

Exploring the social, cognitive, and political limits of innovation in projects

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Introduction

It is often argued that projects are the organisational form most ideally suited for innovation (e.g. Davies and Hobday, 2005, Hobday, 2000, Kodama, 2006). Typically bringing together groups of people representing a diverse range of skills, knowledge, experience, functions, roles, and disciplines, projects are frequently depicted as sites of intense negotiation and creativity, where alternative ideas are generated, decisions are made, and problems solved through interactions between specialists. This paper suggests that while this image of projects as sites of innovation is a plausible one, it is crucially incomplete, both in terms of its characterisation of project work and of innovation processes. Projects are not always the setting for creative interactions, often exhibiting instead a number of social, cognitive, and political limits that channel and constrain the innovative activities of those involved. Examples of such limits include the over-routinisation of practices and relations, the formation of deeply entrenched cognitive frameworks surrounding project work, and the difficulties of integrating diverse knowledge bases and interdependent activities due to the increased potential for conflicts, disputes, and misunderstandings to occur under conditions of social diversity. All these features can mean that rather than being cauldrons of creativity, there may actually be characteristics of project work that either limit the potential for novel ideas needed to set innovation in motion, or effectively dissipate the energy needed for such creativity through political conflict over competing interests (c.f. Keegan and Turner, 2002). In terms of the characterisation of innovation, it is also important to remember that creativity is only one, albeit important, aspect of innovation processes. Innovation involves more than having a good idea or coming up with a novel solution (Tidd *et al.*, 2005). It crucially entails complex processes of elaboration, implementation, adoption, and use that may benefit from quite different organisational conditions to those offered by projects. In particular, the diverse contributions within projects that potentially enhance the creative elements of innovation processes may arguably work against the activities required to put ideas into practice because it may be more difficult under such circumstances to reach agreement over the direction to be taken and how to achieve it.

As a way of exploring the interplay between the social, cognitive, and political elements of project work, the paper is informed by practice-based approaches to studying organisations (e.g. Cook and Yanow, 1993, Gherardi, 2000, 2006, Lave and Wenger, 1991, Nicolini *et al.*, 2003, Orlikowski, 2000, 2002, Suchman, 1988). A practice-based perspective emphasises the socially constituted, context-specific, provisional, and emergent nature of organisational knowledge and practice as culturally and historically situated. It offers a relational and process-oriented view of the mutually constitutive nature of social phenomena which makes it meaningless to speak of them independently. As such it is well placed to provide a theoretical vocabulary for considering the interconnections between social, cognitive, and political processes and relations. Having said that, these approaches have tended to be less than forthcoming in considering the cognitive and political dimensions of practice and it is important to address these omissions.

Thus, while practice-based approaches make frequent mention of the enduring and patterned character of social action, often drawing on sociological accounts of practice (e.g. Bourdieu, 1977, 1990, Giddens, 1979, 1984), they have tended to be suspicious of invoking any cognitive explanations in understanding how these patterns are produced

and sustained. Social norms and routines are depicted as effortful accomplishments that are the medium and outcome of practices by knowledgeable actors. Yet, as Sewell (1992) has argued, such approaches offer no convincing account of what people need to know in order to participate knowledgeably in collective practices. I suggest that individual and collective cognitive frameworks or schemata play a central and dynamic role here by providing the, often implicit, unarticulated, and shifting background upon which knowledge and action are grounded. (Cicourel, 1973, 1981, Zerubavel, 1999). Schemata provide the crucial link between past, present, and future that permit both the reproducibility and transformational capacity of practices, allowing genuine agency without voluntarism and regularities of action without determinism.

Practice-based approaches have also tended to be silent on issues of power and politics, which means that they struggle to provide a realistic account of the formation, reproduction, and transformation of social practices. To begin to address this absence I draw upon the literature on power in social theory, and particularly the argument that power operates through the interplay of different modalities (e.g. Clegg, 1989, Latour, 1986, Law, 1991). The usual distinction here is between more overt conceptions of power, portrayed as political interactions of individuals and groups seeking to pursue their interests, and more subterranean and anonymous modes of power, taking the form of social norms, rules, and discourses that are frequently taken-for-granted and underpinned by a whole network of social and material practices and relations. The manner in which these different modes of power interrelate provides another useful way of thinking about the simultaneously patterned yet shifting character of social practices. The enactment of normalised forms of power through overt episodes of social interaction provides the opening through which norms are reproduced, but also potentially transformed.

As well as the conceptual challenges of simultaneously tracing out the cognitive, social, and political limits on projects as sites of innovation, there are important methodological considerations. These are being addressed through research currently being undertaken by the author into knowledge, communication, and innovation in project settings. The illustrations in the paper are taken from a multi-method study of a team of civil engineers in the utilities sector. The study is attempting to combine an ethnographic approach with methods drawn from cognitive psychology. For the exploration of issues concerning the social and political limits of project innovation, an observational research strategy has been invaluable. However, for the purposes of considering the cognitive dimensions of project practices, other methods have been needed to supplement the ethnographic aspect of the study. Practice-based approaches typically assume that the situated intelligibility of practices can be mainly grasped through observation, but I argue that this assumption is crucially incomplete (c.f. Turner, 1994). While many collective practices certainly elude the explicit knowledge of any single individual, limiting their ability to articulate what, how, and why they do what they do, this does not have to be taken as meaning that the observable interactions of people, artefacts, and settings are the only way of gaining insights into their ongoing social practices. Consequently, the paper also considers the potential of other methods to address the research questions. Drawing inspiration from various attempts to map individual and shared schemas, which have been applied particularly in the areas of organisational strategy and team dynamics (e.g. Cooke *et al.*, 2000, Hodgkinson, 2005, Huff, 1990, Langan-Fox *et al.*, 2000, Porac and Thomas, 1990), the current study is exploring the possibilities and limitations of using cognitive mapping in a more action-orientated and socially situated manner than has often been the case previously. The

paper reports on the preliminary results of this study and what they are able to tell us about the implications of team diversity and dynamics for innovation in project settings.

Projects as innovative milieu?

There seems to be a commonsensical association between projects and innovation. This is not simply because of the regularity with which projects are used for the explicit pursuit of innovations, as indicated by the extensive literature on projects in new product development (e.g. Ancona and Caldwell, 1992, De Maio *et al.*, 1994, Donnellon, 1993, Katz and Tushman, 1979). Ever since projects were depicted as the flexible and organic antidote to more mechanistic forms of bureaucratic organisation, and thus more suited to uncertain tasks and unstable environments (Burns and Stalker, 1961), there has been a tendency among many to view projects as the antithesis of all that is repetitive, stable, predictable, and ordered. Instead, projects are depicted as fast-moving, fluid, emergent, and creative centres of temporary activity. Consequently, projects are themselves treated as the embodiment of all those positive-sounding characteristics that have tended to gather around the notion of innovation. It now seems self-evident that projects are the obvious choice of organisational form for those wishing to promote innovation. According to Keegan and Turner (2002, pp. 368-369), [p]rojects are portrayed in the literature as a fast, flat, flexible approach to managing change (and innovation) in organisations". Huang and Newell (2003) have commented that two main purposes of cross-functional project teams are to deal with situations requiring creativity and innovation and managing strategic change initiatives. Hobday (2000, p. 878) has suggested that the project-based organisation "... is a form suitable for meeting innovative needs, responding to uncertainty, coping with emerging properties, responding to changing client requirements and learning in real time". One of the frequently claimed advantages of project organisations for innovation is their ability to improve information flow and communication between different functional areas, which in turn is credited with enhancing the speed and quality of decision-making and the ability to adapt flexibly to dynamically unfolding situations (Ford and Randolph, 1992). Projects are focusing devices (Hobday *et al.*, 2000) that are capable of integrating different functional and organisational areas and aligning them around a common set of objectives (Lawrence and Lorsch, 1967a, 1967b).

