How local is local knowledge? Space, time, and knowing in project work

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Introduction

Numerous authors have identified a polarisation, or even rift, in theories of organisational knowledge and learning. Cook and Brown (1999), for example, have written about contrasting epistemologies of 'possession' and 'practice'; Gherardi (2000) has drawn a sharp distinction between practice-based theorising on organisational knowledge and mentalist or functionalist perspectives; and Swan *et al.* (1999) have characterised approaches to organisational knowledge as lying on a continuum between cognitive and community models. While it would be an exaggeration to say that practice-based approaches to knowledge have supplanted cognitive or mentalist perspectives, the former have arguably launched a persuasive critique against the latter which has proved increasingly difficult to ignore. However, there is a puzzling ambiguity in practice-based approaches which limits their otherwise important contribution to debates on organisational knowledge. This concerns issues about the mutually constitutive relationships between space, time, and knowing. What we argue in this paper is that the shift in perspective associated with practice-based approaches from a static, individualistic, functionalist, and entitative view of knowledge to one which emphasises knowing as a dynamic, situated, practical, and collective accomplishment, has not been fully paralleled by an equivalent shift in conceptions concerning the interplay between space, time, and knowing. This has important implications because the understanding of context, setting, or situation which is so central to practice-based approaches is incomplete without explicitly engaging with conceptions of time and space. While this may appear to be an unduly abstract consideration, it is no exaggeration to

say that these dimensions are inescapably woven into the fabric of organisational life. To leave them undisturbed and unexamined is to promote a view of context which is strangely at odds with the spirit of practice-based theorising.

This is not to say that practice-based approaches have no implications for how time and space are conceptualised. These facets are so ingrained in our everyday language, consciousness, and experience that particular conceptions of space and time are persistently invoked in our efforts to make sense of, talk about, and act in and upon the world. Metaphors of time and space, for example, are a regular feature of language which are taken for granted, yet which "enable and constrain particular ways of seeing and being in the world" (Schultze and Orlikowski, 2001, p.47). Their ingrained and taken-for-granted character, to the extent that space and time have become naturalised categories within modes of being, is revealed as much in the writing of social theorists as in everyday life. As Urry (1985, p.22) has argued:

> It should be clear that most, if not all, theories in the social sciences contain implications about the patterning of human activity within time-space. Social activity necessarily involves passing through time and space. The passage of time involves movement through space ... Changes in the temporal order of events generally involve changes in spatial patterning. Even the repetitions of everyday life involve both temporal and spatial regularities. However, most sociological theories of such activities do not draw out the temporal and spatial implications. They tend to remain at an implicit level. Indeed in many cases if the implications were fully specified they would be found to contradict other aspects of the theory in question.

There is something of this danger of contradiction in practice-based approaches, perhaps more so than in the cognitivist, mentalist, and functionalist perspectives which they are challenging. It thus useful to consider, as we do in the first section of the paper, the often implicit conceptions of space and time in these different approaches as a precursor to thinking about how a more systematic inclusion of these concepts potentially opens up new avenues in theorising organisational knowledge. This will also help to underline some of the confusions and ambiguities arising from the lack of a more explicit consideration of the interplay between space, time, and knowing.

The second section then turns to consider a selection of contributions from social theory which have given more sustained consideration to the spatio-temporal character of human action and interaction. Drawing in particular on the work of Bourdieu (1977, 1990, 1991)

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and Giddens (1984, 1990), we assess how far such notions as habitus or time-space distanciation are adequate for thinking about the varied spatio-temporal character of social practices. While these approaches suggest the lifting-out and transposability of practice through the development of norms and dispositions which are capable of generating a broad range of more or less appropriate actions across a wide range of times and spaces, they nevertheless reproduce the tendency to equate the situatedness and context-dependency of practice with localisation in time and space. In common with other authors (e.g. Latour, 1987, Star, 1995), there is the suggestion that abstraction, generalisation, and de-particularisation are the main ways that knowing and practice can be stretched across more extended times and spaces. Weick (1995) has made a similar point in his argument about the extendability of organisational practices through the spread of 'generic subjectivity' whereby relations are conducted on the basis of regularised and interchangeable role-based expectations (see also, Chia, 2002, Kallinikos, 2003). However, it is questionable to what extent generic subjectivity is the only way that social relations can be conducted across more distanced time-space. Is it not also possible for interactions at a distance to be accomplished through relations based on a more personalised and situated intersubjectivity where those involved in communication do not orientate themselves to each other as complete strangers?

