

# IT'S NOT WHAT YOU DO, IT'S WHY YOU DO IT: REFLECTIONS ON THE ROLE OF TEACHERS IN RESEARCH ON ALGEBRA

Laurinda Brown and Alf Coles

University of Bristol, Graduate School of Education and Kingsfield School,  
South Gloucestershire, UK

Generalisation is accepted as an activity supporting students' use of algebraic notation and language. One class of such problems used in the research literature involves finding a general rule for, say, the number of matches used to make a row of  $n$  squares. There seem to be four styles of research with such problems:

- 1) students' responses (problems given without teacher intervention, but often with support of interviewer or teacher) are analysed (e.g. Friedlander et al, 1989)
- 2) a large-scale survey testing mathematical reasoning which, after analysis, is to be followed up with case studies of effective outliers (Küchemann & Hoyles, 2001)
- 3) discussions of personal pedagogical practice (e.g. Hewitt, 2001, Mason, 1988)
- 4) exploring details of teaching strategies alongside student work (Radford, 2000, Brown & Coles, 1999).

How is it possible for us, as researchers, to question assumptions that we are making and to become aware of different teaching approaches? Reading research papers does not seem to be sufficient experience. At the recent 12<sup>th</sup> ICMI study conference, in a discussion amongst researchers from many countries, it was possible to surprise each other as we discussed the research and teaching related to this class of problems. The surprises came as we experienced the detail of the teaching practices of others. At the heart of research are the developing awarenesses and actions of teachers and their students. If the aim of research is to improve teaching and learning, then we need to report on what is *possible* and include the complexities of teachers' purposes, knowing that these cannot be copied but with the hope of extending our practice. This paper comes with a plea that we make the role of the teacher and the related students' work central to our research projects and that we report, in some detail, case studies of examples of practice that surprise us.

## REFERENCES

- Brown, L., Coles, A. 1999 'Needing to use algebra: a case study.' PME 23, Vol 2, pp.153-160
- Friedlander, A., Hershkowitz, R., Arcavi, A. 1989 'Incipient "algebraic" thinking in pre-algebra students'. PME13, Vol.1 pp.283-290
- Hewitt, D. 2001 'On learning to adopt formal algebraic notation'. In Proceedings of the 12<sup>th</sup> ICMI study conference: 'The future of the teaching and learning of algebra', Vol.1 pp.305-312
- Küchemann, D., Hoyles, C. 2001 'Investigating factors that influence students' mathematical reasoning'. PME25, Vol.3 pp.257-264
- Mason, J. 1988 *Expressing Generality: Mathematics Update*. Milton Keynes: Open University
- Radford, L. 2000 'Students' processes of symbolizing in algebra'. PME 24, Vol.4 pp.81-88