ANALYSING PISA'S REGIME OF RATIONALITY

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This paper explores the regime of rationality which PISA helps to reinforce. Bringing together certain approaches of Bernstein and Foucault, three levels of analysis, relating to social categories and communication, the self, and government are identified. A single PISA mathematics item is analysed, illustrating these levels of analysis and their interrelationships. We find evidence that Kenway's concept of the technopreneur as an agent of cultural and economic production might help in our analysis. The paper reports the first tentative steps towards a research agenda that brings together key contemporary theoretical resources in educational research.

INTRODUCTION

The official aim of the PISA is to "assess the extent to which students near the end of compulsory education have acquired the knowledge [of mathematics, science, literacy] and skills essential in everyday life". Answers are sought to questions such as: "Are students well prepared for future challenges? Can they analyse, reason and communicate effectively? Do they have the capacity to continue learning throughout life?" To answer these, PISA says it needs to "develop indicators that show how effectively countries have prepared their 15-year-olds to become active, reflective and intelligent citizens from the perspective of their uses" of these subjects (OECD, 2006, p.114). Indicators are thus purposed to assess "students on their ability to *adapt* the knowledge they acquire at school to *real-life situations* as opposed to how they master a specific curriculum" (italics added). Within this context, PISA studies have amassed an almost iconic status in policy and discourse regarding mathematics educational futures – and doubtless do provide a large volume of useful and serious information. Nevertheless, we ask, does PISA do what it says it does?

In the assessment literature, this question is usually addressed in terms of the quality of the assessment regime, framed around the concepts of reliability and validity (Messick, 1989; Gipps, 1999; Broadfoot and Black, 2007; Black and Wiliam, 2007). However, we note that in these accounts analysis often narrows quickly to be construed in technical terms; quality is rendered against functional criteria relating to "fitness for purpose" - despite a rich parallel literature problematising exactly such criteria. Perhaps this tendency is explained by Patricia Broadfoot's remark that the "power to define what counts as quality in education is the single most influential source of educational control" (2007, p. 64). In other words, restricting the scope of analyses to the effectiveness of assessment methods *qua* techniques, self-controls the debate and creates a semblance of consent and rational commitment to PISA's aims. Nevertheless, all may not be as unproblematic as it seems. Indeed, as we argue below, it seems unclear whether PISA does or even can do what it says it does. This suggests the need to ask a perhaps more fundamental question: What *can* PISA do?

In the next section we outline three separate but interrelated levels of analysis, which are key to our approach. The first level of analysis, taking up Bernsteinian resources, essentially argues that the validity of PISA's assessment instruments is undermined by the recontextualisation of categories such as school mathematics and pedagogic discourse and by the differential effects of this across student populations. We visit the seminal studies of Cooper and Dunne (2000) and open a discussion about the problematics of recontextualisation complicating PISA's work. In the second and third levels of analysis, we adopt Foucauldian approaches to try to better understand, more positively, what PISA *can* do. Here we are convinced of the importance of making visible the regime of rationality that makes PISA assessment possible. However, in order to do this we think it necessary to go beyond Bernstein's theory of power and control – a theory foregrounding interrelationships among social categories and communications (Bernstein, 2000, p. 5). Decisive in this is to understand how PISA performs the labour of governing. Using Foucauldian terms we want to explore how technologies of self are co-opted by PISA to work simultaneously as technologies of government. We will argue that these constitute the second and third levels of analyses needed in our enquiry. A fuller understanding of the interrelationships among these analyses is also required; our offering here, however, can only hint at these.

In order to illustrate how these key levels of analysis might be conducted we outline an investigation of a single PISA item, concluding the paper with a brief discussion. This paper represents a report in progress on an emerging large-scale agenda for research we have begun to design and implement. We are only too well aware of short cuts we have taken in presenting the flavour of our thinking within the space available. Our intentions here are to ask questions and provoke debate.

