Explaining Global Policy Phenomena Using the Small and the Mundane: A Network Analysis of PISA

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Abstract

The 2006 round of the Program of International Student Assessment (PISA), run by the Organisation for Economic Cooperation and Development (OECD), included 57 countries - nearly 90 per cent of the world's economy. How has PISA managed to gain such reach? How has it made itself relevant to such a large and diverse set of nations? The growing popularity of large-scale testing is but one example of the global spread of policy ideas. How do policy ideas become global phenomena? Finding theories of diffusion and globalisation inadequate in explaining the large-scale spread of policy ideas, I argue that the notion of assemblage offered by the process sociology of actor-network theory (ANT) provides a useful analytic. Rather than using big ideas to explain how certain situations have come to be, ANT uses situations to explain how certain ideas have become big. It offers a way to understand even apparently established networks as fluid assemblages that are continually built and translated, and provides the tools for thinking differently, and with greater agency, about issues that appear powerful and entrenched. It has been argued that deconstruction, which has been the main approach of policy researchers in recent years, is no longer adequate, and that new theories to understand and to engage with policy-making are urgently needed (Gale, 2006). ANT offers the role of 'assembler' rather than 'deconstructionist' to the policy researcher, and thus has the potential to transform policy analysis. To view policy phenomena using this analytic is to bypass tired debates and adversarial stories of power struggles, and to create spaces of hope and negotiation.

Introduction

We think the universal explains, whereas it is what must be explained. (Deleuze & Guattari, 1994, p. 49)

How to study large policy phenomena? This depends not only on the analytic employed, but the work one wants the analysis to do. Diffusion theories are empirically rooted and trace trajectories of the travels of ideas. While these provide fine-grained detail and are useful in the study of particular instances, they fail to account for the type of global spread evidenced in the use of the Program for International Student Assessment (PISA), which is enrolling more and more countries with each round of testing. Discourses of hegemony and theories of globalisation account for scale and explain it in terms of differences in power, but they are often able to do no more than describe, critique and lament, as they afford little agency to the 'victims' whose cause they espouse. Many have raised the urgent need for new theories and concepts in education policy. Among them are Stephen Ball, who finds the available theoretical tools to be blunt and irrelevant (1990, p. 8), and Trevor Gale, who asserts that it is no longer enough to 'simply expose the power/knowledge relations of policy' and seeks a 'theory of and active politics for policy engagement' (2006, p. 2). In this paper, I explore how resources provided by the material semiotic perspective of actor-network theory (ANT) may be employed in the study of global phenomena such as PISA, and propose that it provides useful tools to study policy-making and opens up spaces for intervention and negotiation.

As the PISA brochure (OECD, 2007, p. 4) reminds us insistently, countries that make up 90 per cent of the world's economy participated in PISA 2006. PISA's ubiquity provides great potential for mobilising discourses of globalisation, hegemony, colonisation and empire.

They evoke the worry that a set of standards is becoming universally accepted such that an OECD-sponsored, Western-centric view of what constitutes learning will lead to singular and homogenic versions of schooling everywhere. However, empirical evidence suggests that PISA is in fact not the same everywhere. If it is a major influencer of policy in Australia, it is also not central to policy in the US. If it causes 'shock' in Germany, setting off intense policy activity, it is merely a source of reassurance in the UK that brings about no change in policy or practice (Grek, 2007).

A material semiotic sensibility accounts for both standardisations and differences in the same terms. It allows us to banish the dichotomies of 'big' and 'small' *a priori* and to ask: how has PISA become big? By what means? How does it travel so seemingly easily and well? How is it that PISA has become – or, better, is becom*ing* – global? In the sections below, I seek to explore this question using some ANTish notions. But first, a short introduction to ANT and to PISA

ANT

Propounded by Callon, Law and Latour, actor-network theory or ANT (also referred to as 'material semiotics' and 'the sociology of translation') has itself been performed variously and used to study a variety of phenomena over the years. ANT theorists hold that ideas, practices and established 'facts' are effects of heterogeneous assemblages. The notion of assemblage is concerned with the processes by which heterogeneous entities can produce 'facts'[1]. Here an *assemblage* is 'a process of bundling, of assembling … in which the elements put together are not fixed in shape, do not belong to a larger pre-given list but are constructed at least in part as they are entangled together' (Law, 2004, p. 42). A number of materials – images, graphs, humans, processes, money, experts, documents – may come together to form more or less stable assemblages.