In the third section we consider this question in the light of an empirical illustration of the unfolding relationship between members of a team involved in a consulting engineering project for repairing a hydro-electric power facility. This example is drawn from research currently being conducted by the authors into the knowledge and communication practices of a range of project teams in the consulting engineering, computer, and defence technology sectors.[1] In opposition to arguments which offer a stark choice between the intense sociality of place-bound, locally situated practices or the generic and anonymous subjectivity of interactions distanced in time-space, our illustration suggests a more contingent, intricate, and mutually constitutive relationship between the spatio-temporality of practice and the evolution of different forms of subjectivity.

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Situating knowing in space and time

The characterisations of space and time that can be inferred from practice-based and cognitivist approaches are arguably quite different. They can be summarised as the distinction between space-time embeddedness and disembeddedness. That is to say, these alternative approaches promote radically different visions of the extent to which knowledge can be levered out of the context within which it was created and transferred to other contexts. Cognitivist approaches, with their emphasis on the extensive codifiability of knowledge, highlight its fluidity and mobility, depicting it as applicable across a wide range of times and spaces. The ability to decontextualise and disembed knowledge in these perspectives is closely related to their view of knowledge as object-like, abstract, and self-sufficient. This is what Cook and Brown (1999) denote as an 'epistemology of possession'. According to Gherardi (2000, p.213), the reification of knowledge associated with such perspectives has "grown more overt with the 'objectified transferable commodity' envisaged by the knowledge management approach, which treats knowledge as practically synonymous with information". The elision of knowledge and information is in large measure consistent with the central position accorded to codification in the cognitivist literature. Often based on a limited, and even contrary, reading of Polanyi (1958, 1966), whose writings arguably resonate more closely with practice-based approaches, there has been a strong preoccupation with the issue of 'converting' tacit into explicit knowledge. Gore and Gore (1999, p.556) provide a typical rendering of this argument:

> If tacit knowledge can be captured, mobilized, and turned into explicit knowledge it would then be accessible to others in the organization and enable the organization to progress rather than having its members having to relearn from the same stage all the time.

The focus on capturing or surfacing tacit knowledge has also been heavily influenced by the work of Nonaka and Takeuchi (1995), although again this is based on a partial reading. Any concern with the other transformations they identified in their spiral of knowledge creation, namely combination (explicit to explicit), internalisation (explicit to tacit), and socialisation (tacit to tacit), tend to fade into the background compared with the attention devoted to externalisation (tacit to explicit). Even more sober commentators writing on the economics of knowledge appear to be caught up in the enthusiasm for codification (e.g. Boisot, 1998, Cohendet and Meyer-Krahmer, 2001, Cowan *et al.,* 2000, Cowan and Foray, 1997). It is

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through codification, according to these approaches, that knowledge can be put into circulation and become a source of economic value. Cohendet and Meyer-Krahmer (2001, p.1563), in one of the few direct references to the spatial and temporal implications of this process, have described codification in the following terms:

> The codification of knowledge is a process that aims at reducing and converting knowledge into messages. These messages can then be processed as information that will serve to 'reconstitute' knowledge at a later time, in a different place, or by a different group of individuals. The main interest of this process of transformation of knowledge is to facilitate the treatment of knowledge as an economic good which can be exchanged.

The capturing and packaging of knowledge (c.f. Clark 1998, Stewart, 1998) are depicted as necessary antecedents to its commodification. It is the treatment of knowledge in stable, objectified form which permits the issue of its transferability across space and time to be considered largely unproblematic. As Gherardi (2000, p.213) has expressed it, the "transfer of knowledge … may be accomplished without distortion: to transfer is not to transform" (see also, Gherardi and Nicolini, 2000, Shariq, 1999). It is also in this sense that the theoretical contradictions arising from the more explicit consideration of space and time mentioned earlier tend to be less pronounced, if not absent, in cognitivist approaches compared with practice-based theorising. Indeed, the portrayal of knowledge and the implications for time and space in cognitivist perspectives are quite consistent. Space and time typically appear in these approaches as abstract dimensions, stable co-ordinates providing an independent and homogeneous container for the flow of people, knowledge, and resources. This makes it easy to conceive of knowledge in object-like terms as a clearly bounded substance capable of being moved around this four-dimensional container without loss of integrity. As Law (1999) and Law and Mol (2000) have observed, this is a familiar Euclidean topology in which object integrity is about stable volumes moving around within a larger volume. Boisot's model of the information- or i-space exhibits such a topology (Boisot, 1998, Boisot and Cox, 1999, Boisot and Griffiths, 1999). Even though the dimensions of the space in question are not defined by spatial extension but rather by variations along the axes of codification, abstraction, and diffusion, the visual depiction of knowledge moving around within a clearly delimited container means that the topological similarities are difficult to avoid.

