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Developing pedagogic content knowledge using climate change as a theme to teach Physical Sciences concepts to grade 11 learners a self-study

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ABSTRACT

This self-study is my own personal experience of teaching the topic of climate change to learners doing Physical Sciences in Grade 11 as I look at the shifts and portrayal of my Content Knowledge and Pedagogical Content Knowledge at Sandtonview secondary school. Climate change is one of the most critical socio-scientific issues in the global community as it impacts the continuity of species. It has been observed that the effects of climate change have become more severe in the last decades. In South Africa, studies have called for scientific climate change education. However, teachers' specialized knowledge for teaching socio-scientific themes is under researched and difficult for teachers to portray in their practice. This study focuses on my personal learning journey, as a teacher studying how I develop, portray and observe shifts in my own Content Knowledge and Pedagogical Content Knowledge. I undertook a self-study methodology to explore my teaching of climate change as a context when teaching Grade 11 Physical Sciences. To induce trustworthiness in my study, all my activities are opened to a collaborative team of critical peers that constitute my colleagues and supervisor. In this study, PCK is my conceptual framework and the Learning for Teaching through Participation model the framework for studying the learning environments and an analytical tool to capture and portray my shifting knowledge in my planning and teaching of climate change. Climate change is not a topic in the current curriculum, the ploy used was teaching it as a theme in teaching the relevant chemistry topics at Grade 11. In this way exploration of its place in the current Physical science curriculum is possible. As an outcome of my study I was able to capture, portray and obsrve shifts in my CK and PCK by framing and reframing my thinking and executions in the classroom. The self-study is qualitative research with nominal quantitative calculations that made use of two-staged prior and post concept mapping and CoRes, entries into a reflective journal and teaching artefacts. Drawing from socio-cultural and cognitive perspectives, the LTtP model in conjunction with PCK, offered pre-determined categories to portray my PCK of climate change. I found that my Content and Pedagogical Content Knowledge for teaching climate change had shifted during the course of the self-study. I was more conscious of my Content and Pedagogical Knowledge as my misconceptions on teaching this topic had been exposed and confronted to develop my professional knowledge for climate change pedagogy in terms of my classroom practice. The implications of this study is that teachers may create stories of teaching to grow their own specialized content knowledge for teaching and for other practitioners that may be a source of teachers' PCK in specific teaching contexts.