Design and Implementation of an Initial Primary Teachers Training Course through Modelling-Based Inquiry

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Abstract

The success of implementing Inquiry-Based Science Education (IBSE) from school is intended by international reports and projects, due to the advantages for science learning. There are many definitions, but for us "Inquiry teaching" is defined as *"providing a classroom where learners can be engaged in scientific-oriented questions to formulate justified explanations or models based on evidence"*. Other authors emphasize the importance of modeling, because involving learners in developing and investigating explanations and models leads to more sophisticated understanding of key models in science, as well as helping learners understand the nature of disciplinary knowledge. Given the importance of inquiry and modeling in science classrooms (and in science), it is essential that students learn science and about science through modeling-based inquiry.

Science teachers' use of inquiry in the classroom is most strongly associated with previous research experience. Knowing then how potentially powerful these experiences can be, it suggests that teacher education programs should promote some science research experiences in conjunction with methods classes.

Nevertheless pre-service teachers have really persistent conceptions about science and science teaching and learning that can work as barriers for an effective IBSE in their classes, due to these conceptions determine their instruction. Because of that initial training should be focused among other things on a pre-service teachers' conceptions change.

The aim of our work is to improve the pre-service teachers training, with the long term aim of an effective IBSE implementation in Primary school. To do that, we have designed, implemented, and we are evaluating an initial teachers training course, focused on a pre-service teachers' conceptions change, through modeling-based inquiry. In our training proposal pre-service teachers make an explicit reflection based on their school experience and their conceptions on: what is science and how it works, why people need to learn science, how people learn science, and how to teach science, identifying troubles in traditional science teaching, and finding the way to improve it. And also student teachers are actively engaged in a learning process about specific science content, by an IBSE approach, and can use it as methodological model to teach. In this second part of the course, prospective teachers construct descriptive knowledge based on evidences, and secondly, they construct a model to explain this descriptive knowledge, specifically the sun-earth model.