Mathematics and a Curriculum for Justice

Antony Cotton *
The University of Nottingham

> *One way of representing the present condition of our educational system is as follows: it is as if we are driving a multi million dollar sports car, screaming, "faster, faster!" while peering fixedly in the rear view mirror.* It *is an awkward way to tell where we are much less to tell where we are going, and it has been sheer dumb luck that we have not smashed ourselves to bits* - so *far. We have paid almost exclusive attention to the car, equipping it with all sorts of fantastic gadgets and an engine which propels it at ever increasing speeds, but we seem to have forgotten where we wanted to go in it. Obviously we are in for a helluva jolt. The question is not whether but when.*
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> *(Postman and Weingarter* 1969*, p 12-13)*

This paragraph is one of the earliest memories I have of reading in preparation for my own PGCE course. I feels that the metaphor holds for much of my experience since then. I seemed to rapidly forget my reasons for entering the profession, which where for me to do with personal political ideas of social justice, as the everyday life of the classroom took over. I use the paragraph as an opening to this paper as my present work aims to return to these commitments. I also use the paragraph as a metaphor for much of our educational life post National Curriculum.

As I reflect on what I hold as basics for my role in the education system I am reminded of a Bertold Brecht poem, used to great effect by Robin Richardson in his excellent book "Daring to be a Teacher". {Richardson 1990, p 33 Try reading the poem aloud to a colleague - I always find poems have more power this way,

Learn the elementary things! For those
Whose time has come
It *is never too late.*
Learn the ABC, it won't be enough, but learn it!
Don't be dismayed by it!
Begin! You must know everything
You must take over the leadership.

I would suggest that we could include mathematics as a part of the ABC mentioned here. Learning and succeeding academically at Mathematics in school can enable us to gain greater control over our lives after we leave school. I have a trivial example and perhaps a more important example as to how confidence and success in mathematics can empower individuals.

* Address for correspondence: The School of Education, The University of Nottingham, University Park, Nottingham, NG7 2RD.

I asked a group of teachers for their personal memories of learning mathematics. One teacher told of how she particularly remembered Friday mornings at Primary schoo1. On Friday mornings (why was it always Friday?) the class were given a mental arithmetic test. She remembers the feeling of panic as the teacher gave out the results. The teacher would then rearrange the classroom based on children's test results. She remembers feeling frightened as if she had to move into a 'lower' desk she knew her mother would be able to tell she had done badly when she came to collect her later in the day. She feels that this experience has effected the way she feels about and therefore the way she works with mathematics to this day.

As I was being told this a story of my own came to mind. My class in Primary School also followed this ritual on a Friday morning. I remember discovering that if I came fifth in the test I would be allocated the desk nearest the door. I also discovered that if I got about 3 questions wrong I would be placed fifth in the class. So by deliberately making three errors I could sit in the desk of my choice. I could use my mathematics to control events in my life. I still find that I use my mathematics like this to some extent.

A less trivial example; sitting in a meeting which was due to organise a protest about the cuts in Section 11 funding. These cuts would mean about a third of the teachers funded under the Section 11 programme would be made redundant. Feelings were running high until an officer from the LEA produced a complex chart showing cuts in government funding and used the phrase "The budget means we have no option". It was as if all personal responsibility disappeared and the complexity of the figures he was using precluded any argument. The overwhelming feeling after the meeting was of disempowerment. Many felt that they could now do nothing.

The figures produced an instant state of confusion and despondency in many minds. The Cockcroft Report (Cockroft 1982, Sections 2: 26.,2:27) gave the example of how the use of percentages to describe inflation was widely misunderstood by adults. Similarly "all the government do is flummox us with percentages" was the response of a pensioner recently trying to understand the VAT rates on fuel (Cotton, 1994). A Social Justice perspective within Mathematics Education would attempt to empower individuals to gain a greater understanding of the way that mathematics is used to explain the worlds in which they live. I became particularly aware of the importance of this two years ago when a teacher showed me one of their students responses to the question "What is Mathematics?". The reply came,

> *Mathematics is the only universal and non-racially motivated or discriminating facet of life that white society cannot manipulate for its own purposes.*

The comment challenged my idea that all mathematics was inherently biased and I realised that if we feel empowered by our mathematics we can see through the bias and challenge and question the basic assumptions made.