THREE ANALYSES

As indicated above, our efforts to recuperate the rationality of PISA mobilise analysis at the levels of categories (social unities) and communications, the self, and government. These levels of analysis are not arbitrarily chosen: they arise in remarks by Foucault on his methodological choices in unpacking problems concerning how forms of madness, punishment and sexuality have been produced and circulated within various regimes of truth. Foucault's analytic is driven by four interrelating "major types" of technology: of the production of things; the production of semiosis, semantics and signification; the production of the self; and the production of power (Foucault, 1988, p. 18). Though we find Foucault's refocusing of thinking around the concept of technology in keeping with his tacit foregrounding of production, this move begs an important question. If technologies are defined by the ends or *telos* to which they refer, what is the *telos* of technologies of power? Simply put, we believe the answer must be the deferred ends of the production of things and communication, of the production of self, of government. In considering these, it is interesting that Foucault himself construed his work as unpacking technologies of power in understanding the interrelationships of the self and government. For us, a treatment of

educational assessment, adopting this Foucauldian approach, would be illuminating. While Foucault avowed that his research was much less concerned with the production of things and communications, this area is a strong aspect of Bernstein's work. Thus we see prospects here for a useful complementarity and supplementarity between these substantial bodies of work. As a tentative exploration of this possibility, we set out three levels of analysis drawing on these resources. We seek an account of the circulation of rationality among the projects of production, communication, the self, and government.

The level of categories and communications

A dominant feature of PISA's discourse of mathematics is its emphasis on application. Indeed, mathematics is restyled as "mathematical literacy" and defined as dealing "with the extent to which 15-year-old students can be regarded as informed, reflective citizens and intelligent consumers" (OECD, 2006, p.72) rather than directly with the knowledge and skills of school mathematics. This constitutes both a particular form of *recontextualisation* of mathematical knowledge and a representation of the world of the 'everyday' (Dowling, 1998; Moore, 2007), constructing new meanings both for mathematics and for the 'real world'. In coming to this view, we feel supported by the seminal work of Cooper and Dunne (2000) who have demonstrated how the discourses of UK tests, which also combine school mathematics and the 'real world', compromise the validity of attempts to assess mathematical knowledge. They draw upon Bernstein's notion of code orientation (and Bourdieu's notion of habitus) to explain differences in patterns of response, and hence patterns of achievement, across and within social classes and other social divisions. Cooper and Dunne's focus is primarily on the ways that, depending on their social backgrounds, students with different styles of response may differentially negotiate the weakened boundaries implied in the emphasis on knowledge and skills essential in everyday life, arguing that this leads to the invalidity of certain mathematical assessments. Likewise, though the nature, variety and complexity of boundaries in the case of the PISA programme/system requires analysis of its own (one of our future tasks), we assume that such analyses will show that the PISA programme/system cannot in general validly assess what it claims to assess.

Thinking with Bernstein's concepts we can conceive of the PISA assessment system as an evaluative dimension of a *pedagogic discourse*, which OECD attempts to construct and disseminate. Pedagogic discourse, Bernstein suggests, has no content of its own, but is a set of principles for *recontextualising* knowledge for purposes of transmission, acquisition and evaluation (Bernstein, 1990). To construct school mathematics, educational agents in OECD operate by selecting, reassembling and relocating elements of discourse from the discipline of mathematics, incorporating within the discourse aspects of the social world as its field of reference (Dowling, 1998). Furthermore, they draw on other scientific domains related to education, crucially methodologies for pedagogical instruction (Bernstein, 1990). Two consequences might result from such a form of pedagogic discourse. One concerns its

orientation, which positions the pedagogic subject in an activity whose criteria for appropriate action seem to remain implicit, suggesting that an *invisible* form of pedagogic practice may be at work (Bernstein, 1977). The other possible consequence is that in positioning the subject as an 'actor' within a 'practical field' a normative framework may be imposed, i.e., appearing to sanction particular ways for doing things, rather than indicating ways for students to seek mathematics specific resources in acting upon this field. As Moore (2007) puts it, pedagogic discourses differ in the degree to which they impose particular normative frameworks or create possibilities for critical questioning and interpretation. In Bernstein's terminology, we must seek to describe the regulative characteristics of the discourse in which the instructional elements are embedded.

