

## BSRLM Day Conference University of Sussex: 20<sup>th</sup> November 2004

### Speaker

Dave Baker,

Title: to be confirmed

### Working group session

Keith Jones, University of Southampton & Sue Pope, St Martin's Lancaster

Sharing experiences of beginning as a researcher

Time: 1 hr

This session provides an opportunity to share experiences of beginning as a researcher. What helps? What are some of the obstacles? If you're an experienced researcher, what advice would you give to those starting out? If you are new to research, what is your motivation, what has got you started? Within the session, the intention is to generate advice and illustrative stories which might be useful to those new to mathematics education research, especially those involved in initial teacher education. Such writing could become part of the "itemaths" website:

<http://www.itemaths.org.uk>

### Conference sessions

Laurinda Brown, University of Bristol

It's about learning: from purposes to basic-level categories to metacommenting

Time: 1 hr; age: secondary, HE, teachers; topic: teacher education

**Abstract:** In my work as a teacher educator, teaching on a PGCE secondary mathematics course, and as a teacher in a classroom, I am interested in how students learn in situations where they, initially, don't know what to do. What is the process of coming to know? For ICMI-15 I have submitted a short, distilled paper on the theoretical principles underlying my practices, but, in this session, I want to explore with participants the ideas of purposes, basic-level categories and metacommenting through activities and transcripts to see whether they have any meaning in your own situations.

Pat Drake, University of Sussex

Learning mathematics the hard way as a teaching assistant

Time:  $\frac{1}{2}$  hr;

**Abstract:** A group of TAs undergoing a degree in mathematics education studies will reflect upon

- \* changing attitudes to mathematics
- \* being stuck
- \* dealing with difficulty
- \* school mathematics and university mathematics

Julie-Ann Edwards, University of Southampton

Friendship groups and socially constructed knowledge

Time:  $\frac{1}{2}$  hour; age: secondary; topic: pupil learning

**Abstract:** This paper explores the role of friendship groupings in developing socially constructed mathematical knowledge. Transcripts from small groups, working on open-ended activities in secondary school classrooms in the south of England, are examined. Evidence from this peer talk is used to challenge the Vygotskian model of the need for a 'more learned other' in social learning settings. The paper argues the case for a neo-Vygotskian perspective in which peers jointly and equitably construct meaning from situations problematic to them.

**Camilla Gilmore**, University of Oxford

Children's understanding of concepts in arithmetic

Time:  $\frac{1}{2}$  hr; age: primary; topic: pupil learning

**Abstract:** To learn arithmetic, children must not only learn to add, subtract, multiply and divide, but they must also learn key concepts (like the inverse relationship between addition and subtraction) in order to make their calculations faster and more efficient. I will present a study that assessed Yr 2 and Yr 4 children's skill with arithmetic calculations and their understanding of the inverse principle. Most children learn the concepts and calculations together, but there was a group of children with conceptual understanding that was far more advanced than their calculation skills. This suggests that learning the procedures of arithmetic and learning the underlying concepts may be independent processes, with implications both for theories of cognitive development and education.

**Dave Hewitt**, University of Birmingham

Explaining, questioning and stating

Time: 1 hour; Age: primary, secondary; Topic: pupil learning; language: computers/IT

**Abstract:** During this session we will look at selections from a video of myself working with a small group of low ability year 9 students on manipulating arithmetic expressions using the computer program *Working with Equations*. On recently looking at this video I was surprised by the number and nature of the interventions I made and some of the language aspects involved. The focus on this session will be a critical, retrospective, look at times when I explained, times when I questioned, and times when I just stated and to look at this within a particular conceptual framework. Particular attention will also be paid to language issues and the notion of stressing and ignoring. I should state here that the video is mainly a computer screen and due to the lack of sync between the computer updating the screen and the video recorder, there is a flicker effect. Anyone affected by strobe lighting may not find it comfortable to watch the video.

**Andrew Noyes**, University of Nottingham

Where have all the maths teachers gone?

Time: 1 hour

**Abstract:** In this session I will examine how mathematics teachers choose, and are chosen by, the schools in which they will start their induction year. Using Bourdieu's notions of habitus and habitat I argue that such choices are far from arbitrary and are strongly influenced by teachers' social histories as well as tutor placements. The net result of this is the uneven distribution of teachers, with clear differential effects for children learning mathematics in different kinds of schools. The data is taken from a pilot study consisting of one cohort of 40 student teachers together with survey work conducted in our partnership region.