The spatio-temporal implications of the emphasis in cognitivist approaches on disembedding and decontextualising knowledge are thus primarily about movement and mobility within a passive space-time container. Certainly the limits of knowledge flow are acknowledged by these perspectives. However, while recognising the 'stickiness' of tacit knowledge (Von Hippel, 1994), codification is nevertheless presented as the lever allowing knowledge to be unstuck and set in motion. This image of disembedded, free-flowing knowledge is given even more extreme expression in some parts of the literature on virtual teams and organisations. Here it seems that any sense of spatio-temporal fixity has been dissolved in the face of the frictionless flow of information across electronic networks. In these cases, space and time appear not so much as stable co-ordinates against which to measure the movement of knowledge, but are almost entirely erased as a relevant nexus for social action. Echoing Leo Marx's (1964) earlier sentiments about the 'annihilation of space and time', there have been many recent proclamations announcing the 'death of distance' (Cairncross, 1997), "death of location, death of organizational boundaries, death of time zones" (Prasad and Akhilesh, 2002, p.102). Information and communication technologies are typically identified as the murder weapon in this frenzy of killing (e.g. Lipnack and Stamps, 2000, O'Hara-Devereux and Johansen, 1994, Rayport and Sviokla, 1995). Writing about virtual teams, for example, Lurey and Raisinghani (2001, p.524) have suggested that:

> ... these teams are able to perform their work without concern of space or time constraints since they are given access to the same technologies to communicate and coordinate their activities. These information technologies effectively link people together, despite their working at different times or in different locations, thus enabling them to communicate and share resources as needed.

Practice-based approaches have offered a comprehensive critique of these confident declarations regarding the disembedding of knowledge. This primarily focuses on the inadequacy of treating knowledge in object-like terms as "a substance that can be 'sent', 'received', 'circulated', 'transferred', 'accumulated', 'converted' and 'stored'" (Gherardi and Nicolini, 2000, p.330). Rather than viewing knowledge as something 'out there', which is separate and separable from practice, it is depicted in practice-based approaches as a dynamic, negotiated, situated, social accomplishment. For Orlikowski (2002, pp.250-251), this:

... leads us to understand knowledge and practice as reciprocally constitutive, so that it does not make sense to talk about either knowledge or practice without the other. It suggests there may be value in a perspective that does not treat these as separate or separable, a perspective that focuses on the knowledgeability of action, that is on *knowing* (a verb connoting action, doing, practice) rather than *knowledge* (a noun connoting things, elements, facts, processes, dispositions).

The shift from *knowledge* to *knowing* implies a concomitant ontological shift. The portrayal of knowledge-as-object in cognitivist approaches is arguably based on a representationalist view of individual cognitive beings gathering information about, and building up representations of, an objective, external, knowable reality where truth is about the correspondence between thought-objects and objects-in-the-world (Winograd and Flores, 1986). In this view, according to O'Connor (2001, p.287):

...the power of knowledge depends on its degree of abstractness and generality - the more abstract and general, or 'decontextualized', knowledge is, the more contexts in which it will allow for 'intelligent behavior' ... Learning, in this view, is a matter of building up increasingly decontextualized knowledge in the minds of individuals, which can then be transferred to other times and other contexts to be 'applied'.

Practice-based approaches, in contrast, are deeply critical of representationalist thinking with its reliance on a series of strict oppositions or dualisms (between subject and object, mind and body, thought and action, and so on). Instead, they present a relational (which does not imply relativist) view of the mutually constitutive nature of social phenomena which makes it meaningless to speak of them independently. This is closely tied to an understanding of social reality as something which is not simply 'out there' waiting to be discovered; reality is "still in the making" rather than "ready-made and complete" (James, 2000 [1907], p.113). As Lave and Wenger (1991, p.51) have argued:

... the socially and culturally structured world ... is socially constituted; objective forms and systems of activity, on the one hand, and agents' subjective and intersubjective understandings of them, on the other, mutually constitute both the world and its experienced forms. Knowledge of the socially constituted world is socially mediated and open ended. Its meaning to given actors, its furnishings, and the relations of humans with/in it, are produced, reproduced, and changed in the course of activity.

