# RECOGNISING, RECALLING AND DOING IN THE 'SIMPLIFICATION' OF TRIGONOMETRIC EXPRESSIONS

Ali Delice, School of Education, University of Leeds

I consider students' 'simplification' of trigonometric expressions and present an operational model of how they simplify expressions. The model has three components: recognising, recalling and doing. I describe the interaction between these components and link this model to other models, e.g. Saxe (1991), of doing mathematics.

Data on students' manner of simplification was obtained using concurrent verbal protocols as students solved simplification items to gain an insight into their thinking. revealed a uniformity of approach with regard to approaches to simplification.

Students begin by reading the question and then focus on a subexpression or an algebraic form – I call this 'recognising'. They then 'recall' trigonometric or algebraic properties. In the schematic of my model (see Figure 1 below) read, recognise and recall are grouped together under the term 'recognition' because they all rely on sign association. Students then 'rewrite' the given expression with some form substituted for another. They then examine the rewritten form and recognise/ recall another subexpression/property and enter a further manipulate/ rewrite phase or accept their rewritten form as the result, the simplification. Recall, manipulate and rewrite are group under the term 'doing' because they all rely on transforming signs. The model, in its current form, has 'recall' in both the 'recognition' and 'doing' groups which reflects the dialectic between recognition and doing in this context.
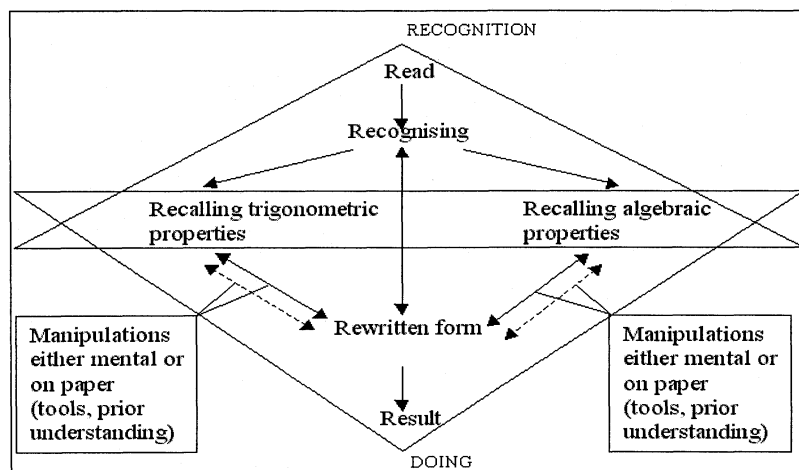
Figure 1 *Schematic model of students' simplification of trigonometric expressions.*

Reference

Saxe, G.B. (1991) Culture and Cognitive Development: Studies in Mathematical Understanding, Hillsdale, N.J : L. Erlbaum Associates.