

Tales of Power: Foucault in the mathematics classroom Tansy
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Power and how teachers talk about it has been a recent interest for me. In particular I have been looking at the power relation between mathematics teachers and descriptions of mathematics teaching and the school mathematics curriculum. My intention is to develop an account of how that power relation works. I have found that the theories of Michel Foucault on the operation of power within groups and institutions provide me with tools with which I can develop such an account. I have used those 'tools' to give me a way of looking at teaching and learning interactions, teachers' talk about how they plan their work and how they view their practice. I have used these tools as a way of highlighting what might have been previously unexamined areas for me.

Power is in the relation

I want here to introduce some of the ideas from Foucault's work on discursive practices and power relations that I have found helpful and consider their applicability to the mathematics education context. Also by drawing on the discussion that followed the presentation of this research report at the June conference I will give some illustrations of what may be highlighted by using these tools as a way of examining aspects of mathematics teaching and learning.

I start by investigating further Foucault's (1972a) statement that *'Power is in the relation. It is not exercised in a repressive sense from outside the individual'* Foucault starts from the premise that, primarily, knowledge and power work through the language; that as we learn to speak we pick up the basic knowledge and rules of our culture at the same time. He extends this to see that all human sciences define human beings at the same time as they describe them, and working together with their associated institutions, have significant effects on people. Relating this specifically to power he wrote

'Individuals are the vehicles of power, not its points of application.'

Foucault in Gordon 1980

'What characterises the power we are analysing is that it brings into play relations between individuals (or between groups) ... In effect, what defines a relationship of power is that it is a mode of action which does not act directly and immediately on others ... The exercise of power consists in guiding the possibility of conduct and putting in order the possible outcome' in Dreyfus and Rabinow 1983 p217/220

There is a powerful shift here in his focus from individualistic ways of viewing power. His view of power is that it is not outside of an individual or invested in an individual to exert over another, but that it is in the relation between people and within the institutions that they work in. In this sense power is generated by the interactions of members of a group. It is not only in the relation but power brings into play the relation - it is actually constituted in the relationship itself (it takes two - or more!)

Maggie McBride (1989) applies this notion to her mathematics classroom and writes:

'Foucault claims that power does not act directly on people but on their actions. 'Power is made and exists in every social interaction and classroom the site of power is within individual students and teachers.'

For Foucault power is internally contradictory. It oppresses and enables.

'If power were never anything but repressive, if it never did anything but to say no, do you really think one would be brought to obey it? What makes power hold good, what makes it accepted, is simply that fact that it doesn't only weigh on us as a force that says no, but that it traverses and produces things, it induces pleasures, forms, knowledge; it produces discourse. It needs to be considered as a productive network which runs through the whole social body, much more than as a negative instance whose function is repressive.'

Foucault in Rabinow 1990

These notions: seeing power as existing in every social interaction in every classroom together with the productive properties of power, enable me to look at teacher and

pupils interactions and start to account for what is going on in terms of power. Referring ² back to Foucault's words in Dreyfus and Rabinow (1983), there is a sense in which the exercising 'of power consists of guiding the possible conduct, putting in order the possible outcome'. This introduces the notion that when power is circulating it determines, to some extent, what are possible ways of acting and limits in some way what can be done. The determining and limiting effects of power are important for my analysis. Foucault in his writing how knowledge is actually produced and induces power through what he calls 'discursive practices' in society. 'Discourse' is a central term for him. In its broadest senses it means anything written or said or communicated using signs - a connection can be made here with Structuralism and its dominant focus on language. He describes a discursive practice as

'a body of anonymous, historical rules, always determined in the time and space that have defined a given period'. There is no knowledge without a particular discursive practice and any discursive forms'
p 117, p.183 Foucault 1970

A discursive practice is constituted by the actions of the members, their interactions with each other and the texts and communications and artifacts from within that practice and argues that these discursive practices have profoundly shaped the structure of our society. This allows me to make the move of looking at my classroom (set within the wider mathematics education culture) as a discursive practice, and I can consider how the actions and reactions of the people in it are constituted by the discourse at the same time as the discursive practice is actually constituted by their actions. This enables me to consider how power is formulated within teaching practices and interactions with curriculum texts.

What might be my research task ?

In trying to look at aspects of classroom practice one task (and that task was set out by Foucault) is to try and reveal the power that is operating there. He argues that one of power's characteristics is that it is often invisible - hidden. And one of the tricks of power is that it makes things look natural and obvious and unquestionable, so one of the tasks of a researcher would be to try and reveal that hidden power. One example of this might be that the constitution of the National Curriculum in Maths is seen as 'how we must describe maths' nowadays. It's obvious and natural to split maths into number, shape, data handling and of course using and applying permeates throughout - that's obvious?!