It is from recognising the mutually constituted character of knowledge and practice that questions of context, situation, and setting come to the fore. This is because at "issue here is

not knowledge as a self-standing body of propositions, but identities and modes of action established through ongoing, specifically situated moments of lived work, located in and accountable to particular historical, discursive and material circumstances" (Suchman, 2000, pp.312-313). Although not always explicitly stated, this emphasis on the situated nature of knowing and practice reveals a number of assumptions about the associated character of time and space. Unfortunately, in some versions of practice-based theory, the lack of direct engagement with these concepts, particularly with the spatial nature of practice, means that there is more than enough room for ambiguity and confusion. A good example of this concerns the tendency to conflate situation or context with the immediacy and co-presence of socially shared space and time. Sensitivity towards the particular, the contingent, and the specific, which practice-based approaches make a strong case for, too easily becomes a preoccupation with the local. Indeed, terms such as specific, particular, contingent, and local seem to be used almost interchangeably. Add to that a tendency to slip between metaphorical and spatio-temporal uses of 'local' and the picture becomes no clearer.

Nevertheless, out of this confusion it is possible to detect a tendency for situated knowing to be presented in terms of the participation of people in embodied, collective practices which involve co-presence, where space and time intersect. This vision of the localisation of practice is strongly promoted by the choice of settings for practice-based studies, which in turn tends to be influenced by the guiding traditions in these approaches, such as ethnomethodology, symbolic interactionism, cultural anthropology, and social psychology. Thus, we are offered such examples as flute-making in Boston (Cook and Yanow, 1993), ship navigation crews (Hutchins, 1995), error checking on airline flight decks (Hutchins and Klausen, 1996), Alcoholics Anonymous meetings (Lave and Wenger, 1991), and insurance claims processing (Wenger, 1998). What all of these rich examples have in common is a focus on the immediacy of physical co-presence. They are about people participating in practices together, talking, observing, listening, manipulating artefacts and material technologies, all with a face-to-face orientation. There are, of course, exceptions. The frequently cited study by Orr (1996) of the work of photocopier service technicians, for example, does not presuppose ongoing co-presence since the service technicians largely work independently of each other. However, the significant practices of story-telling, through which collective identities are constructed and the technicians make sense of their work, occur through face-to-face encounters where supervisors or colleagues are called upon for help, and when they meet up for meals or coffee.

The strong emphasis on direct, face-to-face interaction involving co-presence lends a particular, immediate character to conceptions of time and space in practice-based approaches. To some extent this is consistent with the concept of enactment which often informs practice-based theorising (Smircich and Stubbart, 1985, Weick, 1979, 1995). Drawing on insights from phenomenology (Heidegger, 1962, Husserl, 1964, 1970a, 1970b) and Pragmatism (James, 1950, 2000, Dewey, 1966), enactment refers to the ongoing, socially situated, provisional, and emergent attempts by people to make sense of the world by extracting cues from an ongoing flux of experience. Continuous interaction and collective negotiation of meaning are important aspects of this process. As Tsoukas and Chia (2002, p.577) have described it, "[o]rganizational phenomena are not treated as entities, as accomplished events, but as enactments - unfolding processes involving actors making choices interactively, in inescapably local conditions, by drawing on broader rules and resources". However, it is often tempting to interpret these interactions and negotiations in purely localised terms, situated in the here-and-now of everyday experience with no connections across wider swathes of time and space. The use of the term enactment, with its connotation of locally situated performances, is equally suggested by the closely related idea of 'instantiation' preferred by Giddens (1984). However, a closer reading of these arguments suggests that there is more to enactment or instantiation than the immediacy of co-present interactions. This is where the conceptions of time and space in practice-based approaches begin to suggest, if not inconsistencies, then points of tension which require further articulation.

