

2.2. New training and professional development models

SP - (18696) - CONTRIBUTIONS OF A PROFESSIONAL DEVELOPMENT PROGRAM ON STEM EDUCATION FOR THE PCK OF PHYSICS AND CHEMISTRY TEACHERS

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Short Abstract

Introduction

STEM Education (Science-Technology-Engineering-Mathematics) is an educational approach that has had a growing role in recent decades (Sanders, 2009; Thibaut et al., 2018). The potential of STEM Education is widely described in the literature and is related not only to students' learning and skills development but also to their motivation concerning scientific areas (Chittum et al., 2017; Glynn & Koballa, 2006; Hurley, 2001; Shahali et al., 2017; Toma & Greca, 2018). However, the successful implementation of this approach in the classroom is strongly dependent on the role of teachers and, therefore, constitutes an added challenge for this professional class. Thus, it is essential to provide teachers with resources and tools that allow them to develop their Pedagogical Content Knowledge (PCK), an important type of knowledge for teachers, that results from the intersection of the domains of content knowledge and pedagogy (Shulman, 1986, 1987).

The lack of consensus on a PCK model has resulted in several publications describing PCK in different ways, considering different perspectives. One such model is the Topic Specific PCK (TSPCK) (Mavhunga & Rollnick, 2013) which is based on the premise that the knowledge needed to teach the topics of a subject is different from topic to topic, and which is in line with the latest proposed PCK model, the Refined Consensus Model (RCM) (Carlson & Daehler, 2019).

Research Questions/ Research Goals

The objective of this study is to know the outcomes of a STEM program on the development of the Physics and Chemistry teachers' PCK on the topic "Electrical circuits with components in series and in parallel". The following research questions conducted this study: (1) What evolution occurs in the teachers' personal PCK regarding the issued topic, after being involved in a STEM program? (2) What are the differences between the reported PCK and the enacted PCK?

Methodology

This study follows a qualitative approach with an interpretative orientation. The participants were six middle school Physics and Chemistry teachers, and data collection was carried out through interviews and naturalistic observation. More specifically, specific PCK assessment instruments were used for two different moments of a teacher's practice (planning and implementation): the CoRe (Content Representations) and the PaP-eRs (Pedagogical and Professional Experience Repertoires) (Loughran et al., 2004).

Results

The results are indicative that, for most teachers, there was a development regarding their PCK, in consequence of their involvement in a STEM program, and that the reported PCK differs from the enacted PCK.

Final Considerations

Based on the results obtained, it is possible to conclude that it is important to reflect on training models that support teachers and future teachers to explore how STEM activities can be integrated into their classes, to understand what is behind students' difficulties when involved in STEM activities, and what this implies in the planification of their classes and their implementation.

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