As a counterpoint to this image of projects as milieu of innovation, numerous authors have identified limitations to the innovative capacity of project-based organisations. These do not necessarily question the ability of individual projects to deliver innovative outcomes, but rather shift attention to the overall capacity of organisations or sectors based around projects to generate, diffuse, and implement innovations. This is consistent with the recent emphasis on moving away from a portrayal of projects as individual, isolated, and self-contained centres of activity divorced from their wider historical, social, organisational, and institutional contexts (Engwall, 2003). The individualised depiction of project has tended to be particularly dominant in the project management literature where the single project is overwhelmingly the privileged unit of analysis. By looking at the wider network of relations within which projects are embedded, several authors have identified tensions between the ability of individual projects to promote innovation and learning compared with the overall system capacity to do so. Dubois and Gadde (2002), for example, have used the concept of loosely and tightly coupled systems drawn from Weick (1976) to argue that the project-based organisation of the construction industry is ultimately a barrier to innovation. The combination of tight coupling within projects and loose coupling between projects, they argue, means that project-based industries are well suited to generating and

implementing novel ideas at the project-level but less able to support the wider diffusion of innovations at the firm or industry level. Gann and Salter (2000) have similarly argued that problems can occur when there is a failure of integration between project processes and firm-level business processes. These sorts of dilemmas have been extensively identified in the literature on learning within and between projects (e.g. Davies and Brady, 2000, DeFillippi, 2001; Prencipe and Tell, 2001). While sympathetic with these arguments, there is the danger that by locating the problem of project-based innovation mainly at the inter-project, organisational, or industry level that the capacity of projects themselves for generating innovation are left unquestioned. Individual projects, in this view, can still be considered effective and flexible instruments for integrating and co-ordinating diverse types of knowledge and activity in support of innovation even if the sum of these processes at the broader level may be less than the parts. However, as we shall see in the following section, there are some who cast doubt on what is often portrayed as the inherently innovative character of the project form. In particular, I will examine in turn some of the social, cognitive, and political limitations of project innovation. The intention here is to problematise the generally positive association between projects and innovation without in any way falling back into the view of projects as isolated islands of activity.

The limits of project innovation

The system-level critique of the innovative capacity of project-based organisations outlined above needs to be supplemented by a more balanced view of the ability of individual projects themselves to support innovations. In doing so, this is in no way meant to suggest that projects can be treated as sealed off from broader social, institutional, or organisational processes and relations. Indeed, it is precisely the way that individual projects are embedded in institutionalised patterns and norms of social action and interaction, as well as the cognitive schemas that underpin these, that help us to understand how projects may hinder as well as help innovation processes depending on the nature of such norms and schemas and the way they unfold in concrete terms within specific contexts. It is here that a practice-based lens is invaluable for understanding the patterned character of social practices which contain within them the potential for both continuity and transformation. The implications of the routinised nature of practice for innovation are considered in the next sub-section. Following that I give some consideration, often neglected within the practice-based literature, of the interplay between the routinisation of practice and the equally patterned character of knowledge by outlining the ambivalent role that cognitive schemas play in supporting innovation. Finally, to address another blind-spot in the practice-based literature, I also consider the thoroughly political character of project work as a further potential barrier to the creation and integration of knowledge needed for innovation.

Projects and the routinisation of social action

A regular argument encountered in the literature on projects is that because of their temporary nature it is difficult to build the same norms, institutions, and social relationships that more permanent organisations can rely on (e.g. Meyerson *et al.*, 1996). Projects are depicted as ephemeral encounters bringing together people who are often unfamiliar with each other and giving them little time to sort out what they are going to do and how they are going to interact. Notwithstanding the wide variety of project characteristics and settings that mean they may vary considerably in duration and degree of continuity, there are those who have suggested that even the briefest

projects are not quite as free-forming and institutionally anchorless as sometimes implied. Sydow and Stabler (2002, p. 216), for example, have suggested that:

Although project tasks are temporary, the network of interpersonal and interorganizational relationships in which tasks are embedded may be more enduring ... Because of the temporary nature of tasks, and despite a certain degree of relational stability, project networks themselves develop only a limited set of institutions. As a consequence, they depend more heavily than other organizational forms ... on supportive social and political institutions in their organizational field. These institutions not only supply essential material and informational resources but also set regulatory constraints, create possibilities for interorganizational action, determine normative expectations, and provide the social context within which practices obtain project-relevant meaning.

Rather than being a *tabula rasa* on which boundless possibilities of social and technical activity can be inscribed, projects are crucially constrained by existing institutions, structures, and norms that partly guide how they unfold. These can hold both positive and negative implications for the innovative capacity of projects. Institutional stability and the routinisation and patterning of social action and interaction are preconditions for innovation because, as authors from numerous traditions have argued, the potential for learning and change is necessarily grounded in previous activities and experiences (e.g. Dewey, 1922, 1958, Kolb, 1984, Schön, 1983). As the literature on dynamic capabilities has highlighted, organisational learning and innovation do not come out of nowhere. They are supported by specific routines that are able to transform the nature of an organisation's activities and prevent its core capabilities becoming core rigidities (e.g. Leonard-Barton, 1992, 1995). There is also a sense in which innovation processes themselves are subject to routinisation to the extent that it is meaningless to counterpose routine activity and innovation as polar opposites. As Nelson and Winter (1982, p. 134) have observed, "... organizations have well-defined routines for the support and direction of their innovative efforts". These include specific strategies and heuristics that economise on time and effort in the search for solutions to problems.

