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# Integrating critical theory and practice in mathematics education

David Swanson<sup>1</sup> and Laura Black<sup>2</sup>

The University of Manchester, UK

<sup>1</sup>[david.swanson@manchester.ac.uk](mailto:david.swanson@manchester.ac.uk); <sup>2</sup>[laura.black@manchester.ac.uk](mailto:laura.black@manchester.ac.uk)

*Recent years have seen many valid and important critiques of mathematics, mathematics education and mathematics education research (M, ME & MER). However, we also discern in some of these critiques a tendency toward one-sidedness and passivity. Unrelenting stress on the negatives of M, ME and MER can lead to a dismissal of the possibility of improving ME and a dismissal of those who attempt to do so. The separation of critical theory from critical practice which follows is then in danger of rendering critique sterile, becoming a mere pseudo-radicalism. As an alternative, we explore here the mutual relation between critical pedagogy and critiques of society, and the relationship between reform and more radical change, in wider society and ME. We argue that this analysis encourages a stress on joint activity, between individuals and organisations with a wide range of perspectives on what change is needed, to tackle the problems a critical perspective raises.*

*Keywords: Critical mathematics education, theory and practice.*

## Introduction

A growing body of research in mathematics education has explored critically the socio-political function of school mathematics in terms of its role in the mobilisation and production of capitalism (e.g., Kollosche, 2014; Pais, 2013, 2014; Swanson, 2016; Williams, 2012) leading to the reproduction of inequalities in education along the lines of social class, gender and ethnicity (e.g., Jorgensen & Niesche, 2008; Solomon, 2008; Black, 2004; Noyes, 2007). This work suggests that school mathematics (and associated qualifications) serves as a ‘gatekeeper’ in that it enables society and its dominant institutions (e.g., universities, employers etc.) to select and sort individuals under the rationale that ‘mathematical ability’ is a valued source of human capital. This critique is highly relevant to the current situation of mathematics education in England, where a new, more challenging curriculum has come into play since 2014 which serves to further substantiate the elitist position of mathematics in schools. At the same time, there is widespread concern in policy and in the mathematics education research community about achievement gaps (i.e. between rich and poor, or the most and least deprived) – a concern which has been said to further produce social inequalities – Gutiérrez (2008) refers to this as “gap gazing”.

Whilst such critiques of mathematics and mathematics education are important and necessary to challenge dominant ideologies (including those pertaining to education more broadly), at the same time, we argue, there is a need to propose an ideologically grounded alternative. This paper presents a case for an alternative way forward by first looking at the potential mutual relation between critical pedagogy and critiques of society. We then examine the relationship between reform (i.e. improvement whilst remaining within the same overall framework) and more radical change, in terms of wider society, education and mathematics education. What follows from this exploration, we argue, is the need for activity which tackles the problems a critical perspective raises. In

particular, it suggests joint activity between those with a wide range of perspectives on what, and how far, things need to change. We then look briefly at the Stand Up for Education campaign in the UK, which brings together trade unionists, teachers, academics and parents, to show that what we outline here is not a purely abstract or ideal position. Spaces for the much required interrelation of critical theory and research with practice can and do exist, and we conclude by discussing why that matters for critical researchers.

## What might a critical perspective on education look like?

We begin by looking at the relationship between critiques of education or society and critical mathematics pedagogy<sup>1</sup>. Arguably the most radical perspective here is to imagine and work towards a society beyond capitalism (e.g. Bowles & Gintis 1976; Counts, 1978; Freire, 2005) i.e. a change that involves a complete transformation of society. Discussions of what form education would take in such a society face certain limitations however. For instance, if we assume, as we should, that moving beyond capitalism entails the democratic collective control of society by the majority, then we who are so shaped by, and operate in, capitalist society are not best placed to either decide or predict what may happen. Nevertheless, we can speculate on how an alternative future education might work by taking the reverse of the features of capitalist education which are seen to lead to negative consequences today, for example the individual-competitive exam system which produces ‘losers’ who internalise their failure as objective qualities of themselves (for others, see Swanson, 2016). Then, we can combine these with the aspects of education that others have fought for (e.g. in school student strikes against corporal punishment, oppressive uniform policies or privatisation, see Lavalette & Cunningham, 2016) and at times, implemented (e.g., the banning of homework and exams in revolutionary Russia, see Karp, 2012).

