The Indicators of Becoming an Effective Science Teacher: Inquiract and SCEPSATI

Allan Blake & Jim McNally, University of Strathclyde.

In order to establish those practices which underpin a science teaching performance that combines pupil enthusiasm and creative classrooms, it will be necessary to uncover evidence of inquiry-based learning experiences in science, both in and beyond the classroom, that can provide a warrant for theory and practice that will assist new science teachers in becoming effective. In response to earlier small-scale research (McNally et al 1994; 1997) which found that beginning teaching was an affective transition in which relationships with colleagues and pupils were crucial, *inquiract* is designed to find out more about the actual interactions between beginning science teachers and significant others. The instrument will take the form of a graphic flowchart onto which new teachers will be able to map their inquiry-based science teaching interactions during their initial months of teaching (Gray et al. 2005). Because existing instruments for social network analysis are often based on generic items that fail to capture the specificity, for example, of a science lesson, the foundation for *inquiract*'s quantitative measurement of performance will mainly derive from the important dimensions of our existing qualitative theoretical base (e.g. McNally 2006; McNally & Blake 2008). Although the instrument has yet to be tested in practice, it should be emphasised that its measurements will reflect questions to which credible answers could be expected from busy new teachers (rather than empirically-derived or literature-based dimensions); for example, if the question asks what factors inhibit inquiry-based science teaching practices, the possible responses may be: 'not knowing where things are … being in an unfamiliar situation … knowing less than the pupils about something … not knowing the curriculum as a whole … no previous experience of investigating' (McNally 2006: 432).

As part of this measurement process, we will also measure the science classroom environment on the basis that recent studies have identified the important contribution of pupil voice to professional development in teaching. For example, research on embedding pupil voice in the life of the school (Ruddock 2005); the use of pupils' ideas in teachers' practice (McIntyre et al. 2005); teacher perspectives on pupil voice (Bragg 2007); and evidence of the willingness of new teachers to use pupil opinion to effect self-evaluation (McNally et al. 2008). The Science Classroom Environment Pupil Satisfaction and Achievement Instrument, or SCEPSATI (Gray et al, 2006) will enhance the achievement of new science teachers as learners by providing an innovative, self-administrable instrument for measuring pupil opinion that takes into account the 'educational quality of [science] classroom processes in contexts of meaningful action' (Elliot 2001: 572).

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