On the one hand, one gains a strong impression of the localised, deeply contextual character of performances, where collective sensemaking is an inter-subjective accomplishment of interacting agents. This offers an important antidote to the abstract, universalising, and decontextualising impulses of cognitivist approaches. However, for some it also runs the risk of voluntarism, privileging the constitutive actions of human agents in the here and now (e.g. Fox, 1996). On the other hand, from a more charitable perspective, it is clear that enactive sensemaking and allied practice-based approaches have a highly temporalised notion of practices of knowing which casts doubt on the easy charge of voluntarism. This suggests that we are not dealing with largely unconstrained "playing fields of interacting, strategically acting and negotiating agents" (Lash, 2002, p.39), but neither is this a case of determining structures in the form of pre-established normative rules whose influence can not be escaped in the immediacy of action. Turning again to insights from Pragmatism, enactive

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sensemaking attempts to side-step the paralysing dualism of structure and action by considering the ongoing interplay between knowing and experience of the world. As James (2000 [1907], p.112, emphasis original) described it:

> We plunge forward into the field of fresh experience with the beliefs our ancestors and we have made already; these determine what we notice; what we notice determines what we do; what we do again determines what we experience; so from one thing to another, although the stubborn fact remains that there *is* a sensible flux, what is *true of it* seems from first to last to be largely a matter of our own creation.

There are also close similarities here with the writing of Heidegger (1962) who argued that people are 'thrown' into ongoing situations, a condition of being-in-the-world, in which understanding is necessarily based on making choices guided by pre-existing and pre-reflective suppositions. There is thus no presuppositionless space through which one can step out of the flux of experience in order to reflect on it. Being is thoroughly temporal in that it always emerges out of a past and tends towards a future. Our experiences are shaped by past experiences and an orientation towards the future in terms of expectations, elements of which are given meaning by our current experiences. The concept of enactive sensemaking captures something of this emergent and ongoing weaving together of presuppositions, expectations, and action through its focus on the temporality and context-dependency of extracted cues and their capacity to stimulate and guide action. Crucially, it is only through being enacted that values, beliefs, expectations, dispositions, and norms are summoned into existence and given definite form, and so action is always open-ended and provisional. Their enactment or instantiation under specific conditions of action and interaction may serve to reproduce relatively durable regularities of interpretation and activity, but sometimes they may also be transformed and modified, producing what Weick (2001, p.226) terms a new *residuum* of enactment, which establishes a changed set of opportunities and constraints under which subsequent sensemaking takes place.

The sensitivity to the temporality of knowing and practice in enactment helps to avoid the twin pitfalls of voluntarism and structuralism. However, there is a tendency towards one-sidedness in this argument which privileges the temporal character of experience at the expense of the spatiality of practice, mirroring a wider bias in social theory (Foucault, 1986, Soja, 1989). Thus, while the emphasis on the immediacy of action and interaction is

balanced by a concern with the history and future of knowing and practice, the emphasis on the localisation of (inter)action is not similarly balanced by a concern with more differentiated or diffuse spatialities. In short, the implications of enactment in practice-based approaches are not extended to an adequate conceptualisation of the spatial. Fortunately, practice-based approaches to knowing contain within them the seeds of a theoretical perspective which allows for a shift from prioritising the temporal to a more balanced concern with the *spatio-temporal*. This centres around arguments concerning the role of background assumptions, shared interpretative resources, norms, and values in the collective and distributed negotiation of meaning. These largely implicit rules and resources are primarily highlighted by practice-based approaches as permitting temporal bridging whereby collective knowing can be sustained and often deepened over time, although always potentially subject to breakdowns and reversals. This raises the question as to whether these rules and resources can be portrayed as having a similarly spatial bridging character, and if so, under what conditions is this constituted and with what implications. It is to these questions that we turn in the next section.

Spatio-temporal bridging and the negotiation of meaning

Although we have argued that practice-based approaches to organisational knowing have tended to privilege the temporality of practice over its spatiality, the latter has more recently received at least some degree of attention from these perspectives. Thus, for example, Orlikowski (2002, p.253) has acknowledged that most studies of organisational knowing have tended to focus on groups "proximate in time and space", whereas "[l]ittle is known about the process of knowing in complex organizations that are also geographically distributed". Adopting an explicitly enactive perspective, she has argued that knowledgeability, while continually generated from moment to moment through ongoing participation in social practices, is lent continuity and consistency by being recurrently reconstituted "over time and across contexts" (*ibid.*, p.253). The important suggestion here is that knowing involves the enactment not only of temporal regularities through the experience of continuity, but also spatial stretching of practices through the experience of consistency. This leads her to argue that:

> … sharing 'knowing how' cannot be seen as a problem of knowledge transfer or a process of
> disembedding 'sticky' knowledge from one community of practice and embedding it in another - with

or without the mediating help of boundary practices, brokers, or forums. Rather, sharing 'knowing how' can be seen as a process of enabling others to learn the practice that entails the 'knowing how'. It is a process of helping others develop the ability to enact - in a variety of contexts and conditions - the knowing in practice. (*ibid.,* p.271).

