

## WHAT MATHEMATICS DO PRIMARY B.ED. STUDENTS WANT AND NEED?

Lin Taylor

University of North London

*I have been investigating what mathematics Primary B.Ed. students feel it is important for them to study to be competent teachers in the classroom, and the thinking behind their choices. This survey was intended to explore the implications of this for the restructured six-subject B.Ed. degree.*

Next year the courses for training primary teachers in line with the new guidelines come on stream. The clearest statement I have found of the subject knowledge students are required to have is the Ofsted guidelines for inspecting primary ITT institutions. It may appear from these that, if all students have a GCSE grade C or equivalent, they will have covered all the necessary mathematics before they start. However, the experience of most of us is that GCSE does not give much indication of students' real knowledge or confidence. I wanted to find out what our students themselves felt they needed.

In our institution, primary BEd students are recruited onto either an Early Years (EY) or a general Primary programme. Towards the end of a generalist first year, they choose a specialist subject "cluster" for their second and third years, which will form the core academic content of their degree programme. Specialist subject mathematics (SS) is taught as part of a cluster with computing art or science, which may therefore attract students whose main interest is in one of the other subjects. Furthermore, a previous study showed that some students chose it precisely because they felt less than confident in mathematics and needed to build up their strength in this area. These considerations give a context to some of the findings and analysis below.

I devised a questionnaire to explore students' perceptions of their own strengths and weaknesses and of mathematics as a subject, and what mathematical content they felt they and others needed on the course. Most questions were of the yes/no or agree/disagree variety, but in addition students were invited to add their own comments; many did so, and I have drawn freely from these in my analysis. The order of questions may seem arbitrary, but this was in part a deliberate attempt to separate related questions in order to elicit an "uncontaminated" response. Pairs of related questions were analysed together.

The questionnaires were administered to about 130 first year students during spring term 1995, after they had made their specialist subject choice for Part II and after they had done the first curriculum mathematics course (which focuses on subject application). 71 replies were received, which broke down as follows:

|                      |    |
|----------------------|----|
| Early Years / SS     | 14 |
| Early Years / non-SS | 20 |
| Primary / SS         | 13 |
| Primary / non-SS     | 24 |

(Note: SS means mathematics specialist subject,  
nonSS means the specialist subject is not mathematics)

The response rate for Early Years was proportionately somewhat higher than that for Primary.

Q.10 Should all the mathematics you study be related to what you will teach?

Q.12 Do you think it is important for all BEd students to study mathematics as a subject in its own right as well as mathematics for the primary classroom?

These were analysed together, as they both explore perceptions of the relationship between subject knowledge and subject application. My previous survey showed a tendency among many students, including SS specialists, to covertly redefine issues of mathematical content in terms of classroom application. Question 10 showed a perhaps predictable difference between the SS and nonSS groups across both age specialisms. Clear majorities of the SS specialists (EY 10 out of 14, Primary 10 out of 13) gave negative replies, i.e. not all the mathematics studied should be related to their teaching, and clear majorities of the nonSS group (EY 13 out of 20, Primary 14 out of 21) responded positively, i.e. the mathematics should be related to what they would teach. However, several of the positive replies, especially among the EY students, were very thoughtful and took a broad and flexible view of what "related" meant in this context, showing a willingness to explore mathematical concepts at well above classroom level in order to develop their own fluency and confidence in the classroom.

Answers to q. 12 showed a less clear-cut picture. Among the EY students a clear majority of the SS group (9 out of 12) and a narrower majority of the nonSS group (11 out of 18) agreed that they should study mathematics as a subject in its own right. The Primary nonSS group showed a similar proportion in favour to their EY equivalents (14 out of 23), but there was a puzzling result among the Primary SS group who were evenly split on the issue (6 each out of 12).

