
HIDDEN MESSAGES

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There is an almost unchallenged assumption that mathematics education, for both teacher and taught, occurs in a political vacuum. This I cannot accept: it seems impossible that such a central part, mathematics, of such a political institution, education, should really be politically neutral.

It is easier to be objective about, and therefore to recognise, the social bias of mathematics questions from abroad. Chinese examples stress agricultural and military applications; a Cuban textbook asks children to find 'the average monthly number of violations of Cuban air-space by North American airplanes'; Russian children are asked about collective farms; East German children have a similarity problem about a tower in Berlin and a bigger one in Moscow. All the following problems contain assumptions, some explicit and some implicit, about the society from which they (or in some cases their enemies) come.

Twenty-three peasants are working in a field. At midday six guerilla fighters arrive to help them from a military base near to their village. How many people are working in the field.

(Mozambique)

Once upon a time a ship was caught in a storm. In order to save it and its crew the captain decided that half of the passengers would have to be thrown overboard. There were fifteen Christians and fifteen Turks aboard the ship and the Captain was a Christian. He announced that he would count the passengers and that every ninth one would be thrown overboard. How could the passengers be placed in the circle so that all the Turks would be thrown overboard and all the Christians saved?

(USA)

A Freedom Fighter fires a bullet to an enemy group consisting of twelve soldiers and three civilians all equally exposed to the bullet. Assuming one person is hit by the bullet find the probability that the person is a) a soldier, and b) a civilian?

(Tanzania)

When worker Tung was six years old his family was poverty-stricken and starving. They were compelled to borrow five dou of maize from a landlord. The wolfish landlord used this chance to

demand the usurious compound interest of 50% for three years. Please calculate how much grain the landlord demanded from the Tung family at the end of the third year.

(China)

These examples coming from foreign cultures strike most of us as blatantly political, a part of the indoctrination of the young into the currently dominant values in these societies. But I feel that we are less aware of this same process when it occurs in British schools.

To find out more about this I recently made up a small collection of questions on percentages. They were based on textbook questions, some almost as printed, but slightly altered to make political points. I then asked some twenty-five teachers (in schools and FE) for their reactions to these questions.

One question concerned Mr Jones who owned a factory employing 100 people. He drew a salary of £15000 pa, paid each of the 20 supervisory staff £10000 pa and the other 80 employees £6000 pa. The question asked for the total wage bill and went on:

The company has done well in the last year so Mr Jones decides to give himself a 15% rise, the supervisory staff a 10% rise and the non-supervisory staff a 5% rise.

There were then questions about the new wages bill. Only ten out of my twenty-five teachers found the social and political assumptions here worth commenting on:

– There's a bit to talk about there ... we might have a little talk about industrial justice

– This is the shocking one ... I'd have to have a laugh about it I couldn't resist a comment.

It was surprising that there was divided opinion, even amongst teachers from the same institution, about whether or not the students would notice the inequalities of this industrial situation.

Another question was ridiculous, about a spider's weight which increased to 500 gm. Sixteen teachers commented on this absurd situation, six more than had mentioned the social context of the previous question. Was this because the first consolidated their own view of the world?

One question was about a man who won £2000 in a competition and the way in which he shared the prize money, his wife getting nothing and each of his sons more than their (older) sister. No one mentioned the latter point and only four teachers the former. Again, did they not notice or was it that this is how they know things are? One teacher made a different point: I don't believe in competition ... I usually say so.

It was alarming that only about half the teachers responded adversely to the use of the word 'alien' in this question:

Assuming that the number of aliens in the UK is $\frac{1}{3}\%$ of the population and that a football crowd is a random sample of the population, how many aliens would you expect to find in a crowd of 60000?

- I would avoid [it] ... [It is] likely to cause embarrassment to certain people and give rise to the nastier feelings of one or two members of our society.
- Calling people 'aliens' smacks of racialism.
- We'd be on very dangerous ground .. to use words like 'alien' or even to draw to children's attention that our society is a racial mix. We've got quite a few pupils in our school who will seize on anything like this as a means of causing friction between the various groups.

But what of the half who did not comment? They came from a variety of schools and backgrounds and it is difficult to believe that their pupils are more immune to racial prejudice than those mentioned above, or that such wording does not encourage prejudice, albeit subconsciously. Indeed on two occasions a teacher accepted the question without comment while another in the same school mentioned the extreme dangers of its use.

Just under half the teachers I spoke to broadly agreed with the two who said of this collection of questions: 'very establishment' and 'obviously class-biased, sex-biased and race-biased'. But the rest either did not find them so, or did not consider it relevant to their teaching of mathematics. It would have been interesting to see the teachers' reactions to questions about profits from burglary or tax evasion rather than investment. Even more revealing, had I been asking the questions now, would have been the reaction to this one, suggested by Griffiths and Howson [3].

A coal-mine employs 1000 men and loses £ N per year. If it were closed down suppose 750 of the men would not expect to find another job and would have to live off social security payments.

What value of N makes it cheaper to the state to keep the mine open? Is this a good way of thinking about the problem?

Would *you* use this question? Why? Or why not?

Swetz [1] found a problem in a Tanzanian textbook about canned peaches and 'is concerned about asking a poor man to struggle through the problems of the rich'. Likewise British textbooks use questions about

mortgages, investment and interest for those whose families, or who themselves, are on social security. In fact the time has perhaps already come when some people would find questions about wages offensive. Few questions ask the rich to struggle through the problems of the poor.

After further discussions with the teachers covering attitudes, methods and topics ('If a few more people had understood what inflation meant, they might not have won the election') about a quarter of the teachers remained clearly of the view that mathematics education is, and should be, politically neutral. It was interesting to see the pervasive and unanimous attitude of guilt and apology whenever a teacher felt she was questioning the norms of society. Four teachers expressed fear of being thought 'leftist'. Yet none was anxious about upholding the values of the right.

For some the discussions, and particularly the examples, caused a shift of position:

- Just looking at these questions ... one can ... have an influence even through mathematics which I see as being unlike many other subjects ... You've exposed to me that it is quite easy to subconsciously ... accidentally, inadvertently ... put forward views which .. you may not believe in. But ... through a degree of thoughtlessness and ill-considered preparation you may end up putting forward social views that you disagree with.

But no one went as far as the teacher quoted by Len Masterman [4]

For over twenty years I worked under the delusion that I was teaching maths. The social pressures I put upon the kids were designed to make my maths teaching more effective. I now realise that I was really teaching social passivity and conformity, academic snobbery and the naturalness of good healthy competition, and that I was using maths as an instrument for achieving these things.

For me, the final proof that mathematics education is by no means neutral came in answer to the question 'Has mathematics a role to play in furthering social causes and political understanding?'

Two teachers, from the same institution, replied: 'Yes definitely' and 'Oh, I shouldn't think so'.

How can anything which can elicit two such opposing but adamant replies be neutral? Politics is about conflict and there was conflict here. ■

References

- 1 Frank J Swetz: *Socialist Mathematic Education*, Burgundy Press 1978
- 2 Paulius Gerdes: *Changing Mathematics Education in Mozambique, Educational Studies in Mathematics*, vol.12 1981.
- 3 H B Griffiths and A B Howson: *Mathematics, Society and Curricula*, CUP 1974
- 4 Len Masterman: *Teaching About Television*, MacMillan 1980