These analyses are potentially able to problematise the validity of PISA assessments, as they expose them to possible criticisms/charges of social class bias, as well as of symbolic control; still they do not of themselves explain in any elaborate way the symbolic control function and how this might relate, in this case, to PISA's work of reinforcing particular versions/forms of rationality.

The level of self

Following Foucault, *technologies of self* are practices which "permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality" (Foucault, 1988, p. 18). Elsewhere (Foucault, 1997) he describes these as giving an ongoing commentary on the self by the self with respect to behaviours, desires and dispositions. These technologies open up for analysis the manner of individual commitment to social designations of identity. They go beyond identity in itself, to address how the self makes the self in relation to a particular identity (anticipating that the self will be encountered by others and by itself as a social type precisely in virtue of this identity).

Analyses at the level of self supplement the analyses of social categories and communication, which generally leave aside the manner of the inhabitation of these categories by the self. In particular, technologies of the self serve as self-regulative micro-level devices, thus contributing to the rationality of PISA, whether concerning the 'scholastic identity' of students or the 'professional identity' of the teacher (Ball, 1990; Meadmore, 1995; Evetts, 2003). Yet, without a third level of analysis into how the domains of categories and communication and of self are interrelated, we would have an incomplete picture of the rationality of the actions and behaviours of actors. This third level of analysis is an investigation into the mediating agency of government.

The level of government

For Foucault, government is not an entity, "developed above individuals, ignoring what they are and even their very existence", but a "structure, in which individuals

can be integrated, under one condition: that this individuality [is] shaped in a new form, and submitted to a set of very specific patterns" (Foucault, 1982, p. 214). The work of government is thus integrating work and paradigmatically performed by certain *technologies of government*. On the one hand, government secures the reproducibility of resources that are the grounds of power and symbolic control (as revealed in our first level of analyses). On the other hand, government also stabilises and makes predictable the formats required by individuals (and groups) to build dispositions and commitments to ongoing and future actions (the technologies of self, the object of our second level of analysis). Combining these, we follow the Foucauldian insight that work at the mediating level of government characteristically co-opts interactions accounted for at the other levels of analysis. In particular, for Foucault, *subjectivation* is the process whereby government co-opts technologies of self, and *governmentality* is the mode of working of such government. As Klein (1996) notes, governmentality for Foucault

> applies itself to immediate everyday life which categorises the individual, marks him (sic) by his own individuality, attaches him to his own identity, imposes a law of truth on him which he must recognise and which others have to recognise in him. It is a form of power which makes individuals subjects. (Foucault, 1982, p. 781, cited in Klein, 1996, p.376)

It would therefore seem that unlocking the "laws of truth" might give us a way to understand the regime of rationality of PISA. But which are the salient laws? Here enquiry must go to the prevailing cultural realities of politics and economics. Lemke argues that individuals in a neo-liberal state regulate themselves in accordance with the "imperatives of flexibility, mobility and risk taking" (Lemke, 2002, p.6). Meanwhile, Kenway *et al.* (2006) draw attention to an emerging class of cultural and economic agents – *technopreneurs*: those who must be conditioned by Lemke's neo-liberal imperatives, yet simultaneously work within bureaucratically controlled and managerialist settings. As a model for the kind of student who performs well in PISA assessments, Kenway's identity designation seems thought provoking.

