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Problematizing the pursuit of progress in mathematics education

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Abstract

In this article I use a Foucauldian poststructural analysis to examine productions of progress within key discursive spaces of mathematics education. These sites of production are: educational policy, mathematics education research, and case studies of primary school student-teachers' in England.

From my analysis, I show how progress governs what is possible in the classroom, as they become constructed around a measurable, linear temporality assumed in educational policy. This encourages comparison to and pursuit of the 'normal' mathematical child, which in educational policy is produced as a functional automaton; whilst for much of mathematics education research is produced as the cognitive 'natural' child. These over sanitised constructions result in confusion for student-teachers who struggle to take these impossible discourses on board.

Key Words: *progress; mathematical child; Foucault; neoliberal; educational policy; New Labour; governmentally*

Introduction

Within recent times in England progress has become a buzzword in education, and often a main indicator of 'success'. Indeed one of the key criteria for a successful Ofsted¹ judgement is that pupils demonstrate a measurable version of progress in lessons (Ofsted, 2008). This investment in progress is not unique to English education, nor to the mathematics classroom, notions of progress permeate many aspects of society around the world. However, my intention in this article is not to historicize progress but instead to talk about the here-and-now, and the relationship between progress, modernity and current mathematics education 'practice'.

¹ Ofsted is a non-ministerial government department in England that has overall responsibility for inspecting and judging the quality of English schools.

We live in a time of 'reform' (Popkewitz, 2008), where the advancement of society is thought to bring contentment. In particular, modernity is constructed around a notion of progress; "a fundamental Enlightenment precept, the thesis that humanity is making steady, if uneven and ambivalent, progress towards greater freedom, equality, prosperity, rationality, or peace" (Brown, 2001, p. 6). Within this, education always already evokes a binding relationship to progress, its emancipatory narrative being difficult to resist (Mendick, 2011). Education is used to reform both the individual and society, and children and education become the hope (Popkewitz, 2008). From this, any nation that positions itself as a key builder of both a 'modern' society, must invest in progress, and simultaneously, must invest in education. Conversely, education must invest in progress as both the process and the outcome.

Improving education and society may seem like worthy goals, however any privileging within discourses does not come without limitations and consequences. It is the narratives that are taken up as uncontested 'common-sense' that are in most need of deconstruction. My intention in this article is to show how in unreservedly valuing progress we include some, and exclude others, we facilitate some stories and foreclose other 'non progressive stories'; hence, we fabricate what it is be successful at mathematics, and hence what the 'mathematical child' should be. This argument is particularly imperative in mathematics education research as much of it is posited upon discourses of the 'natural' cognitive, essentialised child. Instead, I suggest that the person who more easily succeeds at mathematics in school is created by the discourses that circulate within mathematics education, and the privileging of progress is a key part of this production. This argument builds on my previous work using the same case studies, and work with Heather Mendick (Llewellyn, 2012; Llewellyn & Mendick, 2011), where I have argued that the mathematical child is often presented as homogenised and unproblematic. In this article, I offer a 'new' analysis by showing how a commitment to progress is a key part of this production. This work has similarities to Popkewitz (2008), who discusses cosmopolitan, reform and the making of society by making the child.

Specifically, I compare and contrast versions of progress within the key discursive spaces of mathematics education research and mathematics educational policy within the neoliberal New Labour years (1997-2010). I then examine how these are enacted, or not, by student-teachers. My contention is that the productions within the spaces of educational policy and mathematics education research govern what is possible for the student-teachers and the mathematical child they construct. Hence this governs what is possible for the 'messy' children they work with; who never quite fit the standardised discourses of the sanitised texts.

Conceptual Framework

My analysis is informed, both openly and tacitly, by poststructuralism and in particular by the work of Foucault (1972, 1979, 1980b). This is an attempt to step outside the dominant paradigms that circulate within mathematics education research that (re)produce what is possible. More broadly than that, Foucault allows for the critique of human sciences, and for alternative perspectives on cultural 'truths' and established practices. By exploring these power structures, we can acknowledge and expand the prescribed (both covert and overt) limitations on our actions (Foucault, 1972). My concern is that mathematics education (schooling, government and research) is blinkered by the narrow positions and conventions that we tend to adopt, and by our (re)production of them through governance that goes unquestioned. This follows other mathematics education researchers, such as

Walshaw (2007), Walkerdine (1998), and, Mendick (2006, 2011), who similarly use Foucault to deconstruct discourses.

