

commitment of time and thought. Nevertheless they are skills that *can* be learnt like any others.

You can't rig the game simply by moving chairs about the classroom, separating cliques, splitting friendships or plugging in a spotlight and shining it on that unwilling and wide-eyed face. If we want to be positive about anything, we shouldn't be positive in our *discrimination*, but in our *affirmation* that everyone has individual needs which can be met as part of a whole community. If those needs can serve concurrently both the individual and the group, then maybe Sirath will one day be happy to show us the history of his family, lovingly set down in dot-matrix print, whilst David might chair a discussion with sensitivity and discretion, and Karen might champion herself and others in joyous debate.

## Examining Assumptions

Maria Goulding

'Equal opportunities' is a phrase which means many different things to different people. Just as in the language of mathematics, where a word like *difference* can have a precise meaning which may be confused with its everyday use, so too with equal opportunities. For some, the phrase is to be identified with the policies designed to tackle the problem of particular groups of pupils underachieving in our educational system. For others it is a blanket term which describes the entitlement of free school education for children aged 5 to 16 regardless of outcome. Increasingly, however, in the official language of policy documents and government charters, equal opportunities has been narrowed down to mean women.

There is a danger, in my view, of isolating gender issues in this way or even of organising related issues along a continuum:

*'race' and gender...disability...(and for the really daring) sexual orientation*

It becomes increasingly apparent to me that the glue which holds the issues together is power, or lack of it. Yes, we are looking at entitlement and the celebration of difference as Glyn Holt argues, but there is much more to it than that. It is not an oversight on the part of teachers that has led to some children receiving preferential treatment in the classroom or computer

room; a complex web of connected assumptions rooted in, amongst other things, teachers' beliefs and structures in schools may at worst perpetuate the power differentials which exist outside school. Does the continuum I have suggested above look the way it is because the groups along it are themselves in a pecking order of disadvantage or powerlessness? In treating issues discretely we may well be losing sight of fundamental and unifying principles.

So where does learning mathematics fit into all this? Gender issues have often been treated in isolation here, largely because of the perceived importance of the subject in the school curriculum and the perceived underachievement of girls [1]. To begin with, I would like to examine a well worn path. It is commonly assumed that boys dominate the discourse in the classroom. Redressing this imbalance and giving the girls a fairer deal seems a worthy aim for the teacher. However, simply asking more questions of the girls may be an inappropriate way of proceeding. They may not want to be singled out and their silence may not indicate a lack of understanding at all. The teacher may simply be reinforcing an existing value judgement – that vocal participation is a necessary prerequisite for success in learning mathematics. She may be assuming that girls have a problem and, in order to overcome it, they need to behave more like boys. Closer inspection may reveal a far more complex pattern of interaction, where differences within the behaviour of the girls or boys in a class are as marked as differences between them. What about the quiet boys and the vocal girls? Further and more importantly, it may not just be a question of looking at behaviour patterns. For instance, Valerie Walkerdine [2] demonstrated that *similar* behaviours in boys and girls resulted in different *interpretations* of their mathematical ability.

I am not suggesting that conscious management of discussion in the classroom is pointless, rather that directing more questions to girls is a simplistic strategy. It may be more fruitful to look at who holds the power, who needs empowering and how different learning styles can be harnessed to achieve this. Groups who have traditionally, and with some evidence, been identified as disadvantaged may benefit from this analysis but the approach can also be used when the classroom does not seem to fit other people's patterns. So the teacher may well find that it is largely, but not entirely, girls who are disadvantaged and can act accordingly, but she may also be using the same principles in a class where, say, the children of professional parents are getting more than their fair share of attention. One of the ways of handling talk in the classroom may now be to offer a range of different opportunities for talk besides work-

ing on the usual 'teacher - pupil - evaluation' model.

The consideration of learning styles leads us on very naturally to the use of technology, which should provide us with increased opportunities for flexibility. Again, a common assumption is that girls like to work cooperatively so that, for instance, using Logo to set and solve problems in small groups may be seen as a good way of building upon this preferred way of working. As a strategy this may have more in its favour than the directed questioning, but we do need to avoid seeing this strategy as a 'catch-all' easy solution. Research into group interaction with Logo [3] revealed a more complex picture than is often imagined. Here there were gender differences but it was not simply a question of cooperating or not:

"girls *do* plan and boys *do* collaborate but not necessarily in the way we would predict, and who achieves more is at least partly dependent on how we organise and assess the activity."

Intriguingly, it also became evident that teachers' perceptions of the girls changed over the period of this longitudinal study. Looking through the lens of gender in this way may not produce simple and generalisable patterns but it does begin to throw light upon aspects of the teachers' work which have implications for equal opportunities in its widest sense.

So far I have been trying to unpick two common assumptions, not to devalue them. Looking for patterns may help us to find better ways of empowering groups and individuals, but we need to try and reveal their limitations. We may find out more by focusing on class or gender differences, but our conclusions may inform situations where the power imbalance is not necessarily in those areas.

Further unpicking of these assumptions may also be useful in illustrating the two pathways which have been seen as ways forward in the equal opportunities debate. Directed questioning seems to belong to a range of strategies which have encouraged the powerless to adopt the values and behaviours of the powerful. In the case of girls it goes with a 'deficit' view of their learning which can be both patronising and counterproductive. However, since it is unrealistic to expect powerholders to give up their power without a struggle, it is a strategy which may have to be adopted, amongst others.

The second strategy, encouraging cooperative ways of working, belongs to the school of thought which embraces a gender inclusive curriculum. Here, rather than looking at girls as 'lacking' in some way, it is

assumed that most of them have been socialised differently, but not in an inferior way, from many boys. Here we are trying to shift the values of a dominant group, not just change its membership.

A third strategy, for which technology can be a powerful tool, is to bring equal opportunities to the attention of pupils as a part of the mathematics curriculum. Here, pupils are actively encouraged to contextualise their mathematics by examining issues of social justice. Data handling provides the legitimisation, should it be needed.

For example, the excellent graph plotting program *Mouseplotter*[4] has global information collected together in a datafile called *Nation*. It is an extension of the file *Glostat* produced by the centre for Global Education at the University of York for use with *Quest*, and benefits from the sophistication and ease of use of the mouse driven program. My PCGE students in the past have been both staggered and absorbed at the access to such information and the ability to ask and answer questions which throw light on issues of inequality across nations. This could be part of work which also examines the selection and presentation of statistics in the press and looks for examples of misrepresentation not just in diagrams but in the body of the text where numbers and percentages are often slipped in to support arguments.

By actually raising such issues in mathematics classrooms this third strategy ranks alongside moves in the other two directions to work towards shifting the conventional power bases, changing them and redressing past imbalances.

In this article I have tried to explore equal opportunities issues in mathematics education by looking at power. As I visit schools and talk to students, it becomes increasingly obvious to me that the dominant organising principle of knowledge and pedagogy in mathematics education is not gender or race or sexual orientation. The construct of ability stares me in the face, and I am left with a big question. Does an analysis of power relations help me with this one and what strategies can be adopted to redress inequality here, given the present political climate.

#### References

- [1] Ernest, P. (1991) *The Philosophy of Mathematics Education*, Falmer Press.
- [2] Walkerdine, V. (1989) *Counting Girls Out*, Girls and Mathematics Unit, Institute of Education.
- [3] Hoyles, C. and Sutherland, R (1989) *Logo Mathematics in the Classroom*, Routledge.
- [4] *Mouseplotter*, The Shell Centre, University of Nottingham.

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