Educating activist adult numeracy teachers?

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What knowledge and skills are needed by adult numeracy teachers if they are to genuinely give voice to the personal and community aspirations of their learners? How can adult numeracy teachers navigate their way through a policy framework that may not reflect their philosophical and ethical positions about adult numeracy curricula and their own role as educators? What is it beyond the competencies of teaching adults, that teachers need in order to encourage imagination and social action, both among their professional colleagues and among their learners to create a better world?

This paper will draw on Sachs' and Groundwater-Smith's ideas of 'activist professionals' and Skovsmose's and others' ideas of critical mathematics to discuss the possibilities of developing and supporting adult numeracy teachers who can exercise agency in shaping their field in times of hostile policy contexts.

Introduction

In this paper I want to explore what it means to be a critical adult numeracy teacher – an activist teacher - and why this is a question worth posing. This question has emerged for me on the one hand from the work I have been doing in theorising the relationship between mathematics and society, and on the other from my work as an adult educator involved in the initial training of new teachers, including new adult numeracy teachers. Many of us who take a socio-cultural approach to understanding mathematics and numeracy have rejected, at least in part, the absolutist, Platonist view of mathematics in favour of the socio-cultural or constructivist view that sees mathematical knowledge production as a human/social endeavour. Furthermore, many of us will try to reflect this in our own teaching in many ways – for example, by making visible the different ways in which different cultures 'do' mathematics, and by uncovering the maths that is embedded in our everyday practices. So we have shifted from a view of mathematics as a pre-fabricated construction, to maths as a human/social construction.

Social aspects

Quite apart from the compelling evidence that researchers in the social history of mathematics can provide to support the social constructivist view of mathematics, teaching mathematics as a human/social construction has a pedagogical benefit: it gives a level of agency to the learners - a sense that learning is an active endeavour of making sense of the world through mathematics. The learners therefore have some 'ownership' of the mathematical knowledge that they have worked with. Whether or not the learners end up creating any 'new' or original mathematical knowledge, they can have the confidence that mathematical understanding is humanly possible. In

theory at least, teaching from a social constructivist perspective is more empowering than teaching from an absolutist perspective where the maths is given and meaning is non-negotiable.

But there is also a reflexive aspect to mathematical knowledge. The socio-cultural view of the nature of mathematical knowledge says that mathematics emerges as a result of people – individually or collectively - trying to make sense of the world. So for example, as society started to be organised in larger and larger units of people, it has used averages and other statistics to group and differentiate people efficiently. We group clothing into standardised sizes of 6, 8, 10 and so forth, because clothing is mass produced to meet the needs of the masses; gone are the days of individually tailored clothing (for most). But in the process of creating mathematics, we have increasingly learned to describe and view the world through a mathematical lens. And in that process, we – individually or collectively - subject ourselves to being reconstructed by mathematics. Now we say, we are a size 14, but we should be a size 10, so will go to the gym or Weight Watchers to turn ourselves into a 10. So we may be a constructor of mathematics, but we are also constructed by the mathematics that we have created. In effect, we need to shift to, or at least add to our thinking about the nature of mathematics, the idea of maths itself as an architect and builder of social reality.

Ole Skovsmose in his 1994 publication *Towards a Philosophy of Mathematics Education* talked about the formatting power of mathematics. Over the last decade or so, Ole and I have examined this notion further and have come to a view that the formatting power of mathematics operates in a number of ways, including that:

- mathematics is a tool for imagining alternative futures that cannot be conceived without the analytical and constructive (modelling) capabilities that mathematics can afford;
- mathematics enables hypothetical reasoning by enabling us to examine details of situations that have yet to be realized; and
- when choices that have been made imaginable and realizable through the functions of mathematics are implemented, mathematics enters into the social world and becomes part of the fabric of social realities. (Skovsmose and Yasukawa 2004)

Mathematics acts upon our social and physical world. We may have been the creator of this mathematics, but the mathematical view of the world is shaping the way we imagine what could be, what might be, and help to turn these imaginations into realities. What kind of world are we living in now –as teachers?

The audit culture and ‘qualculation’

Groundwater-Smith and Sachs (2002) describe world in which we work in the following way:

> Contemporary public sector reforms and the ensuing policies in the UK, USA and Australia and elsewhere have led to the development of the ‘audit society’ and ‘audit cultures’ … the major concern has been with issues of public accountability by making practices and processes more transparent as well as efficient, effective and economic. In practice, this has meant that, in its attempts

> to reduce any risk to the national involvement in its human capital, the state has sought to control and standardise the provision of such essential services as education and health. (p. 341)

What do the 'audit society' or 'audit cultures' have to do with mathematics? What's the problem with this 'audit' society? Aren't public accountability and transparency good things? Perhaps, but how do these processes of making what we do accountable and transparent actually work? In Australia, government funded (and private) educational programs for adults are increasingly defined and framed as 'training packages'. Training packages, in theory are defined in the following way:

> An integrated set of nationally endorsed standards, guidelines and qualifications for training, assessing and recognising people's skills, developed by industry to meet the training needs of an industry or group of industries. Training packages consist of core endorsed components of competency standards, assessment guidelines and qualifications, and optional non-endorsed components of support materials such as learning strategies, assessment resources and professional development materials.(National Centre for Vocational Education Research, http://www.ncver.edu.au/resources/glossary)

Whether we agree to, believe in, or object to the aims of training packages, the work becomes framed in its aims and ways by thinking of a 'package' of unit components, links to a set of employability skills, performance criteria and range statements. The value and the accountability of adult numeracy teachers are framed by the authorities in these terms, and the work that teachers do in designing learning for their students must be accountable in these terms. Frameworks, templates and reporting dominate the work of teachers. It is an environment in which there is a propensity for a practice that includes, but is broader than calculation or measurement. It is a practice that seeks to 'enumerate, list, display, relate, transform, rank and sum' (Callon & Law 2003, p. 13) – a practice that Cochoy (cited in Callon & Law 2003) calls 'qualculation'. And the more we qualculate, the more we generate things and ways to qualculate in order to challenge other's qualculations or to strengthen our own qualculation. It resonates with the much contested but often compelling idea of technological determinism which says that once technology is released it becomes a logic of its own and society is changed and shaped by this autonomous force (McKenzie and Wajcman 1999). Once qualculation is introduced into our social world, it is unstoppable, and this world becomes more and more qualculatively complex and intractable.

