

Appendix A: Classroom questioning by teachers

Classroom Questioning by Teachers

- an investigation of how teachers formulate, select and present questions to guide student learning

Working with the Transcript

Before beginning this process, please make sure you have recorded your initial overall impression of your use of questioning on the Transcript Analysis Sheet.

- ④ Save the electronic version of your transcript!
- ④ Read your transcript all the way through. In the right-hand column of your transcript, record what you were thinking. These reflections might include:
 - your concerns at this point of the lesson;
 - your intentions / where you were heading & why;
 - conceptual understandings / misconceptions;
 - students' specific learning needs.
- ④ Then highlight what you consider to be key episodes or moments in your lesson. Describe why you consider these to be key parts of the lesson, using the Transcript Analysis Sheet.
- ④ Next, sort all your questions, referring to the process outlined below.
- ④ After that, return to your identified key episodes. Comment on your use of questioning in these episodes, recording your ideas on the Transcript Analysis Sheet.

Process for Sorting Questions

1 The first task is to separate each question in your transcript. There are two ways you may like to do this:

- Either photocopy the transcript, perhaps enlarging the page from A4 to A3, number each question so that you can re-locate it in your transcript when necessary, then cut out each question, or
- Using your electronic version of the transcript, delete everything that is NOT a question, enlarge the font, and print before cutting up into individual questions. Remember to save this document with a different name.



2 i) Beginning with the first question – consider the question and think about: How does it facilitate learning? What kind of question is it? What kind of response did you require / expect? Why did you ask it? When you have decided, place the question in front of you and write a tentative label for this category of question.

ii) Take the next question. Consider the question and think about: How does it facilitate learning? What kind of question is it? What kind of response did you require / expect? Why did you ask it? If you consider it to be the same kind of question as the first question, place it with the first one. Otherwise begin a second group by placing the new question apart from the second question and making a new label for this second type of question.

iii) Continue by picking up one question at a time, considering the question and placing with one of the groups already formed or beginning a new one.



3 When you have placed all of your questions, go through the groups and review the ideas with special consideration for whether the questions belong together. You may make changes by dividing or combining groups or by switching questions around.



4 When you have completely reviewed your groupings, put a blank card on top of each group and write a word or a phrase that best describes the central idea that caused you to place the questions together in that particular group.



5 Finally, glue your questions onto sheets of newsprint. Include your labels for the categories you have sorted the questions into. These will be shared at our next research team meeting.

Appendix B: Questions and issues arising from the analysis of transcript one

Questions and issues arising from the analysis of transcript one

Please tick the following questions that are issues you identified with, then add any further issues which arose from your analysis. (Please write these as questions.)

We will use a compilation of these to inform where we head after today's session.

- Are our questions differentiated according to students' abilities? If so, how are they differentiated?

- Are certain question categories more effective than others for promoting students' learning?

- What is the relationship between the students' responses and the teacher's questions?

- Is there an appropriate quality and quantity of questioning during an 'ideal' lesson?

- How is effective questioning related to a teacher's content knowledge?

Appendix C: Questionnaire: What are my beliefs about teaching and learning?

Name: _____

What are my beliefs about teaching and learning?

1. In considering teaching and learning, I see:
 - A. teaching and learning as complementary;
 - B. teaching as taking priority over learning;
 - C. learning as taking priority over teaching.

2. Students learn through:
 - A. being challenged and struggling to overcome difficulties;
 - B. being introduced to one mathematical routine at a time and remembering it;
 - C. being 'ready' to learn certain mathematical ideas.

3. Numeracy teaching is based on:
 - A. dialogue between teacher and students to explore each others' understandings;
 - B. practical activities so that students discover methods for themselves;
 - C. verbal explanations so that students understand teachers' methods.

4. Becoming numerate is:
 - A. an individual activity based on actions on objects;
 - B. an individual activity based on following instructions;
 - C. a social activity based on interactions with others.

5. My favourite piece of maths equipment is:
 - A. A wafer;
 - B. Liquorice straps;
 - D. Pizza (or pi?)

6. Being numerate involves:
- A. the ability to perform set procedures or routines;
 - B. using both efficient and effective methods of calculation;
 - C. finding the answer to a calculation by any method.
7. Being numerate involves:
- A. Reasoning, justifying, and eventually proving results about numbers;
 - B. Being able to use and apply mathematics using practical apparatus;
 - C. Being able to 'decode' context problems to identify a particular routine or technique.
8. A numerate student shows:
- A. confidence and ability in mental methods;
 - B. confidence and ability in practical methods;
 - C. shows confidence and ability in paper and pencil methods.
9. The programme I would prefer to watch is:
- A. Desperate Housewives
 - B. Numbers (when it starts again soon)
 - C. Spongebob Squarepants
 - D. None of the above – I prefer reading women's magazines
10. In relation to students' strategies:
- A. students' own strategies are the most important: understanding is based on working things out yourself;
 - B. students' strategies for calculating are of little importance – they need to learn standard procedures;
 - C. students have calculating strategies but the teacher has the responsibility for helping them refine their methods.
11. Students' misunderstandings:
- A. are the result of failure to grasp what was being taught and need to be remedied by reinforcement of the 'correct' method;
 - B. need to be recognised, made explicit, and worked on;
 - C. are the result of students not being 'ready' to learn the ideas.
12. People who complete quizzes in women's magazines are:
- A. desperate
 - B. sick
 - C. very silly
 - D. all of the above