However, while routines are themselves needed to support innovation, there are situations where they can become a liability and act as a source of inertia. In the case of project organisations, there are some who argue that, contrary to the image of projects as flexible adhocracies, there are strongly isomorphic tendencies in the form of standardised methods of planning and control that can potentially make projects as rigidly bureaucratic as some more permanent organisations. Hodgson (2004, p. 88, emphasis in original) has argued that "project management can be seen as an essentially *bureaucratic* system of control, based on the principles of visibility, predictability and accountability, and operationalized through the adherence to formalized procedure and constant written reporting mechanisms". According to Keegan and Turner (2002), the deeply ingrained practices of planning and control that are so central to orthodox project management approaches may turn projects into overly mechanistic environments that are excessively focused on short term efficiency and productivity and do not allow the slack needed to explore alternative ideas from which potential innovations may emerge (see also, Bresnen *et al.*, 2004; Dubois and Gadde, 2002). Several authors have suggested that the institutionalisation of standard project management practices through, for example, attempts by the Project Management Institute in the USA and the Association for Project Management in the UK to establish and promote the Project Management Body of Knowledge as the definitive approach to managing projects, has reinforced the tendency of projects across a wide range of sectors to prioritise short-

term, project focused goals over wider processes of innovation and learning across networks of projects (e.g. Bresnen, 2006, Hodgson and Cicmil, 2006). As Arthur *et al.* (2001, p. 113) have suggested, “[o]rganizing a project for successful knowledge capture appears fundamentally different from organizing a project for performance success”. It is the latter that tends to be prioritised within the institutional field surrounding project work. Rather than promoting flexibility, dynamism, and creativity, the intense standardisation of project management practices, it is suggested, may actually eliminate the slack needed for experimentation and the requisite variety that is needed to support the emergence of innovations (Richtnér and ? hlström, 2006).

If project organisations, as with any form of organisation, require some degree of routinisation in patterns of activity in order to operate, the question arises as to the conditions under which these support or hinder innovation. One problem, clearly identified in the capabilities literature, is where established ways of doing things are so entrenched that they are unable to change to meet the shifting conditions faced by organisations. The solution in this literature comes in the form of overarching routines that support change, so-called dynamic capabilities (Teece *et al.*, 1997). Coming from a somewhat different angle, drawing on practice-based approaches, Feldman and Pentland (2003) have argued that organisational routines contain an internal dynamic that allows for their potential transformation. They explain this in terms of the distinction between the ostensive and performative aspects of routines, originally specified by Latour (1986) in the context of his theorisation of power. As Feldman and Pentland (2003, p. 101) argue, the “ostensive aspect is the ideal or schematic form of a routine. It is the abstract, generalized idea of the routine, or the routine in principle. The performative aspect of the routine consists of specific actions, by specific people, in specific places and times. It is the routine in practice. Both of these aspects are necessary for an organizational routine to exist”. Accordingly, rules and norms in their formal or ostensive sense can never be all-encompassing because they always rely on being enacted through performances. These enactments are effortful, if not always conscious, accomplishments that are actively situated within specific action contexts (c.f. Garfinkel, 1967). Their potential to be modified can stem either from unintentional micro-variations in how they are performed or through reflection and purposeful action (c.f. Becker, 2004, pp. 648-649).

The knowledgeableability of actors and their capacity for reflection are central themes in the practice-based literature. However, there has been a tendency for this literature to be silent on the cognitive dimensions of norm-based practices. As Sewell (1992, p. 7, emphasis in original) has argued in relation to one important influence on many practice-based approaches, structuration theory, “Giddens places a great deal of weight on the notion that actors are *knowledgeable*. It is, presumably, the knowledge of rules that makes people capable of action. But Giddens develops no vocabulary for specifying the *content* of what people know”. As a way of addressing this, the following sub-section explores issues relating to the cognitive characteristics of project teams and their implications for innovation.

Team cognition in project settings

Although practice-based theories have been generally unwilling to accept cognitive explanations of the patterning of social action, there is an important sense in which cognitive schemas can be considered a corollary of social rules and norms. The performance of rules and norms by necessity relies upon an active, if often implicit, background of interpretations and assumptions, in an ongoing flow of mutually

constituting interactions. These are needed to reproduce normative behaviour to give it its regularised character, but also offer the potential for its transformation through unintentional modifications and the reflexive self-monitoring of more conscious agency (Emirbayer and Mische, 1998). A key issue here is not only that individuals are active agents in the reproduction and potential transformation of social rules and normative expectations, but also that the process of fitting together norms, dispositions, and situations is a crucially interpretive accomplishment. In order to orientate their behaviour by calling upon different normative or dispositional elements that are more or less appropriate to the situation, individuals must first make sense of the what the situation is, often on the basis of quite fragmentary, fleeting, and incomplete evidence. How one makes sense of situations is, in turn, influenced by what Hochschild (1979) called 'framing rules' and Cicourel (1973) termed 'interactional competence'. In either case it is not only knowledge of the rules that is needed, but also a practical sense of how and where they can be applied (c.f. Bourdieu, 1990). For Cicourel (1973) there is a crucially cognitive dimension to the ability to generate situationally appropriate actions in that both normative expectations and the understanding of situations are guided by interpretive schemata.

One important feature of project organisations is that they provide a setting in which different functions, roles, and disciplines come together to make their own specific contributions. It has been suggested that different groups within organisations tend to occupy their own 'thought worlds' and that this can act as a barrier to knowledge integration (Dougherty, 1992). Projects are intended to be a mechanism for overcoming such difficulties (e.g. Galbraith, 1973, Lawrence and Lorsch, 1967a, 1967b), but this may not necessarily be the case. As Bresnen (2006, pp. 77-78) has suggested, "... different cognitive schemas and relational norms – associated with different professional and/or organisational values, codes and norms ... are likely to act as impediments to the diffusion of knowledge and learning". However, the literature on team cognition is still relatively undecided on the implications of cognitive diversity in guiding team activities, divided as it is between three main strands.

The first strand comprises those who argue for the benefits of cognitive similarity (e.g. Bettenhausen, 1991, Druskat and Pescosolido, 2002, Mohammed and Ringseis, 2001). This includes proponents of so-called shared or team mental models who argue that where team members' cognitive schema overlap or converge they "help team members determine appropriate actions, form expectations of each other, explain how the team operates, describe the current state of the team, and predict its future state" (Druskat and Pescosolido, 2002, p. 309). The implication is that cognitive convergence increases intersubjective understanding and reduces conflict, thus allowing for more effective interactions. In contrast, the second strand suggests that cognitive diversity in groups leads to enhanced decision-making outcomes by considering a wider range of possible alternatives, thus allowing for the emergence of new insights (e.g. Guzzo, 1986, Hoffman and Maier, 1961, Janis, 1972, 1982, Levine *et al.*, 1993). Too much similarity in schemas between team members could lead to a paucity of different ideas and a foreclosure on searching for alternative solutions which could in turn limit the potential for innovation. The third strand includes those who have offered a more contingent understanding of the effects of group diversity, arguing that it is dependent on intervening conditions such as task type and degree of interdependence (e.g. Austin, 1997, Jehn *et al.*, 2000, Pelled, 1996). In terms of the innovative capacity of projects, such contingent arguments suggest that cognitive diversity is more appropriate for supporting the earlier creative, exploratory, problem definition stages of projects, while

cognitive convergence is better suited for reaching agreement about the direction of the project and implementation activities.

