Plenary lecture : Promoting an interdisciplinary teaching through the use of elements of Greek and Chinese early cosmologies.

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Most of the curricula, at an international level, encourage an interdisciplinary approach for the teaching of both mathematics and sciences (see for example AAAS 1989, Rocard 2007). In this context, interdisciplinarity is often promoted as a fruitful way of making students aware of the actual links existing between mathematics and sciences. As an example, the third pillar of the French *common base of the knowledge and skills* for primary and lower secondary school claims for "concrete and practical approaches to mathematics and sciences" that should allow students acquire the "scientific culture needed to develop a coherent representation of the world and an understanding of their daily environment" and help them grasp that "complexity can be expressed in fundamental laws" (MEN 2006). Here, mathematics and experimental sciences are considered altogether in a global enhancement project of the scientific culture.

Nevertheless, nothing is easy about effectively integrate mathematics and science in the classroom since the disciplinary isolation of the two disciplines in the traditional teaching organizations has to be overcome (Czerniak & al. 1999). Indeed, in most cases, the separation between science and mathematics is rigorously maintained and the boundaries are rather drawn even in primary school where the teaching is assumed yet by a unique teacher. Moreover, mathematics and science education lack of teaching-learning sequences leaning on interdisciplinary approaches that aims the learning of both mathematical and scientific knowledge and skills (Davison & al. 1995) but when they are performed they tend to show that even young students are able to acquire skills in the domains of mathematics, science, and scientific processes such as measuring, modeling, etc. (Munier & Merle 2009). The lack of teaching resources of that kind may be puzzling if one considers the interrelations between science and mathematics in their historical developments. In this regard, history of science can thus be considered as an inspiring ground for the elaboration of teaching sequences where mathematical and scientific knowledge and skills are integrated.

In this lecture we will present an example of such integration through the use of two distinct historical episodes dealing with Greek and Chinese early cosmologies (de Hosson & Decamp 2013). From these cosmologies a teaching sequence (involving historical elements miked-up with non-historical ones) was elaborated in order to provide students with elementary cosmological knowledge dealing with scientific and mathematical knowledge and skills (quasi-parallelism of Sunrays, shape and size of the Earth, Sun-Earth distance, measuring and computing, etc.). After presenting the results of the actual implementation of the sequence, this lecture will end with the statement of open-questions of two kinds : To what extent the interdisciplinary approach promoted by a teaching sequence based on historical ground modifies the views that students usually have on the nature of the science enterprise? What is the specific gain of the historical approach for the acquisition of the knowledge involved? Is it possible to define conditions of use of the historical material that promote an interdisciplinary mathematics-science approach?

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