

# Supporting understanding: Using teachers' questions in the elementary school

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## Introduction

Teachers ask a lot of questions. The assumption is that it does some good and, the more questions they ask, the more good it does. Questioning is not a new strategy, as the oft cited use of it by Socrates illustrates. Socrates was intent on having people think, understand and justify their assertions. This was not something that everyone liked or found comfortable but, presumably, Socrates thought it worthwhile. Is questioning useful? Is it used to optimum effect? I will present evidence that questioning can provide effective support for understanding. I will suggest, however, that some popular taxonomies are not always a helpful guide to the kinds of questions that make a difference. Further, I argue that it is not so much the number of questions that matters but what they do for the learner. Half a dozen, well-crafted questions that focus on particular thinking needs at crucial times are likely to be more use than a thousand questions, scattered like pellets from a shot gun and demanding the quick recall of facts. These questions, however, cannot always be conjured up from thin air but are likely to benefit from forethought.

## Asking questions

A lot of work on questioning is North American. The literature has been regularly reviewed and the reviewers agree that questioning is a strategy that is extensively used in all areas of teaching (e.g. Sanders, 1966; Gall, 1970; Dillon, 1982, 1988; Morgan & Saxton, 1991; Young, 1992). There is evidence that this is also true of the UK (e.g. Brown & Wragg, 1993; Newton,



1996; Newton & Newton, 2000). Various studies have attempted to find out why (e.g. Brown & Edmondson, 1984; House et al, 1990; Johnson, 1990; Ramsey et al, 1990). In essence, there seem to be three main reasons. Questioning is:

- [i] an assessment strategy, to determine what pupils know, understand, can do, feel or need;
- [ii] a control strategy, to manage pupils, settle a class, control pupils' behaviour, maintain attention and direct discussion; and,
- [iii] a strategy to induce thinking, to direct thought processes, challenge ideas and stimulate expression and learning.

The variety of questions, however, tends to be small so that most of the time is spent asking for the recall of facts and rehearsing answers. Brown & Wragg, (1993), for instance, analysed over one thousand questions asked by UK primary teachers (4-11 years). They found that teachers' questions comprised some 10% of a day's interaction. Most (92%) of the questions were of a management and control nature. Of those to do with the lesson content, most were of the closed or recall of factual information type. There were far fewer (8%) open or more



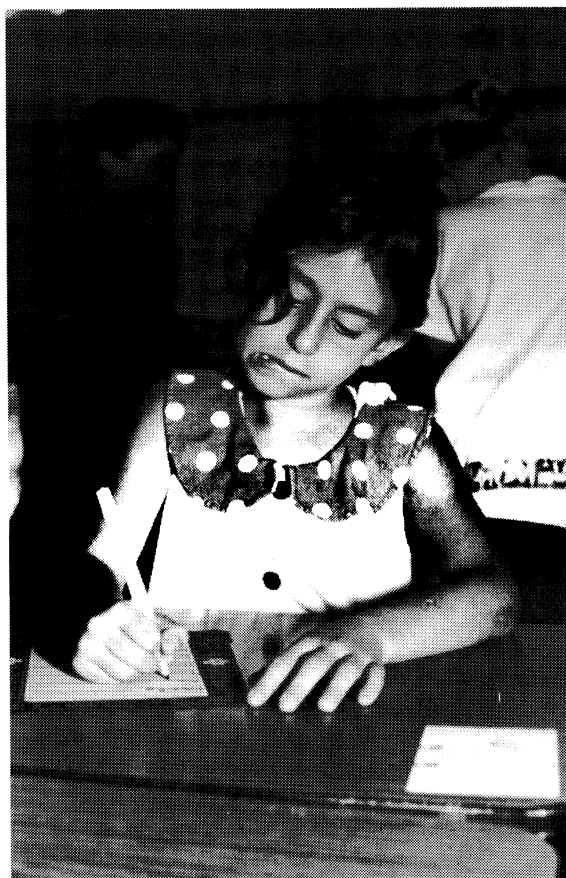
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demanding questions that went beyond the recall of facts. Brown and Wragg suggested that:

*... teachers do not necessarily prepare such questions, but somehow expect them to arise spontaneously. It may be that if we want to ask questions to get children to think, then we've got to think ourselves about the questions we are going to ask them.* (p. 14)

The point is that teachers may ask a lot of questions but not always about the topic in hand or necessarily to the best effect. Teachers are not, of course, equally confident in all subjects. Where the broad, underlying subject knowledge is not strong, what to ask may not always be apparent so the teacher finds it easier to stick to the facts. Equally, they may think that it is facts that count in that subject and so pursue them. There is probably some truth in this but, at least in science, there are teachers without an A-level who do ask for more than facts and there are those with science degrees who seem to ignore all but facts (Newton & Newton, 2000). At the same time, current pressures on raising standards and ranking by test performance may result in teachers seeing their main task as the transmission of ready-made information, not the promotion of active participation (Rodriquez and Kies, 1998). Elder and Paul (1998) describe this as "...burying thinking under tons of information." By asking closed questions (those that lead to a right answer), the teacher diverts the pupils' thinking from wider problem solving into a search for 'right' answers'. In effect, the cognitive hard work is being done by the teacher, not by the pupils. There is no doubt that teachers' questions control communication and hence influence the learning, in one way or another (Gall, 1970;

Dillon, 1982; Newton, 1996; Rodriquez and Kies, 1998; Shaunessy, 2000). Closed or factual questions allow the teacher to maintain control of both communication and learning. In the cognitive/learning domain they ensure progression on the teacher's terms, the pupil's role being that of a respondent in the slots allowed by the teacher. Such control also restricts the cognitive freedom of the learner. More demanding questions may lessen the teacher's



control of the content and direction of the progression. Does it matter?

### **Support for learning, but which kind?**

So-called higher level questions are commonly taken to be those that ask for 'higher' levels of cognition as defined in various taxonomies, such as that of Bloom (1956). This means that they ask for such mental tasks as evaluation, synthesis or application of information and knowledge. Some research has shown that children's thinking and

problem solving abilities improve when teachers use higher level questions (e.g. Blosser, 1973; Andre, 1979; Redfield & Rousseau, 1981; ILEA, 1985; Koufetta & Scarfe, 2000). More recent work has found that *What if...?* and *Why...?* questions stimulated creative and critical thinking which, if followed by more questions, encouraged the development of ideas and the construction of understanding (Fredericks, 1991; Newton, 1996;

Kazemi, 1998). Similarly, the Inner London Education Authority (ILEA) Junior School Project (1985) found that the more time teachers spent asking questions, the greater was the effect on pupils' progress. Progress was defined as the 'cognitive outcomes' in reading, mathematics and visuo-spatial skills. The type of questions asked determined the level of thinking required. Lower order questions (of the *Who...? What...? When...? Where...?* type) required recall of facts limited by the information previously given. Higher order questions (of the *How...? What if...?* type) encouraged comprehension and the application of rules. Those asking *Why...?* encouraged analysis by inference, or deduction, leading to

conclusions.

However, the effects of teachers' questioning levels on students' achievement was considered by Samson *et al* (1987). They synthesised fourteen studies contrasting the effects of predominantly higher cognitive questions with predominantly factual questions. They concluded that the former had only a small positive effect on learning measures. Related to the cognitive demand of tasks and questions is the work of Neumann and Mahler (1989). They investigated the

cognitive congruence in questioning (the degree of cognitive match between the questions asked by the teacher and the pupils' answers). They found a mismatch in that the questions were not stretching the pupils' thinking abilities. The teachers' questions functioned at the task level (that is, management, procedural, factual recall) not at the cognitive level (requiring higher order thinking skills). These findings were confirmed by Newton (1996) in a study of fifty primary school teachers' questioning in science lessons. Willig (1990) suggests that skilful questioning lies at the heart of the cognitive conflict strategy, making children reflect upon their ideas and their reasons for holding those ideas. Whatever the potential of higher level questioning, however, it is academic if they are often absent in the classroom.