ILLUSTRATIVE ANALYSES

Here, using a single item taken from the set of example items published on the PISA website, we illustrate the three levels of analysis identified in the previous section. Clearly a single item cannot provide us with definitive conclusions. Nevertheless, we hope to suggest an approach to analysis that may prove illuminating and to raise issues and questions for further investigation. The item (see appendix) has a structure common to PISA items: a stem presenting the student with information about a "real-life situation"; a set of questions related to this context; and a scoring rubric for each question indicating for the assessor how they should allocate marks to student answers. We use Question 44.1 to illustrate the first and second levels of analysis and Question 44.2 to illustrate and contrast all three levels of analysis.

Analyses of Question 44.1: Although the stem of this question might best be described as an instance of popular science discourse, the question quickly moves away from the scientific and real world reference, first instructing the student in how to read the diagram and then engaging them with a 'pure' mathematical calculation. Even here, however, the student's task is not simply to calculate but to "show the calculation to demonstrate …". The statement of this task suggests that the activities demanded of the student are communication (*show*, *demonstrate*), while the nominalisation *calculation* presents the process as an agent-less object. The 11% result of this calculation *is obtained* using the passive voice, again obscuring agency. Thus, the student is distanced from the mathematical performance ("the calculation" is presented as having an unproblematic existence) and privilege is nominally allocated to communication. Despite this, as the rubric shows, in order to earn full credit the student must actually perform the necessary calculations correctly. Moreover, marks are deducted if the student offers correct arithmetic expressions but calculates incorrectly – thus contradicting the distancing from calculation created by the question itself. Most tellingly, marks are allocated for correct calculations, even where incorrect arithmetic formulations are proposed. Because credit is allowed where there is an invalid correspondence to the real world, a concerted preference for performance over communication is revealed. But this preference precisely contradicts that constructed, as we showed above, in the posing of the question and is thus concealed from the student confronting this mathematical problem.

The question begins: "In the diagram you can read …". Here the student is addressed directly as an apparently successful student who is able to interpret the diagram as required. This particular "you" may be read as the abstracted "one" of more formal speech. Yet simultaneously, the heightened modality of "you *can* read" and the fact that the correct interpretation is explicitly provided, opens up the possibility that a particular "you" actually is not able to "read" as stated, and therefore needs the help implicitly offered in order to answer the question. This "you", a second "you", brings to the question a real "you", a personal "you", one that might be taken by the student as "*me*". The student then faces the instruction "Show …". This, together with the use of the definite article "the calculation" suggesting a single possible correct answer, is a common formulation within traditional forms of pedagogy and as such begins to demonstrate how the individual student is intended to negotiate their identity in the face of ambiguity among these possible "you"s. The assessment rubric is consistent with this traditional pedagogy: criteria for full and partial credit are explicit and draw on exclusively mathematical resources. All of this evidence powerfully indicates the recontextualisation of a pedagogical discourse; by virtue of different modes of access to this discourse, the student's progress in the item is either enhanced or depleted (as indicated by Cooper and Dunne's exemplary instance of such first level analysis).

The second level of analysis, exploring issues of self, occupies an alternative space. Here the concern switches from the structuring domain of the student's experience in encountering this question, to the student's way of encountering herself. The problem

is to illustrate and understand the kind of self-monitoring that provides ways of being, exercised by choices between the two "you"s on offer in this example. Foucault refers to these as 'practices of the self'. Here the problematic is not accessibility, but the question of how a student may encounter this item: on what basis, with what manner of commitment, with what degree of mobility and preparedness to manage the risk of misconstruing one "you" for another? This second level of analysis goes beyond the actual accomplishment (or non-accomplishment) of the task to exploring the kinds of commitment to future ways of being belonging to the student's trajectory. The importance of this second level of analysis is that it asks about the ways students become the subject of their behaviours; and whether these behaviours, and therefore the subjects enacting them, do work also recognisable as the political work of government, and become committed to doing this work.