Unfortunately, the literature on team cognition has tended to promote a rather static and functionalist portrayal of the role of cognitive schemas that is decidedly at odds with the practice-based focus on the enactive performance of social rules and norms outlined earlier. This means, for example, that the differing thought worlds that are supposed to cut across project teams tend to be treated as relatively fixed. This tendency has been exacerbated by the reliance of such studies on time-limited experimental or simulation approaches rather than investigating what Greeno (1998) has termed ‘intact activity systems’. The latter approach offers the potential to trace out the development of schemas and their relation to norm-based social action over time, and this is the method adopted for the study reported in the second half of the paper. Certainly, there is evidence that elements of people’s cognitive schema are likely to remain relatively stable over time. In particular, where schema support self-confirmatory judgements it is unlikely that they will be transformed through new experiences or interactions with people holding different assumptions (Nickerson, 1998, Weick, 1995). However, other elements of individuals’ cognitive frameworks are more fluid and situationally influenced. For project-based innovation processes the question is not so much what is the optimal mix of cognitive diversity or similarity *per se*, but rather how such differences actively play themselves out through the situated actions and interactions of team members over time and relative to specific tasks and activities. This places emphasis on projects as sites of social interaction in which alternative perspectives, interests, and beliefs are negotiated. As outlined in the next sub-section, this suggests the need for a political understanding of project work.

The politics of project work

Project organisations are often considered in paradoxical terms (e.g. Bresnen *et al.*, 2003; DeFillippi and Arthur, 1998). They are depicted as settings in which tensions between competing demands can be managed, if not necessarily resolved. Shenhar (2001), for example, has theorised projects in terms of their capacity to deal with the conflicting demands of order and disorder. “Disorder means creativity, information flow, flexibility, communication, and change and is the way to deal with high uncertainty. Order means formality, rigid procedures, standards, and bureaucracy and is the way to deal with scope and complexity” (*ibid.*, p. 263). The identification, interpretation, and negotiation of competing demands in project settings is a political process for which it is important to develop a suitably elaborated conceptualisation of power. One of the key issues in the literature on power concerns the distinction between prohibitive and productive conceptions of power, which has been summarised as the difference between power-over and power-to. The former, which can be largely traced to the formulation offered by Weber (1958), is mainly a question of the capacity of individuals or groups to draw on specific resources to achieve their objectives at the expense of others. Power is treated as a question of possession to the extent that people are able to access different bases of power (French and Raven, 1959; Raven 1965). It is this approach to power, as a visible set of political relationships between those differently endowed with power resources, that has traditionally tended to dominate and can be found in various contributions to the so-called ‘community power debate’ (Bachrach and Baratz, 1963; Dahl, 1957; Hunter, 1963) and in the power-dependency approach (Emerson, 1962; Pfeffer, 1981; Salancik and Pfeffer, 1974). By contrast, the productive conception of power, primarily influenced by the writing of Foucault (1977; 1980a; 1980b), regards power in altogether “more anonymous terms, not as something

to be possessed and wielded solely as a tool of coercion, but more as a shifting arrangement of materials, relations, dispositions and techniques that are simultaneously the medium and effects of power, and which enable and constrain particular patterns of action” (Marshall, 2006, p. 208).

Power-over and power-to have tended to be treated as totally incompatible and mutually exclusive perspectives. However, as Law (1991, p. 170) has argued, “so long as we understand that there is no necessity about these relations then there is no reason why we should not treat power as a condition, a capacity, something that may be stored, as well as an effect or a product”. Indeed, I would suggest that an adequate theorisation of power that takes into account both its prohibitive and productive modalities is an effective way of linking together the different threads of the earlier discussion about norms, rules, and schemas in project settings. The productive conception of power is consistent with the theorisation of the norm-based and patterned character of social action, interaction, and knowledge, while the prohibitive conception can be considered part of the performative or enactive dimension through which norms, rules, and schemata are reproduced and potentially transformed. This is not incompatible with the previous distinction between ostensive and performative dimensions of power referred to by Latour (1986). There are also other similar formulations. For example, the circuits of power framework offered by Clegg (1989) traces the interconnections between episodic, dispositional, and facilitative forms of power; while Mouzelis (1995) has distinguished between the paradigmatic dimension of social action, consisting of position-role expectations and normative dispositions, and the syntagmatic dimension that relates to their expression in concrete situations through specific interactions. In terms of understanding innovation in project organisations, just as the routinisation of social action and the patterning of collective knowledge may act as precondition and barrier to innovative capacity, so the political and power-laden character of projects can be both a source of inertia and change. How these social, cognitive, and political dimensions of projects actually play themselves out in concrete activity settings is a largely empirical question and so the next section reports on a study of project work in the utilities sector.

An engineering team in action: some illustrations

The following illustrations are drawn from a study being conducted by the author into the practices of multi-functional project teams. They focus on one of two teams studied through a combination of ethnographic observation and other methods for investigating patterns of team knowledge, such as open-ended interviews, cognitive mapping, and documentary analysis. The team in question, which is undertaking a programme of capital projects in the utilities sector, has members representing different functions, roles, disciplines, and organisational affiliations. It is responsible for delivering an extensive series of projects over a five year period as part of a large capital investment programme. In terms of the methods chosen for the study, a multi-method case study approach was selected as an appropriate way of addressing the research questions. The two main methods used are ethnographic observation and cognitive mapping which, although perhaps being an unusual pairing, arguably offer complementary insights that partly counteract each other’s weaknesses.

Research method

There is a tendency in practice-based theories to assume that observation is the most secure route to deciphering the meaning of situated practices. This is founded on an

argument drawn from ethnomethodology where the indexicality of practices, in which their meaning is tied to specific contexts of action, is such that those participating in them are able to, and routinely do, provide their own accounts of what they do (Garfinkel, 1967). This offers a foundation for reflexive action, but crucially also, so the argument goes, allows external observers to reconstruct the meaning of practices by observing what goes on in the activity setting (Gherardi, 2006). While ethnomethodology can be criticised for exaggerating the transparency of practice to those involved, and even more so to those outside a given field of practice, there are nevertheless key benefits to approaches based on the longitudinal observation of, and engagement in, activity settings for being able to investigate the routine and patterned character of organisational action and knowledge. Without becoming deeply embedded in the setting being studied it is difficult for the researcher to appreciate the context-specific, localised, and emergent character of practices. To this end, the research has involved repeated visits to the various team locations to observe the day-to-day activities of its members, particularly in their formal and informal interactions. To date this has involved around forty-five days contact with the team over a twelve month period, with visits to the other case study team being conducted partly in parallel. As well as detailed notes, and where possible, direct transcripts of meeting held for a variety of reasons (from team level discussions to detailed planning, progress, design, and implementation meetings), a fieldwork diary was kept for each visit containing a record of observations, conversations, and other points of potential interest. As far as possible, this has been based on an attempt not to pre-select and censor events that only meet my preconceptions about the setting I am trying to understand. This is frequently easier said than done and conscious efforts need to be made to counteract the influence of familiarity on observations as the amount of contact time with the team increases. The danger here is that with the growing routinisation of research interactions over time it also becomes more difficult to appreciate the recurrent character of those team practices that are the target of the research.

