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**Modes of Knowledge and Patterns
of Power**
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ABSTRACT

The paper attempts to identify the extent to which modes of knowledge can be associated with different patterns of and assumptions about power.

It discusses the meanings and scope of power itself, ie both power within as well as beyond epistemic communities and its bases e.g. belief in specialisation and peer evaluation as against 'social robustness' implying more democratic or inclusive forms of evaluation.

It analyses the extent to which knowledge has shifted from an internalist perspective relying on the prestige of epistemic communities towards socially relevant assumptions resting within social contexts. It discusses the factors affecting types of power patterns, such as: the nature of sponsors' objectives and the uses to which they might put knowledge; epistemic characteristics; the nature of the resource required, and the stage of finalisation reached. It sketches the range of models of sponsorship to which knowledge is subjected - from that of the free standing and autonomous individual through different patterns of sponsorship to the directly managed.

It considers the extent to which epistemological concerns and criteria are separable from political issues.

The context of the analysis is one in which the salience of the concept of power, and particularly the power of knowledge, has been questioned through the sociology of knowledge and postmodernism.

It attempts to link these classifications to a range of empirical examples.

Modes of Knowledge and Patterns of Power

1. Introduction: the argument

In social science we struggle hard to discover contingent relationships and, perhaps too often, confuse these with what are no more than partial and contestable associations. This paper attempts to note the extent to which knowledge and power may affect each other whilst noting that those interactions are less determinant than some analysts and social practitioners assume.

There are many discussions of the ways in which knowledge is shaped according to the field or tasks to which it is directed. This paper attempts to pick up one derivable theme from these concerns. It attempts to identify the extent to which modes of knowledge can be associated with different patterns of and assumptions about power. It discusses the meanings and scope of power, both within as well as beyond epistemic communities and its bases, e.g. belief in specialisation and peer evaluation, as against ‘social robustness’ (Nowotny, Scott and Gibbons, 2001) implying more democratic or inclusive forms of evaluation. It explores the range of knowledge modes and analyses their links with forms of power. It attempts to establish the dynamics of those relationships and shows them to be multi-modal rather than simply contingent on each other. From there it can ruminate on particular examples drawn from governmental and policy practices.

The underlying argument is as follows. Specialist knowledge has intra-mural or internalist power. It is governed by accepted rules of certification within epistemic communities. But its second level of power is secular, and depends on the scientist being able to persuade the non-scientist that the work is useful or interesting. The converse might be true. Knowledge that begins by appealing to the ‘shared meanings of given social communities’ or ‘social robustness’ might gain power with user groups and gain purchase within those who share its epistemic ideology but then might need to demonstrate sufficient of the test and demonstration features of hard science for it to be accepted as fully part of the scientific, intra-mural system, and gain credibility outside the scientific power groups.

2. Meanings and scope of definitions of power

Our starting point must be the meanings and scope of power itself, in order to see whether its defining characteristics entail any particular knowledge components or styles, or whether its implications for knowledge are more the result of operational or instrumental frames within which is enacted. In doing so, it will be necessary to divest ourselves of some over-simple assumptions, many of which emerge as dualities representing apparently contingent relationships. Thus, to take obvious examples to which we return more fully later, positivist forms of knowledge generation are held to be associated with determined and statist forms of government. That is not necessarily so. Again, knowledge is thought to be power, but, in fact, can also be disempowering, as when academics in the social sciences bar themselves from policy involvements by adopting critical stances.

3. General accounts of power

For our purpose we need hardly differentiate power from authority, but note that they are closely connected; ‘the latter has a normative dimension, suggesting a kind of consent or authorization, about which the former is similarly agnostic.’ (Isaac, 1992, p 57). The power of knowledge may indeed become authority, which we can take to be an institutional sub-set of power. A relatively recent account refers to authority as ‘a distinctive form of compliance in social life’ and offers three accounts of the basis of this special compliance: authoritative institutions ‘reflecting the common beliefs, values, traditions and practices of members of society’; political authority ‘offering a co-ordination solution to a Hobbesian state of nature, or a lack of shared values’; and a third view which argues that ‘although social order is imposed by force, it derives its permanence and stability through techniques of legitimization, ideology, hegemony, mobilisation of bias, false consensus and so on, which secure the willing compliance of citizens through the manipulation of their beliefs’. (Philip, 1992). These accounts, however, are less definitional than descriptive of the genesis and consequences of authority. Some of the broader definitions of power may be more useful.

