EXAMINING THE DEVELOPMENT OF TEACHER ENVIRONMENTAL PEDAGOGICAL CONTENT KNOWLEDGE

Susan Brundrit's Masters research focused on teacher learning during a Fundisa for Change course. She was interested in exploring how the development of environmental pedagogical content knowledge was supported and constructed during a Fundisa for Change course.

Seventeen Natural Sciences teachers participated in her study; with questionnaires, reflections and observations of the Fundisa for Change Teaching Life & Living course contributing to the descriptions of the emergent pedagogical content knowledge.

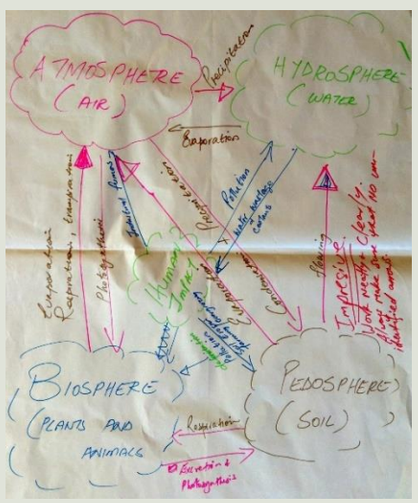
To frame the research, Susan used Borko's (2004) model of the elements of a teacher professional development system: the course; the teachers; the facilitators; and the context. In examining the development of teacher pedagogical content knowledge within the system, attention was paid to factors such as teacher beliefs, prior knowledge and context that could have filtering or amplifying effects. Pedagogical content knowledge was examined in terms of five components relating to teacher professional knowledge bases:

TEACHER PEDAGOGICAL CONTENT KNOWLEDGE COMPONENTS				
Assessment knowledge	**Pedagogical knowledge**	**Content knowledge**	**Knowledge of learners**	**Curricular knowledge**

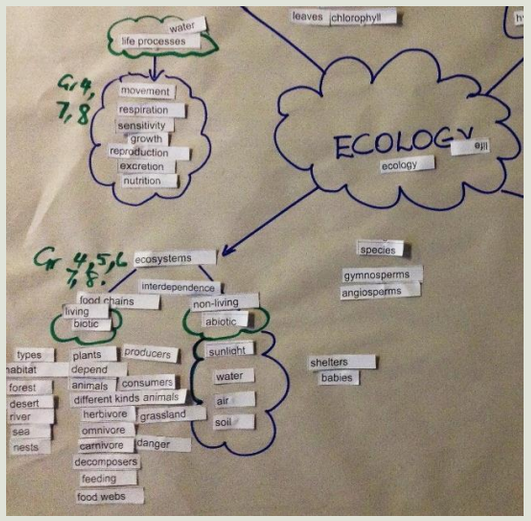
The interactions between PCK, topic-specific professional knowledge and teacher professional knowledge bases, mediated by amplifiers and filters, is described in the Summit Consensus Model of teacher professional knowledge and skill (Gess-Newsome, 2015). This model, used in the research to understand the development of PCK, states that "Personal PCK is the knowledge of, reasoning behind, and planning for teaching a particular topic in a particular way for a particular purpose to particular students for enhanced student outcomes" (Gess-Newsome, 2015, p. 36).

Findings were that during the course, teacher PCK was developed at a general, subject and topic-specific level, predominantly through the co-construction of knowledge by teachers through the collaborative discussions within groups.

Environmental content knowledge developed through the course included biodiversity centering on the inter-connectedness of species within an ecosystem and the importance of keystone species in understanding the ability of ecosystems to be resilient, core environmental concepts and exploring the water cycle as a system. Changing the representation of the water cycle from one form to another appeared to result in a deepening of teachers' understanding.



Pedagogical knowledge developed included the strategies of creating a climate of purposeful listening, supporting language and vocabulary development and using content representations to scaffold conceptual development. Teachers acknowledged that although they understood that different teaching methods could achieve different learning goals and motivate learners, they did not generally use a variety of pedagogical strategies in their teaching, citing reasons such as the assessment focus of the curriculum, large class size, limited time allocated to topics and lack of resources.



Assessment knowledge appeared to be developed in the areas of the formative assessment, understanding the differing purposes of formative and summative assessment and in establishing the cognitive levels of the environmental learning in CAPS. Time pressure due to the time allocations to topics in CAPS, was seen by teachers as a filter to the use of these aspects of assessment knowledge in their classroom practice. For some topics, teachers saw time spent developing understanding of terminology as causing pressure on content coverage. This in turn acted as a filter to the use of teaching strategies such as discussion and practical work.

The course provided opportunities for teachers to think explicitly and share experiences of how they adapt their teaching based on their **knowledge of learners**.

Curricular knowledge developed during the course included opportunities for teachers to learn about progression of concepts across grades as well as within topics. Teachers reported that learning about the links between, and progression of, environmental concepts also enabled them to have a clearer understanding of what prior knowledge learners should have and enabled them to better assess the level of learners' understanding.

We hope that teachers will continue to attend Fundisa for Change teacher professional development courses which aims to develop all aspects of pedagogical content knowledge. The course supports collaborative engagement with the new environmental and sustainability topics/concepts in the CAPS and helps teachers explore effective ways of teaching and assessing these within local contexts.

REFERENCES

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