Looking beyond our own qualculative workplaces of teaching, we can find other evidence of qualculations gone out of control – in fact some of the biggest crises and conflicts facing us globally. We are in the midst of a global financial crisis; our physical world which science and technology tried so hard to 'control' to make it behave in ways that are sympathetic to human comforts is warming up. The world is faced with risks and uncertainties that we are struggling to make sense of – but they are manufactured uncertainties, products of the reflexivity of techno-scientific development; we are dealing with what Beck (1986) describes as the conditions of the risk society. And mathematics is intimately implicated in manufacturing these risks.

Critical adult numeracy education

What has any of this got to do with adult numeracy teaching? In particular, what has this got to do with adult numeracy teaching if we believe its ultimate aim to be

imagining and creating alternative, better futures for people through education? What does it mean for critical adult numeracy teaching? Skovsmose says that 'if education practice and research are to be critical, they must address conflicts and crises in society (1994, p. 24). What does the formatting power of mathematics do? What happens when qualculation becomes the dominant discourse? Like any discourse, we become framed in our practices by the discourse.

We can work within this discourse – become fluent and effective within the frames of this discourse - or we can try to undermine the discourse, work around it and 'pretend' to those we are accountable to that we are working within the frames set up for us. But I am reminded of what Ira Shor says:

> "beating the system" is a very active way to stay frozen in the system. It is a means to outstmart captialism by playing within the rules of the business world. In the end, you wind up devoting huge amounts of time learning the ropes of the system, and none to rejecting the social model. (Shor 1987, p. 59)

So what is it that we as numeracy teachers need to do beyond simply 'beating the system' in small ways? I don't have the answers, and I certainly don't believe that individual teachers on their own can get very far in even 'beating the system'. But we can question – collectively - how qualculation or the formatting power of mathematics is acting upon our social world. How productive is a qualculative way of thinking in the different spheres of our lives? Callon and Law (2003) describe qualculation as being 'indefinite', leading to 'amnesia' and lack of closure -

> qualculation as a process of proliferation - in which entities are detached from other contexts, reworked, displayed, related, manipulated, transformed and summed in a single space. (Callon & Law 2003, p. 13)

I can think of examples where I experienced the 'lure' of qualcuation. One is in the role of a union negotiator in enterprise bargaining. As a union we demand data – financial data, enrolment data, staffing data - to put together a case for a pay rise based on increased productivity. As soon as we access them and use them to 'prove' that we are deserving of the pay rise we are demanding, and that it is easily affordable by the University, the University comes back with another set of data that 'proves' how our calculations didn't take x, y or z into account, and so the real picture is something else. Then we retaliate with another transformation of the same data. And so it goes on. Does any of this really help us to determine whether or not the staff are 'deserving' of one or the other level of pay rise?

Another example is the development of a fair workload policy in the faculty. A policy is developed that is supposed to lead to equitable and reasonable workloads for everyone. It will involve all academics teaching an average of 5 classes each year. Six months later there is a high level of suspicion, coincidentally among academics who somehow or other acquired a much larger number of classes than the 'average', that there are in fact a large number of academics who are doing no teaching. There is a call for transparency – a database on the intranet perhaps so everyone could look at everyone else's workload. But don't forget, supervision of research students can count as 'teaching' or 'research'. And if you have a large research project, then that can offset the amount of teaching you do. Well, what kind of an average is 5 – is it just the mean or is it the mode; what's the spread? Maybe it should be the mean within

smaller units. And so it goes on. Again, how do any the proliferation of methods of counting and averaging help to resolve fairness and reasonableness?

We can be forever clever at qualculation and proliferating numbers and ratings that help us win a few points before someone else qualcalates another set of data. We can get caught up and lose sight of the question or the issue that we started out with – often a question that once abstracted or detached from context loses meaning altogether. Do all the different components and rules around training packages really help us educate people who are active and critical citizens?

Conclusion

If as educators we want our students and ourselves to be part of creating an alternate and better future, then we may need to consider Beck's (1992) suggestion that 'there might be a revival of reason … and a dynamic theory of scientific rationality which digests historical experience and … develops itself further in a way that is capable of learning' (pp 157-158). I think we have to also help our students understand – even in a numeracy or mathematics class – that mathematical rationality is not always the best way to describe, experience and engage with the world. We need to engage ourselves and our students in developing a critical understanding of the nature and ethics of mathematical practices in order to imagine a better future.

There is a lure to be complicit in the proliferation of qualculation. As numeracy teachers we need to critically reflect and resist this proliferation into spheres of the social world where qualculation is unproductive and lacks an ethical basis. We need to educate ourselves and our learners in what it means to challenge and resist the propensity of qualculation, and to analyse the formatting powers of mathematics and other qualculative reasoning in our own practices and experiences.

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