The way that maths is constructed and the way mathematicians are limited in their actions by that and the power relation itself can remain hidden.

The notion of power as hidden and best exercised when people are not aware it exists is an important one. On an electronic mailing list dedicated to the work of Foucault, Sam Binkley (1995) remarked

'In fact as in Nietzsche's critique of morality, he (Foucault) would say that the mere pretence to operate on a realm free of power relations is perhaps the most cunning and sinister play of power there could be, which masks itself behind a benign facade of liberal (christian) generosity, a mode of domination specific to the period of modernity.'

Set alongside this, the way that Foucault was not interested, for example in his work of looking at medicine, of what characteristics (personal characteristics), say, doctors had. What he was interested in was the role that those who practised medicine must follow to maintain their role and be seen as doctors. In the same way, one way of looking is to look at what the roles, the way of talking, the way of behaving the teacher, the pupils, the text, the activity has to be in order to be seen as and able to stand in that position.

] A posting on the subject of Foucault and Habermas to the Foucault electronic mailing list
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Revealing the Power

I am including a transcript of the video extract² that was used in my research report. The task given to focus our viewing of the video was to reveal the power that may not initially be on view and to consider the questions - How do you have to act, what do you have to say be seen as a teacher of mathematics or a learner of mathematics? and - **In** what way are you limited or enabled by the power that circulates?

(You may want to read this transcript with these foci in mind and see if you recognise in the discussion that follows, the elements that took our attention in that session.)

David Burghes comment: In order to convince our teachers that they can actually do this we felt it important to provide them with precise lesson plans, so that we have in our document quite clear-cut lessons that, in fact, indicate to the teacher what they should be doing, what they should be covering in each of the lessons with their classes.

Commentator: Following the example of Hungary every lesson starts with the previous day's homework. Any problems children had are sorted out in front of all the class and only then do they move on to that day's lesson.

Teacher comment: The first day we introduced this particular scheme into year 10, one of the children said 'This is the hardest day's maths I've ever done in my life'. and that was because she knew that for the whole lesson she had to keep on task and couldn't have 2 minutes rest while I wasn't watching her while I was attending to somebody else.

Scenes from the start of a lesson ...

Teacher: Right I want now to go through any of the questions people had difficulty with. Who would like to come up and put any antle in there on B?

Teacher comment: It's very demanding for the teacher because you are in control for the whole lesson and you are having to answer questions that are unexpected questions where as if you set an exercise for children to do for 10 minutes say you have 10 minutes thinking time to get yourself organ/sed for the next bit and you don't have that kind of break in these kind of lessons.

Pupil A comment: If you are up at the board then you don't have to know exactly what you are on about but you've got to have a good idea cos you've got the whole of the class that are there to help you. So you've got like 32 teachers instead of one.

A right angled triangle is drawn on board with sides marked 6 and 8. Pupil A goes up to board and writes $c^2 = a^2 + b^2$

Teacher: Excellent

Pupil A: Your hypotenuse is always opposite the right angle

Teacher: Excellent

Pupil A: so ... (and writes on board marking one side as 'hyp') Teacher: Do you want to [Jut your values in now, into your equation? Pupil A writes on board $c^2 = 8^2 + 6^2$

Derek: no shouldn't it ..

Teacher: (to Derek) go on ... yeh ... tell her

Pupil A: so 8 squared is 64 (and writes on board $c^2 = 64 + 36$) Derek: It's not c squared - shouldn't that be c equals 64 + 36 Pupil A: that's c squared

(affirmative mutters of c^2 " c^2 from other pupils) Pupil A now writes $c^2 = 100$ on board

Teacher: I think that you are out voted on that one, Derek Derek: no ...

Teacher: Just a minute. We'll talk about it in a minute.

Commentator: Teaching thirty or so students is always a challenge for the person in charge. Pupil A continues by writing something we don't see on the video then $c = 10$

Teacher: do you all agree with that ... ?