This does not mean that all is illusion or relative; rather, it means that reality is an achievement that is empirically performed and made more or less durable through more or less stable relations between heterogeneous actants. It is the socio-materiality of assemblages that makes possible this durability. Rather than accept 'pre-maturely naturalized objectified facts' (Latour, 2004, p. 227), ANT seeks to trace the associations through painstaking empirical work to understand how the effect of naturalisation has been achieved. ANT eschews dualisms such as 'distant and near' and 'local and global', preferring instead to search out the relations between actors without any preconceived notions of structures and relations.

PISA

PISA has become one of the most comprehensive large-scale international tests in current times, gathering what it describes as 'an unprecedented comparative knowledge base of school systems and their outcomes' (OECD, 2007, p. 6). It tests a sample of 15-year-olds in three areas – reading, mathematical and scientific literacy – and aims to measure how well-

[1] This performative view is in sympathy with Gough (2002) and Turnbull (2000) who emphasise the situated and localised nature of knowledge. They talk of space as an important actor in the production of knowledge, so that all knowledges are local knowledges. Spaces also provide the context in which certain ideas become intelligible. By highlighting the importance of space and location in knowledge production, Gough and Turnbull challenge the 'acultural' and 'asocial' claims of the 'scientific' and 'rational'.

prepared students at this age are 'to meet the challenges of today's knowledge societies' (p. 6). Over one million students have participated in PISA testing to date.

In 2000, when the first round of PISA was conducted, OECD's 30 member countries, and 13 PISA partner countries enrolled in the program. By 2006, the numbers swelled to 57 countries, covering, according to the PISA brochure, 90 per cent of the world's economy (OECD, 2007, pp. 4, 6). Sixty-eight countries have currently enrolled to participate in the 2009 round of testing. Increasingly, nations are using PISA scores as measures of the success of their education systems and their policies, and to compare themselves with other countries (what Grek, 2007, p. 5, calls the 'PISA effect'). In many countries, PISA results are widely reported in the media. PISA results also appear to frame policy issues and to trigger reform. In Germany, for example, a poor showing in the PISA league tables led to 'PISA shock', reported as a scandal that demanded urgent and radical reform (Grek, 2007; Steiner-Khamsi, 2006). Finland, which has consistently come out at the top of the PISA league tables, has become a Mecca for policy officials and educationists interested in understanding what makes for such consistently high performance. The McKinsey Report (Barber & Mourshed, 2007) *How the World's Best Performing School Systems Come out Top* takes the PISA rankings as the measure of success, and isolates the factors that contribute to better performance, thus further reifying and entrenching the PISA rankings.

This leaning on PISA for policy direction is synchronous with the OECD's declared intention of providing data from PISA specifically to inform policy. One of the key features cited by the OECD is '[i]ts policy orientation, with design and reporting methods determined by the need of governments to draw policy lessons' (OECD, 2005, p. 3).

Over time, there has been a subtle but very significant shift. Where earlier the OECD saw PISA as providing useful data inputs to countries as they shaped their policies, more recently the OECD is able to use PISA performance results (outputs) to 'monitor' countries' education systems and to encourage countries to adopt certain policies, as is evident from the words of OECD Secretary-General Angel Gurria:

> *Quality education is the most valuable asset for present and future generations. Achieving it requires a strong commitment from everyone, including governments, teachers, parents and students themselves. The OECD is contributing to this goal through PISA, which monitors results in education within an agreed framework, allowing for valid international comparisons. By showing that some countries succeed in providing both high quality and equitable learning outcomes, PISA sets ambitious goals for others. (OECD, 2007, p. 3)*

How has PISA managed to capture the imaginations of so many nations' policy-makers? How is it that policy-makers in 68 countries are prepared to believe that PISA would be relevant to them and would yield information useful to them? How, to borrow Jane Jacobs' phrase (Jacobs, 2006), has PISA managed to become such a 'big thing'[2]? This is the question that occupies the remainder of this paper.