Specifically, I use Foucault's notion of *discourses*, such that discourses construct rather than describe meaning. As such, progress is defined by the work that it does, rather than what it inherently is. Moreover, "discourses authorise what can and cannot be said; they produce relations of power and communities of consent and dissent, and thus discursive boundaries are always being redrawn around what constitutes the desirable and the undesirable" (Britzman, 2000, p. 36). Particular versions of progress are allowed and acquire the status of 'truths', whilst others are dismissed.

Foucault also asserts that discourses install and propagate *normalisation* (Carabine, 2001), a process that encourages a specific version of the 'normal' that subsequently becomes taken for granted or 'natural' (Foucault, 1978). Normalisation, "opens up membership to social entities that have a sense of cohesion about them ... Education is one such social institution. It provides a perfect demonstration of how easy it is to be seduced by its emancipatory rhetoric" (Walshaw, 2007, p. 130). Hence normalisation thrives in education; the conformity of the classroom are designed to propagate it.

Within a neoliberal measurable education system, there are several principles that further propagate and produce a certain version of the 'normal'. For instance, performativity is used as a method of legitimising education (Ball, 1994), and surveillance, accountability, and governance support classrooms in tending towards homogeneity. Alongside such outward measures of performativity, neoliberalism also offers the individual autonomy, and the impression that we govern ourselves (Rose, 1999a). Hence we also (re)produce specific versions of the self within our own narratives.

Foucault (1978, 2003a) calls the process through which governments and/or social systems produce normalised subjects, *governmentality*. He argues that people are governed by practices of normalisation by their consent, as opposed to governed simply by authoritarian principles (Walkerdine, 1990).

Studies of governmentality are not sociologies of rule. They are studies of a particular 'stratum' of knowing and acting. Of the emergence of particular 'regimes of truth' concerning the conduct of conduct, ways of speaking truth, persons authorized to speak truths, ways of enacting truths and the costs of so doing. (Rose, 1999b, p. 19)

It is this that forms my analysis, as I contend that we are governed through the norms created by certain discursive spaces.

Method

Specifically, I employ a comparative reading of student-teacher interview data in relation to dominant branches of mathematics education research, and educational policy documents from the New Labour era (1997- 2010). The use of interview data provides personal stories of current practice, whilst the policy documents allow my analysis to be set within the contemporary *regime of truth* "that is, the types of discourse which it accepts and makes function as true" (Foucault, 1984, p. 73). Specifically, I am concerned with examining what is allowed to be said, and what is allowed to

be heard; what is taken up, and what is resisted. Moreover, I contend that we are governed through these places of (re)production.

The student-teachers' interviews are part of a three-year case-study concerning prospective primary school teachers' relationships with mathematics. Student-teachers are interesting in that they are 'fresh', at the beginning of their careers in education; as such, they have little background knowledge to make sense of the multitude of discourses to which they are exposed. The participants were students on a three-year undergraduate degree course from 2006-2009, 'training' to be primary school teachers² at a university in the North of England. I interviewed five times, at various moments during their course³. The interviews were "active" (Holstein & Gubrium, 2004), and semi-structured, and were loosely based around the students history, and perceptions of mathematics and mathematics teaching, though I also let each interview move in the direction determined by each discussion. They varied in length between 25 and 90 minutes. All were audio recorded and transcribed verbatim. Throughout the interviews, I was concerned with the hierarchy between 'them' as university students and (my)self as a university lecturer. Albeit, I only contributed to their course in a minor role, giving three, one-hour lectures on year two of their course. In addition, I was a similar age to some of the student-teachers, which may have contributed to some positioning me as a student.

As mentioned, educational policy documents provide a snapshot of the dominant discourses of the then current education practices in England. The politicising of which, is often overlooked as the positive function of education in society is mostly unquestioned. As Foucault states, "the real political task in a society such as ours is to criticize the working of institutions which appear to be both neutral and independent" (Foucault, 1984, p. 6) and have authority. Many decision makers in education neglect to discuss the political nature of their propositions in order to give them authority as 'common sense'. For the purpose of this article, I identified the educational policy documents that contained references to progress.

