the achievements of our students (in our opinion, quite satisfactory).

References

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