A problem with 'higher order' questions relates to the notion of cognitive levels and the assumption that higher-order questions elicit higher-order answers. What exactly is a 'higher' cognitive level? Some argue that most questions narrow the respondent's communicative and cognitive options; even when questions relating to the higher levels of taxonomies are asked, higher order responses do not automatically follow (Dillon, 1982). Any question narrows the options open to the respondent, limiting the field of thought to that intended and expected by the questioner. The degree of restriction depends on the type of question asked, the degree to which the questioner and learner share common knowledge and experiences and the extent to which the questioner is in a real position to evaluate the answer. This emphasises the importance of contexts and shared meanings for question asking and answering. Researchers have tried to assess the cognitive level of the questions or

have focussed on the interactional, as well as cognitive, effects of open, half-open and closed questions (Call, 2000). There have been numerous attempts to produce classification systems or taxonomies which teachers might use yet they seem to be unaware of such taxonomies or do not use them (Dillon, 1990). Many of these systems suggest a hierarchy from lower level/order questions to a higher level/order. Generally, the former are concerned with simple



factual recall or basal comprehension, while the latter involve reasoning, analysis and synthesis and evaluation.

We can conclude that certain kinds of questions can promote more integrated and better understanding but sometimes they work and sometimes they do not. Probably the more important point was made by Willig (1990) who wrote that what counts is *skilful* questioning but what exactly is skilful questioning? I argue that tying questioning tightly to particular levels in taxonomies is

not always of great practical benefit. Slavishly asking questions at any particular taxonomic level without regard for what is going on in the child's mind is likely to be unproductive. A child faced with impossibly demanding mental tasks probably learns little other than how to avoid them. It is not a matter of *one* kind of question being better than another but of recognising *which* kind is needed and knowing how to use it to good effect. It is often assumed that asking only for

facts is a bad thing and that somehow it will pervert young children's minds. There are times when lower level thinking is appropriate and prepares the way for greater things. Learning the relative location of the body's organs is an example. Even when the child must learn the function of these organs and why they go wrong, factual questions may bring relevant prior knowledge into working memory or draw attention to some important relationship. Later, asking the child to translate the new knowledge into another form, express it, articulate, evaluate and apply it may be what is needed to support the child's construction of a further understanding. It is not a question of either/or but of each in its rightful place – the right kind of question

for the right purpose at the right time.

### Focused questions

This is where what Martens (1999) describes as productive questions is helpful. Productive questions "...enable teachers to create a bridge between activities and students." The concept of bridging for understanding is explored by Newton (2000). Essentially, the bridge helps the learner to connect prior experiences to new experiences, the concrete to the abstract, the known to the

unknown. Productive questions can do this. The focus of Martens' productive questions is:

- attention-fixing → fixing attention on significant details,
- measuring and counting → encouraging precise observation,
- comparing → encouraging analysis and classification,
- action-generating → encouraging exploration of properties and events,
- problem-posing → encouraging solution generation and implementation,
- reasoning → reflecting upon ideas and making sense of them.

I prefer, however, to call them focused questions because this

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indicates better that they are tailored to the particular needs of an evolving learning situation as teacher and learner work towards the construction of understanding. This evolving situation might include episodes of, for instance,

- tuning children's attention to the task in hand;
- eliciting prior knowledge;
- developing or supplementing that knowledge;
- developing a grasp of the new situation;
- highlighting significant relationships;
- consolidating learning, articulating;
- developing and using learning;
- exploring the idiosyncrasies of the children's mental structures; and,
- deepening and widening learning.

