

# **"I'D BE MORE LIKELY TO SPEAK IN CLASS IF...": HOW SOME YEAR EIGHT STUDENT'S EXPERIENCE TEACHER QUESTIONING AND DISCUSSION STRATEGIES**

Mark Boylan, Sheffield Hallam University

Peter Lawton, Aston Comprehensive School

*This paper reports on some exploratory research with one class of Year Eight students. The students were given the opportunity to express their views on a variety of teacher questioning strategies in whole class interactions. The students' responses highlight that feeling emotionally and intellectually secure are important factors influencing willingness to participate. A key finding was the importance of having an opportunity to discuss questions for many students. This was particularly true for female students.*

## **TEACHER QUESTIONING**

Questioning of pupils is an important feature of mathematics teaching. Little research appears to be available that details current or historical patterns of teacher-pupil interaction in secondary mathematics. However, we feel that the following description of primary classrooms is applicable to many secondary classrooms as well;

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 page 33)

This contrasts with research evidence that indicates that using more open questioning approaches has a positive effect on attainment (Askew and Wiliam 1995, page 17). Teacher questioning can also be a feature of less transmissive forms of teaching. Indeed, both constructivist and social constructionist approaches to learning suggest the importance of inquiry through questioning and discussion. In addition there are important issues of equity in relation to questioning, for example who is asked and who answers. Questioning of pupils can also be a cause of pupil anxiety particularly where this is perceived as a form of testing (Anderson and Boylan 2000).

Increasing pupil participation in whole class teacher pupil interaction is a worthy aim and one way of doing this may be through teacher questions. But how might it be done and without causing pupils anxiety? The research reported here is premised on the belief that an important voice, but one that is often not heard in debates about teaching methods, is that of the learner themselves.

## **ASKING A CLASS OF YEAR EIGHTS**

### **BACKGROUND**

The research findings presented here are not the product of a pre-planned research design but rather arose out of work that we were doing together exploring issues of mistake making during whole class interaction. This centred on exploring alternatives to 'hands up' as the most normal means of answering questions and exploring alternatives to questions that only had a right or wrong answer. We do not wish to make any claims about generalisability or validity. Indeed the class itself was unusual in a number of respects. We do believe that the dialogue with the class does give a small insight into the experience of one particular class and raises some important questions for further research.

At the time of the research Peter was coming to the end of a two year PGCE mathematics course. Previously he had taught mathematics abroad and so although still in initial teacher education was more experienced than this might suggest. Mark was in the first year as a full time research student with a background in secondary mathematics teaching. Peter's final teaching practice was in a 11-18 school in a semi-rural area on the edge of a large conurbation in Yorkshire. The school has a comprehensive intake with respect to gender and class background but is almost exclusively white. Results in external examinations are near national averages.

The class in question was a 'set A', this being formed from the highest quartile of pupils by attainment on the basis of Y7 examinations. The school set for mathematics in two half year groups. The class had 12 girls and 17 boys in it.

### **AN INTIAL DISCUSSION**

The decision to ask the class about their experience of teacher questioning arose from an initial discussion that occurred during one of Peter's lessons when Mark was present.

Peter introduces the days topic – revision of formulas for  $n^{\text{th}}$  term of a series. He asks the class to spend a moment individually thinking about the topic to see what they can remember and invites those that "have some thoughts" to put there hands up. About four or five hands are raised. He then asks the students to discuss in pairs. Nearly all students seem to be involved in this and the discussion seems to be centred on the topic.

He now asks again for people to put their hands up if "they have any ideas". There are now perhaps 6 or 7 hands up. Peter comments that lots more should have something to say. He indicates two girls as an example "you were saying some really interesting things". Looks a little perplexed as to why there were not more hands up.

I intervene and refer to the implicit question that "who has some thoughts" also implies "who wants to say something".

Peter picks this up and asks again for hands up but this time saying he won't ask anybody to share, nearly all put their hands up. He asks the class why the difference. One boy responds, his comments include "people don't want to make a mistake, they might look stupid"

(Field notes, May 26<sup>th</sup> 2000)

An interesting discussion followed about making mistakes and how the students experienced teacher questions. We decided that we wished to continue a dialogue with the class about some of the issues that had been raised.

Unfortunately there is only space here to highlight some of outcomes of this dialogue.

## **OPENING DIALOGUE**

Peter put aside a lesson in which we shared my notes of the incident from the previous lesson and invited further discussion about it.

Peter devised a short questionnaire focussing on the students' willingness to answer questions in class. A key question asked for a response to the statement "I would be more likely to answer questions in class/join in class discussions if ...". This was completed individually by students.

A group discussion activity was prepared that asked the students to discuss statements that gave a number of possible ways that the class might answer after a question from the teacher. The students were asked to order them, firstly by the frequency with which the situations occurred in mathematics lessons, secondly according to how nervous the different situations occurred and lastly by how helpful the students felt the different means of responding were to their learning.

The students' responses were collated. The answers to the open questions were analysed firstly on the basis of an open-coding of meaning units. Secondly, more general themes were generated. On the basis of these themes a summary in the form of a class letter was prepared.

Later 17 of the students were interviewed in single gender groups about the classes responses. The interviews were supportive of the analysis that had been made of the students responses. For the purposes of this report the interview material is not discussed further in detail.