Contrary to the assumption often found in practice-based approaches that observation is the best route to comprehending a field of practice, I would suggest that social practices are often more opaque to outsiders than frequently claimed. The previous point about the researcher becoming absorbed in the taken-for-granted nature of a practice indicates the paradoxical nature of observational research. Familiar to anthropologists, the paradox is that in order to understand the rule-based and routine nature of practices, the researcher must allow him or herself to become, at least partly, engaged in those practices and thus risks treating them in the same taken-for-granted way as the research participants under study. With minimal engagement, the researcher is presented with a potentially bewildering series of obscure activities and the danger is that their meaning is interpreted solely according to the researcher's existing conceptual schemas. However, by developing the degree of engagement required to begin to understand the meaning of practices as it appears to those involved in them, it becomes likely that the more routine or 'normal' activities go unobserved as they no longer have the capacity through unfamiliarity to capture the attention.

Recognising the challenges and limitations of observational work, the study has also drawn on other methods, particularly cognitive mapping, as a technique for eliciting team members' perspectives on project work. Using the issue of what constitutes and differentiates 'good projects' and 'bad projects' as an opening thematic prompt, team members were asked to construct cognitive maps of their immediate responses to this theme side-by-side with the researcher using the mapping software package Decision Explorer™. 30 mapping interviews were conducted for this case study, each lasting

around 1-1½ hours, and I am currently involved in repeat interviews with those participants who are still available to see the extent to which their thematic priorities have changed over the intervening period of several months since the original mapping exercises were undertaken. For each of the mapping interviews, the emphasis was on minimising the amount of prompting provided to participants beyond explaining the mechanics of the mapping process, introducing the initial thematic prompt, and clarifying the wording of the concepts as they were recorded by the researcher using, as far as possible, the respondent's own words. Audio recordings and transcriptions of both the initial and follow-up interviews have been made, providing an important cross-reference during the subsequent analysis of the resulting maps (see Figure 1 for some examples of maps generated with team members).

The status of the representations developed through cognitive mapping in its various forms have been the subject of vigorous debate (e.g. Bougon, 1992; Daniels and Johnson, 2002; Hodgkinson, 2002; Scheper and Faber, 1994). While this is by no means inevitable, cognitive mapping is frequently associated with some of the less beneficial characteristics that conventional cognitive psychology has been criticised of (e.g. Descombe, 2001, Greeno, 1998). In other words, there is the danger through cognitive mapping of promoting a static, individualistic, and representationalist view of knowledge, often accompanied by a strongly positivist and functionalist research orientation. At its most extreme, there is the risk of conflating cognitive maps as verbal and visual representations of ideas or perspectives, with cognitive maps as a metaphor for heuristic and schematically guided processes of perception and interpretation. At best, as Swan (1997) has observed, cognitive maps are representations of representations, and incomplete and fragmentary ones at that. However, as a corollary of my suggestion that to draw on insights from the cognitive tradition does not have to mean that one accepts all its attendant problems, providing its limitations are acknowledged, cognitive mapping can be used as an effective method for gathering perspectives about a particular domain. This does not inevitably mean that the method has to be used in a static, functionalist, and positivist way.

By treating the resulting representations generated from the mapping sessions not as final and definitive mirrors of an individual's thinking, but rather as partial, provisional, and revisable documents charting a person's perspectives on a given theme at a specific point in time, many of the above difficulties fall away. The resulting cognitive maps are not an end-product, as they appear to be treated in some studies, but instead take the form of incomplete markers that can be positioned and compared relative to the activity setting of the respondents. Without this they remain abstract and fixed with no sense of how they are mutually constituted in practice. This is where the ethnographic element of the research comes back in. By taking a multi-method approach, it is possible to use cognitive mapping in a much more situated and dynamic way than has usually been the case, while at the same time providing another window into the nature of practice that does not depend entirely on insights drawn from observation. The following examples are drawn from both elements of the study and the crucial attempts to trace out the connections between them.

Example 1: Social limits on project innovation

Earlier in the paper it was argued that the routinisation of activity is a central characteristic of organisations and projects are no exception in this respect. Particularly with the increasing adoption of generic templates and models for conducting project-based work, promoted by a range of professional institutions, there is arguably a

growing standardisation of project practices. As suggested previously, the regularisation that this implies is by no means incompatible with innovation. However, there may be situations where organisational norms or routines effectively stifle innovation by encouraging the blind repetition of activities. In practice-based theory, this is the difference between reflexive and unreflexive action. Only where participants are able to reflect on their practices and challenge existing ways of doing things are they likely to generate the conditions to support innovation. As we shall see in the next subsection, there is a close connection between the potential for reflexive action and the dynamics of team cognition. However, for the purposes of the following illustrations I would like to suspend consideration of the cognitive dimension and focus on the social limits on project innovation associated with the over-routinisation of practice. These illustrations present two contrasting situations: one where project routines are used to support innovation and another where they effectively turn into a hindrance.

The first illustration relates to an emergency repair project carried out by the team, which in itself marked a departure from their more routine activities. The majority of the projects undertaken by the team are planned well in advance as part of the overall programme of capital works. However, every so often unplanned work arises as a consequence of unforeseen events and emergencies. In this instance, there was a major structural failure of a tunnel which, until it was repaired, would have a major impact upon the organisation's operations. Corporate-level managers made it clear that it was imperative to resolve the problem as quickly as possible, setting an extremely challenging target of five months for completing the work. The senior manager of the engineering team undertook the management of the project himself and established a dedicated team to carry out the work. This team was insulated somewhat from the usual pressures of working on other projects within the programme and their separation was reinforced, both symbolically and geographically, through the setting up of a separate project office close to the site of the incident. The repair of the tunnel presented a number of technical challenges that would almost certainly require novel solutions. However, at the outset it was uncertain precisely what had caused the failure and the full extent of the damage was unknown. In short, the team had agreed to take on a technically challenging project that had to be delivered within an extremely tight time scale over which they had no real control and without detailed knowledge of the scope of work. By all accounts the conditions for the successful delivery of the project did not look favourable. However, five months later, just ahead of schedule, the project was successfully completed. Although senior managers within the company had emphasised that, within reason, the timely delivery of the repair was more important than the cost, the project was also delivered within the original budget that was set after the preliminary investigation.

The team had followed all the usual project procedures prescribed by the company, including all the normal routines for planning, financial and technical approval, health and safety, design processes, construction management, meeting structures, and so forth. These procedures are formally specified and codified in considerable detail within the client company's IT systems. Here the standard project processes, with their clear sequence of stages, milestones, and decision points for financial and technical approval are laid out. Underneath these are arrayed a progressively more elaborate hierarchy of work instructions describing in minute detail the actions that need to be undertaken within each stage of the project. However, compared with the more routine conduct of planned projects, several team members commented on the way that these project procedures, which were often considered burdensome, seemed to flow more smoothly in this emergency repair project. As the project manager described it:

It just had an unstoppable momentum. We knew that we were going to crack it right from the beginning ... We had a little bit of luck, but we kind of forced it down the road where it was more likely to be lucky than not. And even if it wasn't we had backup plans to get round them ... And we were never in any doubt as a group of people that we were going to do it. And every time we had a problem we just fought our way out of it ... In fact, we had one issue where we just couldn't work out how best to get access to the tunnel so we built a mock-up of the tunnel on the surface and tried different ways of solving it. And three or four times later, within three days, we'd solved the problem.

