

# **Becoming a science teacher: Narratives and conceptions**

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## **Abstract**

This research project explored the classroom practices, and the conceptions and identities which informed those practices, of early career physical science teachers who qualified through the four year initial teacher preparation programme in which I was involved. Taking the view that education is a complex system, where both the agency of the individual and her past and present contexts affect learning, implies that individual histories fundamentally affect the way student teachers make sense of and appropriate their initial training. Moreover what counts as good science teaching is contested and context dependent. I spent two days in the classrooms of eight of my past students, writing narratives of their lessons, and talking to them about their lessons and about what they saw as having influenced their practice. Narrative inquiry was used to explore the teachers' identities and phenomenography to explore their conceptions of teaching. The threat of classroom reactivity was addressed by reducing it and by accounting for it by asking teachers afterwards what they thought the effect of the observer had been. The threat of researcher subjectivity was addressed by rich data, teacher and peer feedback, the use of established methods of analysis, and transparency.

A grounded analysis revealed that the activities in the lessons could be classified according to the teachers' underlying purpose (the introduction of new subject matter content, the application of that content, feedback on learners' work, or revision of work done previously) and the mode of engagement (exposition, question and answer, or conversation). Some teachers had strong preferences for particular modes of engagement while others worked with a wider repertoire. For lessons where the purpose of the lesson was the introduction of new physics or chemistry content, the 'content object' (the propositional and procedural science knowledge and the transformation thereof) was identified and assessed using a rubric with three dimensions (the accuracy of the content, the appropriateness of the content and the transformation of that content to make it accessible to learners) which was developed in working with the data. The best lessons were those where good transformation of mostly accurate content took place. The study shows how learners contribute significantly to the quality of the subject matter content of a lesson by their questions, answers and silences. A

conversation mode of engagement is useful for promoting learner contributions. The sample became teachers for a variety of reasons, and their professional identities reflect diverse influences, many of which are outside their initial teacher education. However for three of the teachers in this study, their teacher education programme was a defining experience, core to their current identities as teachers. Thus an initial teacher education programme can have a major influence on teachers, particularly teachers who know their own school experiences of science teaching to be deficient. Small inputs in teacher education may lever up large but unpredictable ‘butterfly’ effects. Despite the challenges involved, it seems there are still young people who want to become teachers, but bursaries are key to making this a reality. A mentoring programme may support teachers in township schools in their vision of making a difference. A phenomenographic analysis revealed four conceptions of teaching science, with two dimensions: whether the science knowledge to be taught is seen as problematic or not, and the nature of the mediation of that knowledge, either by transferring the knowledge from the teacher to the learners or by creating space for learners to acquire the knowledge. Since the subject matter content of a lesson is key to the overall success of a lesson, conceptions of teaching which recognise that subject matter knowledge can be problematic may be more powerful. The results of this study speak back to the vision of teacher educators about the kinds of teachers they want to produce.