## **THE YEAR EIGHT'S RESPONSES**

### **Willingness to answer in class**

The question asked was

"When your maths teacher asks a question of the whole class *and you are sure that you know the answer*, do you put your hand up?"

| Response  | Boys | Percent of boys | Girls | Percent of girls | Total | Percent of class |
|-----------|------|-----------------|-------|------------------|-------|------------------|
| Always    | 9    | 53              | 2     | 17               | 11    | 38               |
| Sometimes | 8    | 47              | 9     | 75               | 17    | 57               |
| Never     | 0    | 0               | 1     | 8                | 1     | 3                |

The clear and perhaps unsurprising gender divide that emerged here was reinforced by the students' response to a question that addressed the pupils' willingness to risk being wrong when they were unsure of the answer.

### **Preferred ways of answering**

The students were asked

“If your maths teacher is asking questions how do you prefer to answer?”

Four possible response were given. In the table below these have been paired to highlight an important gender difference.

| Response   | Boys | Percent | Girls | Percent | Total | Percent |
|--|------|---------|-------|---------|-------|---------|
| By putting your hand up and/or being picked by name?   | 11   | 65      | 4     | 33      | 15    | 51      |
| After a discussion with the person next to you and/or by writing down your answer in your book | 6    | 35      | 8     | 67      | 14    | 49      |

The importance of discussion here for girls is supportive of other work on gender and mathematics (for example, Boaler 1997). However, we believe that this should be seen as a gendered response rather than a gender-specific response. The students answers to the open question, the group activity and the interviews highlighted that having to answer individually and under pressure caused anxiety for a significant number of the boys. Approximately a third highlighted the importance of not standing out.

**“I'd be more likely to answer questions/contribute to discussion if...”**

The students' responses were varied and the majority identified a number of different factors. A number of important themes emerged.

Firstly ,security. This has two aspects: security of understanding and emotional security. These two aspects were not mutually exclusive. Responses that related to security of understanding related to the pressure some of the students felt about being in Set A and the fast pace of lessons, teacher expectations of correct answers, having time to think before answering and being sure of being correct (75% of the girls, 53% of the boys). Responses that related to emotional security included being sure they would be correct, being able to discuss with someone else before answering, not standing out or being laughed at (58% of girls, 58% of boys).

Overall all of the girls who responded to this question and 87% of the boys included some reference to a factor that could be related to the theme of security.

The other two themes are more difficult to characterise simply. The first related to the importance for the students of not standing out, being different or being laughed at if they were wrong (45% of girls and 60% of boys). This might be summarised as it being acceptable and normal to contribute without having to be correct. The second related to a desire for greater participation. Important factors here were being able to discuss before answering and, for a significant number of the girls, a desire for the minority of boys who shouted out answers not to do so (55% of girls and 20% of boys). These themes can be seen as a desire on the part of the students to have different social practices in the classroom.

The students' responses to the closed questions on likely response when asked questions were reflective of observed behaviour. A strong gender difference is found. However, when asked to imagine what might allow them to feel more able to participate, a more complex picture emerges. Many of the boys as well as the girls experience teacher questions as causing anxiety and there is a shared desire for security.

The student's responses were summarised in the form of a short passage or 'letter to our teacher' which was discussed and broadly agreed as being representative in interviews.

As a class we would feel more comfortable speaking/contributing to a discussion in a maths class if.....

('we' here may mean all of you or it may mean some of you)

If we felt more secure about our understanding of the subject so we were more certain of being correct. Some of us don't want to be wrong. Having better explanations and being able to go more slowly might help. There was not the pressure of the expectations we feel because we are in Set A. Also some of us feel nervous about answering in case we get it wrong. We are worried about what other people might think. There are many of us who don't like to be put on the spot and be the centre of attention. It doesn't help that some people in the class shout out as it is important that we get a chance to think about our answers. We think that we should have the chance to discuss our answers with someone else before answering. This means we get more time to think and we don't feel on our own as much.

## **A CHALLENGE**

The Year Eight class we worked with had a limited range of experience of types of mathematics teaching. For them the answer to a teacher's question was generally right or wrong. An additional important idea for many of them was that it was important for a teacher to give 'clear explanations'. The students' desire for greater security might lead us to believe that these students might have negative feelings about teaching approaches that encouraged an approach to mathematics in which different and even 'wrong' answers are valued as important contribution to the construction of understanding.

However, the students do indicate they want to have the opportunity to be engaged in that construction. When the students' were asked in the group discussion exercise to rank a series of statements according to which would be most helpful to learning, the following four were identified: the teacher asks a question then gives time for thinking before hands are put up, the teacher asks for discussion with someone else before asking for hands up, the teacher asks for discussion with someone else before asking by name and, interestingly, the pupils ask the questions.

The idea of discussing with someone next to you re-emerged in the interviews. This is a relatively simple practice to arrange in mathematics classrooms. It would not, in itself, change the epistemology of the classroom. However, it does, in a small way, recognise the legitimacy of mathematical authority of other learners and not just the teacher. This group of Year Eight students also say that it means they would be more likely to participate.

There has not been the opportunity to discuss the students' views that were expressed in the interviews. But we leave the last word as a challenge from one of the boys when asked if he had anything to add:

Will any of the stuff that we've discussed today change any of the teaching?

## **REFERENCES**

Anderson, J. and Boylan, M.: 2000, 'The numeracy strategy, teacher questioning and pupil anxiety.' Proceedings of British Society for Research into the Learning of Mathematics, Loughborough 6th May 2000. Volume 20 Numbers 1 and 2, 49-54

Askew, M. and Wiliam, D.: 1995, *Recent Research in Mathematics Education 5-16*. London: HMSO.

Boaler, J. : 1997, 'Setting, social class and the survival of the quickest.' *British Educational Research Journal* 23(5), 575-595.

Galton, M., Hargreaves, L., Comber, C., Wall, D., and Pell, T.:1999, 'Changes in patterns of teacher interaction in primary classrooms: 1976-96.' *British Educational Research Journal* 25(1), 23-37.