I begin with a brief exploration of diffusion and globalisation as theories that attempt to explain the spread of ideas. I then explore how the material-semiotic notion of assemblage may be employed in the study of large-scale spread of PISA. In particular, I examine PISA as

[2] Jacobs' choice of the word 'thing' is deliberate – in ANT 'things' are established assemblages, entities that have come to be taken for granted, or have become 'matters of fact'. For more on the 'thinging' of things, or how 'matters of concern' become 'matters of fact', see Latour, 2004.

a fluid object and as a 'centre of qualculation'. I conclude with a note on the implications of using ANT in policy analysis.

Mobilising Education Policy Ideas: A Review of Theories

Diffusion

Diffusion theories have been widely used in the study of the spread of ideas. They trace how policy ideas are borrowed and adopted. They are concerned not so much with how policies are produced as with how they are received, how faithfully they are transferred or implemented, and to what intended or unintended effect. Diffusion theories generally assume a relatively stable receptor (a school system, for instance) through which a relatively stable idea (such a new assessment technique) percolates, and the focus is on the mechanisms by which policy adoption occurs (or is inhibited).

Dobbin et al (2007) outline four processes of policy diffusion – construction, coercion, competition and learning. The growing numbers of 'expert epistemic communities and international organizations' (p. 449), both local and foreign, which advise governments on policy and the increasing visibility of international league tables, would illustrate the constructivist view. The practices of World Bank, which may make aid contingent upon reform, would fall under the coercion category. PISA and other similar league tables make it possible for countries to set up in competition, as well as provide the basis on which learning can occur.

Policy borrowing is a chief focus of study for comparative educationists. Comparative education concerns itself with such questions as: to what extent is the borrowed policy suitable? How well has the transfer occurred, and what use if made of it? Comparative education researchers might examine how successfully country *x* might solve its problems by using the policies of country *y* (Phillips, 2006, p. 553), or indeed by the analyses provided by transnational organisations such as OECD. Policy borrowing, policy lending, policy attraction, policy transfer and so on are related processes.

Diffusion theories are more focused on local and particular reform events, and give a nuanced account of what happens when ideas from the outside collide with, or are transported to, particular sites. They trace trajectories of the spread of ideas from one place to another. In doing so, they assume a 'here' and a 'there', with reasonably stable boundaries. They explain convergence and difference in terms of interactions between the external and the local. In these accounts, places and change are imagined in the 'geographies of cores and peripheries' and are not concerned with the constantly changing nature of associations that produce the conditions of 'outside' and 'inside', and the many mundane objects and materials that are needed to stitch diverse actors together (Jacobs, 2006, p. 13).

Globalisation

Despite its multiple meanings and debated understandings, globalisation is ubiquitously cited in policy documents as impetus for very similar educational reforms. Globalisation is thought to imply 'new policy worlds' for contemporary reform (Mundy, 2005). The economic, cultural, political and technological changes being brought about by globalisation bring in new fears, new opportunities and new priorities for education. And the borderlessness and porosity ushered in by new models of production and commerce, new technologies, and the formation of such transnational bodies as the EU and the OECD bring in their wake porosity and borderlessness in education policy.

Globalisation is often projected as a juggernaut that forces nations to succumb to the logic of the market and to surrender economic and other controls, at least partially, to global forces. While the era of globalisation has tended to bring in similar policies across many countries, many critics do not believe that these policies are inevitable, and disagree with the argument that globalisation forces the hands of nations to bring in certain policies. Many researchers also dispute the tsunami-like metaphor often assumed to describe globalisation, saying the lack of choice on the part of 'receiving' entities portrayed in these metaphors is exaggerated. Massey finds that the binary of 'global' and 'local' is itself problematic, asserting that the local is always complicit in producing the global (Massey, 2004). Ong takes a similarly 'coproductionist' view (Ong, 2007).