Both the interview data and key policy documents (from 1997 – 2010) were analysed using a Foucauldian approach (Carabine, 2001; Foucault, 1980a), although "these approaches become 'instruments of analyses' (Foucault, 1980b, p. 62) rather than rigid sets of rules for those analyses" (Cheek, 2000, p. 2). Specifically, I moved from 'open' to selective coding. During the open stage, dominant themes emerged that were found to be problematic in their discursive production between each of the three domains; one of these themes was progress. In the first instance, the extracts which contained the word progress were analysed. This was supplemented by selective coding and immersion in the wider texts, to include other relevant readings.

In choosing to analyse mathematics education research as the third site of production, I am acknowledging its role in the governance and production of norms within mathematics education. I am explicitly stating that research itself is "one of the loci for social enquiry" (Pais and Valero 2014, P. 244), one that both enables and restricts, and hence should be contested. I am, like Pais and Valero (2012, 2014), (and Lundin 2012) looking inward on our practice, and querying those who do

² Primary school is for ages 5 - 11

³ At the beginning and end of the first year, the middle of the second year, and at the beginning and end of the third year

not. Thus, I view research as part of technologies of surveillance and (re)production that govern what is possible. This is akin to educational policy documents, though more important such that academia is perhaps more privileged, and the knowledge it produces automatically has authority. Moreover, researchers are always already involved in what they critique and hence, they produce knowledge and norms.

For the analysis of mathematics education research, I was both systematic and eclectic. To provide a broad picture, I used searches, around the words progress, mathematics and education, in the search engine *Google Scholar* and two top-rated mathematical journals⁴. Within these results, I focused on a selection of publications in more detail; here I was wide-ranging in my choices as the primary criterion was “opportunity to learn” (Stake 2005). These searches were performed after the themes were established from the earlier data. From this, a reflexive process followed which moved between the interviews, educational policy and mathematics education research.

It is within this framework that I move on to examine notions of progress, arguing that we are governed by stories of (re)production, where progress is always already within education; these discourses of reason, are governing by tactics as opposed to governing by law (Foucault, 2003a). In the remainder of the article, I tackle each site of production in turn - research, policy and student-teachers’ talk.

Problematising progress in mathematics education research

This section serves two purposes, to examine ‘truths’ concerning progress within dominant branches of mathematics education research, and to critique these. From my analysis, there are three particular priorities that I attend to. Firstly, that mathematics education research is unequivocally committed to straightforward progress. Next, that this progress is allied to certain ‘progressive’ pedagogies. Finally, these pedagogies rely on a naturally inquiring and cognitive version of the mathematical child.

“‘Truth’” is centered on the form of scientific discourse and the institutions that produce it ... it is produced and transmitted under the control, dominant if not exclusive, of a few great political and economic apparatus (university, army, writing, media)” (Foucault 1980a, p. 131,132). One such apparatus, mathematics education research, is unapologetically committed to progress (Lundin, 2012). Whilst this may take on various forms, there are several ‘truths’ that circulate. Firstly, that progress in mathematics education is connected to improvement of the state, and of the self. One illustrative example is found in the abstract on the back-cover of the *Handbook of International Research in Mathematics Education*. It states: “[This book] brings together important mathematics education research that ... anticipates problems and needed knowledge before they become impediments to progress [and] interprets future-orientated problems into researchable issues...” (English, 2002 abstract/back cover). It is unclear what or whose progress is referred to, however the extract creates two particular ‘truths’: that the future can be predictable and controllable, and that mathematics education is uncontestedly, a route to progress. Furthermore, these relationships are presented as non-problematic. My concern is that mathematics education research does not trouble the narratives or context within which it invokes progress; indeed, its role is to disappear these and to make progress appear relatively straightforward. Indeed, Brown and Clarke (2013) contend that

⁴ *Educational Studies in Mathematics* and *Journal for Research in Mathematics Education*

research is bound by the parameters that allow it; as such mathematics education research more often infers that mathematics education contributes to societies progress. They state “it is clear that “improvement” cannot be defined in absolute terms” (p. 467), and question the apparent universality of mathematics education and instead argue that there is a need for alternatives to such “consensual aspirations”.

Progress as an “anchoring narrative” (Mendick, 2011, p. 50) is a discourse of education that runs beyond mathematics; certainly within the UK, the majority of educationalists seek to improve education, rather than study it for its own sake. This is different to other academic disciplines, where the subject is often ‘studied’ (Dale 2001). However, mathematics has an even more ‘special’ relationship as it is often deemed as, responsible for progress, of both society and of the self. It is a reasoned man, through rationality that is sought (Foucault, 2003b). Hence progress is part of the governance, and (re)production generated through mathematics education research. This very much constrains what it is possible for educational research, in terms of the topics, the process and the outcomes. It creates a discourse where mathematics education and progress are always already bounded. As such, I am arguing that mathematics is important “in terms of the place this subject occupies within a given structural arrangement ... and not in terms of mathematics itself” (Pais 2013, p. 16). This is a very important shift in direction of how we may come to view mathematics education research, particularly as the dominant fields rely on the power of the inherent ‘nature’ of mathematics.

