

Excavating and mapping the social landscape of beliefs

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In this paper I look at some of the present models and approaches to teacher belief systems and argue that these can only give us an incomplete picture leaving as they do, the source of belief systems in the social world unexamined or unproblematised. I offer some sociological concepts that can help us understand better how belief systems are constructed upon teachers' ideological foundations and elaborate on how we can operationalise in practical research terms concepts of habitus and ideology.

The social role of mathematics education

Naturally there is diversity and variety in all mathematics teaching – a diversity that finds its rationale in mathematics teachers' belief systems. While what teachers do is based upon what they believe – what they do has both unintended as well as intentional consequences. Mathematics thus performs a social function, and by engaging in mathematics teaching, teachers are consequently involved in a social function. Hence in order to understand better the nature and functioning of mathematics teaching we need to look for foundations, predilections and structuring frameworks that would support a social model for understanding the discipline. Such an approach requires us to locate ourselves within a dynamic and dialectical analysis of the relationships between human agency – the will of the individual – and social structure – the wider enabling and constraining forces operating on us. Indeed, it requires us to look for social forces not only as acting *on* us, but also as acting *in* us. Karl Mannheim takes this argument a little further.

Strictly speaking it is incorrect to say that the single individual thinks. Rather it is more correct to insist that he participates in thinking further what other men have thought before him. He finds himself in an inhabited situation with patterns of thought which are appropriate to this situation. (Mannheim 1936, p 3)

Mathematics teacher belief structures – some theoretical limitations

Studies of teacher beliefs often focus attention on beliefs as if they existed in a social and political vacuum drawing fundamentally upon a psychological paradigm, which seems unable to account adequately for the difficulties of teacher change. However, as the Centre for Contemporary Cultural Studies has suggested, beliefs do not exist in a social vacuum:

If we are interested in the ways in which consciousness is formed, we cannot stop at the level of lived beliefs. Beliefs, conceptions and feelings are not only carried in the minds of human subjects; they are also written down, communicated, 'put into circulation', inscribed in physical objects, reproduced in institutions and rituals and embodied in all kinds of codes. ((CCCS) 1981, pp. 27-28)

Hence, beliefs have a wider and deeper dimension, rooted in cultural norms and forms that are themselves rooted in social structure. These have a huge influence

over consciousness and ideology, setting many agendas and putting boundaries around what is considered as possible, describable or even legitimate. The source of belief systems lies within the social world.

Studies of teachers' belief and knowledge structures have increased considerably during the 80s and 90s. Kenneth Zeichner, Robert Tabachnick and Kathleen Densmore (Zeichner, Tabachnick and Densmore 1987) suggest that we need to consider adopting approaches to teacher development that recognise the complexity of the nature of knowledge (Zeichner, Tabachnick and Densmore 1987, p. 24). They identify a lack of consensus in the literature on teacher socialisation and challenge the view that student teachers change and modify their views on teaching through experience and teacher education. Rather what happens is an elaboration of previously existing perspectives and a selective focus on experiences that validated their own perspectives. Again providing evidence for the inherent stability of belief systems.

Thomas Cooney and his associates have worked for some time on the knowledge and beliefs of preservice secondary mathematics teachers. They recognise that beliefs about mathematics and how to teach it are influenced by experiences with schooling long before prospective teachers enter professional training and that these beliefs seldom change (Brown, Cooney and Jones 1990). Such a worrying state of affairs requires us to try to understand therefore not just what it is that teachers believe, but how these beliefs are structured and organised (Cooney, Shealy and Arvold 1998).