Appendix D: Working as a teacher researcher

Working as a teacher researcher

We would like to know about your experience of working as a teacher-researcher in your school. We are aware that your participation in this project is affected by many contextual factors.

Scheduling a lesson to record was:

- straightforward
- slightly problematic
- very difficult

Please explain:

The technology involved in recording my maths lessons:

- was easy to use
- necessitated asking a colleague to help
- proved problematic

Comments:

I found the lesson analysis to be:

- difficult
- interesting
- unhelpful
- useful

Comments:

Please use the continuum to indicate the level of interest and support from:

○ the principal

Disinterested and / or unsupportive |-----| Extremely interested and / or supportive

○ management team

Disinterested and / or unsupportive |-----| Extremely interested and / or supportive

○ colleagues

Disinterested and / or unsupportive |-----| Extremely interested and / or supportive

In what ways have they shown their interest and support?

To what extent do you see your participation in this research enhancing the learning community in your school?

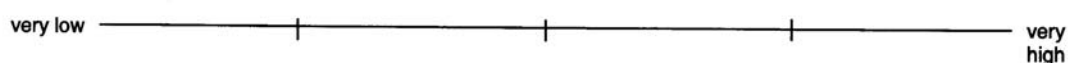
Appendix E: Reflecting on your Involvement in our Research Project

Reflecting on your Involvement in our Research Project

You as Teacher-Researcher

1. Please list any relevant details under these headings:

- Years of Teaching:
- Qualifications:
- In-depth professional development:
- Leadership within your school:
- Level of confidence in mathematics content and teaching:



2. What were your reasons for becoming involved in the project?

3. Have you had any previous research experience?

4. Prior to your involvement in this project, have you used research to inform your practice? In what ways?

The Research Team

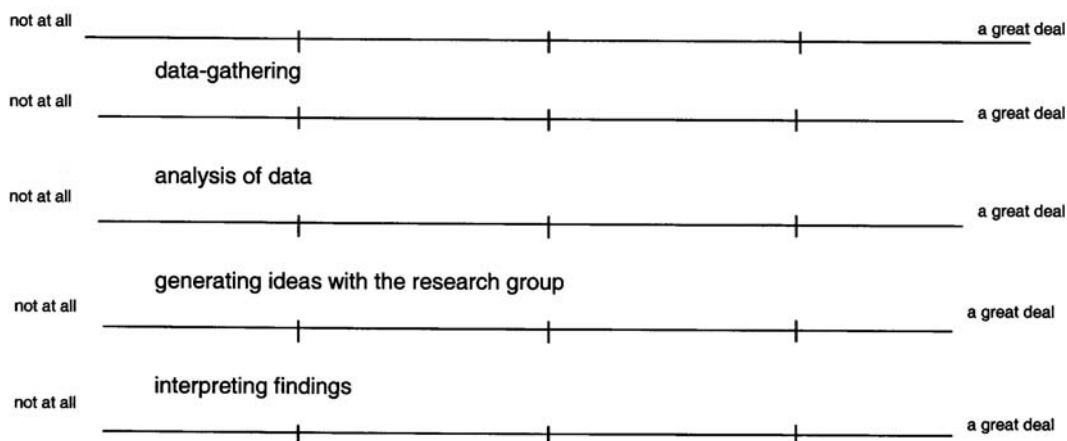
5. One of the goals of the project was to develop partnerships between teachers and researchers. How well do you think our project fitted your ideas of partnership?

- What worked well? What didn't work well? What could have been done differently?

6. What, in your view, were the roles of each member of the research team?

- Teacher-researchers (you)
- Project leaders (Linda and Ruth)
- Research consultant (Jo)

7. How much did you feel you contributed to:



Reflecting on the Project

12. How relevant did you feel the focus of the project was for your teaching practice?



Please explain:

- In what ways has your involvement in the project influenced your teaching practice?
- What relevance do you feel the research has for teachers in general?

13. What are the important ideas about questioning you discovered? How has the research changed your views about questioning?

14. What else has the research made you think about?

15. What have you learned about research in general and the relationship between teaching / learning?

- Have your views of research altered in any way? How?
- Why is research important?

16. What further questions about teaching/learning has it raised for you?

Any further comments?