Thus globalisation, itself saddled with a lack of clarity, is not an adequate explanation for the large-scale spread of neoliberal ideas. Globalisation is not only an empirical phenomenon but also a set of dominant discourses (economic globalisation, political globalisation, technological globalisation), and it would be easy for researchers to get caught up in the stories globalisation tells of itself. Using globalisation theories to study the spread of the use of PISA does not provide the tools to recognise PISA's own role in *creating* 'the global' through such technologies as global standards of learning and global league tables. Globalisation theories tell a story of homogenisation which does not adequately account for the difference and diversity that is obtained empirically. Most importantly, globalisation theories assume size to be an attribute rather than an achievement. Such a view hides the work of the armies of invisible actors that create these global phenomena (Latour, 2004) and makes it difficult to envision breaking down such structures.

Assemblage: The Making of Big Things

Even as we see evidence of similar policy ideas across the world, a closer look reveals all manner of diversity and variation. Steiner-Khamsi, for example, finds that even in a situation of coercion, Mongolia is able to articulate, simultaneously, different rhetorics in different languages (2006a). Grek (2007) finds that PISA has quite different effects in Finland, Germany and the UK.

So how are we to reconcile the discourses of homogenisation with the evidence of diversity? Different understandings of the same phenomena arise from differing analytical frameworks. In her study of the spread of neoliberalism, Ong ascribes the assumption of tsunami-like power to be the result of 'an industrial or military model of neoliberal takeover'. Such a view assumes 'that neoliberalism is an ensemble of coordinates that will everywhere produce the same political results and social transformation' (Ong, 2007, p. 3).

She finds, however, that neoliberalism acts differently in different milieus, producing different effects. Rather than assuming a 'big N' neoliberalism which has determined outcomes, she conceptualises neoliberalism as a set of migrating practices that interact with the local context, producing diverse effects, or, as she puts it rather evocatively, 'the promiscuous entanglements of global and local logics crystallize different conditions of possibility' (p 5). She suggests that 'neoliberal logic is best conceptualized not as a standardized universal apparatus, but a migratory technology of governing that interacts with

situated sets of elements and circumstances'. And to think in this way requires an analytic of assemblage[3], rather than of structure.

An analytic of assemblage is central to actor-network theory. It does away with asymmetrical approaches and dualistic thinking by treating the local and the global in the same terms, focusing on relations between actors, both human and nonhuman, that produce both 'big things' and 'small things', localities and globalities. Thus 'neoliberalism', 'globalisation', 'standardisation' and 'PISA' are not fixed entities. They are not 'matters of fact' (Latour, 2004) – already pre-formed and circulating in stable and immutable ways. Instead, they are fluid[4] entities that are sufficiently flexible to be performed variously in various locations.

PISA as a Fluid Object

What is PISA? On one level, it is a test that is administered in a changeable number of countries once every three years. On another, it is a set of agreed measures that have become an international standard against which students' performance, as well as that of school systems, can be measured. On yet another level, it is a measure of equity in a nation's education system, and indeed possibly a measure of the nation's commitment to equity. On still another level, it is a reason for countries to feel proud or embarrassed. It is an opportunity for media to smirk with satisfaction or revel in sarcasm and rhetoric. It is material for such organisations as the OECD and the McKinsey Group to provide strategies for becoming the best performing school systems. It is a set of graphs and scatter plots that are interpreted and presented to policy makers by experts and academics. Thus PISA is different things in different contexts and on different occasions.

Even as a test, PISA is constantly changing. Each year, it focuses on a different area of literacy. Further, the tests have begun to provide data on much more than measures of literacy, to include

> *… students' motivation to learn, their beliefs about themselves and their learning strategies. They examined how performance varies between the genders and between socioeconomic groups. They also provided insights into some of the factors that influence the development of knowledge and skills at home and at school, how these factors interact and what the implications are for policy development. (OECD, 2007, p. 4)*

PISA also does a wide range of work. Amongst other things, it provides policy direction through its country reports, pronounces the state of health of much of the world's education systems, sets the agenda for educational reform, achieves consensus on standards deemed appropriate for 15-year-olds across the world and provides impetus for raising the bar for teacher training and leadership training. Perhaps it will be the catalyst for raising the profile (and salaries!) of teachers, with the McKinsey report noting that the high status accorded to teachers in their society is key to Finland's success. PISA may do a lot of work (as in Germany) or little work (as in the UK).