Among the features we might expect to see are i) democratic collective control of education by teachers, students and other education workers, within the wider framework of its democratic shaping for society’s needs; ii) much greater control by individuals over their own learning within that, but with an emphasis on social rather than individually competitive learning; iii) an end to exams and their production and reproduction of societal inequalities; iv) an equivalent end to the performativity culture of continual measurement to judge teachers and other education workers, v) an increase in societal resources (such that, for example, class sizes reduce to the levels seen only within private education in this society), and vi) a closer integration of education with wider life, reducing both the formal detachment of schooling from the world outside, and the artificial separation of subjects from one another.

The perspective above can loosely be termed the *revolutionary perspective* in education. We would define reformist perspectives, and these are far more common than revolutionary perspectives<sup>2</sup>, as

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<sup>1</sup> We use pedagogy here and throughout to mean teaching *and* learning combined due to the lack of an adequate single word in English.

<sup>2</sup> This is true even when reformist political organisations are weak or non-existent. However recent years have seen an important revival in reformist organisation with new parties such as Podemos in Spain, or around individuals in existing organisations, such as Corbyn in the UK and Sanders in the U.S.

those which may agree with some, many or even all of the elements above but which are accepting of greater limits as to how much things can change, for example limiting the possible changes to within one classroom, or to what is possible within capitalism. Although this covers an enormous range of possible beliefs (e.g., the free schools movement in the U.S., see Miller, 2002, or on a small scale, Boaler's work on reform pedagogy in the US, Boaler & Staples, 2008) and in Australia (Sullivan, Jorgensen, Boaler, & Lerman, 2013), in general we view such perspectives as radical and important. Fighting for fewer exams or less influence of exams on education clearly overlaps with fighting for no exams. We explore the general relationship between reform and revolution in a later section, but first we look at the relationship between the radical perspectives discussed so far and a particular type of reform, that of improving mathematics pedagogy.

### **The relationship between critical mathematics pedagogy and (active) critiques of society**

We can see within critical mathematics pedagogy (in the broad sense of the term critical) parallels of many of the more general demands of radical educationalists. For example, we see pedagogies which aim to promote: a more active role for students in learning through open problem solving (e.g. Barron et al. 1998); teaching for understanding rather than for grades (e.g., Schoenfeld, 1988); an emphasis on dialogue and social learning (e.g., Lerman, 1996); and a more meaningful mathematics connected to the world outside of school and student experiences and concerns (e.g., Gainsburg, 2008). In doing this, pedagogy acts to counter some of the worst effects of capitalist education, even if it cannot overcome them fully. Here we argue, perhaps contra to some perspectives in critical MER, that it is worthwhile to subvert spaces, such as the classroom, as much as one can in these directions. Various forms of critical mathematics education which attempt to provide curricula and pedagogies which offer 'use value' to low status, disadvantaged or 'poor' learners and communities (e.g., Skovsmose & Greer, 2012; Gutstein, 2006) have much to offer. They can potentially challenge the 'gatekeeper' role of mathematics described above and can maybe transform the function of education, that is, rather than the learner serving the school/education system, education can begin to serve the community/learner (Williams & Choudry, 2016). Perhaps more importantly, attempts at developing critical thinking within the mathematics classroom have the potential to be generalised and transferred to other aspects of life, for example, to a pupil's future life in the workplace (see Black et al., 2010). The experience of critical thinking, of challenging everything, of weighing up arguments can assist in developing the confidence to do so elsewhere.