**Sandra Pendlington**, University of Bristol

Low self-esteem: its effect on the learning of low achievers

Time: 1 hour; age: primary; topic: pupil learning

**Abstract:** The session will describe a 3 month teaching project with low achieving year 6 children. During the project on-going analysis showed that low self-esteem was a crucial factor in the children's difficulties when learning mathematics. Affective teaching strategies were developed to help the children to overcome these difficulties and raise self-esteem. These strategies will be discussed in relation to other research on self-esteem. Further analysis of the project data showed that children with low esteem when learning mathematics need different approaches to those detailed in the National Numeracy Strategy.

**Adrian Pinel**, UCC, **Carol Plater**, University of Brighton, **Maria Dawes**, University of Portsmouth

Developing a secondary mathematics partnership across a south coast region, spanning pre-ITT and within-ITT course provision

Time: 1 hour; age: teachers, secondary; topic: teacher education

**Abstract:** The session will outline the key factors and processes identified within our joint development of a creative partnership culture across our three south coast universities. This partnership has developed in the context of the bidding, designing and teaching of a pre-ITT mathematics enhancement course. It has continued consequentially with collaborative developments within 3 neighbouring PGCE Secondary Mathematics ITT routes. It is currently focused around a project initiative wherein each of us contributes half-day specific teaching sessions to our own and each others' routes, thus enabling the pooling of complementary expertise, so as both to enhance all three training routes and to contribute significantly to our mutual continuing professional development. Indeed, this very conference session and paper, and its preparation, are themselves a part of the process of extending and deepening the creative nexus.

**Anna Poynter**, Kenilworth School

Mathematical embodiment and understanding

Time:  $\frac{1}{2}$  hr; age: secondary; topic: pupil learning

**Abstract:** This paper considers how reflection on practical activities can lead to meaningful embodiment of mathematical concepts in a way that integrates practice and theory. In particular, it focuses on how an action such as translating an object on a table can be conceptualised as a mathematical concept - in this case a free vector - by shifting the focus of attention away from the actions themselves to the effect of the actions. The practical theory that arises has wide applications in mathematics involving processes that are symbolised and then conceived as mathematical concepts.

**Alison Price & Bill Domoney**, Oxford Brookes University

Thinking algebraically about early number operations with primary ITT students

Time: 1 hr; age: primary, HE; topic: pupil learning, teacher education

**Abstract:** We have been exploring ideas of algebraic thinking about early number operations with students on our primary ITT programmes. Early findings show differences in student's understanding of the relationship between early number and algebra according to the type and stage of their training. We hope to share and discuss some of these findings.

**Stuart Rowlands, Ted Graham and Peter McWilliam**, University of Plymouth

Misconceptions of Force: Spontaneous reasoning or well-informed ideas prior to instruction?

Time: 1 hr; age: Tertiary, HE, teachers, secondary; topic: pupil learning

**Abstract:** Throughout its twenty five year history, the conceptual change literature assumed student misconceptions of force are formed prior to instruction in mechanics. We argue that it may well be the case that misconceptions are not formed until the student considers force and motion in a scientific context for the first time. We also argue that misconceptions are elements of spontaneous reasoning that cannot be examined outside the lens of Newtonian mechanics and that we have to induce them in order to change them. With reference to data taken from one-to-one Socratic tutoring we will attempt to show how the characteristics of misconceptions can be explained.

**Chronoula Voutsina & Keith Jones**, University of Southampton

Studying change processes in primary school arithmetic problem solving: issues in combining methodologies

Time:  $\frac{1}{2}$  hr; age: Primary; topic: pupil learning

**Abstract:** In studying changes to children's successful strategies while solving arithmetic tasks with primary school children, two methodological approaches were combined: the micro-developmental method and the clinical method of interviewing. This paper discusses the ways in which these approaches were combined in supporting the design of the project. Extracts from the data collected illustrate how the combination of the two methods can reveal a variety of aspects in children's ever changing problem solving behaviour, such as problem solving approach,

efficiency and solution time as well as changes in children's verbal and non-verbal behaviour. The paper discusses specific aspects of the combination of the two methods of research that proved to be suitable and particularly effective in studying the *process* of behavioural and conceptual change in the domain of arithmetic problem solving.