This rapid approach to decision-making appeared to be characteristic of the project. The usual stages in terms of planning, design, and implementation, were rigorously followed, but there was the pressure not to allow the project to stall at any of the key decision points. This was something that was not so apparent for the more routine projects observed during the study. In many of these instances, there was the tendency for decisions to be kept open for longer than was perhaps strictly necessary as new ideas and options were considered. This was evident in the way that the same issues and discussions would arise time and again at project meetings without any sign of resolution.

The emergency repair project, by contrast, demonstrated a quite focused decision process. All the key project constituencies were involved from the beginning and, supported by external technical specialists, they worked together to diagnose the problem and arrive at a series of design options. These were then progressively narrowed down and elaborated in the light of the new information emerging from the site investigation until a plan for implementation was agreed. At this point the team switched from an exploratory focus on searching for alternative design solutions to an emphasis on implementing the agreed approach. The emergency nature of the project, which created a palpable sense of excitement among the team, was clearly important in feeding a sense of commitment and a joint motivation to make it work. It is this socially shared impetus that arguably drove the way that the usual project procedures were performed in a more directed and parsimonious way than for other routine projects. There was an emphasis on allowing the space to reflect critically on how the project was to be carried out and where existing procedures came into conflict with the delivery of the work they would be amended or waived providing they did not have statutory implications. Of course, as we shall see later, there is a crucial political dimension to this in the sense that the freedom to revise formal project procedures depended on the team being given the authority and autonomy to do so by corporate-level management.

The second illustration offers a complete contrast to the above example. In this case, which involved a programme for identifying and implementing a series of process improvement projects within the client company, the formal project procedures and routines instead became a hindrance on delivering the aims of the programme. Rather than providing an adaptable framework within which project practices could be undertaken, project procedures became the target of an almost obsessive focus, taking on a life of their own rather than being used to support the activities of the programme team. A decision had been made to base the improvement programme around the PRINCE (PROjects in CONTROLLED ENVIRONMENTs) project management methodology (OGC, 2005). This is a tightly sequential and carefully controlled process-driven approach to project management that involves the initial formation of a Business Case and its subsequent review on a regular basis. One engineer, who had recently been

involved in the programme, commented on how he thought the documentation requirements for this approach are excessive and that the procedures are generally too cumbersome for most activities. He went on to say that the use of a high profile approach, such as PRINCE2, which attempts to present itself as the current best practice for managing projects, is probably being used by the company's process improvement programme less as a workable approach and more as a visible display of their being at the cutting edge in project management terms, as well as a justification for the resources they have been given to undertake their work. He outlined two reasons for this.

Firstly, the improvement programme is mostly staffed by people who have not come from an engineering or project background and so he thought that they may be keen to demonstrate their project management credentials within an organisation that overall has a strong technical orientation. Ironically, by choosing a methodology that many practising project managers and engineers within the engineering side of the company consider to be overly complicated and bureaucratic, the result has arguably been the opposite of that intended by the process improvement team. Rather than demonstrating their legitimate membership within the project management community, they unwittingly set themselves apart. This is because their slavish following of PRINCE2 principles appears in stark contrast to the more experience-based, rule-of-thumb, and commonsensical image of practice that the established project managers within the company like to portray.

Secondly, having made a number of "quick wins" in improving processes, the engineer suggested that most of the "low hanging fruit" had been picked and that further measurable improvements would be both less dramatic and slower in coming. He argued that since it was now becoming more difficult to prove the outcomes of these improvement projects, more emphasis was being placed on the activities being undertaken rather than their outcomes to demonstrate that something was being achieved. PRINCE2, with its detailed "paper trail" of documentation was, according to the engineer, an effective way of achieving this even if it ultimately did not contribute to the aims of the programme. The technical rationality of the highly formalised project management approach became self-serving, leading to a minute focus on means as an attempt to disguise the failure to deliver obvious outcomes. This situation was unlikely to be sustainable and in the end the programme was abandoned. Unlike the first illustration, the social dynamics of the programme team were such that they reinforced the mechanical performance of formal project procedures without any real reflection on their appropriateness.

Example 2: Cognitive limits on project innovation

The previous examples highlighted the way that social norms of project practice, as embodied in routines and procedures, can either support or hinder innovation, partly depending on the degree to which they are the focus of critical reflection. As suggested earlier, a corollary of social norms are cognitive schemas or regularised patterns of thinking that are shared to a greater or lesser degree across groups such as project teams. Just as social norms can be the basis of either transformation or inertia, so can schemas act as limits on perception or the foundation for new knowledge. Although social norms and schemas are not linked in any straightforward or mechanistic fashion, there are important connections between the two. This is consistent with the practice-based literature on knowledge and learning which regards knowledge and practice as mutually constitutive. It is also important to acknowledge the social character of cognition and this is where the earlier discussion about the implications of cognitive diversity across

teams is relevant. This suggests that there are some situations where diverse perspectives are a definite asset, providing a range of alternative insights that can assist in the stimulation of novel ideas. The tunnel repair project outlined above provides an illustration of a situation where a diverse range of perspectives were effectively drawn upon to generate alternative solutions to a challenging design problem. Yet at the same time there was sufficient common ground between the participants in terms of their shared understanding about the purpose and importance of the project to enable them to coordinate their activities and arrive at an agreed way forward. However, there are other situations where such diversity can be counter-productive, particularly where perspectives are so different that it is difficult to achieve shared understanding. The flip side of this is that cognitive overlap can be both positive, where it supports agreement around collective actions, and negative, where it leads to a paucity of new ideas and a lack of critical examination of decisions. Acknowledging the double-edged nature of cognitive diversity and consensus, the cognitive mapping element of the study has been used as a way of attempting to provide a more systematic understanding of the patterns of cognition across the team as a starting point for identifying the implications, both positive and negative, for project activities. This is still very much work in progress, particularly in terms of tracing the connections between patterns of cognition and project practices. Nevertheless, the following provide some emerging indications of the direction this element of the research is taking.

The individual cognitive maps generated with team members have been analysed and compared on the basis of both structural and thematic characteristics. The former include such features as the number of concepts and links and their ratio, the density of links around particular concepts, and the hierarchical centrality of concepts. These give some sense of the degree of elaboration of different individuals' schemata concerning project work, as well as the extent to which specific concepts are considered more or less salient. The latter refer to the occurrence of particular themes within the maps which have been identified through an iteratively refined process of content analysis and coding. Figure 2 provides a broad overview of the themes covered across all the maps collected, indicating the extent to which some themes are more widely shared than others. The more overlapping themes that appear at the centre of the diagram suggest a common understanding of project work across the team that is based on a fairly orthodox model of what projects entail. Here the usual preoccupations of project management thinking come to the fore, not least the 'iron triangle' of time, cost, and quality, but also planning, control, and monitoring, issues about scope of work and establishing a clear direction to follow, processes, standards, and regulations, resource allocation, a focus on delivering actions, outcomes, and outputs, and so on. Not all the central themes are quite so technically-orientated but are arguably equally rational and instrumental in flavour. These include issues about staffing and personnel, such as team selection and role allocation, how to motivate the team through appropriate incentives, how to organise and arrange team relationships to promote enhanced performance, and how to streamline communications between different parties.