Wenger (1998, pp.130-131) has similarly made some useful, if not entirely elaborated, observations on the spatio-temporality of practice, along the following lines:

> … the geography of practice reflects histories of learning, but learning continues to reconfigure relations of proximity and distance … Practice is always located in time and space because it always exists in specific communities and arises out of mutual engagement, which is largely dependent on specific places and times. Yet the relations that constitute practice are primarily defined by learning. As a result, the landscape of practice is an emergent structure in which learning constantly creates localities that reconfigure the geography.

This argument is part of a direct attempt by Wenger to counter the accusation that practice-based approaches glorify the local and, in Giddens' (1990, p.18) terms, ignore the increasing *distanciation* of social life whereby "space [is torn] away from place by fostering relations between 'absent' others, locationally distant from any given situation of face-to-face interaction". Rather than accepting either the glorification of the local, or the unchecked expandability of the global, Wenger (1998, p.133) has argued for seeing "these processes - negotiation of meaning, learning, the development of practices, and the formation of identities and social configurations - as involving complex interactions between the local and the global".

These insights from both Orlikowski (2002) and Wenger (1998) begin to suggest alternative spatio-temporal textures to organisational knowing and practice which move beyond the tendency for situatedness to be equated simply with localisation and immediacy. Instead, we are presented with a whole series of tensions - between global and local, general and particular, continuity and change, identity and difference - whose implications are not pre-given, but rather emerge through ongoing negotiation. Associated with this shift in emphasis, which was already prefigured in the concept of enactment, is the notion that time and space are not external reference points within which the social constitution of knowing and practice can be located, but are themselves both the medium and outcome of ongoing social practice. In other words, as numerous social theorists have long emphasised, space and time are

socially constituted (e.g. Bachelard, 1969, Giddens, 1984, Gregory, 1994, Harvey, 1985, Latour, 1987, Lefebvre, 1991, Le Goff, 1980, Massey, 1994, Merrifield, 1993, Thompson, 1967). However, as Unwin (2000) has argued, referring critically to the influential work of Lefebvre (1991), it is not simply a question of the social production of space and time, but also simultaneously the spatio-temporal production of the social. That is to say, social practices tend to constitute particular spatio-temporal configurations which may, in turn, rebound to influence the character of these practices by, to use a favourite phrase of practice-based approaches, affording certain possibilities and limiting others (c.f. Gibson, 1979), recurring in an ongoing chain of mutual influence. There is the danger, however, of simply asserting the recursive and mutually constitutive relationships between space, time, and social practices and leaving it at that, as if nothing more needed to be said. One difficulty in moving beyond this position, which should not be underestimated, is finding an appropriate conceptual vocabulary to represent this interplay.

A number of social theorists have experimented with alternative spatio-temporal metaphors, and these provide some intriguing ways of beginning to explore elements of what such a vocabulary might look like. We briefly examine two such metaphors here: the notion of habitus associated with Bourdieu (1977, 1990, 1991); and the concept of time-space distanciation proposed by Giddens (1984). Each in their own way, these concepts invoke images of spatio-temporal bridging. This is a useful notion because it suggests ways that social practices can bridge spatio-temporal distances, in the process transforming experiences of space and time, and potentially leading to an ongoing cycle whereby the spatio-temporality of practice and the experience of space and time are mutually supporting. Closely associated with this, it also indicates how the negotiation of inter-subjective meaning, while always situated and context-dependent, is not wholly trapped in the immediacy of the local.