Class chorus: yeah

Teacher: right, there's just one little thing wrong with it and that's that we shouldn't have had that square root of 100 there. We write

She rubs a line off the board and writes $\sqrt{100} \quad c = 10$

The video extract can be treated as a piece of text. There were different ways in which we read it. Multiple discourses can be drawn out and we each choose the one we work with. I would claim that there is value in looking at this clip this way, whilst knowing that there is

² taken from 'From The Trouble with Numbers' broadcast BBC2 Thursday 30th January - further information available on <http://www.bbc.co.uk/Jeducation/lcmi/tblnum.htm>

some historical passing and many things that we don't and can't know (whether the' teacher moved on to do something quite different, whether she had a key notion in mind). The task is to look at the event in the detail, at the acts and the setting, and see what is highlighted for us. The task is not to try to establish the truth, to tell the one story that fits. I choose to give here a collage of power themes that were thrown up for the contributors to this session at the June conference rather than the specific elements I had drawn out for myself in advance, and include further references as they came up . These illustrate what meaning 'power is in the relation' might bring to this context and give views of the exercising of power and the creation of knowledge.

Maths as right or wrong

The nature of the mathematics contained here is one where there's a right answer and a wrong answer and from what the teacher was writing on the board at the end it looks like there was one method as well. That isn't, to my mind, what mathematics is. It is just one sort of mathematics. She said that there is just one thing wrong with it -it deviated just a tiny bit from the right way. That strongly emphasises that there is the only one way to do it. McBride (1989) says *'(Mathematics) needs to be understood as a constructed discourse that, with its rules and practices, effects our concept of truth, accepted methods of learning, and many attitudes within the classroom'*

Handling the questions

The teacher said it's difficult to answer (unpredictable) questions. We should ask what questions? There were none asked in the extract. The pupils weren't facing any questions. Consideration of questions like 'what if it wasn't a right angled triangle ?' were not legitimate. The speech form was "this is a right angled triangle", "this is opposite to this", "this one is the hypotenuse". So it might be important to ask why she was panicking. What sort of questions were legitimate? What might the pupils have asked (of her) in that situation that she couldn't understand?

32 teachers

The pupil said there's 32 teachers. How do I have to act to be a teacher? What element of her peers' actions did the pupil see that made them occupy the position of teacher? The pupil could have seen herself as teacher as she was at the board. Her peers were sitting behind their desks in straight rows which was facing her and yet she still looked at the whole room as teachers. They are teachers because they are seeing if something is right or wrong - an arbiter's role? They are teachers because teachers tell you (what to do) ? The teacher said, at one point, to the boy, Derek "Go on, tell her." There are 32 teachers because they can all tell you what you should be doing, what you should be writing. The pupils' perception could be that 'the teacher is there to help us' and what the teacher was doing was directing. In that particular clip she did say 'we'll talk about it afterwards'. It was 'excellent, excellent' 'just one mistake' Is this helping or guiding? I've found children who are very emotional about 'teachers are there to help us' and they get very angry when teachers don't help them.

Much of Foucault's work is focused on the construct of 'normalisation' - on the mechanism that categorises people into normal and abnormal (Foucault 1977). Linking the notions of normalisation and power as a productive network allows us to see the process that determines what is considered to be knowledge in the classroom and how that know ledge can be expressed and by who, as part of the process of normalisation that determines who is included and who is excluded in this discourse. Those who conform to these roles are likely to have their voices heard.

'Discursive practices are characterised by the interplay of these rules that typically are not written out; nor can people usually articulate them. Rules determine the possibilities and limitations for the content of a discourse. They determine the conditions under which discourse is used, who can speak. how\ ' individuals must speak or write, and who speaks the 'truth ' . Rules also determine what can and cannot be talked about. Another group of" rules has to do with the form that theories must take in order to be seen by people as truth within

any discourse. These rules determine the vocabulary that must be used in stating the truth. Even the arrangement of statements follow these rules.'

McBride 1989

More on teachers' role

We should be careful not to generalise and say that telling someone something or leading someone through something is in itself wrong or bad teaching. And, it's interesting to see how the pupils view it. It was mentioned that there is a wider spread of ability in the UK than in the Eastern European schools that these ideas are based on and where there is quite tight streaming whereas, if you want to do it in a wider mixed ability situation perhaps you have to be more proactive and bringing more of the children's ideas out, allowing questions in that situation. Also knowing what to teach is important. The pupils couldn't teach it - they don't know the key points to draw out, they don't know how to guide.

Surveillance

There was a phrase "if I wasn't watching her". In a sense of the language of surveillance, As a teacher I have to watch people to make sure they're doing things? Learning happens when you are watched? Also if the teacher' is occupied, if demands are made on her for the whole lesson, then the pupils learn more?