Alba Thompson ~~has~~ worked for a number of years on mathematics² teacher beliefs. She claimed ~~eds~~ that teachers' patterns of ~~behavior~~~~behaviour~~ characteristics are ~~a result of~~~~down to~~ consciously held beliefs acting as a *"driving force"*. In addition, practice can be the result of unconscious beliefs and intuitions (Thompson 1984) ~~What is unclear are the possibly unconscious beliefs which Alba Thompson held which forced her to put "driving force" in quotes in the article cited above. What is unclear is ee used to avoid confronting an Alba Thompson's work where is was seminal and helpful, but she fails to look deeply into the nature of these "driving forces", where they emanate and how they become operationalised. Alba Thompson suggested that more research was needed on the stability of teacher beliefs.~~

This phenomenon of teachers modifying new ideas and practices by adapting them to fit existing practices is now well understood (Thompson 1992, p. 140). Underlying this problem is the issue of stability of the structures of commitment that we hold as individuals acting within a social world. This is an example of the difficulty in changing deeply held ideological dispositions and underpinnings. We may change words, we may change the context to (pseudo) real life situations, and we can even change the architecture of the school buildings, but little changes in the relations of power and domination in the mathematics classroom. "Unfortunately the literature on teacher change, though rich with tips, does not offer explanations for this phenomenon" (Thompson 1992, p. 140).

Alba Thompson reviewed much of the research on mathematics teacher beliefs (Thompson 1992) yet it becomes clear in her review that much of the driving force in this research comes from the belief that it is the *teacher's view of mathematics* that is responsible for classroom practice. This position needs to be questioned and deconstructed. Without further clarification, one reading is that one's conception of mathematics is the deciding factor in structuring one's teaching. Rene Thom (Thom 1973) seems to go further in using the word '*rests*' – a spatial metaphor that has a sense of dependency embedded in it. The question this begs is – on what does one's philosophy of mathematics itself rest.

Teachers' social perspectives – the missing dimension?

Much research undertaken on various aspects of teacher beliefs tends “*inadequately to explore teachers' social beliefs*” (Liston and Zeichner 1991, p. 61). Teachers' *social* knowledge

tends to be inadequately addressed in most accounts of teacher knowledge, is rarely examined in teacher education curricula and is awkwardly handled in the prominent models for cultivating reflective thinking and action in teachers. (Liston and Zeichner 1991, p. 61)

As social beings, mathematics teachers do not come to the classroom devoid of social and political motives and intentions. Yet nor can we merely append '*social knowledge*' to a growing list of categories of professional knowledge alongside 'knowledge about children', 'pedagogical content knowledge' etc. because of the fundamentally constitutive nature of social beliefs. Beliefs do not exist in a social vacuum. Beliefs have a wider and deeper dimension, rooted in cultural norms that are themselves rooted in social structure. We are the embodiment of social structure. Bodies are the carriers of relational and institutional structures.

In developing a theoretical framework, we need to be able to conceptualise this dialectical relationship between the individual and the social. Pierre Bourdieu offers a way through this in his appreciation of the interplay between objective social structure and subjective personal dispositions, which forms the central methodological and conceptual organisation of his work and informs his empirical studies (Bourdieu 1972, 1990b). It is his assertion that objective structures are actualised and reproduced through subjective dispositions (Bourdieu 1972, p. 3). This does not mean that subjective dispositions have a primacy over more objective social structures. Rather that the development of individual dispositions is influenced and constrained by objective structures, the nature of hierarchy, the form of hegemonic positions and so on, which in their turn reinforce the objective structures. What distinguishes Pierre Bourdieu's approach is the way in which social structural properties and social and economic conditions are always embedded in everyday lives and events of individuals (Harker, Mahar and Wilkes 1990, p. 8). Of course implicit in here is a readiness to accept that:

There exist in the social world itself, and not merely in symbolic systems, language, myth etc. objective structures which are independent of the consciousness and desires of agents and are capable of guiding or constraining their practices or their representations. (Bourdieu 1990a, p. 14)

Within this framework, there are two main conceptual tools that can be incorporated into research on teachers' beliefs that will give us access to some previously un-illuminated routes to the roots of the systemic logic of teachers' belief and values systems – the *habitus* and ideology.