Arguably these sorts of shared understandings provide the basis for ordering the conduct of activities because they suggest general agreement among the team about how projects should be carried out. This means that there should be less need for detailed negotiations around common work activities. For example, at a series of meetings in the early stages of a large tunnelling project, it was interesting to observe how quickly the team aligned themselves around a standard set of project procedures without questioning them. Equally, everybody was aware of their role on the project and what was expected of them. This is not to say that there were no disagreements about how

the project should proceed, but these tended to be around technical and commercial issues. However, there was a common ground of role expectations and routine behaviours that the team could take for granted without having to spend a good deal of time negotiating them. An arguably important influence on this was the fact that the project was embedded in a wider programme of works and could draw upon relatively enduring relationships between participants. Having already worked together for over a year at this stage, many of the project members shared a reasonably common image of what projects entail, as indicated by the data from the cognitive maps.

However, a closer examination of the maps, also taking into account their structural characteristics, suggests a more differentiated picture. A key aspect of the analysis has been to consider the degree to which different individuals' maps reflect their identities in terms of professional background, organisational role, career path, organisational membership, and other demographic characteristics. To assist in the exploration of the data, statistical cluster analysis techniques were employed to identify similarities and differences between maps on the basis of their structure and content. Figure 3 shows an example of one such analysis based, in this instance, on the extent to which there is an overlap between the cluster analysis and project roles. Although the clustering between maps is by no means clear-cut in terms of an expected segmentation according to differences in role, profession, or other bases of identity, there are nevertheless some indications of differences between groups. For example, the maps of many of the design engineers reveal a strong emphasis on the detailed performance of design tasks, the need to produce workable technical solutions, and the importance of having a clear understanding of the scope of work. The project managers' maps, in comparison, tend to have a greater focus on planning and control, and accord a central role to project management in moving the project forward and achieving satisfactory outcomes. Although both groups share much in common in terms of their perspectives on project work, differences in emphasis may have important implications for how project interactions work themselves out. In the case of the tunnelling project referred to above, there were some delays caused by the repeated reworking of design solutions by the design engineers working on the project. This is perhaps consistent with the task- and technically focused orientation evident in the designers' maps which might go some way to explaining why they were sometimes unwilling to stop pursuing alternative design solutions. During the observation of project meetings there were several encounters between the designers and the project manager where the former attempted to justify the need for further design iterations while the latter applied increasing pressure to arrive at a stable solution. Such anecdotal evidence suggests something of the potential interplay between team members' schemas and their project practices. However, there is still a considerable amount of work to be done in analysing the data more systematically to explore this relationship.

Example 3: Political limits on project innovation

Cognitive characteristics and processes within project teams arguably have an important influence on innovation. As I have suggested, there is a fine balancing act to be achieved between having too much and too little diversity in perspectives across project teams, as well as crucial issues about what sort of knowledge is and is not shared by team members. However, while some level of shared understanding is clearly needed for the effective coordination of different yet interdependent tasks, this should not be taken to imply the necessary existence of largely consensual patterns of decision-making. Individuals and groups within teams may actually have a clear understanding of each other's perspectives and sufficient appreciation of different domain specific

knowledge, as well as seeing the implications of how their tasks fit into wider project activities, and yet still there may be failures in coordination and decision-making. These stem not so much from mismatches in knowledge or assumptions, but rather from the negotiation of competing and potentially conflicting interests within project teams. These negotiations, which are necessarily political in character, are partly about processes of collective interpretation in which certain views are likely to be privileged over others, but also crucially about deciding upon and implementing specific courses of action instead of others. The third and final example offers an illustration of the implications of the political character of project knowledge and action for innovation.

In this case, the innovation centres around changes to the company's waste management and recycling practices in response to statutory changes, in particular the increase in Landfill Tax which has been rising at a rate of £3 per tonne every year since 2001. What starts off as the seemingly straightforward implementation of a corporate-level directive, ends up setting in motion a series of discussions at the project level about the meaning of corporate social and environmental responsibility around which not only differences of opinion emerge, but also surrounding which there are important political influences on the capacity to act in certain ways over others. The issue first arises at a meeting where members of the team are informed of the recent requirement introduced by the company to complete a waste management plan when planning their projects. This is being implemented with the intention of reducing the environmental impact of projects through increased on-site recycling of waste materials, reduced landfill, and fewer vehicle movements. A manager has come from head office to explain the new requirements. Throughout his presentation he repeatedly emphasises how there is a good business case for cutting down on waste, reducing corporate social and environmental responsibility issues to a financial rationale by portraying such practices as also good for the bottom line. However, rather than accept this rationale at face value, different members of the team questioned the way that the changes to waste management procedures were being justified to them. The team leader was particularly vociferous on this point, saying that he would "like to hear the company say this is what you should do because it's the right thing to do" not simply because there is a workable business case for it.

What is interesting is that the manager from head office clearly assumes that the team shares his financially orientated conception of efficiency and it appears to come as something of a surprise when people do not simply go along with the discourse he is presenting. Indeed, rather than going along with what is arguably a familiar norm of business behaviour, the justification of environmental practices in terms of their financial implications acts as an impetus for various team members to reflect on how this fits with their own beliefs and understandings regarding this issue. The breakdown that precipitates this course of events occurs due to a mismatch between the sedimented expectations regarding corporate environmental responsibility held by the head office manager and certain members of the team respectively. Their social interaction reveals this mismatch and the concept of environmental responsibility is unsettled from its status as an unexamined set of values and beliefs to being problematic and in need of negotiation. In terms of the earlier discussion of the twin modalities of power, there is a disruption to the normalising power of a particular corporate discourse on environmental issues that sets in train a more overt episode of negotiation. In this instance, the resolution of the issue is relatively straightforward. The personal views of the team regarding why the company should pursue environmentally sustainable practices and those of the head office manager may be quite divergent, but neither question the benefit of pursuing such practices and so the practical implications are the

same. The team will undertake to adopt improved waste management practices for their projects even if many of them are doing so because they believe it is the right thing rather than something that needs to be justified through reference to hard-nosed business rhetoric. It is sufficient for team members to express their opinions and leave it at that.

At a subsequent meeting a few months later, the issue of reducing the impact of projects on the environment was again raised, except that this time views about the relative priority of such matters had changed quite radically. This was because in the intervening period a major reorganisation had been set in motion within the company with a strong focus on improving efficiency and concentrating only on business critical activities. Each of the different programme areas was under extreme pressure to show demonstrable improvements and so, to avoid being the target of senior management interventions, the team's management was now retreating into a more conventional position on such things as environmental and social responsibility. The team leader was still keen to promote an ethos where team members are encouraged to think about their wider responsibilities and "do the right thing", except that now he emphasised that this had to take second place to questions of efficiency. He is keen to justify this change of position, counterposing his own interpretation and beliefs against what are portrayed as the inescapable realities of business.