Comment [M1]: Ideology, hegemony, mobilisation of bias, false consensus and so on, which secure the willing compliance of citizens through their manipulation of their beliefs.’ do

Isaac's discussion of power records four models:

The *voluntarist* model. For Dahl 'power is a capacity to get others to do what they otherwise would not do, to set things in motion and change the order of events.' 'Power terms in modern social science refer to subsets of relations among social units such that the behaviour of one or more units (the response units, R) depend in some circumstances on the behaviour of other units (the controlling units, C).'

This may be disputed by Lukes, Bachrach and Baratz, but invites the point, relevant to our discussion, that some forms of power depend on persuasion. Persuasive forms of knowledge, depending on rhetorical strategies, are likely to be different in format and content from those that depend on coercion or sanctions (ie authority) for their acceptance.

There are links between these persuasive forms of the voluntarist and the *hermeneutic* or *communicative* model. The hermeneutical model of power holds that it is constituted by the shared meanings of given social communities.

This definition can be related to the way in which academic power is exercised. Within epistemic communities and their bases, the dominant source of power is an emphasis on specialisation and peer evaluation related to it, which justifies exclusiveness – the specialist possesses knowledge not available, or less available, to others. The exclusiveness bites on those not empowered by specialised knowledge, no matter that it is shared within the epistemic community. Those within the peer group gain power and authority by their participation in the knowledge. In that sense, power is not a shared meaning but an exclusive and esoteric meaning.

This is a perspective powerfully backed by Bourdieu . He argues that even the purest science is a 'social field, with its own distribution of power and its monopolies, struggles and strategies, interests and profits.' ' The scientific field is the locus of a competitive struggle for the monopoly of scientific

authority.' The better resourced and the more autonomous the field, the more tightly drawn becomes the group of people that determine the holding of authority: ie the key competitors in the field. He thus not only distances himself from the idealised notion of scientific community but insists that 'the operation of the scientific field itself produces and presupposes a specific form of interest.'

Recent attempts rely on 'social robustness' (Nowotny, Scott and Gibbons, 2001) implying more democratic or inclusive forms of evaluation, although this is, perhaps, more a programme for action than a statement of what now dominates the fields of knowledge. Much earlier, Trist's definition of domains (1972), too, implied multiple reference groups. In contrast to disciplinary knowledge, socially robust forms may generate power by their appeal to wide constituencies including those holding power within client and practitioner groups. Lindblom (1990), too, has articulated the case for demotic forms of 'probing' which would be set fair to demote the power of academic specialisation.

A *structuralist* model is rooted in the work of Marx and Darwin. It insists on the pre-given reality of structural forms that both enable and constrain human conduct. This leans towards power being vested in those who have command of the structures controlling knowledge formation and use.

In a *post-modernist* mode, as developed in Foucault and some feminist writing, language and symbols are central to power. Power is defined as the capacity to act possessed by social agents in virtue of the enduring relations in which they participate... 'It has a 'materiality' deriving from its attachment to structural roles, resources, positions and relationships.' This micro-analysis of the power exercised by different communities implies that knowledge is an exercise of power, which could be particularly exemplified by the power of academic disciplines.

These power/power attributes can all yield some linkages with knowledge. The hermeneutical model, the more democratic or inclusive forms of evaluation, Lindblom's probing, Trist's domains, imply that the power that they generate may come through persuasion and interaction and their perceived utility. Both the voluntarist and structuralist models give space to the pressure exerted on the exercise of knowledge preferences by social structures such as academic status hierarchies or collegia. But that opens up the question of what kinds of knowledge will be more persuasive within these inclusive interactions, to which we will return later.