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[3] Ong goes on further to distinguish this notion of assemblage from that described in actor-network theory, which she finds seeks 'to describe a fully fledged system geared toward a single goal of maximization' (p 5). However, my own understanding of 'assemblage' as used in 'classic ANT' and, more particularly in 'new-wave ANT' or what Law (2007) calls the 'ANT Diaspora', is of an emergent and precarious entity rather than the determined one that Ong appears to read in ANT. See definition provided above (Law, 2004).

[4] For an explanation of the use of the metaphor of 'fluid' rather than 'network' see The Zimbabwean Bush Pump: Mechanics of a Fluid Technology (de Laet & Mol, 2000).

Where does PISA reside? We might say PISA is located in the Parisian offices of the OECD. We might also say it is in the 57 participating countries, or in the reports on the OECD website, and on the desks of ministers and bureaucrats. We may say PISA lives in contented smiles or in the sleeplessness of policy makers. PISA lives in the economic policies of many countries and in their education policy documents. It lives in the new practices and materials motivated by test results. And PISA resides in the million students across the world who have taken the tests and provided the data (who are themselves constantly changing – as indeed are the cohorts for each test), and in the millions more who are represented by the test takers.

Thus we can say, even with this necessarily short, surface analysis:

- PISA is different things in different contexts and to different groups of people and at different times
- PISA does varied kinds and levels of work, often depending on 'local' conditions of uptake and possibility
- PISA resides in a number of locations

Indeed, it appears to be quite difficult to draw boundaries around PISA or to hold it still, even for a moment. So much so, that if we tried to explain how PISA stops being PISA, we would be hard put to do so. PISA may enrol fewer or more countries, alter the subjects it tests, change the nature and content of tests and the way it reports, be used or ignored by countries, and it would still be PISA. Rather than a 'big thing' that is standardising education by producing rigid accounts of what15-year-olds throughout the world should know, we find that PISA has not even standardised itself! Far from being a giant stomping about predatorily, Godzilla-like, crushing its victims underfoot, it is a shape-shifting, obliging and accommodating metamorphmagus. Indeed, it is by being meek, by being fluid, by being ready to give up its rigidity, that PISA becomes the giant capable of enticing 68 nations into joining its next round of testing.

As highlighted in its brochure, one of the challenges facing PISA is negotiating the tension between stability and change. With each round of testing, there are changes. PISA is not only expanding on the number of participating countries and the number of students tested, it is also gathering more types of data (student motivation, attitudes etc), considering the addition of optional subject tests from the 2009 round, attempting to link PISA results to available results on students' primary school performance and so on. At the same time, to make its results comparable and to assess trends, which assist policy-making, it must keep many of the elements the same (OECD, 2007).

PISA as Centre of Qualculation[5]

The PISA assemblage brings together, in one space, an amazing array of people, concepts, ideas, problems and solutions. ANT views the processes of classification and standardisation as one of tying things and people together, translating them into commensurate entities and arraying them in a single spatio-temporal frame. In PISA reports, 400,000 students from 57 countries from around the world, their families and their cultural possessions, their 'motivation to learn, beliefs about themselves and their learning strategies', their schools and

[5] In using this term, I add to the well-known ANT concept of 'centre of calculation', the notion of 'qualculation'. Qualculation' (Callon & Law, 2005) is not an ANTish term in the same way as 'translation' and 'assemblage', though the ideas behind 'qualculation' are clearly central to ANT. Callon and Law attribute the term to Cochoy (2002).

