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A Case Study on the Development of Pedagogical Content Knowledge on Electric Force through a Longitudinal Study

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Abstract

A study was conducted to explore physics teachers' development of pedagogical content knowledge (PCK) through a longitudinal study of in-service teacher of Colombian high school. A case study of Maria's development of PCK was presented. Data were obtained using video recordings from 6 classroom observations of the teaching and learning of the following topics/concepts: (1) methods of charging (2) Coulomb's Law, (3) superposition of electric forces (3) electric field, (4) electric potential; pre- and post-lesson plans of electric field and force; initial and final semi-structured interview; pre-and post-CoRe.

The data was analyzed using a constant comparative method. The findings revealed a static PCK whit tendency to traditional model of teaching. The results revealed that, the factors which condition her personal teaching models are her interpretation of the institutional curriculum, the time available to develop the topic, the relationship between physics and mathematics, and consideration of the most effective strategies for teaching physics.

She regarded demonstrations on electric field as necessary to understand the electric force as a contiguous force. But she found that it was difficult to teach, because she cannot demonstrate a phenomenon in a concrete way or illustrate a real-life situation related to the topic. Maria developed more understanding of each component of PCK depending on her prior knowledge and experience.