4. The spectrum of knowledge

It is possible to construct a spectrum of knowledge ranging from 'hard' and rigorously defined states to 'soft' forms which are less capable of meeting the criteria of being 'explanations which are at once systematic and controllable by factual evidence' (Nagel, 1961):

HARD		SOFT	
Hard science	Experiential/ Connoisseurial	Hermeneutic Ordinary Knowledge	Common sense (Nagel)

Nagel sets the scene for the hard end of the spectrum: ' The practice of scientific method is the persistent critique of arguments, in the light of tried canons for judging the reliability of the procedures by which evidential data are obtained, and for assessing the probative force of the evidence on which conclusions are based. Such 'intemalist' models of science (ie those relying on exclusive and intramural governing arrangements) have exerted a powerful influence not only upon scientists but on those who have admiringly observed science's growth and strength. In the 'internalist' view, science is an authoritative and self-regulating universe. The nature of scientific work, its evaluative criteria, its institutional norms and structures are regarded as logically connected and rooted in the relationship between science and the physical world. The goals of science are "the extension of certified knowledge ' (Merton, 1957). Science uncovers regularities of nature through accurate observation and empirical testing. It expresses and explains them in laws that are " both as precise

and as general as possible. The criteria of scientific merit are thus accuracy of observation and measurement, replicability of experimental work entailing rigour in design and control, validity and systematic importance or profundity of theory. The derivative and tightly interconnected technical and moral norms of logical consistency, emotional neutrality and impartiality are strongly embedded in Merton's classic statement of the four sets of 'institutional imperatives' of modern science: universalism, communalism, disinterestedness and organised scepticism, and in the additional norms, identified by himself and others of, for example, originality, humility and independence. In this list, be it noted, universalism and communalism are credited with belonging to the intramural versions of scientific power.

At the other end of the spectrum, there is Nagel's account of 'common sense, and Cohen and Lindblom's Ordinary Knowledge (1979). Yet, if the 'softer' forms of knowledge do not display 'the organisation and classification of knowledge on the basis of explanatory principles' they may yet seek 'to discover and to formulate in general terms the conditions under which events of various sorts occur, the statements of such determining conditions being the explanations of the corresponding happenings' (Nagel, p.13). They appeal, however, as much to the demotic and lay perceptions of what applies and what works as to any esoteric form of knowledge structure. (This should not be taken to imply that non-parametric knowledge cannot be rigorous, elegant and, for that matter, esoteric.)

Such claims, to be organised and classificatory, could apply across the boundaries and apply not only to the 'softer' forms of knowledge but also to historical analyses of changing polities and economies. Historical studies have moved a long way from HAL Fisher's admission (Fisher, 1935) that: 'One intellectual excitement has... been denied me. Men wiser than I have discerned in history a plot, a rhythm, a predetermined pattern. ...I can see only one emergency following one another as wave follows upon wave, ... there can be no generalisations, only one safe rule for the historian; that he should recognise in the development of human destinies the play of the contingent and the unforeseen.'

Within the internalist model, Polanyi (1962) argued that the validity of scientists' work is enforced not by objective proof but by the exercise of responsible

judgement. For Popper (1972) the power of science is rooted not in its outcomes but in its methods of putting its propositions to the test. The issues became further elaborated and the internalist perspective to some extent undermined by Kuhn's belief (1972) that paradigms challenging previous conceptions are determined not only cognitively but socially by disciplinary communities. And Mulkay (1979) went further and argued that recognition by the profession is the key objective of the scientist and that the scientific community was not a republic but a complex nexus of problem-focused, discipline-centred and wider networks of elites able to perpetuate themselves through interaction between differential allocation of resources, differential capacity to recruit the best talent, and a privileged informal communication system. With Kuhn and Mulkay, power rests not solely on epistemics but also on social arrangements.

The context of the analysis is thus one in which the salience of the concept of power, and particularly the power of knowledge, has been questioned through the sociology of knowledge and postmodernism – itself an important example of the power of knowledge to change political relationships. Assumptions about both knowledge and power have shifted. Concepts of power have changed markedly since the 1960s when power and authority as exercised politically and socially faced a crisis of legitimacy. The 'hard' versions of science sustain legitimacy through their claims to impenetrable specialisation backed by peer review. These venerable legitimacies have not been supplanted so much as paralleled by new ones. Knowledge may be authorised as much by its social robustness and relevance as by its epistemic containedness. It can be derived from communicativeness which is central to the hermeneutic and experiential modes of knowledge, though some of those working in the hard sciences might question whether one can always have confidence in what is being communicated. Perhaps the knowledge that scores highest is that is hard and tight, perhaps positivistic and quantitative in the social sciences, and/or which is geared to key public issues and explained through multiple media – the science of DNA would be an example.