What is productive in any one of these episodes may be different to what is productive in another. The type of question, as in lexical categorisation, is not always a

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useful guide. For example, *How...?* as a process or instrument (as in, *How did you connect the materials together?*) cannot be distinguished from *How...?* as a fact or quantity (as in, *How much string did you use?*). The second form is conceptual categorisation and refers the representation of meaning and purpose. This relates to mental representation and learning with understanding. It is this latter form that is more useful for thinking about question focusing. For instance, *What was the common name for...?* and *How did we ...?* questions function to elicit prior knowledge and understanding, the former of factual information learned and the latter of procedures. *What will happen if ...?* and *How might we ...?*

questions extend and apply knowledge and understandings gained from prior and current experiences to new contexts. All are useful productive questions but are stronger in their use if focused on particular stages in a lesson. Recall of prior experiences would work well at the beginning of the lesson to set the scene for new experiences. Extension and application questions focus attention on the new experiences and force learners to connect ideas and construct new understandings.

Such a focusing of questions is

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intended to stimulate more precisely the active thinking that is needed at that point. Supporting learning through questioning, therefore, involves a sequence of questions, each helping the child over a particular mental obstacle. Of course, not every topic will present every obstacle so the pattern of focused questioning cannot be a rigid one.

### Questioning skilfully

Most researchers agree that questioning is a strategy with potential for supporting learning (e.g. Morgan & Saxton, 1991; Newton, 1996). Children know the question and answer game from an early age. Their own conversations

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often involve question-answer sequences. Taylor and Taylor (1990) noted that very young children can distinguish questions from non-questions and *yes-no* questions from *Wh*-questions, relying on intonation, the presence of key words and sentence structure. Even 2-year-olds are able to do so, although not always responding appropriately:

*Toddlers' questions tend to depend on the activity in which they are engaged. They ask, 'Where's my ball?' or 'Which one shall I take?'. As children grow older, their questions show a developing interest in getting to the bottom of things. (p. 280)*

In a study of pre-school children, Berninger and Garvey (1981) found that *yes-no* questions evoked relevant responses from all the 3-year olds tested, but certain *wh*-questions evoked irrelevant responses from them. Some *what* and *where* questions were easily answered by them using pointing words, such as *that* and *there*, and often questions were answered

with offers of demonstration, such as, 'I'll show you.' However, why questions require answers that involve formulating cause and effect. Berninger and Garvey found younger children unable to handle these. By the age of 4 years, Wells (1985) found most children studied were enthusiastic question askers, although many parents found difficulty answering appropriately. Children themselves are no obstacle to the strategy. The problem is in defining skilful questioning and helping teachers to question skilfully.

Defining skilful questioning as that which addresses the needs of the immediate mental situation with the aim of helping it progress to the kind of learning that is desired reflects the realities of teaching and learning. However, this means that skilful questioning is not a mechanistic process but is one that requires the mental engagement of the teacher with the children's thinking as well as that of the children with the topic. This means that decisions have to be made in action but this does not mean that questioning is a totally on-the-spot matter. Forethought and planning can prepare the teacher for the interaction and ensure that there is a clear progression that the questioning will support. A collection of prepared questions can be a useful resource. For those who lack confidence in the subject, a good book or scheme may help but these may be few and far between as far as focused questioning is concerned (Newton, 1996). That, of course, is to be expected. A textbook writer cannot know the children the way their teacher does so cannot tailor questions exactly to their immediate needs. Nevertheless, used thoughtfully, books and schemes can be a useful resource.

## In Conclusion

I began by asking two questions: Is questioning useful? Is it used to optimum effect? I have argued that questioning can provide effective support for

understanding and suggested, however, that confining attention to one category of a taxonomy is not a helpful guide to the kinds of questions that make a difference. What matters more is that the question produces the kind of thinking that furthers the kind of learning that is wanted. What is needed is focused questioning that facilitates the development of children's knowledge and understanding.

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