

KNOWLEDGE, BELIEFS AND SAYINGS ABOUT BIODIVERSITY AND BIODIVERSITY TEACHING AMONGST NATURAL SCIENCE TEACHERS

This qualitative research project was conducted in 2014 with three Grade 7 Natural Science teachers. The researcher, Dorelle Isaacs, was interested in how teachers were responding to the topic of biodiversity as a body of 'new knowledge' in the school curriculum. More specifically, she investigated three Natural Science teachers' knowledge of biodiversity, what they believed and valued about biodiversity, and why they taught biodiversity in the way that they did.

In the Grade 7 Natural Science CAPS, the topic of biodiversity is allocated 3½ weeks of teaching in Term 1. Against the backdrop of global and national biodiversity loss, and the relatively recent inclusion of biodiversity in the Grade 7 Natural Science curriculum, Dorelle identified that not much is known about how teachers are engaging with the topic of biodiversity. Through her case study, she sought to stimulate further discussion and research around the teaching of biodiversity in the Fundisa for Change programme.

The study drew on a range of theories. Each theory provided concepts and descriptive tools to illuminate different aspects of the data (see Figure 1). For example, Shulman's (1987) work on teacher cognition, especially teacher knowledge, was helpful to analyse the teachers' biodiversity knowledge. As the study focused specifically on biodiversity, Dorelle needed more specific literature on the discourses and metaphors that people often use when talking about biodiversity. The teachers' narratives also revealed their values and ethics and so Dorelle used a framework developed by Kronlid and Öhman (2012) to analyse different environmental ethics.

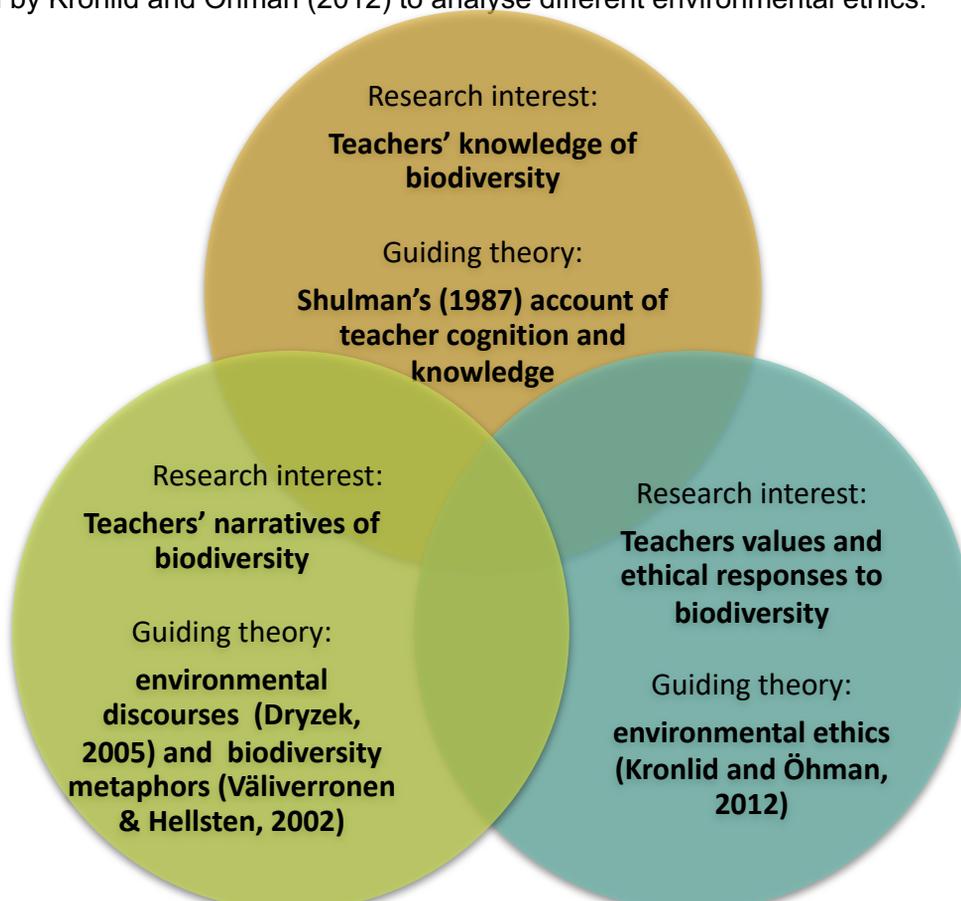


Figure 1. Schematic of different theories used in the study to guide analysis of different aspects of the data – all centred around the research question (RQ).

For this qualitative case study, Dorelle generated data using three research methods:

- classroom observations (one per teacher, when teaching biodiversity),
- semi-structured interviews (with teachers and one Department of Education official)
- document analysis (CAPS Natural Science Gr 7 policy documents and relevant sections from the Natural Science textbooks used by the teachers)

She then analysed the data using five categories derived from the literature.

PLANTS	ANIMALS
Plants do not move	Animals move
Plants have roots and absorb water from the soil.	Gets water by drinking it
Can make their own food by a process called photosynthesis	Get food by eating plants and other animals
Reproduce by producing seeds	Reproduce by giving birth

Example of a teacher's focus on basic knowledge about differences between plants and animals when teaching biodiversity

The teachers' biodiversity knowledge was rudimentary and mostly limited to what they accessed in the curriculum document and textbooks. They had all learned about the concept of 'biodiversity' for the first time at the CAPS training.

The teachers' reliance on the textbooks seemed to limit the depth, scope and criticality of their biodiversity teaching. They focused almost exclusively on teaching vocabulary, definitions of the basic biodiversity concepts, and classification of plants and animals. Yet the teachers were just doing what the curriculum demanded of them. The CAPS for Natural Science emphasises process skills of sorting, grouping and drawing; the textbooks align closely with this policy and thus also focus only on the development of the process skills. This is contrary to international perspectives on teaching biodiversity which emphasise the importance of an integrated approach to the relationships of plants, animals and people, and to pedagogies that stimulate learners to ask questions, deliberate, find solutions to problems, and examine cause and effect.

The study recommends that:

- The Natural Science CAPS as well as textbooks should reflect a more systemic approach to biodiversity knowledge, recognising the interrelations and interdependence of the ecological systems that make up biodiversity – including relationships with humans.
- Natural Science teachers should be supported in broadening their understanding of biodiversity and biodiversity loss.
- Teachers should also be encouraged and supported to develop or adapt textbook material where necessary and develop learner activities that will encourage active, critical engagement.
- Learners and teachers may benefit from getting involved in citizen science projects that contribute to generating biodiversity knowledge.

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