The power generated by knowledge might thus be affected by three sets of characteristics. One concerns its communicativeness and appeal to social utility. The second concerns who determines the objectives of enquiry - researchers or

government or industry. The third gets to the heart of our concerns, following Whitley (1977) and Weingart (1977), in relating the epistemic style and status of the research to its power.

On communicativeness, Rip (1997) observes that the authority of basic science is legitimised by being fundamental and subject to rigorous testing, but also by the promises made of it. Industry shares the scientific view that basic science will yield results, a view shared by some of those participating in the UK Foresight Initiative (Henkel et al., 2000) who maintained that Foresight needed different forms of knowledge, both 'hard' and 'soft'.

On the objectives-setting dimension, in, for example, health policy making, it has been noted that 'applied research might be more readily useable by a policy system than basic research, but policy-makers tend to relate more willingly to natural sciences than social sciences. Research that follows priorities determined by the researchers themselves, according to the 'internalist' norms of science' is more often, though not always, going to be basic. Applied research is more likely than basic research to be following an agenda driven by forces other than the scientific imperative. '... where such drivers and sponsors are also the most likely potential users of the research, this provides some of the circumstances that might encourage utilisation' (Buxton et al, 2002, pp ii-iii)

The relationships between the producers and users of research have been described as follows: 'The underlying power relationships can be various. Some researchers work within a managerial hierarchy in which they are subordinate to policy-makers; those working within government departments are obvious examples. Others work within a market in which the knowledge is purchased on the basis of competition with other researchers. For the most part the relationship is that of a market in which exchange and negotiation are the styles adopted. In such cases knowledge is exchanged for resources and legitimacy. Some market arrangements, however, allow for quite substantial tenurial rights which weaken the pull of the market and emphasise the need for well constructed negotiation and exchange. (OECD, 1995)'

On the epistemic set of considerations, we look for the ways in which the knowledge content in itself affects its power or autonomy. Whitley's comparison (Whitley, 1977) of restricted and unrestricted or configurational science is important. It shows how the cognitive structures of different sciences give rise to different forms of organisation and so to different degrees of cohesion and power. The arithmetical ideal and the aim of expressing theory inhibits challenge in restricted sciences such as physics, concerned with a small number of properties of objects which can be quantitatively related. The high degree of specialisation needed creates clear boundaries within these sciences, bureaucratisation in the organisation of research and success in attracting resources. Configurational sciences, such as social sciences concerned with small numbers of highly structured entities exhibiting a large number of properties, are essentially poly-paradigmatic. 'Their conceptual boundaries are highly fluid and permeable. In consequence their organisation is less structured and there is greater scope for dispute and fundamental challenge.' This in turn affects their power outside their boundaries.

So, too, does, the 'finalisation' thesis of van den Daele, Krohn and Weingart (1977) make the link. It identifies three phases of discipline development: the exploratory, pre-or polyparadigmatic phase, the phase of paradigm articulation and the post-paradigmatic phase. In the first and third phases problem orientation and discipline development are compatible. But when work is beginning to crystallise on the development of key theoretical models, usually the research programme is dictated by 'internal' needs incompatible with external problems.

Adding to the epistemological debate about the most appropriate forms of production of knowledge intended for utilisation, Trist (1972) argued that domain-based research represented a third category alongside basic and applied research. Domain-based, or policy-oriented, research is essentially interdisciplinary and the crossing of new boundaries and the creation of new syntheses may advance both knowledge and human betterment. It also entails wider reference groups, beyond the scientific or clinical communities. Along similar lines, Gibbons et al (1994) claim to identify a shift from the traditional discipline-centred mode of knowledge production that they characterise as Mode 1, towards a broader conception of knowledge production described as Mode 2. In this, knowledge is generated in a context of

application and addresses problems identified through continual negotiation between actors from a variety of settings. The results are communicated to those who have participated in their production. Although the degree of change described by Gibbons et al could be exaggerated, this general approach, as with that of Trist, is compatible with attempts to identify power through utilisation by explaining research production in terms of the interests of at least some potential users.

