Getting Practical

EFFECTIVE PRACTICAL WORK IN PRIMARY SCIENCE: THE ROLE OF EMPATHY

Ian Abrahams and Michael Reiss share

the interim report of the Getting Practical evaluation of practical work in primary schools

'Getting Practical – Improving practical work in science' is a government-funded programme intended to improve the effectiveness and affective value of practical work in school science in England. In order to evaluate the effectiveness of the programme in terms of achieving its aims, ten primary and twenty secondary schools have been selected as case studies to visit before and after the Getting Practical training.

Most teachers of science see practical work as an essential feature of their everyday teaching, believing that pupils learn better from doing than simply being told. Yet learning about scientific ideas, as Millar (2004) suggests, '*is not discovery or construction of something new and unknown; rather it is making what others already know your own*' (p. 6). Thus, the role of practical work is to help pupils develop a link between 'observables' and 'ideas' (Figure 1).

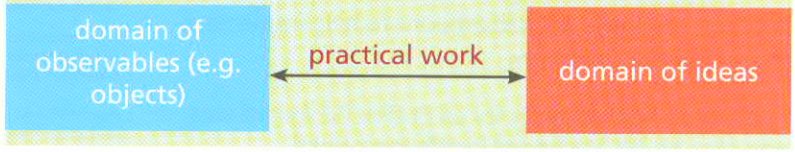
In order to succeed in linking observables and ideas, pupils need to have access to both and, for this to occur, they must be helped not only to observe what the teacher wants them to observe but, equally importantly, to think about their observations in a particular way. Pupils are likely to require assistance in using or developing the ideas that make sense of an activity and which lead to learning. Tasks that are more effective will have this kind of 'scaffolding' built into their design.

Many of us know from experience that, despite the fact that secondary school pupils generally like practical work or at least prefer it to other kinds of lesson activities (Abrahams, 2007), they frequently do not learn from a practical task the things we want them to learn. This has led some science educators to question the contribution of practical work to learning. Hodson (1991), for example, claims that: '*as practised in many schools, it is ill-conceived, confused and unproductive. For many children, what goes on in the laboratory contributes little to their learning of science*' (p. 176).

What emerged from our observations, however, was how well conceived, clear and productive practical science was in the primary schools we visited. One possible reason for this appears to be that the lessons we observed were taught by teachers who were not science subject specialists in the sense that the term is understood by secondary science teachers. Indeed, some of them spoke to us about their own difficulties with scientific ideas and the meaning of certain scientific terms. As a consequence, they appeared able, unlike many secondary subject specialists, to empathise to a greater extent with the problems that their pupils faced when learning about new ideas in science and the meaning of new scientific terms.

The primary teachers we observed used practical tasks that were tightly constrained, of the kind that have been termed 'cookbook' or 'recipe following' (Clackson and Wright, 1992), as a means of ensuring that all their pupils were able to see the desired phenomenon in the time

Figure 1 Practical work: helping students to make links between two domains



available. Furthermore, by using relatively short practical tasks, embedded in a lesson rather than taking up the entire lesson, the teachers ensured that they had sufficient time to introduce pupils to, and fully discuss, new scientific terms and ideas in the way that has been suggested (Abrahams and Millar, 2008) is necessary if teaching and learning are to be effective in developing conceptual understanding. Certainly our observations suggest that primary teachers see practical work as both a 'minds on' and a 'hands on' activity.

The findings of these baseline observations draw attention to the characteristics of current good practice in the use of practical work in primary science teaching. They suggest an understanding of the need to ensure that practical work does not just involve 'doing' with objects and materials but also requires pupils to think about and engage with scientific ideas and terms.

Practical work is always going to have a key role in science teaching. The challenge is to continue to find ways to make it as effective a teaching and learning strategy as possible, while retaining its clear, and refreshingly evident, affective value.

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