This positioning of mathematics as intrinsically important is shown in another ‘truth’ of mathematics education research, where progress of the individual is sought. Whilst there has been a “social-turn” (Lerman 2000), in mathematics education research, the dominant research field at the student-teachers’ university is progressivism, or activity-based learning; arguably this is still the most influential field in educational research. Here, my thinking is similar to Lundin who argues that the “*standard critique*” from mathematics education action researchers “includes the idea that mathematical knowledge must be activity discovered or constructed by the learner herself, through work on meaningful realistic problems” (Lundin 2012, p. 74). As Lundin points out, this ‘critique’ has been typical throughout the twentieth-century, and hence he – as I – queries if it is a critique at all; instead it maintains, *nee* creates, the equilibrium. Through technologies or (re)production, and surveillances, such as citation, conferences and publications, we govern what is possible for mathematics education research; “research participates in constructing the boundaries of its own practice” (Brown & Clarke, 2013, p. 469). Furthermore, it is often allowed to circulate unproblematically, without acknowledgement of mathematics education researches’ role in its production.

For the purpose of this article, it is important to examine what this positioning means in terms of progress. In the first instance, these studies predominantly are typically labelled ‘reform’ or ‘progressive’, and as such the pursuit of progress is always already assumed in their naming. “These studies centred their analyses on individuals shaping their practice in response to the perceived reform agenda (Remillard & Kaye, 2002; Van Zoest & Bohl, 2002). Many of the authors identified and openly subscribed to this agenda” (Brown & Clarke, 2013, p. 464). As such, other versions of events are excluded, and norms and values are established within this *regime of truth* (Foucault, 1984).

Specifically, publications that align themselves to 'reform' agendas and/or to constructivism, and/or cognitive development, seem to produce progress as dependent upon the development of "meaningful learning" (Battista, 1999). This is shown through titles such as *Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress* (Baumert, et al., 2010) or constructs such as "conceptual progress" (Battista, 1999). Typically, as in the Battista article, the focus is on the strategies employed by the pupils to solve problems, which is the mathematical performance that is sought by constructivist research. This has the appearance of acknowledging the pupils' perspective, however the specificities of mathematical thinking are clearly defined at the outset of the article; for example Battista frequently refers to "proper mental models". This suggests a correct and natural way of doing mathematics, which the pupil is measured against; a 'normal mathematical child'. Hence, in this, and many other cases, success with problem solving is the predetermined measure of progress and other versions are foreclosed. However, this is part of the circulatory discursive production of research, for "research is judged by its perceived capacity to deliver success in the prescribed terms" (Brown & Clarke, 2013, p. 460). Thus some researchers are always already setting out the model of progress that they intend to corroborate. In the above case, progress is evident by pupils' demonstrating prescribed models of activity of the 'natural' 'active' subject who is the 'centre' of the activity. As Valero states in her critique,

Most mathematics education research is based on the assumption of the centrality of learners in the processes of mathematical learning. This assumption views learners as active cognitive subjects at the 'centre' of the development of mathematical thinking in classrooms. (Valero, 2002, pp. 542 - abstract)

This position draws upon the privileging of developmental psychology in education, and mathematics education. Such a position, counter to Foucault, privileges developmental psychology with its "up the hill" progressive (Rorty, 1980) model of science, reason, and logic model of science, reason, and logic.

However, mathematics education research very much relies on the constituent subject, the essentialised and normalised mathematical child, who is naturally developing and autonomous; this is the model of progress. This version of the mathematical child is not natural, but is instead a production of discourses of developmental education (Burman, 1992, 2008; Henriques, Hollway, Urwin, Venn, & Walkerdine, 1998; Walkerdine, 1997, 1998). It is these methods of discipline, masquerading as freedom, that make "children's bodies the object of highly complex systems of manipulation and conditioning" (Foucault, 1984, p. 67); they designate what is possible.

