Science education practitioners'

views of research and its influence on their practice

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To whom do you turn when you want to improve your teaching practice? Your colleagues? Targeted in-service support? Articles in books and journals? If colleagues are your first choice, you are not alone. As part of a major research project (Millar, Leach, Osborne & Ratcliffe, 2006), we found, perhaps unsurprisingly, that colleagues are a major source of advice for both primary and secondary teachers. But – to what extent is teachers' practice influenced by research evidence? This was a particular question within an interview and focus groups study carried out as part of the 'Evidence-based Practice in Science Education' (EPSE) Network (Millar et al, 2006). We were motivated to explore perceptions of the nature and use of educational research by an ongoing debate about the claim that evidence should play a more significant role in the professional practice of teachers and others involved in shaping educational policy and practice.

The study had particular aims:

- to obtain a better understanding of the extent to which science teachers, and others professionally engaged in science education, recognise and make use of educational research in the course of their normal practice; and
- to explore the factors that promote and inhibit the impact on practice of research into science teaching and learning.

To realise these aims, we used a combination of interviews and focus groups. Sixty-two interviews were carried out with primary and secondary science teachers (including twenty-one with experience of research) and 'others engaged in science education' (policy makers, pre-service and in-service teacher trainers, textbook authors and examiners). In these interviews, we sought to elicit views on the nature of research in science education, the influence of research on current practice, and the potential contribution of research to improving and evaluating practice. Additionally, we held a set of six focus group discussions (three primary, three secondary), which explored the extent to which teachers saw findings from science education research as convincing of the need to change practice, and clarified the issues that teachers thought might be addressed by research. Four centres were involved in data collection and analysis – the Universities of York, Leeds and Southampton, and King's College London. All interviews and focus groups were transcribed and analysed, using a grounded-theory approach, from which four major themes emerged: *Perceptions of educational research; Influences of educational research; Sources of research knowledge; and Development and evaluation of professional practice.*

"Participants acknowledged the key role of ASE in developing awareness of research and in disseminating research findings."

Perceptions of educational research

In discussing influences of research on practice, it was important to establish what participants understood by educational research and whether there were common perceptions of the nature of educational research. We achieved this by using a card sort in the interview – giving participants short cameos of activities that may or may not be classified as research. For example:

- A researcher is testing a new 'Thinking Skills' course. The course is being taught to several classes. The children's performance in a test of thinking skills is being compared to that of several control classes that are similar to the others, but which have not been taught the course.
- A group of Ofsted inspectors are observing teaching and documentation in a school, and writing an inspection report.

We were not so much interested in which of these, if any, was classified as research, but rather in the reasons behind interviewees' categorisation. From the interviews, there appeared no single, or even dominant, view of the criteria that made an activity 'research' in science education. About a third of the interviewees saw both a clear purpose and a systematic approach as defining characteristics of research, but the majority focused on just one of these criteria. Having repeated this card sort with many groups of teachers since, I have found similar results each time. Generally, there is not a consensus view among science teachers of what constitutes educational research, although there is a strong tendency towards seeing controlled experiments as 'good' research. The extent to which research was likely to trigger a change in practice was followed through in the focus groups. Research was seen as convincing if it appeared generalisable to different contexts and came from studies with clear methods. However, even the most rigorous research is not likely to lead to a change in practice unless it is in tune with teachers' expectations. Teachers' comments strongly suggested that a research finding would only stimulate a change in practice if it also resonated with their own experiences.

Influences of educational research

Despite a lack of consensus on the nature of educational research, the vast majority of participants saw research as beneficial and influential on practice, though only a few felt it was a major