ABSTRACT

Literature shows that teacher education programmes aim to equip teachers with not only strong content knowledge but also the capability to reason soundly about teaching (Shulman, 1987). This sound reasoning requires both a process of thinking about how the teaching will be enacted as well as a sufficient body of content knowledge and experience to draw from (Shulman, 1987). Pre-service teachers in their fourth year of study may not have a wealth of experience to draw from as part of their pedagogical reasoning but they have been sufficiently exposed to instruction that has equipped them with the ability to reason soundly about their teaching. A large part of this instruction has involved use of the Topic Specific Pedagogical Content Knowledge framework. The topic specific nature of PCK has been attested to in many empirical studies (Loughran, Berry, & Mulhall, 2004). This framework has been used as a tool to help pre-service teachers transform knowledge of specific topics, particularly in maths and physical science into instruction.

This research is a case study that followed three PSTs as they planned and enacted three different Life Sciences topics over a period of three lessons, respectively. The study aimed to contribute to a larger study by investigating the extent to which and ways in which pre-service teachers, in their final year of study, made use of the TSPCK framework in the planning and teaching of Life Sciences lessons. More specifically, the study looked at how PSTs were reasoning about the transformation of specific topics in the subject whilst using the TSPCK framework as the basis for their reasoning. Methods of data collection included lesson plan documents, video and audio taped lesson observations and semi-structured video (and audio) stimulated recall (VSR) interviews. The necessity of the three data collection methods was not only for triangulation and validity purposes but also to bring out the elusive nature of both pedagogical reasoning and planned and enacted TSPCK.

Findings indicate that indeed, PSTs use the TSPCK framework as the basis for their pedagogical reasoning and action however, between both planned and enacted lessons, the TSPCK components that manifested the most are learner prior knowledge, representations and conceptual teaching strategies. It was further shown that pre-service teachers lacked knowledge of some aspects of TSPCK components. That being said, instruction in teacher education

programmes that develops pre-service teachers' capabilities to plan and enact richly in their teaching of science topics remains a challenge (Mavhunga, 2014). It is hoped that this study brings out the effectiveness of the Life Sciences teacher training programme at a South African university, particularly by shedding light on the effectiveness of the TSPCK framework as a content knowledge transformation tool for Life Science teachers as well as its usefulness once teachers are out in the field. Recommendations for this study include a call to develop pedagogical transformation competence in PSTs as opposed to waiting for this competence to be gained with experience.