Habitus

For Pierre Bourdieu, this symbiosis can be examined and understood through the elaboration of the *habitus*. I explore this in more detail, theoretically and empirically, elsewhere (Gates 2000), but briefly, the *habitus* is the cognitive embodiment of social structure. Our *habitus* forms the generative principles that organise our social practices leading to social action and provide us with systems of dispositions that force us (or allow us) to act characteristically in different situations. The *habitus* thus resides within patterns of interactions and needs to be explored using techniques that dig deep enough into the logic underpinning the observable practices - a logic that is interwoven with the social origins of one's predispositions.

The mathematics teacher's *habitus* will be at the root of the ways in which teachers conceptualise themselves in relation to others; how they enact and embody dominant social ideas and well as how they transform and adapt them. The *habitus* is at the bottom of how we react, judge and evaluate. Individuals develop tendencies to act and believe in certain situations depending on the landscape of the social field. Objective relations are incorporated into subjective dispositions to act. These schemes of dispositions operate below the level of consciousness and language.

Beliefs thus have a symbolic logic that can be explored through first *mapping the system of dispositions* and then *connecting these dispositions to the predispositions deriving from the conflictual nature of economic and social relationships*. In other words mapping the *habitus* and excavating **ideology**

Mapping the *habitus*

The *habitus* is a conceptually difficult notion to capture, both theoretically and empirically, but I will offer an operationalisation of it drawing on various writings of Bourdieu.

Through our dispositions, the most improbable practices are excluded as unthinkable, which inclines us to be predisposed to act in ways that we have done in the past. The *habitus* produces practices that reproduce the regularities of experience while slightly adjusting to the demands of the situation. In practice the *habitus* is history turned into nature. Our unconscious is therefore the unforgetting of our history turning our actions instead into second nature. The *habitus* is the product of inculcation and appropriation. It is through this that

objective structures and relations of domination reproduce themselves (Bourdieu 1972, pp. 72 - 83).

This is because the regularities that seem to exist appear to us as natural since we are predisposed to see them as such through the way we perceive the world. We tend to ignore the limitations of our previous experiences and give them more weight than they deserve. In this way, both individual and collective practices are produced. Past experiences achieve a constancy over time as we become more tied obeying the past than considering the future. Our actions tend to be habitual - creating a 'structure' to our practices - or as patterns to our behaviour (Bourdieu 1990b, pp. 52 - 59).

From this, I offer a four-fold operationalisation that allows us to get below the surface and deconstruct the generative grammar behind indeterminacy of the logic of human practice (Bourdieu 1990a, p. 77; Gates 2000). I want to suggest we can work by seeing the *habitus* as operating on four levels or domains.

- 1. The *habitus* as the embodiment of social structure;
- The *habitus* comprises the systems of dispositions between structures and practice, through which social life is sustained and managed.
- 2. The *habitus* as habit and dispositions;
- Our *habitus* is what we use to classify and judge and at the same time it is the collection and make up of those judgements and so is deeply implicated in our daily practices.
- 3. The *habitus* as a structuring device;
- It is because we do not, strictly speaking, know what we are doing that what we do has more meaning than we know (Bourdieu 1972, p. 79). In this way our practices play a part in maintaining and energising the organisation of structures within the social fields in which we operate.
- 4. The *habitus* as symbolic violence.
- Symbolic violence occurs where the arbitrary cultural norms of the dominant groups are presented not *as* arbitrary, but as the legitimate and natural norms of behaviour.

Part of the operationalisation of the *habitus* is in articulating the practical knowledge that might be held by a teacher and the logic thereof. Thus, there is a requirement to recognise the *legitimacy* of the social roots of the practice of everyday life, and in research terms to search for that underlying social structure embedded in a teacher's professional discourse. Hence there might be said to be two elements to the use of the *habitus*:

- 1 as a *theoretical concept* concerning basic rules of organisation of social life at the interface of agency and structure; and
- 2 as an *analytical tool* to grasp empirical manifestations of predisposition, internalisation of relations of domination and subordination etc.