At first glance, the theory of practice outlined by Bourdieu, central to which is the concept of habitus, appears to support precisely the tendency of equating situatedness with place-boundness, localisation, and embodiment. However, as Mutch (2003, p.388) has observed, the "notion of habitus is not just about embodied forms of practice, but modes of thought that are unconsciously acquired, that are resistant to change and are transferable between different contexts". According to Bourdieu (1990, p.53), habitus refers to "systems of durable, transposable dispositions ... principles which generate and organize practices and representations that can be objectively adapted to their outcomes without presupposing a

conscious aiming at ends or an express mastery of the operations necessary in order to attain them". The key phrase for our purposes here is 'durable, transposable dispositions' because it emphasises how the inculcation of specific dispositions within any given habitus permits an implicit sense of appropriateness of conduct in different times and spaces because "they are capable of generating a multiplicity of practices and perceptions in fields other than those in which they were originally acquired" (Thompson, 1991, p.13). The forms of conduct generated by these inculcated dispositions are, however, not entirely free-floating and infinitely transferable. They are always generated and performed under specific conditions or 'fields' of practice according to which their appropriateness is judged. This means that we are not talking about a total disembedding because the practices generated by dispositions transposed to alternative fields always have to be re-embedded in the new contexts of action within which they are performed. The range of contexts for which different dispositions permit the generation of appropriate conduct are crucially variable. For example, the ability of different groups to participate with adequate competence across a variety of linguistic communities is considered an important source of symbolic capital (Bourdieu, 1991).

There are similarities here with the argument of Wittgenstein (1953, p.11, emphasis original) "that the *speaking* of language is part of an activity, or of a form of life". The suggestion is that inter-subjective understanding, to the extent that it is possible at all, presupposes the sharing between communicants of a form of life. However, this still leaves some ambiguity about the spatio-temporal character of these specific forms of life. For Introna and Tiow (1997, pp.1005-1006), forms of life are inescapably local:

> … since each partner has a locally-situated language-game that captures what and how they do things, and since these games are incommensurable, the only option is to develop a new language-game that situates the discourse of the different partners into a new combined context. This implies that they have to share a form of life - they have to do things together for a reasonably extended period of time in a shared space, a lifeworld.

It is concerning the incommensurability of language games that the notions of habitus and forms of life begin to part company. While forms of life, and the language games associated with them, are depicted as non-overlapping, the idea of transposable dispositions suggests the potential for different symbolic practices to be transferred and combined across a range of contexts perhaps distant in time and space from the setting in which they were acquired.

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Giddens (1984) offers a similar insight through the concept of time-space distanciation. This refers to the stretching of social systems across extended time-space. In building his argument, Giddens draws on the distinction between social and system integration proposed by Lockwood (1964). In Giddens' reworking of this distinction, social integration is primarily viewed as a local affair arising from the reciprocal practices of actors under circumstances of co-presence. It is closely related to what he terms contextuality, that is to say, the situated character of social interaction in time-space, which comprises the setting of interaction, the co-present actors, and their communication. However, we are not offered here another straightforward account of the local situatedness of practice. This is because the idea of system integration refers to the reciprocal practices of actors or collectivities across extended time-space outside conditions of co-presence involving relations between 'absent' others. These extended reciprocal practices are supported by the development of generic subjectivity (c.f. Mead, 1934), which is a theme also explored by Weick (1995) in relation to the concept of enactment. Weick has distinguished between generic subjectivity and intersubjectivity; the former referring to interlocking routines, habituated patterns of action, mutual relevance, and role expectations which promote interchangeability and generalisability, while the latter concerns the unique, specific, and situated character of direct contact or interaction between individuals as they negotiate meaning. The difference is between, on the one hand, relationships conducted on the basis of a general orientation to others guided by normative expectations about how to relate to the occupants of particular roles and how to respond within a broad range of typical settings, and on the other, those specific instances of interaction which may reproduce the norms and role expectations of generic subjectivity, but sometimes also amend, transform, or reverse them.

A useful way of thinking about this can be found in the sympathetic reworking of Giddens' structurationist approach offered by Mouzelis (1995), which considers the relation between the paradigmatic and the syntagmatic. The paradigmatic refers to general rules which can be applied in a variety of circumstances, whereas the syntagmatic concerns actual instances of social interaction which give expression to these rules and independent of which they have no existence. The paradigmatic is associated with the postion-role and dispositional dimensions of social action, while the syntagmatic corresponds with the interactive-situational dimension identified by Mouzelis. The position-role dimension relates to normative expectations surrounding particular roles, the dispositional dimension concerns historically acquired schemes of perception, thought, and action (broadly similar to Bourdieu's concept of

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habitus), and the interactive-situational dimension refers to the open-ended and contingent enactment of these dimensions through concrete practices of social action and interaction. According to Tsoukas (1996, p.19, emphasis original), these three dimensions come together in the following way:

> … human agents *select out* on the one hand what they understand to be the *relevant* aspects of both their role-related normative expectations and their sets of dispositions, and on the other those *relevant* aspects of the local conditions within which their actions take place, and the try to fit the two together.

