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THE NATIONAL NUMERACY STRATEGY: TEACHER QUESTIONS AND PUPIL ANXIETY

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The Numeracy Strategy documentation and training materials encourage an increase in whole class questioning with an emphasis on directing questions at individual children. From classroom observations and interviews with children, we report on how such questioning strategies may be experienced by pupils. Initial findings lead to the contention that questioning of this type may lead to an increase in anxiety that could adversely affect attainment. In this report we focus on one aspect of teacher and pupil interaction; we do not have the space to discuss the importance of how these interactions are embedded in a whole variety of complex social behaviours.

The basis for this research report

This report is based on initial observations and interviews carried out for the most part in four Primary classrooms in England, two in the North West and two in South Yorkshire. Julie has been engaged in researching pupil anxiety during times of teacher questioning. This has involved extensive participant observation and videotaping in one classroom which included interviewing each Year 4 pupil and their teacher. Mark's research in Primary classrooms on pupil mistake making is supportive of Julie's findings. All four teachers have warm and caring relationships with their pupils. The anxiety we report occurs despite this.

The National Numeracy Strategy and teacher questioning

The National Numeracy Strategy (NNS), through the model lesson structure, the emphasis on "direct teaching" (DFEE 1999a) and the teacher behaviour exemplified in training materials supports the importance of teacher questions. Whilst we believe that since the introduction of the NNS there has been an increase in questioning of this sort, it is difficult and possibly impossible to quantify this increase. However the perception of teachers with whom we have been working is that they now spend more time questioning students.

Teacher questions have always had a dominant role in Primary classrooms (Edwards and Mercer 1987, p45) and, in itself, an increase in the amount of time questioning pupils need not be perceived as negative. The NNS framework has a number of contradictory elements (Boylan 2000). So for example it legitimises forms of questioning which lead to "listening carefully to pupils' responses and responding constructively in order to take forward their learning" (DFEE 1999, page 12). It points to the need for the sort of "dialogue" which is one feature of the practice of effective teachers of numeracy (Askew et al 1997). The NNS framework also suggests that questions should be a mixture of "open and closed" questions. One interesting feature observed is the extent to which asking students to explain their method has become a common 'open' question and a common, although not unique,

way in which children are asked to give more than a single word or phrase as an answer.

The NNS also encourages and legitimises forms of teacher questioning that may be less helpful in promoting pupil learning, where a single correct answer is to be given. This is not new. In a report on classrooms between 1976 - 96, Galton wrote that

> Teaching in today's primary schools at Key Stage 2 is very much a matter of teachers talking and children listening ... When questions are asked of children, these questions require them either to recall facts or to solve a problem for which their teachers expect a correct answer (Galton et al 1999, p 33).

Given this tradition it is not surprising then that, in the main, the classroom teachers we observed, generally questioned in this way. One particular feature we wish to focus on is the way in which the statement that questions should be "adjusted and targeted to make sure that pupils of all abilities are involved" (DFEE 1999a page 12) is being interpreted. Firstly, students may be asked by name even if they have not indicated a wish to answer. Secondly, given that the majority of questions require a single answer, teachers aim to adjust the questions according to their perceptions of children's ability to answer. We believe there is a laudable motivation here; to save children from embarrassment. However, interviews and discussion with children reveal that the children are very aware of the level of difficulty of the questions asked; children may be embarrassed by being asked an 'easy' question. In addition the importance of being correct is underlined, few mistakes are made and the consequence of making a mistake is then worse. This also tends to undermine challenging the children in the way effective teachers of numeracy have been found to (Askew et al 1997) or indeed in the way other parts of the Framework documentation suggests should be done (DFEE 1999a).

Pupil anxiety

Instances of physical signs of anxiety or tension are not unique to particular forms of questioning. This anxiety may be present regardless of whether or not a student has indicated that they wish to answer or has answered correctly. Common examples are:

When the pupil has just answered a question correctly.

Often the pupil may look embarrassed but pleased; blush and look around to peers; look down, avoiding eye contact or make other self depreciating gestures.

The pupils may then be presented with a 'follow on' question.

Generally the child looks perplexed; they may regroup and answer, attempt an answer and stop - or may look flustered and remain silent.

When the pupil offers an answer the teacher may be noncommittal.

The child knows that in some way the answer is flawed and looks crestfallen/ embarrassed/ confused.

Regularly, pupils offer an answer but preface it with " Is it…?" or " Do you mean…?" They look to clarify before committing to a possible wrong or 'half wrong' answer.

Causes of Anxiety

In the literature, the person of the teacher may commonly be cited as the main focus of pupils concerns. In fact, the effect of the peer group should not be underestimated. Holt says that:

> Children who can't do things or do them wrong are made fun of by the other children and very often by the teachers themselves. Most children in school are at least as afraid of the mockery and contempt of their peer group as they are of the teacher. (Holt, 1982, p59).

The interviews Julie conducted with Year 4 pupils indicated that what Holt asserted is still true today:

Kate: When a teacher asks me a question and I say it and I get it wrong and it was like, an easy question then I'm like 'Oh God, it was so easy ...'