More specifically, such an approach underlines the importance of predispositions and orientations in coming to an understanding of the

organisation of teachers' structures of thought. In particular this requires an examination of how the *habitus* manifests itself in such aspects as one's use of language, how one envisages one's interrelationships to others, one's style of dress, figures of speech, the roles ascribed to individuals and how these are to be carried out. We need to consider also the legitimacy of the influence of collective history in enacting and facilitating social organisation. Additionally we need to explore how dominant power relations are enacted and conceptualised through misrecognition, what is accepted without the need for further elaboration for example. Also, we need to look for how the *habitus* predisposes us to position ourselves and relate to dominant discourses. Finally, in recognising the existence of a practical logic we need to look for patterns – for regularities of orientation in different contexts and different situations.

Working with the *habitus* though is not enough. To help us understand the social foundations of mathematics teachers we have to look also at how the *habitués* of groups of teachers gel into more organised forms of thinking and cooperation. Teachers become pulled together or 'interpellated' into social groupings and formations through the sedimentation of the individual *habitus* and predispositions into more socially organised ideological frameworks.

Ideology

Fundamentally, what distinguishes ideology from general sets of ideas is that ideology is about the relationship between ideas and the social context that frames them and the relationships between individuals. What typifies ideological ideas is their relation to the conflictual nature of economic and social relationships. Ideology thus relates to matters of power and social structure as well as relating ideas and activity to the wider socio-cultural context. Ideology can thus be represented as relatively stable, deep structures of ideas. Our ideological makeup establishes us as being the same as and different from the individuals and groups with whom we associate or work – but a positioning process founded not upon some philosophy of mathematics, but upon one's social frameworks.

Excavating ideology:

So what might we look for in attempts to excavate ideological frameworks? Looking for ideological underpinnings requires us to look at *language forms* used, to explore the *social imagery* adopted, to elaborate on how individual teachers *categorise and organise* their ideas especially in relation to others. These in particular will need to connect with ideas on the *nature and form of society* and how it operates. In addition, these will need to be tied to issues of practicality, which embody *relations of domination*. Relating this discussion to teaching, ideological underpinnings appear as ideas and assumptions about *human nature*, about *learning and educational difference*, the *role of education*, the *role of the teacher* and ideas about *priorities for teacher professional development* (Gates 2000, pp. 124-129).

These underpinnings are not constructed purely by individuals, but are constructed through engagement in the social field and social world. They are the outcomes of one's dispositions and socialisation – or *habitus* - mediated by social engagement. They represent the interpellative (or recruitment) mechanisms for the formation of interest groups.

Looking at a mapping

I offer here just some brief exemplars of what such an analysis might throw up from a year-long study I carried out in a school mathematics department. I offer a detailed mapping of teachers' professional orientation drawing on the frameworks above in (Gates 2000).

Alan Brown was a Head of Mathematics in a secondary school in the UK. Alan was strongly in favour of setting pupils into ability groups that were as tight as possible because this allowed the teacher to target children's specific learning needs. In his role as Departmental Head, Alan would take decisions on which set children were to be placed in, on the basis of as much actual information as possible. This information would consist largely of results of objective tests undertaken by children in formal testing conditions. These tests would be organised around a limited set of learning objectives written at specific ability levels. Not only would these tests give Alan information on children's ability, but they would also be a reflection on how well a teacher was teaching the class. As such this data would be one example of information that helped Alan monitor how well his staff were performing in relation to specific success criteria. Underlying this set of processes was a belief that people performed better if they were aware that they were to be held accountable for their actions. He had little time for the notion of differentiation by output, and felt instead that the mathematics curriculum needs to be organised such that children had clearly detailed learning objectives that could be objectively assessed. Alan saw the UK Government's National Curriculum as the framework for the school curriculum and therefore non-negotiable.