5. Modes of governmental power

We should now consider whether particular knowledge modes denote or support particular modes or styles of public activity, policy or government. To keep the argument simple, we refer to central government at the head of systems. The classic and idealised models of government assume that government has its own power and power relationships and regulatory, allocative, rewarding and sanctioning functions. They refer to somewhat autonomous entities but essentially capable of going their own ways without interpenetration or significant mutual effect. The simplicity of these classic assumptions has been drastically undermined in the last forty years. We accept that both science, or, more broadly, in Cronbach and Suppes' term (1977), disciplined enquiry, and government inhabit worlds and client groups. But increasingly they have been pulled into each others' orbits.

The extent to which governmental power is strengthened by its commissioning and use of research has been shown to vary according to the salience of the policy field, the nature of the subject discipline or area to be employed, and the extent to which government at any particular time is committed to a display of evident rationality (Kogan and Henkel, 1983). It also varies according to the nature of the receptor (Caplan, 1977, Kogan and Henkel, 1983). The determinant forms of knowledge, '... explanations which are at once systematic and controllable by factual evidence ; ... the organisation and classification of knowledge on the basis of explanatory principles...' (Nagel, 1961, p4) may be more convincing to managers and politicians seeking certainties than will be a 'softer' and less controlled form of evidence. Perhaps more inclusive forms of encounter lend speed to persuasion, but the content of the persuasive message can be hard or soft.

6. Factors affecting nature of power patterns

(i) Sponsorship

We can now turn to identify those elements of research initiation and control that create power patterns which might frame knowledge creation, and the extent to which sponsors set or influence the setting or objectives. First, there is the nature of the sponsorship. Some knowledge creation is free of external sponsorship but this is increasingly unusual. Perhaps it may be said to exist in those subject areas, mainly the humanities and social sciences, where academics are on tenure and require no more than a good library and a computer to produce a solitary or even a group work. Some mathematicians and philosophers may require even less – a pencil, note paper and a glass of water. In the sciences and technologies advancement of knowledge usually requires money for equipment, materials and technical back-up. And certain types of social science depend on external funding.

In securing sponsorship, academics may submit to highly prescriptive requirements on the objectives and forms of outcome of a project, as when receiving resources from a government department or private firm. Publication may be restricted. It is unlikely that the sponsors will seek to dictate the methods used, though that can happen in the social sciences when sensitivities or ethical issues arise in approaching and working with particular subject groups. Increasingly, too, research is driven by market considerations.

In some countries, but not all, researchers look for funds from private foundations whose demands on the objectives and forms of outcome of a project, one funded, are likely to be non-existent or minimal. In the past, in the UK, the research councils were also regarded as a source of independent funding, although they varied: the old Agricultural Research Council acted virtually as the research arm of the Ministry of Agriculture. They increasingly have moved from the responsive to the initiatory mode, and are prescriptive about, for example, researcher contact with user groups.

But where funding sponsorship has become more assertive on objectives and forms of outcome have methods or epistemic characteristics been affected? Has there

been ‘epistemic drift’ (Elzinga, 1985)? For the most part, apparently not (see our studies of the Foresight Initiative (Henkel et al, 2000) and Henkel, (2000) on academic identities). It would be surprising if they had, since sponsors sponsor research to create knowledge they cannot create themselves.

(ii) Institutional models

We can note several models of the relationships that convert forms of sponsorship into institutional formats:

The autonomous individualistic model which exists not only as, say, medical practitioners practising privately, or free-lance journalists, but a minority of academics who have been able to escape the institutional coop, perhaps by virtue of distinction, and to live perhaps on free grants but within institutional protection.

The autonomous collegial model is still the beau ideal and has as its premise that a group of practitioners will act to ensure their collective standards, by enforcing admission criteria, will share certain resources, but will not exercise control, within broad limits, over the nature or volume of individual work. Its relationship with external sponsors is likely be relaxed, though not necessarily arms-length, in that it is likely to rest upon established institutional protections from interference.

This model obtains in world class universities, though it may now be increasingly mitigated by the numerical predominance of a second class of non-tenured researchers and teachers and the increased dependence of even the most prestigious institutions on government or corporate funding.