Of course mathematics education research is not a homogenous mass; a few articles/books seek markers of both short and long-term development. One example of such is the Realistic Mathematics Education (RME) project based in the Netherlands, who specify a micro-didactic (short-term) and a macro-didactic (long term) perspective of students' "growth" (Van den Heuvel-Panhuizen, 2002). Though RME has similarities to constructivism, for instance they also expect pupils to "apply a natural strategy" (p. 6). This is reiterated by their use of the word growth, which suggests something innate, biological and unidirectional. As such, they have a commitment to the 'natural' mathematical child as discussed above.

My search found few examples of individual progress defined in anything more than cognitive terms. One example is from Watson and de Geest (2005) who refer to "deep progress". This is defined in

broad statements such as, students “learn more mathematics, get better at learning mathematics, feel better about themselves as mathematics students”. This suggests that developing cognitively in mathematics leads to development of the self. As before, it is this prescribed activity of reform mathematics that becomes a marker of progress.

Overall, I suggest that dominant productions of individual progress are based upon the cognitive ‘natural’ pupil, which is caught up in romantic productions of the past, yet supported by the self within neoliberalism. It is this narrative that produces and maintains the mathematical subject.

In the next section, I move on to examine how progress is constructed through New Labour’s educational policy documents and how the mathematical child is constructed within this. Again, I contend that these discourses, particularly as they are from a privileged and powerful apparatus, govern what is possible for those involved in mathematics education. As may be expected, this production largely takes on a more homogenous account than mathematics education research, and severely limits what stories can be told. Specifically, I argue that within educational policy, progress is constructed as functional, which both produces and is a production of the measurable, neoliberal education system. Within this, the mathematical child is similarly a functional automaton. I begin by discussing New Labour’s commitment to progress and what form it takes, before more specifically moving on to offer a ‘new’ analysis of progress and mathematics within educational policy.

Problematising progress in educational policy documents

New Labour’s neoliberal version of education, was based upon the an unprecedented, complete transformation (Ball, 2008). Within this, the past is used as a point of reference to previous government’s failures, often through “discourses of derision” (Ball, 2006); this relies upon productions of linear temporality and progress. Government officials routinely attest to “major step[s] forward in the transformation of our education system” (DfES, 2005, p. 5). Hence, I suggest that as with mathematics education research, progress is always already evident within government policy discourses; they cannot speak anything else.

From the outset of New Labour, “education, education, education” (Blair, 1996) was ascribed as a key symbol of government and of a modern, prosperous nation. Indeed their first white paper, discursively constructed education at “the heart of government” (DfEE, 1997, p. 5). As such, education becomes a method of governance, as well as a measure of governance.

Specifically, New Labour’s educational policies relied upon connecting individual and national progress (Mendick 2011). Within this, individual progress needs to be both visible and measurable. This accountability is part of the wider *regime of truth* in education, which has seen the emergence of a neoliberal managerial discourse (Ball, 1994, 2008). Education becomes a system where pupils, teachers and schools are accountable, where parents (and wider society) became the consumers, and where pupils are products fit for conversion. Furthermore, success is justified through conversion to measurable targets, and constructed levels of progress.

For instance, in the first New Labour’s white paper, they state that during their administration “school performance tables will be more useful, showing the rate of progress pupils have made as well as their absolute levels of achievement” (DfEE, 1997, p. 6). Specifically they will “focus more on the progress made between different stages” (DfEE, 1997, p. 26). For this model to work, and for

progress and learning between schools and pupils to be comparable, progress becomes both measurable and uniform between children and schools.

The rest of this section is focused on exploring how New Labour discursively constructed individual progress in mathematics, and how in this way the mathematical child became a functional product fit for conversion. This is not what is 'found' but what is manufactured through methods of governing and the promotion of expected norms and trajectories. As such, I am "keep[ing] watch over the excessive powers of political rationality" (Foucault, 2003e, p. 128)

In the first instance, linearity is given validity in mathematics education through the objective-driven structure of the mathematics curriculum for England and Wales. During the New Labour era, this was furthered through the National Numeracy Strategy (NNS) (DfEE, 1999), where curriculum objectives were broken down further. In particular, progress within New Labour neoliberal mathematics educational policy documents was concerned with attainment levels and prescribed targets. This was authenticated by *overt* surveillance on a micro and macro level, by Ofsted (mentioned above) and with the publication of school results and league tables.