Pathologising the pupil

The phrase '(questions that) people had difficulty with' appeared. This can seem commonsense. Pupils do 'have difficulties with', their homework -positioning the pupil as the one who has difficulties. It is not the difficulty of the teacher or the homework. There could be an issue our communication as teachers. Perhaps I should consider my teaching as poor if the pupils they couldn't understand? But, this way of thinking is not entertained. Moreover, the curriculum devisors, David Burghes etc, teacher appear as legitimating her position. She felt she was absolutely right in what she was doing because she appeared to have been told that this was the right way. Is that odd? She wasn't responding to the students; she was responding to the curriculum. This removed from her the possibility that there could be difficulties with her teaching. 'They're not understanding and, therefore, I should be doing my job better' wasn't part of her thoughts.

Ideology and discursive practices³

The audience may not have been teachers or researchers but a wider audience on television. The message of the piece was along the lines that traditional teaching is best; traditional teaching signified by role, signified by the fact the pupil is using chalk on blackboard, signifying by the use of Pythagoras as an example of mathematics being done. The teacher's commentary and the pupil's commentary act to support that particular message. The teacher teaching and pupils' learning are part of an exemplification of a traditional mode of teaching. Earlier in the video David Burghes described the class scene as an example of whole class interactive teaching. That expression and others like 'going back to traditional methods' are heard in the discursive practice within society at the moment. His use of these allow him to occupy the position of technical expert. He is constructed (by the media, by the discourse) as someone who knows something about these issues. Not because of what he knows but because of what he says.

³ A technical note: It can be seen that where Foucault uses the term 'discursive practice', Lacan and Marx use the term ideology. Their construal of the notion of ideology is portrayed by Zizek (1989) in his work 'The Sublime Object of Ideology'. In line with this I use a definition of an ideology as a framework made up by set of nodal points, tenets, principles which when held together generate further consequences beyond their statement or articulation. Agreeing with these tenets puts you in a position of finding that you have subscribed to much more, and are unable to deny some argued consequence. This also runs parallel with Althusser's (1994) definition of the joy of ideology as the pleasure, the non-critical tautology, in saying 'yes, the way I see the world IS the world.' From my reading of Foucault I would claim that he invests 'discursive practices' with the same meaning, particularly his sense in which discursive formations operate so that the power is exerted, people are positioned and their actions defined. There is a compulsion, a necessity, it could not be other. In this sense we have no choice.

Where does all this get me?

Each society has its regime of truth, its 'general politics' of truth: that is, the types of discourse which it accepts and makes function as true The problem is not changing people's consciousnesses - or what's in their heads - but the political, economic, institutional regime of the production of truth. It's not a matter of emancipating truth from every system of power (which would be a chimera, for truth is already power), but of detaching the power of truth from the forms of hegemony, social, economic, and cultural,

within which it operates at the present time

in Rabinow 1991

It is not to awaken consciousness that we struggle but to sap power, to take power; it is an activity conducted alongside those who struggle for power, and not their illumination. '

Foucault and Deleuze 1972 P208.

I said I intended 'a struggle aimed at revealing and undermining power where it is most invisible and insidious' (Foucault, Deleuze 1972). Have I reveal that power? I think through discussion of a range of power themes related to the video extract I have. This also reveals some ways in which the discursive practice(s) of mathematics education positions people with the classroom, limiting their actions and determining what each has to say to be heard. Our discussions can be seen to take important and, I would argue, not easy steps to reproblematised (aspects such as teachers role)

'The work of an intellectual is not to mold the political will of others; it is, to re-examine evidence and assumptions, to shake up habitual ways of working and thinking, to dissipate conventional familiarities, to re-evaluate rules and institutions and starting from this re-problematization ... to participate in the formation of a political will

Foucault 1989

The formation of a political will involves enabling people to act in society. There is need, as Foucault shows, to identify tasks and questions that move 'to sap power' and so enable us to act. I find it challenging to articulate in these tasks in practical terms. My current aim would be to tell the stories that are currently untold, of those who were silenced in all this. He does indicate to me that such re-problematization is hard but imperative. There is also a tension. On one level, Foucault talks strongly about how actions are limited and controlled, whilst here he moves to talk about how I can act with some autonomy and not be entirely caught in that controlled situation. Whilst I am a little uncertain about the exact nature of the move that I can make to work on this tension my future researches and analysis of teachers' descriptions of their practice aim to tell these previously silenced stories and to make me more aware of the workings of discourse practices in the generation of power and truth. This moves me towards being able to take more considered action in my classroom practice.

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