

## Improving the Teaching of Experimental Sciences

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This work reports the development of an Educational Research Project, FSE/CED/83453/2008, entitled “Improving the Teaching of Experimental Sciences”. Within this Project 19 University Professors, well acquainted with pre- and in-service teachers’ training, work together with 55 school teachers, teaching Physics and Chemistry, Biology and Geology or Mathematics. The aim of the Project is to develop, within Basic and Secondary School teachers, a guided reflective action attitude as creative practical educational researchers.

The Project started on the 1<sup>st</sup> of September, 2009. A workshop, WS1, on the 19<sup>th</sup> of September, with main subject “A Reflective Teacher as a Researcher”, was attended by every team member. Teachers were given some written notes on how to proceed so that they could develop what was expected from them within this Project. First of all, they had to choose a scientific subject among the ones they were supposed to teach during this curricular year. They were encouraged to form groups, each one with several teachers developing the same scientific subject at different school levels. As a result 15 groups were arranged. Prior to any teaching activity, teachers were asked to analyze critically the curricular Government Orientations and Programs, making notes about the way the chosen subject was supposed to be taught:

- Either along successive teaching levels – for instance, in Physics classes, what should students learn about *forces and movements* on 7<sup>th</sup> grade and how deeply, and what competences should be developed and trained, so that what is then learned can be used on 9<sup>th</sup> grade and later on, for the ones that want to proceed with scientific studies?
- Or within different disciplines of the same school level – at the same time, the students can be attending lessons on Physics, on Mathematics and on Geology. How is *force* dealt with in Geology classes? Shouldn’t teachers try to use the same words with the same meanings?

A second workshop, WS2, took place on the 16<sup>th</sup> of January 2010. Its main subjects were “Interdisciplinarity and Laboratory work”. Every group had 5 minutes to give colleagues an oral summary of what the group had already done. After that, a poster session was organized with places for the 15 groups’ panels, in which teachers should describe their recent teaching experiences within the selected topic.

A third workshop, WS3, is planned for the coming 17<sup>th</sup> of April. Its main subject is “Progressive development of scientific contents along school levels”. The Project groups have already been asked to organize summaries, posters and previous small oral communications evidencing new developments of their activities and presenting pre- and, eventually, pos-tests students’ results. In order to have a reference, the use of control teams was encouraged whenever possible. Some Guided Reflection Helping Documents were already developed by the University team, and sent to the school teachers to be used and commented. These comments will be received prior to the WS3, and will then be discussed, in order to improve future guiding documents.

A final Forum will take place in July, for which the whole science school teaching community will be invited. Final posters, with reflections, comments and conclusions, will be produced by the Project groups.

The three successive workshop presentations, compulsory to every group, force reflection steps on the preparation and development of their teaching actions. Group work was already recognized by teachers to be highly positive for the improvement of teaching activities. The written summaries and the successive poster contents will contribute to the assessment of the different group achievements.