Analyses of Question 44.2: Here the question consists of a stem followed by an item posed as follows: "Do you agree with Mandy when she says this is not possible? Give an explanation to support your answer". It must be noted that the validity of the response cited in the marker's rubric depends on whether the lexical marker "possible" is taken to mean "possible in principle" (the 'of necessity' interpretation) or "possible in fact" (the 'contingent' interpretation). If the first, then Mandy is wrong precisely for the reason given in the rubric. But a student responding to this question may quite conceivably have had reasons (external to the data presented in the question) to believe that, for the specified period, it so happened that the net change of the EU's CO_2 emissions, excluding those of The Netherlands and Germany in this period, was negative, or at least less than a total increase of 4 million tons (this quantity being the salient difference between the decline of the EU total output of CO_2 in this period and the net decline in output of Germany and The Netherlands combined). In such a case, according to the rubric, the student would not receive any credit – despite their answer entirely corresponding to the "real-world" reality. Thus, allocation of the full score for this question critically depends on the student either only recognizing the 'of necessity' interpretation or recognizing this interpretation and actively dismissing the alternative. However to identify the 'of necessity' interpretation (let alone identify both and exclude the 'contingency' interpretation) is a matter of advantageous communication and depends on access to and recognition of the particular genre of pedagogic discourse in mathematics that biases toward necessity and away from contingency. It also depends on being able to decode texts in this genre appropriately. The issues at stake here are categorical and communicational, relating to the recontextualisation of everyday and school mathematics discourses. However, these issues alone are not sufficient to fully understand the regime of rationality applying in this question.

We thus move to the second level of analysis which asks: What *kind* of self would act out of a commitment to a form of practical reasoning that entirely disregards indications of situatedness (with actual and specific dates, quantities, nations, and trans-national aggregations, etc.), no matter how detailed and elaborately set out (in

numerical values and graphs and charts etc), in favour of a response that makes no reference to, or finds any utility for, these details? For us, such a self is one that is routinely oriented towards conceiving of specificity as a distraction. Such a self is habitually oriented towards locating abstracted relationships validly expressible in symbolic and always generalisable terms. As a corollary, such a self is reluctant to engage with concretely related entities expressible in terms where validity is contingent. Instead, this self disciplines itself in spying out necessary, albeit disembodied, relationships wherever the situation requires; and is practised at turning a blind eye to actual, factual, embodied, and contingent circumstances – even though these are overtly offered as a basis for practical reasoning. As a result, the disposition privileged here drifts towards greater flexibility and mobility, a socially acquired ability, related to the social class background of individuals and their differential relation to education, that presupposes recognition of the hierarchical relations structuring the abstract vs concrete distinction. What is emphasised here through the lenses of Foucault is, precisely, the 'labour' required to be able to work towards a rationality that allocates maximum value to higher levels of generality and minimum value to specificity.

In the third level of analysis we need to determine to what extent, if any, this kind of self-worked self does the work of government. That is, whether the technologies of self identified in the second level of analysis amount, in the third level of analysis, to an instance of governmentality. Given the scale of the data under examination, our approach to this investigation must be taken as extremely provisional. Nevertheless, we believe that the practical reasoning that encourages greater mobility and flexibility in producing assessment scores must at the same time lead to the most efficient production of scores (in the sense of maximizing symbolic benefits – the score; whilst minimising their cost – the amount of time on task). Thus, the effect of rewarding greater accumulations of positive scores is to reward efficiency. Yet 'efficiency' as such cannot be rewarded - only the *efficient self* can be rewarded. Thus, where the rationality of overall social production is dominated by the discourse of efficiency, as it is in under our current neo-liberal regimes of government, we can conclude that technologies of government and technologies of the self intersect. From this an outline of a possible regime of rationality in PISA emerges – a form of rationality we tentatively suggest resembles in some measure that of the *technopreneur*.

