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The Impact of a PCK-based Professional Development Program on Science Teachers' Ability to Teaching STEM

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Abstract

Purpose - This study aimed to investigate the impact of a pedagogical content knowledge (PCK) based STEM professional development programme on the perceptions of teachers regarding STEM education and the implementation of STEM activities.

Method - The study incorporated a mixed-method approach that involved a pre- and post-survey, classroom observations, teachers' reflective journals and their lesson plans.

Findings - The results show that the professional development programme had a significantly positive effect on science teachers' attitudes towards STEM education on their knowledge and application of it. The outcome also indicated that the science teachers had a well-developed understanding of the essential nature of engineering and science. Engaging with the PCK-based STEM professional development programme helped the teachers to diagnose and improve their own STEM teaching ability. From engaging in hands-on activity, the teachers learned more about the nature of STEM. They participated in a cycle of designing and implementing their own STEM lessons and engaged with the reflections of their facilitators and peers on their STEM teaching.

Significance - This study provides policy makers, teacher educators and curriculum developers with information about enhancing science teachers' expertise in the teaching of STEM.

Keywords: STEM education, Pedagogical content knowledge, Professional development