The managed model is that which obtains in the private sector, and in some in-house units depending heavily on external sponsorship, where the objectives, methods and format of outcomes are set managerially and directed towards ultimate application and profitability rather than to scientific ends, although deference to scientific codes of verification will be observed.

The partnership model where academics and industry reach agreements on quids for quos.

These institutional ecologies may be both the products and the originators of particular power-knowledge mixes. The capacity to earn or fail to earn different degrees of academic freedom will depend on various mixes of distinction and utility. The outcomes of the different forms are not easy to determine and differentiate. Power derived from teaching or research excellence may be enhanced by autonomy, but, equally, excellent research may derive from tightly managed centres. The power derived from perceived relevance is clearly demonstrable in some areas of technology, including clinical sciences, and economics.

(iii) Nature of resource required.

There is some literature on the effects of size of unit on both research functioning and economies of scale (eg Johnston, 1993 and Kyvik, 1991 and 1993). As far as institutional size is concerned, the jury is out on the economies of scale which are believed to level out as costs of co-ordination, particularly in multi-campus sites, increase with size. It is assumed, at least by government agencies, and some megalomaniac heads of institutions, that quality follows size, though the reverse has often been true. (Consider the size of the University of Manchester between the wars which housed both Rutherford and Namier). In the USA, the 'best' include both very large and medium size institutions.

It has been generalised by Peter Scott that increased sizes lead to more bureaucracy.

In principle that is likely to be true, but if for this purpose we define bureaucracy as the dominance of managerial values and practices over academic managerial values and practices, we would need to compare, say, Berkeley and UCLA with some tightly controlled former teacher colleges in both the UK and USA. In general, therefore, size is an ambivalent characteristic which can affect academic power in differing ways.

(iv) Stage of finalisation

It is tautologically evident that work which has reached its final form is more likely to secure both internal and external power than that which is still struggling to clarify its objectives, boundaries and methods. At the intermediate stages, both objectives and methods may be more open to pressure or negotiation.

7. Examples of knowledge-policy connections

A general account of changing policy moods (Wirt, 1983) depicts a cyclical process in which public services might be set up and institutionalised so that power is exercised through dominant professions until the laity – politicians, interest and client groups- become dissatisfied and take power away from them. But, before long, replacement policies lead to new forms of professionalisation and institutionalisation which perhaps a generation later will become challenged in their turn.

A UK example is of the treatment of educationally impaired children. Under the 1944 Education Act, 10 forms of ‘handicaps ‘ were identified, and specialist schools and staff created to attend to them. But with the Warnock report (1982) and subsequent legislation, these categories were swept away in favour of generic ‘statementing’ and instead a whole new profession of special educational needs set up. With this have come new terminologies, new assumptions about the best ways of meeting needs, new legal stipulations and, of course, texts and training sequences. Their work has been called the only growth sector within education in the UK. A similar example might be the changing fortunes of public policies in the field of positive discrimination – the first phase being that of ‘colour blind’ neglect, followed by a plethora of rules and legislation creating a race relations and anti-discrimination profession, and that to some extent followed by a reaction to these new forms of professional power, albeit reinforced by external reference groups.

The knowledge backing each of these policy phases will lie in the apparent ability to identify different forms of social or clinical impairment and create treatment structures for them. On those presumed abilities, both professional and legal determinism have been based. As the assumed knowledge base has changed so has

the power derived from it. Correspondences between different phases of policy development and knowledge styles have been noted.

Henkel (1998) has noted the ebb and flow of different conceptual and epistemological assumptions in public evaluation. There was an earlier shift from the positivist to the hermeneutic paradigm and ‘the associated change of emphasis to formative rather than summative evaluation.’ Within social evaluation, in the positivist phase, methods included the social survey, statistical analysis and psychometric testing and the preferred evaluative model was the randomised controlled experiment. But over time ‘awareness of the instability of social services undermined the claims of the experimental model. There was a shift towards description and the relationship between inputs, processes, context and outcome. Anthropological perspectives concerned with the interplay between milieu, process and inputs were advanced so pulling towards more context-specific approaches.’

