Surprise

I once overheard this at a mathematics education conference:

Delegate A: Which session are you going to next?

Delegate B: I'm going to the one on 'Surprise'.

Delegate A: Oh.

'Surprise', we are told, is Ingredient X, the pedagogical Viagra that we can all add to our lessons to enthral our students and revolutionise learning. It's hard to challenge this received wisdom. Yet can 'Surprise' become so pervasive a strategy that it becomes mundane? It is, of course, my job as TES Chief Heretic to play Devil's Advocate at every available opportunity. I remember reading the excellent *The Man Who Knew Infinity* by Robert Kanigel, a life of the brilliant Indian mathematician Ramanujan. The following passage describes his attempts at being a tutor:

The only trouble was, Ramanujan couldn't stick to the course material. He'd teach the standard method today, and then if his student forgot it, would improvise a wholly new one tomorrow. Soon he would be lost in areas the boy's regular teacher never touched.

The chance to hear Ramanujan improvising on mathematics is an experience many of us would die for, but for his tutees, grappling with the material for the first time, there seemed to be no solid ground, no familiar signposts that were invariant from lesson to lesson. Some of his students (the more gifted ones) were inspired by Ramanaujan; others grew irritated by his improvisatory approach, and sacked him. As I look around my class, I see some students who find A Level maths hard. Let me take a typical such student, and call her Camilla. I wonder sometimes if the problem here is less 'not enough surprise' as 'too much surprise'. Camilla seems to

experience wave after wave of surprise each lesson, as the number of ways in which she can fail to understand seems to her to grow exponentially (except she doesn’t understand what ‘exponentially’ means). She sits next to students who do understand, almost effortlessly it appears to her, who greet yesterday’s formula as an old friend and who never seem to forget anything. Camilla struggles to construct a question for me that will not betray her complete at-sea-ness in too embarrassing a way. And while she is battling to do this, she is missing the point of the next piece of mathematics, and so it goes on.

So I do believe in surprise, but my responsibility as a teacher is to manage it a little. The aim becomes to create a gentle shock, where the surprise of seeing one's mathematics exposed or confirmed is neither 'failure' nor 'success', but a growing point. If I can create the environment where Camilla enjoys that feeling of mathematical vertigo, because she knows it will lead on (with a little hard work) to a deeper understanding - ah, then I and she would be getting somewhere, towards a confidence that every feeling of at-sea-ness will lead eventually to a sense of land-ahoy-ness.