ABSTRACT

Exploring a bridge-building strategy of comparing traditional practices and beliefs and conventional science at the lower secondary level

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This dissertation describes an action research exploration into the traditional practices and beliefs on health-related matters of a group of Form One lower secondary science students who attended an urban secondary school (Parkview Secondary) and the process of using this knowledge to design and enact a science curriculum unit with From Two students firstly at Parkview Secondary and then at Seablast Secondary. Grounded theory methodology (Strauss & Corbin, 1990) was used to determine the principles underpinning the Parkview students' traditional practices and beliefs, which then formed the basis for the development of a cross-cultural science curriculum unit of work. The process of transforming the traditional principles into a unit of work was guided extensively by George's (1986) generalized categorization scheme for thinking about the relationship between traditional knowledge and conventional science concepts and the contextualized lesson format (Lubben, Campbell & Dlamini,1995). The purpose of using students' prior knowledge was, firstly, to enhance the relevance of the science that is taught in schools. Secondly, the approach was intended to help students to access the conventional science concepts by helping them to cross borders between their everyday worlds and the world of conventional science as they built bridges between their prior knowledge and conventional science concepts. By engaging in action research cycles of plan, act and observe, reflect, I also sought answers to the question: "How do I improve my work?"

The results of the grounded theory analysis of questionnaire data from the 36 Form One students whom I taught at Parkview and of interview data from ten selected students and their parents showed that students were knowledgeable about, and exposed to, traditional practices and beliefs about health. These practices and beliefs were found to be underpinned by an interpretive framework that is similar to that described by George (1995) who had investigated the traditional practices and beliefs of persons who resided in the rural village termed "Seablast." As George (1995) had found, many of the traditional practices and beliefs were premised on different principles from those of conventional science, and these differences emerged as a significant issue as I designed and implemented the unit of work. Grounded theory analysis of the data from the enactment at Parkview (classroom interactions, students' work and my reflections) gave some initial conceptual categories of an emerging substantive theory about bridge-building. Included in these categories were students' interest, students' higher-order thinking and students' access to conventional science evidenced as collateral learning (Jegede, 1995). The analysis of the Parkview data revealed that my actions did not always match my plans/intentions and that there were outcomes, particularly in the areas of assessment and with respect to the technical requirements of the bridge-building strategy that I had not anticipated. Teacher efficacy issues

also emerged as a significant factor during the enactment at Parkview. Based on the lessons learnt, another action research cycle was enacted with Form Two students at Seablast Secondary. The enactment of the unit at Seablast Secondary allowed for the lessons learnt to inform my approach there, and for theoretical sampling of the conceptual categories (Glaser & Strauss, 1967) that emerged at Parkview.

The substantive theory about experiencing an innovation of bridge-building emerged from the enactments, and it identifies from my perspective, the issues involved when I attempted to change the operating procedures in the classroom. The insights into my behaviour and my subsequent growth and development were facilitated by the action research process, and these lessons point to the role of action research as a model for the professional development of science teachers. From the results of this study, there are many other implications for science education and for future science education research. The results of this study lend support to the call made by George (1995) that science teacher education programmes should be designed to sensitize teachers to the cross-cultural approach to science teaching. Additionally, these programmes should facilitate student teachers' involvement in collaborative bridge-building and encourage them to engage in action research into this approach to science teaching and science learning.

(Key words: cross-cultural science curricula, border-crossing, bridge-building)