From these responses, students seem open to the idea of studying mathematics as a subject in its own right but, perhaps not surprisingly, their concerns are focused around mathematics that they can perceive as in some sense relevant to what they are likely to be teaching. This could relate well to the new guidelines linking subject knowledge and subject application but how this is done in practice without diluting the subject knowledge is another question.

Q.5 Do you feel confident about your own knowledge of how children progress mathematically? What would help you feel more confident?

Q.6 Do you feel confident about your own mathematics in the classroom, or when talking to parents? What would help you feel more confident?

The largest group who said that they were confident in response to q.5 are the non SS primary students and they feel it is more subject application not subject knowledge that would help them, whereas at the other extreme it is the EY non specialists that are not very confident and feel more subject knowledge would help them.

From question 6 it seems that in this context EY students and the primary specialists feel more confident about their own mathematics and generally it is seen as more subject knowledge that would help. Often the same students said they were not confident in either area.

Q.4 Are there particular areas of mathematics which you do not feel confident about? If so, what are they?

Q.13 Which areas of mathematics do you personally feel it would be useful for you to study on the BEd degree?

All groups mention "algebra" as an area they do not feel confident about in Q.4 but although it is mentioned by some as an area it would be useful to study it does not feature so prominently in Q.13. "Fractions" are mentioned by the non specialists as an area they do not feel confident about but only by the primary students and this was as an area they would like to study. "All areas of maths" crops up for non specialists as what they lack confidence in but "most areas" they feel they need to study.

Q. 7 Do you agree with the statement that "Some people can never understand mathematics"?

Q.8 Do you agree with the statement that "You have to be very brainy to understand mathematics"?

These questions were designed to assess how far the respondents had a perception of mathematics as a particularly difficult or forbidding subject. The majority rejected the view that "Some people can never understand mathematics" (q.7) This rejection was unanimous among the Primary groups, but 6 out of 20 in the EY/nonSS group agreed with the statement, as did 1 out of 14 in the EY/SS group. No respondent agreed with the statement that "You have to be very brainy to understand mathematics" (q.8), though 2 of the EY/nonSS group gave indeterminate answers of the "Only up to a point" variety. Otherwise rejection was unanimous; what comes through from many of the comments on both this and q.7 is a sense of the students' genuine pleasure at their own progress and their breakthrough in confidence. One student responded to Q.7 "I was told by my maths teacher

that I was never going to be able to do Maths and I failed my GCSE. But on the Access course I passed my maths with an A".

Q. 11 Do Early Years teachers need to study mathematics?

In hindsight, this was the wrong question to ask, as no respondents answered negatively. What did emerge from some of the comments was a sense that EY teachers only needed relatively basic mathematics, and it would have been better to have asked a question focused on this. Interestingly, this view was most commonly expressed among the Primary nonSS group (6 out of 23 responses, compared to 2 out of 20 for EY/nonSS, only 1 for SS). This view may well have been shared by students who did not choose to comment on it, and thus be under-represented by these findings. One or two of the Primary responses showed a slightly patronising attitude to the mathematics required by EY teachers.

Students' comments in this type of exercise are not always clearly articulated, and sometimes show alarming imprecision in their use of mathematical language and their understanding of the nature of the subject. It is my belief however that we have to take them seriously and build them into our curriculum planning, from two points of view:

- a) It is important for students' own perception of the coherence of their mathematics programme that the content, while not constrained by the National Curriculum, should be shown to be linked to it, and that all opportunities should be taken to demonstrate such links
- b) A high proportion of students express a willingness to explore mathematics "as a subject in its own right", while also showing a consistent tendency to redefine mathematical content in terms of subject application. This apparent contradiction indicates both a danger and an opportunity.

It seems to me that such small-scale surveys have a definite value within the institution in terms of sensitising curriculum planners to the perceived needs and aspirations of students, and their own interpretation of the demands the National Curriculum will make of them as classroom practitioners and, in some cases, mathematics specialists.

References

Ofsted Working Papers for the Inspection of Primary Initial Teacher Training HMS O Mar '95