Teachers are part of the governance as they are to "ensure that children progress through the levels expected for their age" (DCSF, 2009b). Like machines, pupils have to move at uniform and continuous rates. This is reiterated within publications such as *Increasing pupils' rates of progress in mathematics* (DfES, 2004) and *Making Good Progress* series of publications (DCSF, 2007b; DfES, 2007a, 2007b, 2009). In the former document "the focus ... is to increase rates of progress for pupils in mathematics by refining and developing planning, teaching and learning" (DfES, 2004, p. 5). These documents contain advise on preferred teaching that resembles many other teaching documents, though this is of course framed around the key marker of progress and that the speed of this should increase for all. They state:

In many schools pupils improve on average by one and a half levels in mathematics through Key Stage 3. In some schools pupils improve on average by two levels through Key Stage 3. Nationally we need to ensure that this becomes more commonly the case in *all* schools. (DfES, 2004, p. 5)

Thus the message is that pupils should conform to this 'normal/average' functional mathematical child. This is "another system of surveillance, another kind of control. An incessant visibility, a permanent classification of individuals, the creation of a hierarchy qualifying, establishing limits, providing diagnostics. The norm becomes the criterion for evaluating individuals" (Foucault, 1989b, p. 197); as such, it is hard to see alternatives.

By New Labour's third term this message was explicit. For instance, the *Making Good Progress* series of documents are explicit about level transitions, giving a specific set of rules for each. Moreover, there are sections entitled, "obstacles to progress in KS2 for all slow moving pupils starting at Levels 2 & 3", "obstacles hindering progression from level 2 to 4" (DCSF, 2008b, p. 2) and "actions to support progression from Level 3 to Level 5" (DCSF, 2008b, p. 3). These suggest that progress is a relatively straightforward track which deviant pupils can be managed onto. However, the very existence of these progress-specific documents problematises this.

There are many more extracts that exemplify this positioning of the mathematical child as functional machine. For instance “the progress of ... pupils needs to be tracked on a regular basis and obstacles to progress identified and addressed” (DCSF, 2009a, p. 27) and teachers are asked to “track progress and to tell pupils how they can do better” (DCSF, 2007a, p. 64). Here, the responsibility for monitoring seems to be placed upon the teacher, with the pupils as passive machine to be repaired. This message is continued throughout other New Labour documents, as pupils are instructed to keep up with the ‘normal’ trajectory, through titles such as *Keeping up – pupils who fall behind in Key Stage 2* (DCSF, 2009a) and *Getting there – Able pupils who lose momentum in English and mathematics in Key Stage 2* (DCSF, 2007b). “Getting there” also implies an end point and a predestined potential to fulfil, which follows an essentialist view of learning and development, and one that has a ceiling. Simple unequivocal suppositions such as these are a trait of government policy documents (Curtis, 2006) and evoke authority through rationalisation.

The exception - ‘Gifted and Talented’ pupils

However, there is one group of pupils who are encouraged to be different to the norm - the ‘*Gifted and Talented*’. These are a designated group of pupils in each school that are determined as developing significantly above the year group.

Specifically, the ‘*gifted and talented*’, are encouraged to move at a faster rate than the norm. The government state that “it will be easier for young people to accelerate through the system - early achievement at Key Stage 3 or AS levels⁵ will be recognised in the achievement and attainment tables” (DfES, 2005, p. 57). Thus for this special group of people, who are positioned as having innate gifts, early achievement and acceleration are viewed as appropriate, and difference is celebrated. It is similar to the ‘natural’ mathematical child found in mathematics educational research, in that it relies on ability, potential and the inner self, rather than attainment (DCSF, 2008a; DfES, 2006). Although the manner with which they demonstrate their potential is by converting at a faster rate. This would suggest there is still the requirement for the *Gifted and Talented* mathematical child of New Labour educational policy to perform functionally.

Overall, there is a huge investment in progress at both a national and an individual level; the proposition is that the latter feeds the former. In the majority of government educational policy documents, the discourse of individual progress is one of neoliberal functionality. This consistent and unified approach affords authority and suggests statements are almost factual and that the new always improves the previous; progress should be teleological for our pupils, and teachers should enable this. This is a much more overt and homogenous message than mathematics education research. Through governmentality, educational policy’s message is presented as the only ‘normal’ option, which could exclude many who cannot perform in these predetermined ways.