their schools' practices, their gender and their socioeconomic status, their countries and their countries' policies and practices are all tied together, creating new associations. Indeed, as the PISA brochure states, while it cannot establish causal connections, it operates by showing the varying *degrees of association* between different entities:

> *Although it does not track individual students and cannot therefore establish causal links, this analysis can compare the degree of association with educational outcomes of various factors in different countries. At the individual level, such factors include socio-economic background, immigration status and cultural possessions in the home. At the school level, they include student perceptions of instructional practices, disciplinary environment and, importantly, the collective socio-economic background of students at each school. At the school system level, the extent of school autonomy and the structural organisation of students in secondary education can be compared to the overall performance and distribution of the performance of students aged 15. (OECD, 2007, p. 9)*

To do this, it must translate entities into forms that can be detached from local contexts, manipulated and made 'cosmopolitan' – commensurate and comparable with a variety of other entities across space and time. They must be rendered into a versatile form – a number, a level, a percentage, a colour, a dot on a graph, detaching them from the armies of students, from the hard-working teachers who put up with them, from the years of schooling which taught them more or less well, from the markings they made on the PISA test paper and so on. The processes of detaching entities from their settings involves a reduction, a subtraction, an abstraction. At the same time, new and different associations are tied up to them – the performances of other countries, their families' fortunes, their motivations, their pasts and their futures, countries' policies and pedagogic practices.

'Calculation' is often used to imply an impartial and 'objective' way of describing entities. But in material-semiotics, entities do not precede description. The notion of qualculation eliminates the division between qualifying and quantifying. It provides a way to understand a set of figures – such as the PISA league table – as a process that involves both counting and judgement, and importantly, production and description. Rather than merely representing the natural (i.e., the abilities/performance of a large group of 15-year-olds), it is also a process that, at least in part, produces the represented entities, through a series of decisions, translations, manipulations and summing up (Callon & Law, 2005).

The notion of 'qualculation' contributes some significant ideas to the understandings of such devices as the PISA league tables. First, it eliminates the notion that there is anything 'purely quantitative' about such tables. Next, it highlights how entities are translated into forms that fit the table. Third, it draws our attention to the role of materiality in calculation. Finally, it reminds us that even highly structured and apparently rigid devices such as league tables continue to be fluid objects.

In this way of thinking, the production of league tables involves these processes:

> *First the relevant entities are sorted out, detached, and displayed within a single space… Second, those entities are manipulated and transformed. Relations are created between them, again in a range of forms and shapes: movements up and down lines; from one place to another… And third a result is extracted. A new entity is produced. A ranking, a sum, a decision. A judgment. A calculation. And this new entity corresponds precisely to – is nothing*

> *other than – the relations and manipulations that have been performed along the way.*[6] *(Callon & Law, 2005, p. 719)*

But there is more – League tables are not made simply from sorting objects and placing them in the boxes in which they fit. As Law says, 'the objects that end up in a spatio-temporal frame don't pre-exist it in that form. They are also being made by it, made into a shape that fits'. There are no natural 'level 6' or 'below average' in the performances of students in a test. These attributes are assigned in the arrangements made in the table. These arrangements could have been made in an infinite variety of ways, with potentially dramatically different results, for there is nothing natural or pre-given about these classifications. Far from being an objective representation of a natural phenomenon, the entities that appear natural on the PISA league table are a result of a great deal of work.

The mundane details of the materiality of the table are often significant contributors to the qualculation. Simple things such as the size of paper, the number of boxes or cells it can reasonably hold, the protocols of electronic systems, the particularities of software and so on alter what is counted, how it is translated and how it is represented. PISA itself, for example is attempting to move towards electronic components to the testing, which may alter the very nature of questions that can be asked. For example, it may permit the use of simulations to test how well students apply what they know.