The objections to positivism with its search for regularities, systematic explanation and prediction in social life have been well remarked: ‘people are not simply objects whose behaviour is in principle explicable in terms of a series of natural laws’. ‘The concepts of intention, meaning and value are central to an understanding of human action and a grasp of them entails a comprehension of the language in which individuals and society express them... The limitations of ‘hard’ scientific criteria were become more strongly felt. Interpretative, illuminative, ecological and anthropological studies depending in internal logic rather than on external controls have intensified (Henkel, 1998).

At the same time, we must be cautious about making global assumptions about these correspondences. For example, the styles attributed to positivist science – often used as a kind of liberal academic swear word- may be found in examples where knowledge has contributed to considerable human progress, including the reduction of privileged political or economic power. Medical epidemiological studies have used to break rather than advance privileged hegemonies, as tobacco firms would ruefully agree. Whilst most educators would question the measurement and assessment of their performances against bench marks and numerical scores of outcomes, some forms of connoisseurial inspection could be too subjective and biased and exercised in favour

of particular educational doctrines. The tradition of Blue Book exploration of social problems at the turn of the 20th Century was positivist in style but exercised the power of knowledge without any kind of institutional coercive framework. The knowledge was authoritative in that it could cause changes in behaviour, but it did so by persuasion on key public issues, and in doing so it dislodged authoritative hegemonies.

The more recent history of both higher and school education in the UK shows well how different forms of evaluative knowledge-seeking line up with assumptions about who should have the power and how it should be exercised. In the long past, higher education evaluation was not primarily hermeneutic in style but contained elements of both the summative and formative –depending on purpose and subject area, and administered by peer review that could be either exigent and external or connoisseurial and interactive. But the increasing desire of the state to break up academic hegemony, and to shift from standard setting by academics on their own criteria to standard setting on criteria set to public policy criteria, has led to drastic changes in the type of knowledge that is now created and employed. The state organisations assume that both teaching and research should have particular forms of outcomes which can be graded and thus measured, and which include contributions to the economy. The system is geared to ensuring that progress in achieving governmental targets can be measured and announced. The models of learning and research outcomes are tied to positivist assumptions about the efficacy of managerially endorsed criteria; academics and teachers are coopted into the elaboration of the criteria which are, however, set as governmental *a priori*s. The official knowledge is powerful because it is quantitative and therefore easily used for grading lists and summations and easily used to divert attention from the more subtle qualifications that apply to individual conditions and performance.

In the UK the return to positivism, which had begun to go into some reverse from the early 1900s in school policy, has been decisive. It has become possible for the state to ‘know’ what are the constituents of good education or research, in schools and higher education, how to achieve them, (through the pressures generated by outcome analysis, bench marking and associated rewards systems) and thus convert precise and quantified forms of knowledge into authoritative resource rewards and

penalties. This assertion of arithmetical epistemics handily reinforces the shift towards managerialism at all levels of the system –managers can more easily use figures which are thin whilst words are thick.

We may see in these examples a clear case of particular forms of knowledge seeking –public evaluation- responding to equally clear assumptions about the distribution and exercise of power.

8. Epistemics and politics

Finally, we should consider the extent to which epistemological concerns and criteria are separable from political issues. It follows not only from the extension of academic boundaries explored by Trist, with his domains subject to multiple reference groups, and Gibbons et al' (1995) Modes 1 and 2, but also the fluctuating fortunes of positivism and interactive or hermeneutical versions of knowledge as noted above, that these concerns and criteria are promoted partly out of the interior discourse of academics but also as part of largely political movements. The challenge of radical student groups to academic power in the 1960s and 1970s was part of a larger struggle for power, voiced largely as an attack on the authority of received knowledge, as indeed was academic resistance to it. Different forms of knowledge reinforce different philosophies of state and professional control as particularly exemplified in the remarkable story of the return of positivism in educational evaluation in the UK and elsewhere.

Yet few generalisations in this area are completely true or false. There remain academic groups who pursue internalist philosophies and practices in the certified surety that these remain the right way to advance knowledge. For the most part, they secure the best academic prizes and the most esteem which are cashable as grants, prestigious academic posts, and in some subject areas, support and prestige in the outside world. At the same time, we have to note how some of the less rigorous academics have made their way into political influence by virtue of their communicativeness and perceived utility. Thus we do right in trying to specify and generalise the power-knowledge nexus, but remain tentative about any generalisation derived from doing so.

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