Julie: And you feel?

Kate: Shocked and scared!

Julie: Why do you feel scared?

Kate: Because my friends like think that I didn't get that question right and it's a dead easy question.

The pace of questions has also been implicated in the creation of tension and anxiety. On this issue, the framework states that teachers should "[allowing] pupils to think through answers before inviting a response" (DFEE 1999, page 12). However, there seems to be some contradiction as training videos exemplify fast paced questioning that may be experienced by pupils as having questions "fired" at you.

Lucy: Sometimes she just fires (questions) at you.

Julie: How does that feel?

Lucy: Pretty scary. You know, you just, like, look at the board and back at Miss and try to give her the right answer. The board might have the question on it or something.

Julie: So you find those fast questions a bit scary.

Lucy: Yeah.

Increased pressure for academic success brings its own concerns. Tansy Hardy and Tony Cotton report the extent to which pupils approaching Key Stage Tests are aware of what is 'expected' of them:

> A 'normal' child will achieve level 4 at Key Stage 2. If a child is given a lower result then they are not up to the required standard. They become 'abnormal'. These primary

> school children are acutely aware of this defining effect, of how it determines how their efforts, past and future, are interpreted, and of ways in which this determines their future position. (Hardy and Cotton 2000).

The mechanism by which such labels are internalised is a complex one but one in which teacher talk during questioning may play a part. For example both of us have observed the teachers often giving cues as to who would be expected to answer such as:

"There should be at least six hands up"

"Everyone should have their hand up"

and in a classroom where the pupils were sat according to ability: " I'd like someone from *this* table (*pointed to*) to answer the next question".

The effect of pupils' responses on their position can be more overt. Mark has observed how, in one classroom, the students' responses to teacher questions influenced whether they were in group one, two or three for the main activity.

Consequences of anxiety

Much of the anxiety observed shows itself in subtle ways, much is virtually hidden. It may be uncomfortable or unpleasant for the children, but does it negatively affect the learning process?

A common effect observed was disengagement. Often this may only mean a temporary lack of attention to the classroom interaction. In more extreme cases, for example where a mistake has been made publicly, the pupils' behaviour suggests that the anxiety remains for some time and the pupils' attention is focussed on the interaction that caused it and so they are no longer engaged in the lesson. They may also be discouraged by the interaction and withdraw from further participation as the following interview explains:

Priya:	I think that when the teacher says you've got it wrong, it makes you feel sad...
Su:	Makes you feel bad.
Priya	Like you can't get anything right. So you won't put your hand up the next time.
Julie:	So it actually makes you feel quite depressed really about doing it again?
Priya:	So you don't put your hand up again.
Julie:	I'm fascinated by that ... Because you two strike me as confident people who go for it and often put your hands up, don't you?
Su:	Yes
Priya:	Yes

Anxiety may cause children to spend more time than necessary checking and rechecking, possibly then not listening to what is going on in the rest of the classroom. The following is an excerpt from an interview with two confident, high achieving siblings, aged 8 and 10.

Julie: What if you feel, 'I'm *sure* I know that answer', do you pop your hand up and go for it or do you still feel...

Yr5: I think about it first, before I do it.

Julie: You think about it .... you're not there straight away, you're a bit unsure....

Yr5: Hmm" (agreeing)

Yr3: If it's like a times table question and I, like, count hard and I find the answer...

Julie: Yes

Yr3: To make sure, um ... I do it again before I put my hand up...

Julie: Right, so you double check yourself before...

Yr3; (interrupting) Yeah.

Anxiety may have other effects. It may not be limited to the pupil who is the subject of the questioning. Other pupils may become concerned with seeing who answers the questions correctly and who wrongly and be distracted from the teacher's objectives for the lesson.

Will this affect attainment? High learner attainment is correlated positively with learner confidence and with positive attitudes towards the subject (McLeod 1992). Research conducted in an experimentalist paradigm suggests that low levels of stress may increase success - high levels have a negative effect (Mandler 1989). There is research evidence that suggests that mathematics anxiety leads to a lowering of performance on tasks such as complex addition and subtraction and to a development of avoidance strategies (Ashcraft and Faust 1994), precisely the sorts of tasks required under teacher questioning in the Numeracy strategy.

Conclusion

We have focussed on the pupils' experience of being required to answer individually. However, there are other forms of questioning or teacher student interaction other than "targeting" which are possible and encouraged by the framework, for example choral work or the use of aids to allow the whole class to answer together. These may generate less anxiety although Julie has observed some pupils looking troubled about being last in the class to hold up their number fan or looking to mimic peers when verbal responses are required.

> Pupil performance has become more high stakes and more overt ... The consequence of this is likely to be a growth in polarisation ... Thus those who succeed choose to socialise with each other, and those who do less well, seek to preserve their dignity by discarding any leaning ambitions they may have once held, and join forces with others in the same position.(Pollard and Triggs, forthcoming 2000, p277)

It could be thought that this may only be true of a minority of pupils but overall, we have found the experience of anxiety under questioning to be widespread and thus by implication, current questioning trends risk leading to a greater number of disaffected pupils than ever.

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