DISCUSSION

In this paper we started with the assumption that PISA's findings cannot validly support conclusions that go unproblematically to the official aims of the PISA programme. We believe it would be possible and useful to work out to what extent and within what boundaries of recontextualisation its data do offer information of the kind it claims. However, we believe that such an analysis would not be easy and would very likely introduce further difficult problems. Notwithstanding, we have reported our progress in outlining theoretical resources that have potential to help scrutinise PISA in a way that acknowledges its weight and complexity, while

providing tools to critique and confront its character. We want to explore further probable links between PISA and the kinds of rationality we have alluded to, and to make this rationality available to critical and further rational inspection. In doing so, we have consciously referred our argument beyond analyses of power and control as rendered among categories of the social and semiotic production (Bernstein's legacy), to the way government governs through the micro actions of its subjects working on themselves (Foucault's legacy). We believe that the theoretical resources offered by these legacies complement and supplement each other, and that to better understand these relationships is also to better understand the rationality of PISA. Clearly this is the work of a large agenda, not of a single paper. Our aim here has been to introduce and advance this agenda, however tentatively. As is typically the case when a certain boldness is attempted, far more questions than answers immediately surface. We conclude by mentioning just two of these: How may the levels of analysis illustrated above be related and combined to recognise the regime of rationality characteristic of globalised education? By what methods of data collection and analysis may technologies of self, in particular, be made visible in the context of PISA productions?

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APPENDIX: THE PISA TASK (OECD, 2006A)

MATHEMATICS UNIT 44: DECREASING CO_2 LEVELS

Many scientists fear that the increasing level of CO_2 gas in our atmosphere is causing climate change.

The diagram below shows the CO_2 emission levels in 1990 (the light bars) for several countries (or regions), the emission levels in 1998 (the dark bars), and the percentage change in emission levels between 1990 and 1998 (the arrows with percentages).
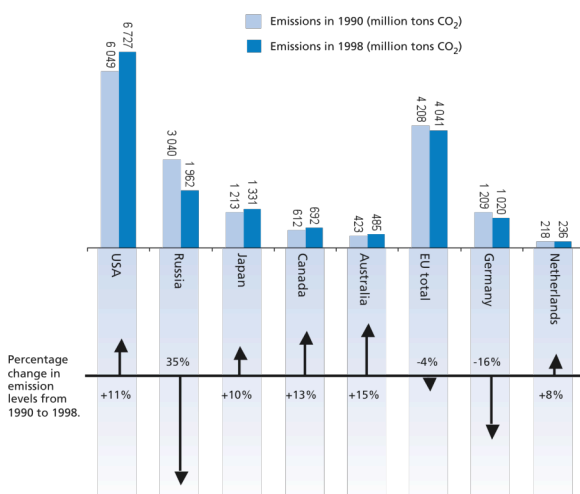
QUESTION 44.1

In the diagram you can read that in the USA, the increase in CO_2 emission level from 1990 to 1998 was 11%. Show the calculation to demonstrate how the 11% is obtained.

DECREASING CO_2 LEVELS SCORING 44.1

Full credit: Correct subtraction, and correct calculation of percentage.

- $6727 - 6049 = 678$, $\frac{678}{6049} \times 100\% \approx 11\%$.

Partial credit: Subtraction error and percentage calculation correct, or subtraction correct but dividing by 6727.

- $\frac{6049}{6727} \times 100 = 89.9\%$, and 100-89.9=10.1%.

No credit: Other responses, including just 'Yes' or 'No', and missing.

To answer the question correctly students have to draw on skills from the connections competency cluster.

QUESTION 44.2

Mandy analysed the diagram and claimed she discovered a mistake in the percentage change in emission levels: "The percentage decrease in Germany (16%) is bigger than the percentage decrease in the whole European Union (EU total, 4%). This is not possible, since Germany is part of the EU."

Do you agree with Mandy when she says this is not possible? Give an explanation to support your answer.

DECREASING CO_2 LEVELS SCORING 44.2

Full credit: No, with correct argumentation.

- No, other countries from the EU can have increases e.g. the Netherlands so the total decrease in the EU can be smaller than the decrease in Germany.

No credit: Other responses and missing.

To answer the question correctly students have to draw on skills from the connections competency cluster.