In the next section, I demonstrate how these discourses are lived by the student-teachers; in this, I am showing how governance through sites of power can be enacted in practice. Specifically, I demonstrate that the student-teachers are aware of the need for progress. It is produced as the marker, and dominant version of learning in the classroom. Thus, there are expectations of the mathematical child. However, the student-teachers find it difficult to reconcile ‘romantic’ and ‘functional’ productions with messy ‘real’ practice. As such, there is tension, which can lead to

⁵ Post 16 qualification

frustration and blame, and in various ways the positioning of teachers and/or pupils as deviant. Moreover, I contend that the personal and the self, are very much part of the student-teachers' discourse, in contrast to official educational policies and dominant strands of mathematics education research.

I construct this argument in phases. I begin by exploring how the student-teachers' talk can (re)produce educational policy discourses of the mathematical child as a functional automaton, demonstrating governance. I examine how this normalised, essentialised discourse is problematic for the student-teachers, by focusing on their relation to others and to their selves. To finish, I explore the student-teachers' negotiating progress through the '*gifted-and-talented*'.

Problematising progress in student-teachers' talk

The re(production) of the mathematical child as functional

Throughout the interviews, all of the student-teachers discursively produce progress as key to their mathematics classrooms. For some, there seems to be a push for linear progress for all pupils, such that everyone achieves at the same rate. This fits the functional production of progress within educational policy.

Nicola: The other day I had four kids that did the Comets⁶ work [lower group] and the Spoons work [higher group] in the same amount of time the Spoons did their own work. And the rest of the Comets did their work. And it was like they should really be working with Spoons

The extract above demonstrates how the mathematics classroom can be constructed around normalcy, which invites comparison, of what pupils "should really be" doing. Pupils are assumed to move at predetermined rates, which is what the teacher seeks.

In addition, it demonstrates how pupils' positions can be fixed within this in accordance with markers of ability/attainment that suit normal trajectories; this is reiterated by Nicola and Sophie.

Nicola: I think there's too many of them [targets]. Because sometimes you're changing topic, like one week on it and then you're on to the next thing, and by the end of the second week they've forgotten what you did the first week, because you haven't got the time to go back over.

Sophie: I think you do need some targets, but there's so much to do in the year, some kids you can go and do it one week, they'll be perfect at it, go and do a couple of weeks of other work and then you come back and they'll have completely forgotten it. So you can't win ... because you were trying to meet all the targets and all the strands, you had to skimp on certain weeks and certain bits and pieces.

Again, there is an expectation of what *should* happen in the mathematics classroom. There is comparison in pursuit of normalisation. Pupils *should* behave as machines, and maintain expected progress. The teacher (and the system) are governing the mathematical child, as they are processed

⁶ The pupils choose their own names for their 'ability' group, suggesting a knowing and subversive subject positioning – a constrained agency

through the production line. This is particularly evident where pupils do not fit 'normal' trajectories, and there is an attempt to reconstitute deviant groups, within what they *should* be doing. There are many more examples from the interviews where the student-teachers talk of working with target groups, and pushing the 'lower' groups.

However, as shown in the extracts above, the push for progress is not as straightforward as discourses in educational policy suggest. Accordingly, the student-teachers express difficulties taking the construction on-board. For instance, the extract from Nicola and Sophie demonstrates that tension is evident between the pressure to obtain targets and the perceived needs of their pupils. Both student-teachers seem to be uneasy about moving through fictional targets at a regulated speed and they express some desire to work more flexibly. Within this, they criticise the system, however it also becomes acceptable for them to criticise their pupils. As such, the child who does not fit the predetermined governing apparatus becomes defective, rather than the system. However, there is another option, for those who do not fit the functional, linear system of progress. Instead of blaming the pupil, you can blame yourself, which is Jane's narrative.

Jane also has an expectation of what pupils 'should' do, and she also conflates speed and progress. This is shown throughout her interviews, for instance:

Jane: See I've got to keep moving on for the higher ones and the ones that get it because there's no point keep doing that because they're just going to get bored but what do I do with those ones who don't get it? Do I just move, you know, it's difficult weighing it up because this was supposed to be a consolidation lesson for those children who still didn't get it.

She is aware that she needs to keep all pupils moving forward, but she is also mindful of what she is *supposed* to do. Thus the fuzzy experiences of the classroom do not match the 'normalised' functional expectations of educational policy. Moreover, Jane positions the pupils who "still didn't get it" as abnormal. Again, there is comparison to the 'normal' mathematical child through the expected temporality and functionality. Thus for Nicola, Sophie and Jane there is tension concerning in relation to their fuzzy classroom experiences.

