Analysing narratives of doctoral studies in science education

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Relevance: A doctorate in education can be the next step for teachers and other practitioners completing a Masters. Such doctoral students have to alter their practitioner focus, interpreting events differently whilst engaging in a new set of literature and ideas. For science educators in particular, the theories and methodological approaches of the social sciences can be unfamiliar. Our experience and the literature suggest that writing reflectively about the research journey is not only beneficial to students but can also help to identify specific challenges and how they are overcome, with important message for doctoral students and supervisors in different countries.

Focus: The enquiry is an analysis of reflective accounts written by twelve science doctoral students studying in three countries (England, Sweden and Germany). Each student was asked to reflect on their initial interest as a practitioner, how they got into research, independently or through a project/research team, how they engaged with theory and designed a research strategy; to show how experiences influenced their thinking and choices, make decisions and evaluate their success, also, to identify challenges and how these were overcome. Of analytical interest was how relevant the structure of thesis (publication or monograph) was to the students' learning journeys.

Research: Analysis of the reflective accounts focused on the basis for research design, including decision points, influences and challenges. The twelve studies fell into three categories: i) traditional pathways in research-based design, where a theoretical framework was used to carry out an empirical study; ii) design-based research using theoretical frameworks to design practice which was then investigated; iii) design-based research using practitioner frameworks, the study being undertaken prior to determining theoretical frameworks for analysis. Students from England and Sweden fell into all three categories, Germany the first two. Thesis structure was less vital than individual practitioner interests and methodological choices.

Significance: Students adopt a range of methodological approaches, quantitative and qualitative, whether the focus is learning in science disciplines, motivation or informal learning. There are common challenges and influences. The reflective process is found to be beneficial for the students. The analysis informs supervisors how to conceptualise students' engagement in research, as individual students shape their ideas from reading, working with others, and designing their research. The dilemmas faced by research students in contributing 'new' knowledge is often challenging for students researching issues arising from their own contexts. The study provides messages about the challenges facing science educators becoming researchers.