Mathematics can also provide us with more control over the choice of career we have as we move into adult life, another young learner I was working with explained to me that she wanted to do well at mathematics because, "being good at maths is important because it means you can get a better job when you leave schoo1." This

comment is supported by the recent report of the Commission for Social Justice. (1994). Research published in this report shows that in 1991/92 a graduate could expect to earn up to double the salary of someone with no qualifications. I would conjecture that qualifications in mathematics effect earning capabilities in a similar way.

The above sets out the reasons why I feel that a Social Justice perspective on Mathematics Education is important to explore, there are however important questions to be asked at the outset of any research in this area. My first dilemma is to select methodologies which are appropriate to research into perspectives of social justice. How can a researcher act in a just way? Patti Lather discussed this problem:

> *There has been little exploration of the methodological implications of the search for an emancipatory social science. Such a social science would allow us not only to understand the maldistribution of power and resources underlying our society, but also to change that maldistribution to help create a more equal world*
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> *(Lather 1986).*

This suggests that finding a suitable research methodology within the Social Science which makes up Mathematics Education may mean that the research process and findings could impact upon social policy. Indeed I would suggest there is little point in researching in this area if there is no political impact. This should lead to ideas of social justice influencing curriculum design and pedagogy within mathematics classrooms. Janet Finch suggests three ways in which researchers can influence social policy. These are;

> *i) Researcher as advocate, in this case a researcher aligns themselves publicly with a particular stance and places the results of any research in the public arena. There are clear dilemmas for researchers as to which groups they may legitimately represent and researchers need to acknowledge and respect the divide between advocacy and patronage.*
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> *ii) Researcher as provider of knowledge upon which policy makers can act, the researcher takes any results of their research to bodies who have control over particular policy decisions, including LEA representatives, advisors or senior teachers, with an expectation of action.*
>
> *iii) Researcher engaging in the development of social engineering strategies (getting your hands dirty), through work in schools or work on pieces of curriculum the culture within the school or within particular classrooms can be changed.*
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> *(Finch, 1985)*

My expectation is that I will move between these three categories as I move through my research project, some stances being more appropriate than others to particular groups I am working with or to particular pieces of research. A further problem I have been grappling with is how to evaluate the effectiveness of a mathematics curriculum which takes a social justice perspective as a starting point. Recent work in the USA moves away from focusing on taking academic achievement as the only

measure of measuring outcomes (Secada 1989). Recent curriculum change in the USA which called for a mathematics curriculum based on investigatory approaches, relevance to learners, learner participation and other values which many of us share seems to have led to a widening of the achievement gap. That is academic achievement generally has been raised through this process of curriculum change but those pupils who were previously advantaged have remained so and have in fact taken more advantage of the 'new- improved' curriculum. The possibility is raised that because the calls for reform were not underpinned by a vision of the role that mathematics takes in forming and controlling society the curricular changes could not be effective in reducing any injustices already embedded within schools. The term equity is defines as follows,

> *Equity in maths education should be construed as a check on whether or not the actions taken in teaching mathematics to students and the social arrangements resulting from those actions are just.*
>
> *(Secada 1989)*

Perhaps this gives us an effective measure for our own practice both within schools and outside the classroom. How does our teaching or research effect or influence social arrangements within the classroom? What effect does it have on individual lives outside school? Walter Secada raises a further key question to all interested in working towards a curriculum based on ideas of social justice:

> *How should we prepare our students to restructure .... social systems in order to remove barriers that women, minorities, and others experience in their jobs and in the social institutions with which they interact?*
>
> *(Secada 1989)*

Taking this starting point we would evaluate success for any curriculum innovation in a very different light. We heard this morning that given the problem of choosing which of the two walls to paint to earn the most money, i.e. deciding which rectangle had the largest area, no pupils suggested that two of them would work cooperatively and share any wages at the end. I conjecture that I could find mathematics classrooms in which pupils would offer this as a solution. Perhaps this would be a measure of social justice within the mathematics classroom. Something also suggests to me that pupils did not see the problem in terms of real walls but decontextualised the problem - they themselves removed the social aspect from the problem.

This paper is designed to share questions raised in my own mind around the issue of mathematics education and ideas of social justice. So I will finish with two quotes which appear to me to pose another dilemma.

> *Without underestimating the way in which the system is loaded against working class people, black people and women, to leave school without formal qualifications is to be placed in an even more powerless position and increasingly face a future without hope.*

(Chatwin 1988)

> *A winner-loser society is not going to be changed by its winners: A society run by a few people at the top is not going to be changed by putting some other people at the top.*
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> *(Holt 1976)*

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