Success at external examinations was a key target for Alan, and all else would be subordinated to this. This meant more number work for less able pupils based around short term tasks, and more algebra for more able students who could be stretched and challenged. Alan saw his appointment as part of a move by the School Management to change the way the Department worked, and to improve examination results. In order to do that, he was prepared to take unilateral decisions on some issues. This was a goal invested in him by the school management, and one that he was therefore empowered to impose upon the department.

Alan had a clear vision of how different groups had diverse needs. Children from less privileged homes needed a focus on basic numerical skills, which they would not get from home. Alan is sceptical of much educational research; those who do it do not have to carry out the consequences with a class of thirty on a Thursday afternoon. This extends to research about social class and achievement

as well as the social and academic implications of setting. Alan was a particularly well-organised manager and teacher. He dressed formally, always had equipment and resources ready, always had work marked ready to give back and would rarely ever have children getting one over on him. He imposed a tight structure on himself, his pupils and his staff. He controlled classes and expected children to toe the line, not contravening an unbroken rule that students should never argue with him. In order to be able to assess pupils and evaluate teaching and learning, Alan felt it important that there was a high degree of uniformity, to avoid all children coming up with different things. As part of this drive, he had purchased a large number of textbooks that would ensure children have sufficient practice because this was an effective way of learning.

There are elements here of a strong *habitus* which orients Alan's evaluative dispositions (I discuss this example in more detail in Gates 2000). He is very aware of social differences and distinctions and respects these as significant factors in making judgements. He has a strong sense of prioritisation of the value of his own personal experience over any theorising or explanatory factors. For Alan, truth consists not in correspondence with the uncovering of facts, but in the successful coherence with reference to his own experiences, dictated by consideration of the immediate practical consequences. Finally, Alan has a strong sense of control, in a number of various forms; surveillance over others, watching observing checking; an acceptance of the legitimacy of his making decisions for and about others; a drive towards uniformity, while a recognition of the importance of differentiating between individuals. Discipline, conformity and a strong sense of hierarchy also permeate Alan's *habitus*.

I will now shift to look at some underpinning components of Alan's ideological framework. Ideological components are the organising features behind the sets of ideas that help us understand the social world and help us organise our action within it. In Alan's case there seem to be three main consistent deep themes or structures that underpin his positioning, and which I would conceive of as components of his ideological framework – for Alan:

Hierarchy is an essential feature that allows individuals to operate together. We live in a structured society. For those in relatively subordinate positions, it incorporates the need to subordinate oneself to others, who are legitimately empowered to take decisions about, for and on behalf of those in subordinate positions. The essential feature is that this is a top-down principle wherein democratic accountability does not figure. Hence those in super-ordinate positions are empowered with the legitimacy to make such decisions over others.

Surveillance incorporates the need to oversee, check and organise others. This is not perceived as a repressive or oppressive force, but as a creative one, which ensures individuals perform at their maximum capacity.

Conformity is important for the smooth running of the school, Department and classroom. This incorporates acceptance of externally imposed conditions

and suppression of individuality. This appears in the management of others and in the processes of learning.

There is a strong coherence between these components, and they form a mutually supportive and justificatory framework. The need for acceptance of hierarchy is both required and reinforced by the process of surveillance, whereas conformity is assumed in order for the system to effectively operate. It would appear that in the way they operated for Alan, there was little dialectical conflict in these components. Not only is there consistency in application of this framework, there is also a high level of integration as a system of social organisation.

Conclusions

I am arguing here that while strictly psychological models of teacher beliefs can give us considerable insight into the structure of teachers' knowledge, they have some limitations when we come to want to look at some of the wider and possible unintended consequences of the education system. This can be informed by adopting models of belief systems as well as research techniques that look at how an individual constructs a system of beliefs both structurally and temporally. As researchers it requires us to go beyond the data of observable practices and into the realms of those patterns and generative principles of which the teachers themselves may not even be aware. Underlying such an approach is the ideological predisposition that sees thinking as a social act, and systems of beliefs as representing dominant and objective social structures as well as helping those structures to operate and reproduce.

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