

ANALYSING DATA ON THE RELATIONSHIP BETWEEN TEACHING AND LEARNING ADDITION IN A PRIMARY CLASSROOM

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Abstract

In the analysis of my data on the teaching and learning of addition in Reception and Year One classes I am attempting to characterise how the teacher represents mathematics to the children and the children's responses in understanding and learning.

Here I will describe the process I am developing and welcome discussion on its ability to describe the teaching/ learning interface.

Introduction

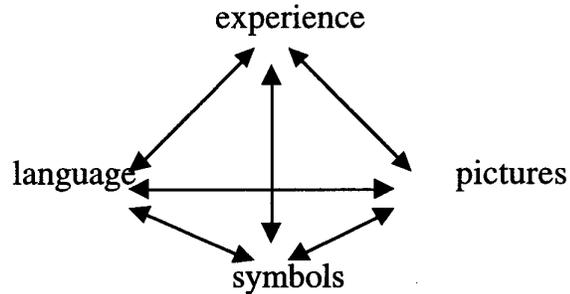
The literature on grounded theory (eg Glaser and Strauss 1967) seems to indicate that having collected qualitative data, the theory will emerge all by itself. There is an extent to which I have found this to be true. Even while I was collecting the data certain episodes stood out as being in some way significant and I was able to reflect on these individually. However, it was necessary to try and get some sort of overview of the whole data in order to avoid just picking out pieces I was interested in.

The first way that I did this was to identify what representations of mathematics the teacher was using. This was based on the headings

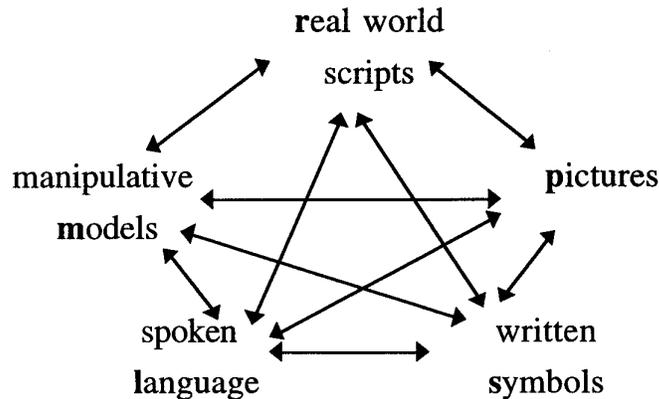
experience --> language --> pictures --> symbols,

a model of teaching early maths developed by Pamela Liebeck (1984) from Bruner's Enactive, Iconic, Symbolic model of learning (1966). Having identified the representations I needed to see the interaction between them. Following

Haylock and Cockburn (1997) who assert that these representations are not necessarily a progression but are interrelated, I started to look at the way that the teacher related them.

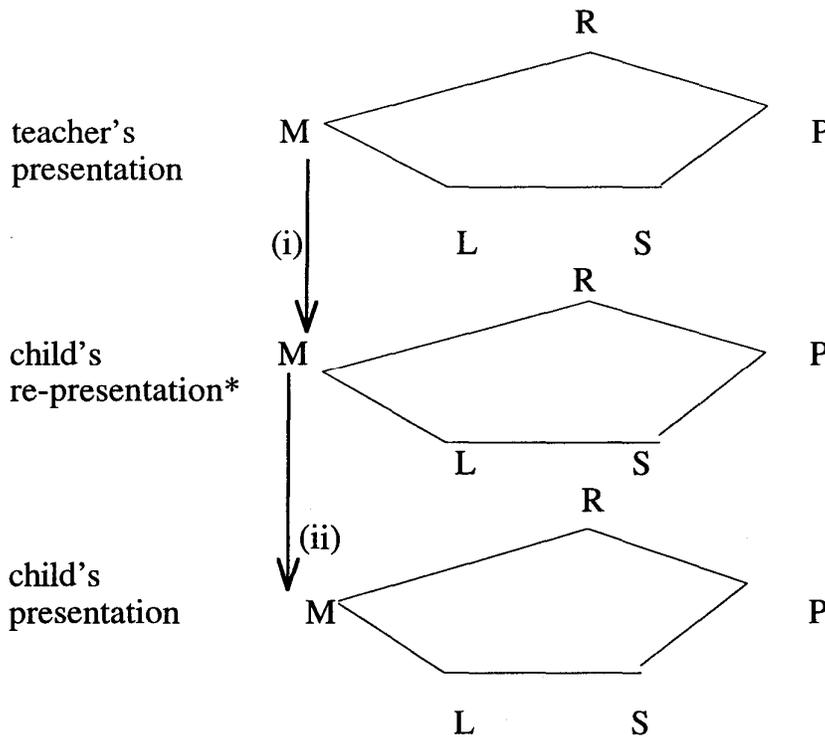


However, although this made a start at representing the whole data, it proved an inadequate model. It did not identify a representative element that had seemed important in the initial significant episodes, that of the use of stories and real life examples to explain the mathematics. This led to the further development of the model with reference to Lesh, Post and Behr (1987) who had developed their model to analyse children's problem solving strategies. They used the expression 'real world scripts' which seemed to me to include story as well as real examples of mathematics.



