



HOLDING UP A MIRROR TO CLASSROOM PRACTICE

Wynne Harlen suggests that self-evaluation can help to change and improve primary science practice

Past progress?

The date of the first edition of *Primary Science Review*, summer 1986, is certain proof that – contrary to some popular belief – there was primary science before the arrival of the National Curriculum in England and Wales and its counterparts in Scotland and Northern Ireland. Of course, the Association for Science Education (ASE) had a Primary Committee and was publishing documents on primary science long before that. Indeed, *Science in the primary school* was published in 1959 jointly by the Association of Women Science Teachers and the Science Masters' Association, before the two associations joined to form the ASE. In this booklet, the committee wrote:

The study of science in the Primary School should consist essentially of investigations, exploration and questioning by the children themselves. The problems they investigate, the 'areas of living' they explore, and the questions to which they seek answers should spring from their experiences at home and at school. The answers they receive will usually be a direct result of their investigations. (AWST/SMA, 1959: 9)

We might well ask what has been happening in the intervening time that has brought us to the situation where report after report is calling for more 'relevance', enquiry-based activities, and the development of 'big ideas' rather than the amassing of facts (e.g. Wellcome Trust, 2005).

Future directions

However, to mark the '100 up' for PSR I want to look forward rather than backward, although recognising that what is shaping the future has its roots in the past. There is much to be optimistic about, for example in the promotion of thinking skills and the creative use of ICT in primary science.

One of the things that really did change following the education reforms begun in 1989 was the attention to assessment in primary science. Notwithstanding some publications on the subject, by and large there was little assessment, or even record-keeping of any kind, in relation to science at the primary level until the late 1980s. Then, in the 1990s, it might be said that too much attention was given to assessment and it began to constrain the

content and teaching methods.

At the same time there has been a more positive side to the attention given to assessment; this is its use to help learning – assessment for learning (AFL) or formative assessment. The review of research by Black and Wiliam (1998) highlighted the evidence that using assessment as part of teaching, to provide feedback into teaching and learning, really does raise achievement. Work begun in the late 1990s and continued since (Black and Harrison, 2004) has confirmed the benefits for learning science. The key features of assessment that helps learning are:

- teachers finding out about children's ideas using 'rich' questions;
- encouraging discussion and dialogue;
- giving feedback that shows children how to make progress;
- engaging children in self- and peer-assessment.

Primary teachers can be very creative in implementing these aspects of formative assessment, as the pages of PSR have shown. It is just one aspect of formative



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assessment that leads me to the thoughts that follow.

Self- and peer-assessment by pupils

The importance of self- and peer-assessment lies in helping children to take responsibility for their learning, an essential outcome of education that aims to develop the ability of school pupils to continue learning throughout life. For self- and peer-assessment what is needed is that children:

- understand the goals of a learning activity;
- appreciate the criteria of quality that apply;
- look critically at their work and judge it against the assessment criteria;
- take part in deciding what to do to achieve the goal

(Harrison and Harlen, 2006: 185).

It is not difficult to see that these could apply equally to teachers, who need not only to understand but to value the importance of pupils achieving certain goals of learning. They, too, need to be fully aware of and committed to the standards of quality and to use them in evaluating their teaching.

Further, as only teachers can change their teaching (just as only learners can do the learning), they need to be involved in making the decisions about how to improve their practice. These four points apply at other levels, too.

Self-evaluation by schools

Self-assessment, or self-evaluation (using the term 'assessment' when referring to learning and 'evaluation' when referring to materials, teaching, educational provision, etc.), is of growing importance also at the school level. Schools are now expected to communicate and explain their philosophy, aims, policies and pupil performance to the wider community. The process of doing this, as in the case of assessment of individual children, can be either formative – helping a school to improve – or summative, providing a judgement that is used for decision-making. Also, as in the case of individual assessment, there is greater value from the process when those being held accountable are involved in the process as opposed to following externally devised procedures.

Giving schools responsibility for self-evaluation can provide

them with the information they need in order to improve. Requiring them to give an account of themselves to others provides parents, the general public, inspectors and policy-makers with information to judge the effectiveness of a school, taking into account its circumstances. Various school self-evaluation guidelines provide some good examples of what this means in practice (SEED, 2002; DfES and Ofsted, 2004; Estyn, 2004a,b).

Teachers' self-evaluation

So self-evaluation/assessment is being developed at the pupil level and at the school level. What about the class and teacher level? Just as with schools, we should not judge teachers merely by the test scores of their pupils. Of course their job is to help children to learn, but teachers and schools ought not to be held responsible for actions and outcomes over which they have no control. Teachers can be held accountable for what they do in the classroom, what learning opportunities they provide and the help they give to children, and so on. They are not necessarily responsible for whether externally prescribed learning outcomes are achieved, since this depends on many other factors, such as the children's prior learning and the many out-of-school influences and conditions that affect their learning. However, just as with self- and peer-assessment by learners, self-evaluation by teachers can help to improve performance and the achievement of goals, and peer-evaluation can be even more effective, holding up a more objective 'mirror' to what is done.

Putting it into practice

The idea of developing self- and peer-evaluation criteria for teachers is not new (e.g. Elstgeest and Harlen, 1990). In the past the lists tended to focus on whether or not pupils were being given, for example, opportunities for practical investigation and using process skills, on what was being assessed and what records were

being kept, on how progression was catered for, and so on. Many items would be the same today but others would reflect the importance we now give to formative assessment, thinking skills, enquiry, conceptual development, linking to real life and to pupils taking responsibility for their learning. Box 1 gives a list of questions teachers might ask in relation to these things.

An alternative approach would be to look at what the children are doing and ask whether, over a period of time, they ask questions, make predictions, find patterns, etc. But it is too tempting to be able to explain why these things may not have been happening for particular children at particular times. What is important is for teachers to ask themselves 'Am I providing opportunities for these things to happen?'

If teachers are able to observe each other and have time to discuss afterwards, this enables them to share ideas about improving practice. They know what their teacher partner is looking for and there is no mystery or anxiety about the process. More and more head teachers are making these opportunities available (as professional development) because of the motivation and new practices that result. Of course not all of the items in the list will apply in one lesson and this is where self-evaluation over a period of time is important. This might take the form of careful reflection by individual teachers on evidence, collected over half a term or so, in pupils' notebooks and reports and in the teachers' notes, using a list like that in Box 1 as evaluation criteria.

In conclusion

The argument here is that what's good for the children in terms of self-assessment is good for the teacher too. But it is not suggested that teachers pick up and use what is in Box 1. Rather, it is important for them to develop their own list of criteria reflecting what is

important for their children and their school. This is more likely to bring commitment to critical review of teaching and facilitate the use of formative evaluation by teachers to improve their practice.

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Box 1 Criteria for teachers evaluating their work

Does the teacher:

- explain the aims of a lesson in ways appropriate to the children?
- gather children's ideas or experiences relevant to the topic under study?
- use open questions and allow time for children to answer?
- listen to children's answers carefully?
- encourage children to ask questions?
- encourage children to talk to, and listen to, each other about their work?
- arrange for children to work and discuss in groups?
- expect children to use evidence to support their conclusions?
- provide activities where children can look for relationships and patterns?
- ask children to predict, test predictions and generate conclusions?
- discuss alternative explanations and generalisations?
- help children to apply what they learn in science to everyday experience?
- help children to make records in notebooks or worksheets to help their learning?
- discuss with children the quality of work expected?
- encourage children to assess their own work, identifying what has been done well as well as what could be improved?
- provide non-judgemental feedback that helps children know how to move forward?