Level 5 Mathematics - Are they Thinking What I Am Thinking?

PEEL in Practice: 1300 ideas for quality teaching
Rosemary Dusting, Avila College

This is a description of a Year 8 Maths lesson in which I made explicit attempts to help my students see the big picture of learning.

My introduction to the lesson was to ask them to write down three things they had learned about "linear graphs" which we had studied for three eighty-minute lessons. After the usual wisecracks ("What are linear graphs?") they wrote assiduously. Then I asked each student around the class to read out one point. In a flash of inspiration, I told the rest of the class that they should listen very carefully and write down anything which they themselves had not written. This proved to be very successful and I was gratified to see them busily transcribing most of what was said into their notebooks. (I deliberately dictate notes occasionally so that their auditory skills are practised, so this task wasn't a problem for most.) Anyone who said their point had already been mentioned was asked to read out their three anyway, as it would be good reinforcement of the ideas. They were surprised to see that they had a page of "revision" notes and also that they had learned "so much".

But this activity worked at a completely different level for me, and not in the way I had anticipated. I had made a concept map with them the previous lesson in which, through discussion, we carefully established links between the main concepts of RULE, TABLE OF VALUES, and GRAPH. They all copied the concept map into their books. At the time, they seemed very confident that they knew how to get from one major concept to another and what it meant to do so. I judged that the majority of students were clear about this. Yet, when it came to the next lesson and the revision/linking activity I have described above, I was surprised that only one student mentioned that she had learned that "you can go from a rule to a table of values", and ALL the other 25 comments were to do with facts, names and procedures.

"there is a vertical axis and an horizontal axis"

"the axes cross at the origin"

"you must use a pencil"

"the scales must be even"

"there can be negative numbers on the scale"

"the ordered pair has x, then y" etc, etc.

Where was the higher order thinking which I had encouraged the previous lesson? They had only remembered how graphs should look and the process of plotting! The main new ideas of functions had largely been ignored.
I mentioned that I was pleased that they had remembered how to make graphs, and pointed out the difference in the type of comments, but could they think at a higher level? This sparked a bit of page turning and half a dozen hands went up.

"you can work out a rule from the table of values"

"you can work out a table of values from a graph"

"the y-intercept is given by the rule"

There was quite a bit of nodding and agreement that, yes, they had learned these things, and, yes, they were very important. Could they see that there was a difference in the type of statements? General agreement.

This was better! This little exercise has made me ponder about learning. Was it that they had just written quickly what most readily came to mind? For me, this fifteen minutes in my class made me see that students often really do only perceive learning as being about facts and how to do things, rather than as being about understanding the overview and seeing the big connecting ideas. It takes a bit of effort, encouragement and explicit discussion in order to elicit better linking. I will be more careful about what I assume they are learning in the future.

Do we all avoid the hard work of thinking a bit more deeply unless we are forced to? I am fairly convinced that the girls were able to think at the application and synthesis level, as in the previous lesson they had been comfortably doing some tasks that required that type of understanding, yet they hadn't initially perceived these ideas as being the most important things. The only solution I can see is to offer this kind of "de-briefing" opportunity as often as possible in my teaching so my student can come to understand what they are really being taught.

Copyright © 2005 Peel Publications