AN EXPLORATION OF SCIENCE LECTURERS' VIEWS ON QUALITY TEACHING IN SCIENCE AT UNIVERSITY

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ABSTRACT

Undergraduate university students learn science in ways that are different to those used in professional science laboratories and do not prepare them for their work as practising scientists. This study aimed to explore lecturers' views on quality teaching and learning in science and what influenced their views and practice.

I developed a theoretical framework of sensitising lenses based on quality as a complex system and wicked problem, to explore science lecturers' views on quality teaching and learning in undergraduate science. This framework, together with key ideas from complexity thinking, guided all aspects of the research. The research design was a multistage mixed methods approach consisting of a dissensus Delphi study followed by a large-scale survey and semi-structured interviews.

The problem definition, openness and social complexity lenses identified characteristics that science lecturers associated with quality teaching and learning in undergraduate science. Quantitative data revealed views with varying extents of consensus on these characteristics. Based on these views I proposed a transformative framework for understanding quality teaching and learning in undergraduate science in which generic principles of good teaching are embedded in ways of thinking and practising in science, social relationships are promoted, and variable cultural and sub-discipline factors are included according to the specific context. From this, quality could be viewed as a complex system (rather than a wicked problem) and conditions for its emergence proposed.

The non-linearity and multiple-causality lenses identified influences affecting lecturers' quality teaching. These showed the main driver of lecturers' changing their teaching was reflective practice, with student feedback the main contributor to this. However, findings from quantitative data showed many characteristics associated with quality teaching were implemented less often than expected, suggesting reflective practice was underutilised. I suggest the potential gap between reflective practice and action is teacher agency. With the aid of the problem resolution lens, I propose a conceptual framework for quality teaching in undergraduate science that has the potential for the

emergence of quality from a complex system, and recommend actions for lecturers, educational development and institutions to help achieve this potential.

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