The possible connections between critical pedagogies and critical perspectives on society can work in the other direction too. The real limitations which schooling imposes on such pedagogy means that it is difficult to sustain critical educational activity if it is solely limited to the individual classroom. Teachers attempting to develop or sustain attempts within their classroom will come up against obstacles. For example, a head of department on a professional development course led by one of the authors was instructed by management to reverse pedagogical changes because students were now talking too much in class. However, arguably, the experience of these obstacles can make teachers open to looking beyond their immediate situation to help them achieve the changes they want. If teachers are connected to networks which challenge how schooling is generally organised and which also show sympathy for progressive forms of pedagogy, they may potentially move

towards engaging in critical activity outside the classroom, whether still directly related to pedagogy or beyond that. Such networks can also give teachers the confidence to persist with their efforts in their own classroom. (e.g., Volosinov, 1976, on the relationship between an individual's critical ideas and collective agency in such circumstances).

Taken together these points mean: Firstly, that it is in the interests of those who are critical of society to encourage meaningful activity in the classroom and to work alongside others who wish to do this, and, secondly, it is in the interests of those who want more meaningful activity in the classroom to work with those who have a critical perspective on society, precisely because they bring an understanding of the obstacles, and, usually, experience in organising networks to overcome these obstacles. A central task therefore for those who are critical of society and who work within mathematics education, is to help create, develop and shape organisational forms which encompass both these components.

### **Reform, revolution and the united front**

The relationship between the particular reform, of developing more meaningful pedagogy in a classroom, and wider social struggles, rehearses similar arguments to that which can be made about the general relationship of reform to revolution. In general, reform and revolution are clearly different perspectives. As Luxemburg (1986) puts it:

[T]hose who pronounce themselves in favour of the method of legislative reform in place of, and in contrast to, the conquest of political power and social revolution, do not really choose a more tranquil, calmer and slower road to the same goal, but a different goal. Instead of taking a stand for the establishment of a new society, they take a stand for the minor modification of the old society. (p. 56)

However, many of the elements key to a revolutionary strategy— for example, maximising active involvement and democratic control of movements; overcoming the division between purely economic and political struggles; attempting to connect up and generalise different struggles; developing an understanding of the interrelated nature of societal problems; and an emphasis that change comes from below, are not necessarily alien to those holding reformist ideas when they are engaged in struggles for particular demands (see, e.g., an account of the 2012 Chicago teachers' strike in Gutstein & Lipman, 2013). At the same time, revolutionaries are also in favour of reforms. First because they improve immediate circumstances, but also because it is through the struggle for reforms that people develop the consciousness and confidence required to transform society: "The struggle for reforms is its means; the social revolution, its goal" (Luxemburg, 1986, p. 5). This overlap in immediate situational objectives, and the potentially shared belief in activity to achieve them, can provide a basis for joint activity.

This joint activity between those who seek reform and those who aim for more fundamental change is central to a revolutionary approach and is termed the united front strategy. The strategy was explicitly formulated by the third congress of the communist international in 1922 as capitalism restabilised following the revolutionary wave around the end of the First World War. However, it has its roots in earlier practice. For example, during the Russian revolution of 1917, the unity of revolutionaries and reformists in repulsing Kornilov's attempted coup was central to the

development of the revolution, and the key organisational form of the revolution, workers councils or soviets, can be viewed similarly as a united front (see Trotsky, 1989).

For revolutionaries, there are two key aims of the united front strategy. The first is simply to increase the likelihood of success of the particular struggle through uniting the maximum number of people and organizations. Secondly, it aims to convince those involved in reform activity of the need for more radical change through i) joint experience of the benefits of revolutionary methods, ii) joint frustration at the limitations of reformist strategies, and iii) exposure to revolutionary ideas in ongoing dialogue. For these strategies to work, the unity and dialogue must be genuine of course, with the possibility of reformists winning revolutionaries to their strategy instead (see Trotsky, 1989). Although often from an alternative perspective, many with a reformist outlook on change equally see the importance of working together with others who hold different ideas to help achieve particular aims.

