

On Negotiation

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One of the most haunting anecdotes in E.M. Renwick's book, *Children Learning Mathematics*, relates how Philippa, a ten-year old who was 'usually a sedate, well-behaved little girl', grew angrier and angrier when her class was invited to consider a situation where as many pennies were collected from everyone as there were children in the class. Given that the total collection came to 49 pence, how many people were there in the class?

"It isn't adding, it isn't subtracting, it isn't multiplying, it isn't dividing," she exclaimed, and then, 'almost screaming', "It's NO SORT of a sum."

I sympathise with Philippa so much because her predicament reminds me forcibly of my own attempts as a child to make sense of my environment. As a second-generation immigrant I was brought up bilingually with my two languages corresponding to two very different worlds. At home I was cherished and loved and the language used seemed to describe my experience. When I went to school things were very different. There the language I used seemed to describe things I did not know about. What was this 'marmalade' people had for breakfast? Was it what I called 'orange jam'? What was this peculiar 'eleven'? Was it what I called 'ten-and-one'? Above all, I was mystified by what seemed to be an enormous network of rules that everyone else *seemed* to know about, but which I had never explicitly encountered. At home, we ate with elbows on the table. At school, this was said to be *rude*. At home, I heard grown-ups talk about God. At school, I heard them talk about the King and for a time I thought these were the same.

I had learned to read at home, but at my infant school the emphasis seemed to be on making rafia slippers and throwing balls, and neither of these activities interested me very much. Certainly everyone else seemed to know how to do them already. There was one interesting exception, namely arithmetic. Here was something that no-one else could do already. And the rules were explicit. Anxious to please, I cottoned on to the rules first time and began to enjoy brief moments of popularity as others began to copy me. I even earned a proposal of marriage from a much admired girl for telling her how to carry the tens digit.

As I grew older, I began to feel more and more of a fraud, because I was increasingly aware that I had not the slightest idea of what all this number-juggling was about. From time to time I made tentative efforts to find out, but my ability to get those interminable shopping lists from Pendlebury's *Arithmetic* always right meant that no teacher took my half-hearted questions seriously, and I was always too nervous to press the matter further in case I lost their esteem. I began to feel that here was yet another activity that other people knew about, but in which I was a foreigner. Everyone, of course, has had — and continues to have — the experience of being an outsider in some respects. After all, most people are bemused immigrants in mathematics classrooms at some time or other. What is important is how people cope with this experience.

It is difficult to convey the anxiety that some children have about being accepted as just like everyone else around them. This anxiety cannot permit any awareness that others may be less confident than they seem and it also blocks any direct grappling with the issue in question. In my case, it meant that I could not allow myself to scream like Philippa. It took me a long time to learn that I needed to express my ignorance when I felt it, that it was fatal to pretend to an understanding I did not have. *The against comes before the for*. Learning involves struggle; and, conversely, struggle means that some learning may be taking place.

The price that is sometimes paid for an early painless facility in arithmetic was uncomfortably emphasised by Winnicott in his notable lecture to an ATM annual conference in the sixties. He invited his audience of mathematics teachers to consider the intelligent baby whose mother is preparing food at the kitchen stove. The baby is raging with hunger. But being *intelligent* he hears the soothing words from Mum as she explains that she is getting his food ready. He controls his gnawing pain and waits, pursuing some 'as if' in his mind. He satisfies himself for a while with 'virtual food'. Such babies, said Winnicott, often become good at mathematics. But what happens to all that rage? After a chilling pause and a hard look at his audience, he went on to say that sometimes the rage wells up uncontrollably in adult life. Of

course, he continued with deadly irony, this was an issue that we enlightened mathematics teachers would know about. Of course, we murmured to each other uneasily at the time.

Yet it continues to be difficult to understand all the implications of the story about Philippa. Not all mathematics teachers agree that square-rooting can be a highly emotional issue. Some continue to talk about the pleasure to be gained from doing mathematics even though there is overwhelming evidence that for most people it gives enormous pain. But surely this pain is social, some would say. If only we could get the transactions right, mathematics could and should be pleasurable for all; the evidence is surely not about mathematics as such, but about the way it is negotiated; and surely this is what associations like ATM are dedicated to improving.

Negotiation may seem a curious word to be using in this context but its various shades of meaning are all relevant. People negotiate with each other, whether in markets or embassies, in order to come to some sort of agreement. At the same time, people negotiate obstacles that seem to stand in their way, and there is also a commercial sense in which people negotiate, say, a cheque, by exchanging it for cash. It is fruitful to bear all these meanings in mind when thinking about what might be happening in mathematics classrooms where each person is involved in some sort of negotiation with an Other, as well as with something called mathematics — usually sensed as something objective, having some sort of independent existence.

I am not sure, however, that there is something called mathematics that is distinguishable from its negotiation. Certainly, people discuss these separately. The contents of a mathematics curriculum are teased out and patted into various shapes; at the same time, questions of classroom organisation and management are debated — indeed, hotly argued about — but in terms that are divorced from the mathematical content. When mathematics is seen as inextricably linked with its negotiation (in whatever sense) then it seems possible to pose more relevant questions. For instance, do we act in classrooms so as to smooth out the possibility of Philippa's scream, or do we deliberately sail towards it? Who determines the negotiation in either case? What element of *surrender* is required? And by whom? Is this surrender related to the axiomatic point of view in mathematics? Is it a suspension of will? Or an intuitive act? These are certainly complex issues that need much more clarification than is possible here.

