

LEARNING MATHEMATICS THROUGH “REAL-LIFE” PROBLEMS: TEXTS, CONTEXTS AND CON-TRICKS

Mike Ollerton

One of my responsibilities as a teacher trainer is to work with students who are training to be KS1 and KS2 teachers, and who need to refresh and develop their mathematics. All of these students will have gained the equivalent qualification of GCSE grade C or above. Most of my energies are spent trying to build up students' confidence in mathematics by seeking to demystify concepts. This often involves deconstructing their anxiety with mathematics. I was particularly interested in one student who, at the end of a session on co-ordinates and linear graphs, commented that for the first time she understood what they were all about. I was, as you would expect, delighted with this feedback. However, her next comment took me by surprise; this was that she had gained a grade C . . . at A-level! How could it be, I wondered, that someone could gain a grade C at A-level when she did not understand the basic ideas about linear graphs? Furthermore, if this student had such feelings about her mathematics, where did it leave other students, some of whom may not have studied mathematics for at least five years?

This comment, together with other reactions and responses from students, raised the issue for me about how some undergraduate students feel about mathematics. I therefore set about exploring the issue of mathematical anxiety and this article is based upon discussions with two graduates, Liz Thornton and Zoe Cropper who kindly agreed to be interviewed.

Interview with Liz

Mike: When you hear the word 'mathematics', what do you think?

Liz: I don't like it.

Mike: Why don't you like it?

Liz: It was the hardest subject at primary school . . . I was always told I was good at English, so maybe I thought I just needed to be good at one subject. At age 7, I remember saying: "I don't like mathematics?"

Mike: Why do you think you said that?

Liz: I didn't like doing things that there was already an answer to . . . that someone else

had already worked out and where the answers were already written in the back of the book. Everybody was working towards the same answer and knowing that someone else had already worked it out before. I found it very frustrating to do this and thought that doing the same sums was pointless if the answers were already known.

Mike: How did that compare with English?

Liz: I never saw maths as a creative subject unlike English or art, even though these subjects had certain rules . . . you had to abide by certain rules . . . there weren't fixed answers like there are in a maths text book . . . I thought it was pointless to work out things that were already known . . . right and wrong answers. I couldn't see the point of working out answers to questions where they were trying to make it relevant to real life, such as how much it costs to build a patio . . . I always thought: "Well I'm never going to build a patio".

It really annoyed me that they tried to dress maths to make little scenarios that weren't at all relevant to me, as a ten-year-old, or even as an eighteen-year-old. I think all kids can see right through the false stories, and find it rather patronising that they are taught in this way . . . they know that it's not realistic or relevant and think it is 'naff', but know they still have to do it.

I also didn't like all the repetition, like doing, say, four pages of multiplication sums and having a race to get to the end of an exercise as all the class rushed through the tedious sums.

Mike: What did you enjoy about mathematics?

Liz: I enjoyed doing algebra to a certain extent. It was logical and it made sense when it clicked. Algebra was like learning the 'art of mathematics'. There was no pretence about supposed usefulness, such as I will need it in the future – it was almost like learning the rules of grammar in English. I think to say I enjoyed algebra is too strong, however . . .

Mike: Were there any similarities, in learning English, that you didn't like?

Liz: I didn't like learning about how to write a letter. It was boring and irrelevant, because – like I wasn't about to write to a future employer – well not when I was 14 . . . I had a problem to do with mathematics last week (July 1998) when I had to sit some tests for an employment agency and there was this question about *A motor bike costs £6200 and you get a 20% discount . . . I got an instant mental block. I felt I was back at primary school with a Scottish Primary Mathematics book!*

At the end of the interview I summarised the main reasons Liz had given for not liking mathematics. These were:

- the futility of having answers already worked out,
- an absence of creativity,
- the counterproductive effect of mathematics being 'dressed up' in 'real-life' to try to make it interesting,
- a lack of relevance to the learner,
- association with real-life jobs she knew she did not want to do,
- repetition,
- having right or wrong answers,
- forgetting the procedures and not knowing what to do,
- trying to hammer it (mathematics) in, in order to pass the exam, especially when she knew she would forget it almost immediately afterwards or discard the knowledge as being useless.

'Real-life' mathematics

There are several issues here which cause me concern, and one I am particularly interested in is that of producing 'real-life' contexts in which to pose mathematical problems to present to the learner. The real-life example which Liz used, of building a patio, is replicated in a *Key Maths* textbook, complete with a cartoon of a builder, Rod, who is surrounded by some hexagonal slabs. It reads:

Rod has ordered 26 white slabs for his patio.

He has forgotten how many red slabs he needs.

Rod needs the inverse of his formula . . .

The same issue was raised by Zoe, who also described how she was provided with so called real life examples in order to help her engage with mathematics . Here is an extract of our discussion.

Zoe: I think, when I did my second year of GCSEs, they were trying to contextualise things and make it more interesting and I remember getting a question about 'you are a farmer and you want to know the area of your field' but I used to think, but I'm not a farmer and who really cares? I could see what they were trying to do, but I could never imagine that I would want to know the area

of a field. I mean, why would you want to know really?

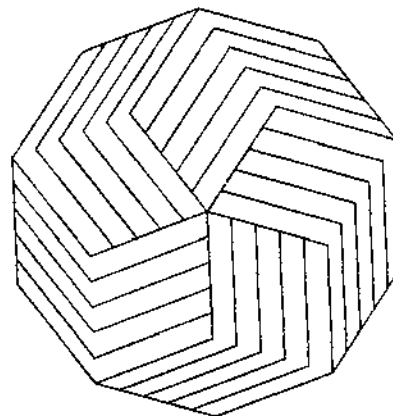
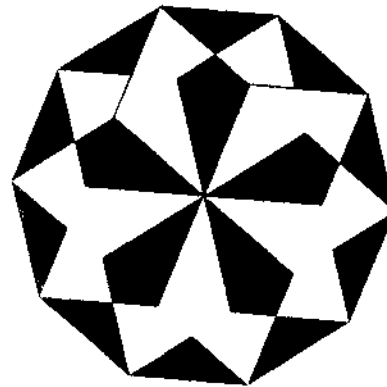
. . . I remember in my actual exam, I think it was trying to be trendy, when it talked about Kylie Minogue getting into a bath and displacing a certain amount of water. I remember laughing, thinking how they are trying to make it sound more interesting. I mean, would you ever need to know that; it's just pointless.

Liz and Zoe's objections to being taught mathematics through real-life contexts raise further questions, including these.

- Do other students have similar feelings about real-life contexts as an approach to being taught mathematics?
- How predominantly do such real-life contexts feature in schemes and textbooks?
- Do real-life contexts empower students to transfer their learning to other, slightly different, contexts?
- Do such real-life contexts aid mathematical learning?
- Are there alternatives to real-life contexts, which can be used to promote mathematical learning?

Mike Ollerton teaches at University College of St Martin, Lancaster. He wants to thank Liz Thornton and Zoe Cropper.

Congruent dissections of polygons



Jon MacKernan

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