However, Jane is different to the other student-teachers such that she places the blame for her pupils' lack of progress onto herself; which is shown in an illustrative example:

Jane: but he still can't work it out in the way that we were working it out and that worries me because I don't know where to go with him now ... I never think it's anything to do with them. I always immediately think that I should have done something different with those children and I just worry that I don't know what else to do ...They could do it yesterday but when they go to the tables something happens and they just can't do it and I'm not sure why

Through governance, Jane needs to ensure that her pupils make progress, as easily as educational policy documents indicate, and/or as intrinsic to the homogenised development of the 'romantic' mathematical child of mathematics education research. However, in practice the pupils do not behave as functional automata, or 'natural' inquirers. As she states, "when they go to the tables something happens", something that Jane cannot find an educational discourse to fit, possibly as

'official' discourses rely on totalising theories and generalisation, which Foucault critiques. In Jane's case she seems to take the majority of responsibility for the 'lack of progress' onto herself, and positions herself as abnormal, and as an unsuccessful teacher.

The mathematical child as romantic inquirer – for the 'able'

As in educational policy, there are one group that are allowed to query the functionality of progress. By the final year of her practice Nicola begins to negotiate the curriculum content led constructions of progress, by broadening the mathematics for those designated as high 'ability'. She states "instead of pushing them onto another objective I try and give them a more challenging way of doing it, a way of thinking". Possibly here, there is an alignment of discourses of educational policy, and mathematics education research as romantic inquirer. However, in contrast to mathematics education research stance, it is only the 'able' pupils that are allowed this production. It is also different to the governance of educational policy documents that advocate early entry and continuous movement through levels. Thus we can consider if progress is about the completion of content based objectives of educational policy or is it about "meaningful learning" (Battista, 1999), more akin to mathematics education research. One concern is that it can create a division in mathematics between the, functional and the romantic, mathematical child and limits the latter to those who are classified as 'able'.

Concluding Remarks

I began this article by arguing that we are bound by the parameters that produce us, and as such we can only see, say and hear certain positions. As Foucault states, people, institutions and societies

govern (themselves and others) by the production of truth (I repeat once again that by production of truth I mean not the production of true utterances but the establishment of domains in which the practice of true and false can be made at once ordered and pertinent). (Foucault, 2003b, p. 252)

My concern is that once we accept these positions as real, we are always already propagating them. As such, we may be feeding practice that restricts who can 'do' mathematics.

I have explored this by focusing on key discursive domains of production, that I argue, govern what is possible to say and hear, namely mathematics education research and educational policy. Next, I have analysed this in relation to student-teachers' talk, examining how these discourses coalesce and conflict. Throughout, I have used a Foucauldian philosophy (implicitly and explicitly) to drive my study, arguing that this allows me to step outside the norms of mathematics education, and the practice in which I am situated.

The specific example I unpacked, was that of the inevitably and form of discourses of progress, within these apparatus of authority, remembering it is "discourse [that] constitutes the field of the object" (Foucault, 1989a, p. 157). Education with its emancipatory narrative is always already bounded by the promise of improvement, and as such, it can only function around development. Specifically, I showed that this 'development' takes on certain constructions within the two domains. Progress for the mathematical child of mathematics education research is bound by 'natural' progressive pedagogies, such as problem solving, whereas progress for the mathematical child of education policy is linear and 'functional'. Both of these notions encourage comparison and

propagate the production of a normal mathematical child, where anyone else is deviant. This is not to be disregarded, “this fiction of what a normal person is like has important effects, according to Foucault, in courtroom, prisons, and various other institutions such as universities” (Pickett, 1996, p. 453).

However, these essentialised, homogenised accounts cannot be taken fully on board, resulting in conflict and disillusionment. Pupils (and teachers) are neither functional nor ‘natural’ as either position suggests, instead they are a complex hybrid of these identities. Student-teachers do (and will) struggle with tensions between competing discourses, especially when such value is attached to them. Moreover, they will find it difficult when discourses do not acknowledge or speak to each other. In the case of this article, they may look for measurable markers that work within neoliberalism. What is perhaps most concerning, and what is drawn out of my analysis is the inherent assumptions that are constructed about the mathematical child and the reification of the normal. Particularly where this is given authenticity, authority and governance through ‘official’ apparatus. As Jane states “I always immediately think that I should have done something different with those children and I just worry that I don’t know what to do”; “those children”, being anyone that does not conform.

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