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PRESERVICE SCIENCE TEACHERS EDUCATION AROUND THE GLOBE

Trends, Challenges, and Future Directions

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Introduction

In recent years, there have been multiple efforts made to summarize, describe, and analyze initial teacher training in general (e.g., Conway et al., 2009; Valenčič & Vogrinc, 2011; Bauer & Prenzel, 2012; Flores, 2017 [and eight other articles in the special issue of *European Journal of Teacher Education*, Volume 40, Issue 3]), and preservice science teacher education (PSTE) in particular (e.g., Abell, 2000; Lederman & Lederman, 2015 [and six other articles in the special issue of *Journal of Science Teacher Education*, Volume 26, Issue 1]; Pedersen et al., 2017), around the globe. Although these analyses and comparisons have led to proposals of different qualities that science teacher training programs and their graduates should have, such as a strong understanding of the content and the nature of science (NOS), a developed pedagogical content knowledge (PCK), or a research-based pedagogy to face current student diversity (e.g., Darling-Hammond et al., 2005; Olson et al., 2015), it is impossible to identify the single best way to educate future science teachers (Lederman & Lederman, 2015).

On the other hand, in the context of new curriculum standards for science education, namely, the Next Generation Science Standards (NGSS) in the USA, Windschitl and Stroupe (2017) have indicated that teacher educators should consider modifying the practical experiences of preservice science teachers to be based on the principles of research in science education and focused on the achievement of learning by school students. However, several different national and international reports and comparative research studies have shown that significant transformations in initial teacher education in various countries are always connected to changing approaches to teacher professionalism in accordance with new government policies, which usually go beyond the traditional boundaries of the subject matter or science education research and are usually more related to the economic, cultural, or political context (Menter et al., 2017; Pedersen et al., 2017). This finding may explain the gap that still exists between the relevance that science education research assigns to the development of PCK in teacher training (e.g., Loughran et al., 2008) and the coverage that this type of knowledge has in science teacher training programs (e.g., Pedersen et al., 2017; McComas et al., 2018). This mismatch between research and policy in science teacher education could also explain one of the longstanding worldwide deficits in teacher training, i.e., the effective implementation of a curriculum that links theory and practice (e.g., Cofré et al., 2015; Flores, 2016).