

## **Indigenous Knowledge and Nature of Science Interface: Content Considerations for Science, Technology, Engineering, and Mathematics Education**

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**Abstract :** Many African countries, such as Zimbabwe and South Africa, have curricula reform agendas that include incorporation of Indigenous Knowledge and Nature of Science (NOS) into school Science, Technology, Engineering and Mathematics (STEM) education. It is argued that at high school level, STEM learning, which incorporates understandings of indigenization science and NOS, has the potential to provide a strong foundation for a culturally embedded scientific knowledge essential for their advancement in Science and Technology. Globally, investment in STEM education is recognized as essential for economic development. For this reason, developing countries such as Zimbabwe and South Africa have been investing into training specialized teachers in natural sciences and technology. However, in many cases this training has been detached from the cultural realities and contexts of indigenous learners. For this reason, the STEM curricula reform has provided implementation challenges to teachers. An issue of major concern is the teachers' pedagogical content knowledge (PCK), which is essential for effective implementation of these STEM curricula. Well-developed Teacher PCK include an understanding of both the nature of indigenous knowledge (NOIK) and of NOS. This paper reports the results of a study that investigated the development of 3 South African and 3 Zimbabwean in-service teachers' abilities to integrate NOS and NOIK as part of their PCK. A participatory action research design was utilized. The main focus was on capturing, determining and developing teachers STEM knowledge for integrating NOIK and NOS in science classrooms. Their use of indigenous games was used to determine how their subject knowledge for STEM and pedagogical abilities could be developed. Qualitative data were gathered through the use dialogues between the researchers and the in-service teachers, as well as interviewing the participating teachers. Analysis of the data provides a methodological window through which in-service teachers' PCK can be STEMITIZED and their abilities to integrate NOS and NOIK developed. Implications are raised for developing teachers' STEM education in universities and teacher training colleges.

**Keywords :** indigenous knowledge, nature of science, pedagogical content knowledge, STEM education

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