2.2. New training and professional development models

SP - (18594) - TEACHERS´ EDUCATION: NON-FORMAL CONTEXTS NEEDED!

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Short Abstract

Non-formal science educational environments closely mirror daily life – with individuals engaged in learning by and large of their own choosing (Falk & Dierking, 2002). For many primary teachers, non-formal experiences can represent a significant portion of their exposure to science (Bell, Lewenstein, Shouse, & Feder, 2009), an opportunity to confront their own personal ideas with scientific reasoning and a compelling (and sometimes initial) point of engagement with science.

Non-formal science education institutions, such as museums or science centers, are well positioned to provide professional development to teachers, which most of them do (Bevan & Semper, 2006). However, studies are lacking on teacher training programs centered on non-formal contexts (Pinthong & Faikhamta, 2017).

This study focuses on a group of primary teachers, participants of an in-service professional development program in a science center, using Astronomy and Space as a non-formal, interdisciplinary context, involving different subjects of science, technology, engineering and mathematics (STEM). Educational kits were especially produced (Allaire & Kamas, 2020) for this program with support from the European Space Agency.

The purpose of this study is to clarify the influence of this teacher education program on the pedagogical content knowledge (PCK) of teacher participants, considered as the specific knowledge of a teacher (Kind, 2009). The four research questions, referring to this program are, (1) “What is the effect on teachers´ PCK in a curriculum topic teaching?”; (2) “Which PCK aspects do teachers develop and what do they learn about these aspects?”; (3) “What changes in teachers' emotions/attitudes (interest, enthusiasm, motivation) are observed?”; (4) “What are the difficulties faced by teachers throughout the program?”.

Following an interpretive analysis model, the qualitative techniques (Denzin & Lincoln, 2008) of the study favor the observation of participants during sessions and follow-up lessons in the classroom. It includes the analysis of teachers' productions (lesson plans, presentation and individual reflection) and examples of students´ work. In addition, data is being collected through a two-phase questionnaire to detect misconceptions and changes in PCK. We use content analysis (Bardin, 2009), considering the internal crossover and validation.

Ongoing observations have shown positive changes on teachers’ content knowledge, including identification and deconstruction of misconceptions. Improvements in pedagogical knowledge and knowledge of context were also detected. Some teachers referred to improvements in their students' learning and attitudes. In general, teachers showed greater interest, enthusiasm and less constraints toward science and requested follow-up activities (teacher programs to school peers). Most teachers expressed their need for the continuity of this program.

We hope the results of this study will promote more effective teacher education programs and improve teaching practices. We also hope to raise new questions and encourage future studies to the advancement in the field.

We assume that a common understanding and shared vision of relevant science education, claims for synergies across sectors and values all contributions to activate and engage science learners. We envision a framework basis for universities and non-formal institutions co-operating on initial teacher education and being part of a larger learning ecology.

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