### **Implications for critical mathematics educators**

Taken together, the arguments outlined so far imply the need for forms of organization which bring together various groups in mathematics education such as teachers, teacher educators, critical academics, parents, students and other education workers in common activity (a united front). This includes those who are particularly concerned with teaching and learning *and* those who are trade unionists; those who want to transform the world completely *and* those who just want to make things a little better. Through such activity radical mathematics educators can both assist in improving immediate circumstances in schools, classrooms etc., and also increase the numbers of those who see the necessity of more radical change (e.g., Gutstein & Lipman, 2013). We speculate that such an organization in relation to mathematics education is more likely to arise as part of, or emerging through, more general forms developed for the field of education as a whole. To illustrate that organisational forms such as this can exist, we now briefly describe the emergence of a network, local to the authors, which brings together the various forces described above.

### **Stand up for Education**

The Stand up for Education campaign by National union of teachers (NUT) (2014) first emerged as a campaign launched by the National Union of Teachers (the largest teaching union in the UK), in the build up to the 2015 UK general election, to influence educational policy discussions and mobilise NUT members and others. Through that campaign, a network of academics supportive of the NUT's aims was formed called Reclaiming Schools. Together Reclaiming Schools and the NUT jointly published a collection of short articles from academics and researchers in support of the campaign (see NUT, 2015). The Reclaiming Schools network continued, with a website devoted to putting research in accessible form for teachers and others campaigning to improve education, and with occasional meetings in local areas which bring academics and teacher activists together and promote the website's activities. At one such meeting in Manchester, partly inspired by recent parent campaigns to remove their children from standardised testing (the Let Our Kids be Kids campaign, see <https://letthekidsbekids.wordpress.com>), the idea emerged for a local conference to be held which could pull together wider forces. NUT activists organised a follow up meeting, which included some parent groups and academics, to plan the conference. The primary aim of the conference was to share and develop understandings of key issues affecting schooling; to develop

and expand the different networks involved (parents, teachers, teacher educators and other academics), and to bring those networks together to promote mutual activity and campaigning. The conference (see <https://www.facebook.com/standupforeducationmcr>) united precisely the range of people that this paper has outlined, and, importantly, it discussed questions of organised activity, political issues *and* pedagogy. In future work we will discuss this movement in more detail, and in particular explore its potential in relation to critical mathematics pedagogy in particular. But we describe it briefly here to show that such networks can and do exist and are not merely an abstract desire of the authors.

### **Critical theory and critical practice**

So far we have argued that i) critiques of ME and MER also require ideologically grounded alternatives; ii) both ‘revolutionary’ and ‘reformist’ alternatives exist; iii) critical pedagogy in mathematics (a particular reform) can be an integral part of both perspectives; and iv) this inter-relationship between reform and revolution is a general one. These last two together entail v) the importance, and possibility, of united front activity and organization within the field of mathematics education for all those who are to any extent critical of how things currently are, whether their initial motivation is teacher wages and conditions, less stressful exams for children, or more meaningful activity in the classroom.

We conclude with the particular relevance of the above for critical mathematics educational researchers. Marx argued that “Practice without theory is blind. Theory without practice is sterile”, and this point is relevant for those who wish to criticise the world of mathematics education without attempting to change it. Arguably though, theory and practice always form an interrelated unity. No practice is uninformed by theory, (it may be unconscious of course). And no theory is unshaped by practice. The question for educational researchers is which practice shapes their theory – academic practice with its demands of publication and superficial novelty, or genuine critical practice and the needs of those trying to transform education. Critical theory detached from critical practice may provide useful insights, but ultimately its quality and usefulness will suffer from the separation. Uniting critical theory and critical practice, on the other hand, can enrich theory and research, and contribute to the development of the critical practice which can transform education.

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