"You can't be a company like ours and not have environmental and sustainability objectives ... It's the money thing isn't it? How far would you go to pay to have good environmental consequences ... So money always comes into it and that's why the word sustainability is always thrown in there because ... sustainability doesn't mean saving up things now so that you can use them later on in the day. That's what it should mean. Doing things now that mean we exist and we can function ... in the future is what sustainable means in my view. But what it means to us is not doing this if it doesn't pay back. Sustainable ... means can the company afford it. Because if it can't afford to do these things even though it wants to do them, it won't exist".

What this example shows is the interplay of quite different rationalities – a more private belief system about environmental sustainability and a more public, role-constrained position that ultimately takes precedence within the changing context of the company's organisational initiatives. The implication is not only that different and potentially competing discourses can coexist within a particular setting of practice, sometimes rubbing up against each other in the form of tensions and contradictions, but also that such discourses and the interplay between them are not static but are instead dynamically constituted and situated within a whole range of other interlocking practices. Thus, while it is possible to detect a continuing concern about not taking an excessively hard-nosed and instrumental position on environmental issues in the team members' professed views over time, there is an important shift in how these are represented relative to other perspectives. With the changing political climate accompanying the company's reorganisation, the team's zone of manoeuvre narrows and they self-consciously subordinate their own more personal beliefs to those of an increasingly powerful corporate discourse of efficiency. Despite this, the team leader's strong personal stance on issues other than purely technical efficiency has not been displaced in all instances by the new pressures from the corporate level. Thus, despite calls from the head office to 'streamline' health and safety procedures in the new efficiency drive, this was not something that he was prepared to compromise on. In direct contradiction to the directive that had been issued he instructed his staff to continue to carry out all existing health and safety related activities and said that he

would take responsibility if they ran into any problems by doing this. Once again this highlights the shifting and power-laden tension between alternative rationalities and modes of practice in which the outcomes are never entirely predictable and secure. This is because there is always the scope for some resistance, however small it may be, as people have the capacity to reflect upon and readjust what they do. Certainly this capacity is not unlimited and is crucially constrained by existing patterns and norms of thought and conduct, but it is precisely the fact that such norms need to be actively constituted to be reproduced over time that provides the opening for their potential transformation.

The above example is by no means an exception in the team. Discussions among team members, both in formal and informal interactions, often involve a questioning attitude towards what might be considered conventional project management thinking. It is in these episodes that one can find indications of multiple rationalities that are often contradictory. Sometimes these contradictions are left untouched, particularly by splitting rationalities into distinct domains (e.g. professional and personal life, work and home, individual and organisation), thus allowing people to cope with the potential conflict. In these instances some norms, values, or beliefs are often privileged while others are allowed to play a less prominent role, a typical example being the self-regulation of personal beliefs that are not thought to be in line with the collective norms of conduct at work (bearing in mind that we have emphasised the provisional and contested character of the latter). In other cases, such as that referred to above, the tensions can not so easily be contained and erupt into situations where attempts are made to repair and resolve the contradiction. These situations provide the stimulus for collective critical inquiry, but as the example shows, the capacity for critical reflection may not be enough if the political context and distribution of power is such that established patterns of thinking and acting can not be overturned.

Conclusion

This paper has suggested that the frequent portrayal of projects, and organisations that base their activity around project work, as almost natural sites of innovation needs to be tempered by a more balanced view that regards project organisations as settings where conditions may actually work against the successful progression of innovations through their various stages. Thus, while there may be situations where projects can effectively manage the tension between the creativity and openness of exploration and the systematisation and output-focus of exploitation (c.f. March, 1991), there are equally instances where project conditions conspire against this. While these may not be the only barriers to innovation, I have focused in particular on a series of social, cognitive, and political dynamics as a way of conceptualising the potential limits on project innovation. Contrary to the image of projects as flexible, responsive, and creative milieu, there is a growing body of research that highlights the social, cultural, and institutional embeddedness of projects and the ways that the routinisation of project work may actually inhibit the processes of development, learning, and reflection that are needed to support innovations in the long term.

Equally, I have argued, it is important to complement theories of the routinisation and institutionalisation of social practices in project settings with an appreciation of the cognitive and political dimensions of such processes. While practice-based theories are an extremely useful lens through which to understand the situated, dynamic, and performative character of social rules and norms, they have tended to be less than forthcoming in offering a coherent account of the patterns and processes of knowledge

that are needed to perform, sustain, and potentially transform such routine practices. It is here, I have argued, that lessons can be learned from cognitive psychology about the role of interpretative schemas in supporting social action. Having said that, in borrowing from cognitive explanations it is crucial not to import the same weaknesses and omissions that have tended to be exhibited by traditional cognitive psychology in terms of offering a rather static, mechanistic, and functionalist depiction of cognition. By placing the notion of interpretative schemas very much in the centre of a practice-based understanding of organisational knowledge and action, it is possible to conceptualise them in much more dynamic, relational, and situated terms.

Similarly, practice-based approaches have tended to be rather silent on issues of power and also require supplementing in this area to make them able to offer a more comprehensive account of social practices. Conveniently, the dual theorisation of power as both normalising and episodic fits well with attempts to understand the capacity of routine social practices to be both a source of inertia and transformation. The normalising character of power consists in its capacity to constitute social practices through often taken-for-granted norms, rules, dispositions, and discourses. In this sense, it is similar to the understanding of the role of social norms, rules, and interpretative schemas introduced earlier in the paper. The episodic character of power takes the form of more overt social interactions through which individuals and groups are engaged in often contested negotiations over competing interests, purposes, and decisions, in which they attempt to constitute and mobilise various resources. The link between the normalising and episodic modes of power is that they are mutually constituting. Social norms, rules, and interpretative schemas need to be performed or enacted in order to be reproduced and potentially transformed, and it is through the episodic performance of power that these potentials are played out. It is in the mutually constitutive interplay between social norms, interpretative schemas, and the power-laden character of social practices, that the varying capacity of project settings to support innovation can be usefully interpreted.

To provide illustrations of how such a conceptualisation could inform our understanding of project innovation, the second half of the paper offered a number of examples of the social, cognitive, and political dimensions of project work in a multi-functional engineering team. The conceptual challenges of exploring the interplay between these different dimensions are matched, if not exceeded, by the methodological challenges of operationalising it empirically. As a way of approaching this, I have explored the potential of combining methods drawn from different traditions, in particular ethnographic observations of project work informed by practice-based theories, and techniques for mapping team cognition drawn from cognitive psychology. Further work is certainly needed in elaborating and clarifying the interrelationships between the multiple sources of data emerging from the study. This is especially the case for attempting to understand in a more systematic way the interplay between the representations elicited through the cognitive mapping, the patterned character of project team knowledge, and the nature of team practices in action. The relationships between these are by no means straightforward and certainly not unidirectional. Nevertheless, I have tried to show through the various examples above that there is sufficient potential in combining multiple conceptual traditions and methods for understanding the dynamics of project innovation to make the endeavour worthwhile.

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Figure 3: Cluster Analysis by Map Themes According to Role