It is intriguing to note that taking a *look backwards* they seem to be issues that some members of the Association have been involved in quite recently. At the last Easter conference there were at least two occasions when I noted important

undertones that need further acknowledgement and discussion. One arose when in preparing for the second session of a seminar I was sharing with a colleague, I expressed some unease to him about a proposal that we should engage in a short dialogue with each other, leaving the seminar no choice but to eavesdrop and contribute later. Could this be carried off, I wondered, among a group of people used to a free-for-all, many of whom were far more knowledgeable about the topic we proposed talking about? But with so-and-so and so-and-so in the front row, said my colleague, we can get away with it — they are always game for anything. It is not for me to say how effective the actual session was, but I did feel that the ability of some people to surrender to the proposed way of working was an important factor that facilitated everyone's learning.

Such surrender is, of course, never total; it is not a surrender of autonomy but rather a willingness to engage. In contrast I felt that in another seminar that I attended the next day, there was a cautious holding back from what was offered. If we did not exactly scream like Philippa, we did nevertheless provide a steady, unacknowledged resistance that must have been very unnerving for the seminar leader. It is intriguing and surely very significant that so many people talk about the seminars they attend at conferences in the same way as children sometimes talk about lessons, as university students talk about lectures or as people talk about television programmes. This was great, that was boring; this was stimulating, that was pointless. It does seem to be difficult for us to stay with the notion that what happens on any occasion is dependent on what we put into it, that there can never be a situation that is so poor that we have not something to learn from it.

A man once complained to the Hodja that there was no sunlight in his house.

"Is there any sunlight in your garden?" said the Hodja.

"Yes," replied the other.

"Then put your house in your garden," said the Hodja.

It is when we act passively in a group that we give the group leader the burden of our dependence. Is this not what all teachers have to struggle with? It is not so much that people get scarred by their classroom experiences of mathematics so much as that they bring their scars to the classroom and steadily bully the teacher to be the authority that they can resist? But of course this is what changes in mathematics teaching have been all about, some would say. We no longer 'fill 'em and drill 'em'; wanting our students to enjoy and

understand mathematics, we have opened classrooms to much more investigation and exploration, to much more discussion and sharing.

Leaving aside the question of whether this is in fact remotely true for the majority of classrooms, I note that discussion can sometimes be a comfortable and comforting, but often unrewarding, exchange of views. Democratic discussion can be even worse since a majority view might still not mean anything to one who is in a minority. And a wish to respect the views of minorities can sometimes lead to the ultimately disrespectful acceptance of all views. Such a bland and unsatisfactory state of affairs can easily be found in many classrooms. This is not surprising since it can also be found on many in-service and initial training courses for teachers.

One of the many startling aspects of the fertile seminar conducted by Gattegno last autumn for some ATM members was the genuine difficulty we seemed to have initially in going with the way of working that was proposed. The apparent curtailment of free-floating discussion seemed to go against all expectations and habits. The challenge to develop a discipline of attention and responsibility for one's own learning seemed new, though the very first issues of *Mathematics Teaching* indicate that this was one of the pre-occupations of the Association in its early days.

Discomfort with the possible passivity of dependence easily moves towards the activity of Philippa's scream: this is NO SORT of sum. But the crucial issue is what she did then with her feelings. Did they stop her from attending further or did she understand them as a signal that something new was available? Can what is new — and possibly threatening — be *negotiated*? How do we learn to do this? What stops us when we find we cannot?

Negotiation seems to require that I try to listen with the ears of the other receiving my words in the same sort of way as I listen with my ears to myself. But having written that down I do not find it any clearer. Sometimes when I am angry I can still in the middle of my anger hear myself expres-

sing what I am really saying. It is more difficult to hear myself as the other must be doing. Sometimes when I engage in mathematics I can sense myself moving towards a surrender that seems to be demanded. It is more difficult to hear the surrender I may be demanding from those to whom I may be teaching mathematics. It seems as if I must attend to these inward movements if I am going to have any hope of sensing others making similar ones. It has been claimed that one of the potentialities of the microcomputer is that it can facilitate such awarenesses as the user is not distracted by the social pressure of another person. I can simultaneously be aware of my own thoughts and be aware — very precisely indeed — of how my messages are being received.

It may seem strange to some people that inward movements of awareness can seriously be proposed as the important 'content' of mathematics teaching and learning. Yet some account of this sort needs to be more explicitly provided if mathematics is to be seen to play any further part in our culture other than a harmless refuge for obsessives or a technological tool for slaves or machines.

The dancer turns and leaps on the stage... Each member of the silently watching audience also has a role to perform. This could be described as being open to the general in the actual particular that is being offered. But, of course, this is a typically mathematical process. So, for that matter, is the calculated disturbance of established boundaries that seems to be one of the main pre-occupations of young adolescents. It can be fruitful to invite people to look at their feelings and behaviour in some such analytical light. We can only do this if we are prepared to do the same ourselves. In any case, such awarenesses seem to me to be the only real 'content' of mathematics education.

I *look forward* to some clarification of this theme. And to the next hundred issues of *Mathematics Teaching*. Meanwhile, I would like to end with an acknowledgement of the help given me in preparing this article by David Sturges and John Mason, neither of whom are responsible for the muddle that still remains.