This provided a model by which I could analyse what the teacher was doing in terms of presenting mathematics to the children.

I then tried to extend this to look at the representations that were used by the children. This could result in a double or treble pentagon with mappings to show the links. (For simplicity the five elements shown above are reduced to initial letters.)



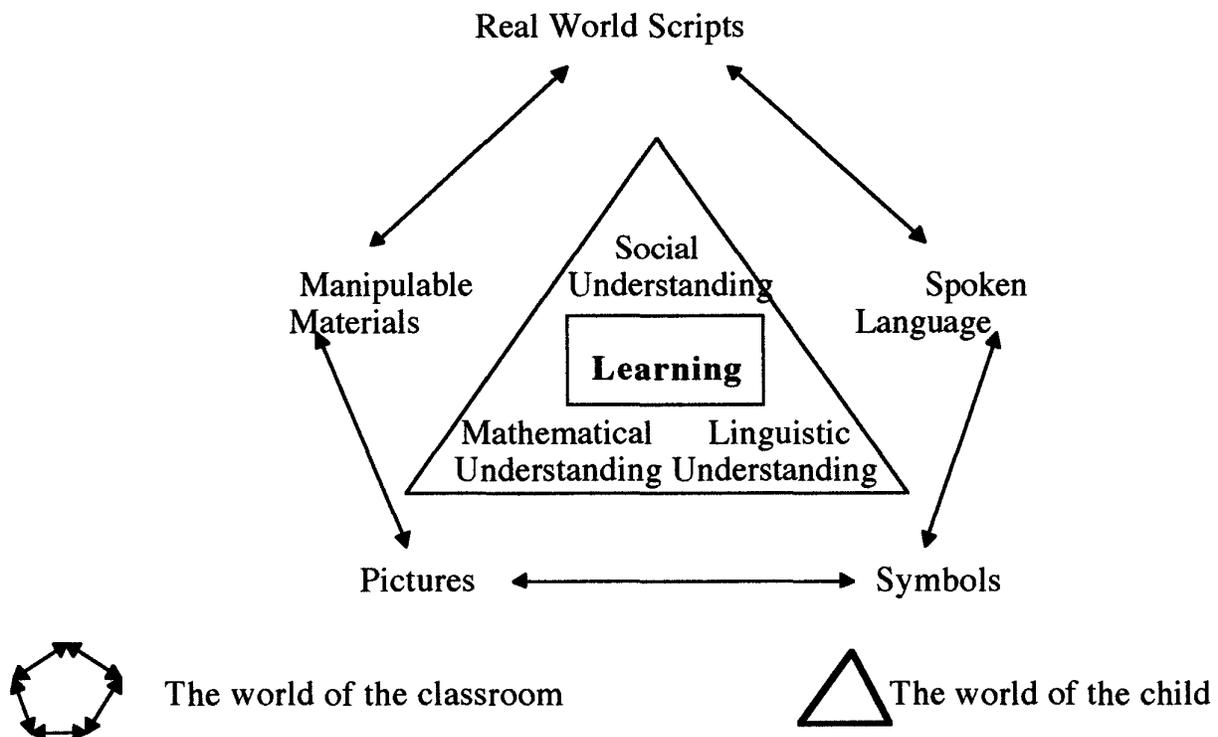
Here the arrow marked (i) indicates the child is able to re-present the mathematics using a manipulative model. (ii) indicates that at a later date the child is able to present anew, yet related, mathematical situation using a similar model. Such arrows would be possible between any of the five representations.

However, from this it was difficult to show any evidence of learning. If the child could say, repeat the language the teacher used how did I know that they had any understanding? Sometimes I could see that they could do the same in a different context the following session but this did not necessarily show what it was about the teaching that had resulted in learning.

did not understand what it was the teacher was trying to explain or get them to do I could see there confusion. Further analysis of the data from to of the teachers showed these *misunderstandings* to be related to one or more of three areas of the children's previous understanding of the world. The children were drawing on their knowledge of the world in terms of social understanding, mathematical understanding and understanding of language. Where the previous understanding was at odds with the present task they were confused and their learning was hindered.

This allowed me to develop a new model which I want to look at with you.

I have now used this model to analyse each of the teaching episodes in my data and I can now compare those lessons where learning appears to be unproblematic with those where problems arise. However I am aware that the model and the analysis is my own. So what I would like to do for the rest of the session is for the group to look at one piece of data for me and attempt to use the model yourselves.



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