Finally, although a league table is an array of entities within a single spatio-temporal frame, it is by no means 'closed' or consolidated. As Law puts it,

> *The character of comparability, and manipulability, this needs to be left open. At a guess, for instance, judgement is often distributed across time and geographical space. It flows, unfolds, and reflects local specificities. It cannot be drawn together at a single commonsense space and time. (Callon & Law, 2005, p. 720)*

The OECD is itself conscious of this idea of extension beyond the spatio-temporal frame of the PISA test reports. As is stated in the PISA brochure:

> *The OECD views education in a "cradle-to-grave" lifelong learning framework, involving formal, informal and non-formal settings. Internationally comparable statistics and indicators underpin the work but it has a strong qualitative dimension as well. The ultimate outputs are policy recommendations designed to increase both the quality and equity of education systems. The OECD's work on education is relevant, not only for government and local authorities, but also for civil society, researchers, professional practitioners and an informed lay audience. (OECD, 2007, p. 19)*

Spilling over from being about 15-year-olds in schools, it seeks to be about everything and everywhere, and relevant to a large variety of people. And the more the entities involved, and the greater the diversity of these entities, the greater becomes the need for fluidity.

Implications: Thinking Policy Differently

ANT may provide the answer to the long-standing calls for new and different tools and instruments to replace the old and the blunt methods in studying education policy (Ball, 1990; Gale, 2006). A material-semiotic approach to education policy provides novel ways to

[6] This of course is an apt description of the research process itself – each piece of writing, including this one, performs its own manipulations and transformations, its own reductions, its own orderings, and it is important for the writer as well as the reader to be alert to this.

understand the processes of policy-making and provides new tools to researchers, policy-makers and activists with an interest in influencing policy. It steers away from an unproductive critical stance and opens up spaces for deliberation and inclusion.

Viewing such phenomena as PISA as assemblages that are made up of a multitude of actors and their relations means we no longer have grand phenomena to explain, and we are left with no demons to vilify and no giants to slay. Nor are we helpless in the face of forces that are too large to combat. Instead, we gain the ability to see how knowledge is constructed and what goes into the making of facts. Once we are able to identify the actors and trace the associations, we are in a better position to intervene and to participate in the policy-making process. Which actors do we want to ally with? Who or what must be resisted or accommodated? What new associations need to be forged? Which relations should be to put on trial? Making the policy-making process transparent in this way creates possibilities for intervention.

ANT draws attention to the fluidity and precariousness of entities that appear stable, large and unshakeable. It shows how phenomena are constantly changing in order to remain viable. Such a view is particularly important in education policy because it leaves issues always open to deliberation. Policy issues such as the importance of measuring literacy, for instance, can be seen as 'ways of knowing' (Feldman, Khademian, Ingram, & Schneider, 2006) about the issue of large-scale testing and about learning. By highlighting the constantly fluid nature of knowledge-making, an ANT sensibility makes possible the inclusion of new and different entities as a result of such deliberation. In the words of Feldman et al:

> *We suggest that the fluidity of knowing an issue is an opportunity for public managers to use inclusive practices to facilitate deliberation. This perspective helps them employ tools such as boundary experiences, boundary objects, and boundary organizations to bring together different ways of knowing and to create opportunities for new ways of knowing to emerge. (Feldman et al., 2006, p. 89)*

The notion of 'centre of qualculation' highlights the translations that must take place in order to create such an entity as a PISA league table. In doing so, it reminds us to 'reverse engineer' (Bowker & Star, 2000) representations and keep in touch with the 'original' entities, which are sometimes far removed from their translated versions. It illustrates the role of material actors in the making of knowledge, and alerts us to the constructed and precarious nature of 'facts' which are frequently seen as 'objective', scientific and indisputable. This is not to dismiss the usefulness of PISA data, but rather to make better use of it – with a greater awareness and understanding.

Thus using a material-semiotic approach such as ANT to study global phenomena such as the rising popularity of international testing can lead to openness and possibility, rather than oppression and fixedness. It makes room for critics to fulfil a productive and positive role, so wonderfully described by Latour:

> *The critic is not the one who debunks, but the one who assembles. The critic is not the one who lifts the rugs from under the feet of the naive believers, but the one who offers the participants arenas in which to gather. (Latour, 2004, p. 246)*

To view global phenomena using this analytic is to bypass tired debates and adversarial stories of power struggles, and to create spaces of hope and negotiation.

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