While this provides a powerful scheme for thinking about social practices without treating them as either entirely free-floating and voluntaristic or wholly constrained, there is still some uncertainty as to whether these accounts provide an adequate treatment of the spatio-temporality of the dimensions identified. What we appear to be given is a stark choice between the localisation in time-space of situated interactions (the syntagmatic domain of social integration and intersubjectivity), and the transposability across extended time-space of role-based normative expectations and dispositions (the paradigmatic domain of system integration and generic subjectivity). In other words, time-space distanciation seems to be reliant on generic rules and resources, while their concrete and situational enactment comes across as a primarily local matter. This promotes a questionable association between, on the one hand, the paradigmatic and generic with extended time-space, and on the other, the syntagmatic and particular with localised time-space. What we would argue is that extended time-space can also be the site of social integration and intersubjectivity depending on the reciprocal orientations and common history of those involved in interaction. In short, people do not relate with 'absent' others solely as strangers, drawing on generic rules and resources in conducting their interactions. They also relate to those who are not co-present according to specific orientations, involving situational attributions, which are coloured by the memories of previous encounters which may have been fleeting or sustained, localised or distanced.

The spatio-temporal patterning of these encounters, their frequency and intensity, whether they occur under conditions of co-presence or at a distance mediated by communication technologies, influence the quality of interaction. As Cramton (2001, 2002) has suggested, communication at a distance entails a whole series of difficulties for establishing mutual knowledge, enhancing the potential for misunderstanding between those involved in interaction. Drawing on the work of Krauss and Fussell (1990), she argues that in the

absence of direct, first-hand knowledge of individuals developed through face-to-face interaction, and given the limitations of technologically mediated communications for gaining a detailed appreciation of the specific orientation and expectations of others, dispersed collaborators have to rely to a greater extent on assumptions about category membership. Importantly, given the reduced volume of cues available for assigning people to social categories, there is the danger in distanced communication of making misattributions, which are also more difficult to identify and repair under such circumstances of interaction (Cramton, 2001). However, while there is considerable support for these contentions, particularly from experimental studies comparing the interactions of wholly co-present teams and/or those collaborating on activities without *any* face-to-face contact (e.g. Johnson *et al.,* 2002, Potter and Balthazard, 2002, Warkentin *et al.,* 1997), these provide an overly simplified picture when compared with the actual practices of people involved in team activities (Robey *et al.,* 2003, Zigurs, 2003). There are certainly instances where interactions are conducted solely at distance where none of the participants have met face-to-face, but these appear to be less usual than situations involving a mixture of spatio-temporal communication patterns comprising combinations of co-present and mediated encounters (Maznevski and Chudoba, 2000, Orlikowski, 2002).

However, it is not simply a case of the spatio-temporal patterning of interaction influencing the character of communication in any direct and unidirectional fashion. Particular chronologies of interaction, involving unfolding exchanges within varying settings and around different activities, can also transform the precise manner in which time-space is experienced by participants. This reflects the insight that social space and time are relative, socially constituted, and only meaningful in relation to action (Clark, 1985, Hassard, 1991). Our argument is that the ongoing interplay between generic subjectivity and situated intersubjectivity, which proceeds contingently and provisionally within alternative interaction settings, is not necessarily tied to any given characterisation of time-space. There is not a one-to-one matching between local time-space and mutual understanding, nor any necessary association between extended time-space and pathologies of communication. It is quite possible for local interactants, by virtue of incompatible normative expectations and dispositions, to perceive social and cognitive distance which lends a particular quality to how the time-space of their everyday interactions is experienced. Equally, people involved in distanced communication may perceive only a small social and cognitive distance and their corresponding experience of time-space may be one of closeness (having said that, affect-

based interactions between distant people may also aggravate feelings of separation associated with a heightened sense of absence and longing). As Hunter (2003, p.154) has suggested, "[d]istance, while measurable between places and across space and time, must also be regarded as the space between understanding and not". The key point is that spatio-temporal practices of knowing, and the experience of time-space, are not fixed. They are mutually influencing and emergent, and it is possible to trace a diversity of pathways between them as people come together and separate, engage in shared practices and pursue different identity projects, sense ever-increasing closeness or drift apart, develop a common appreciation of particular issues or face irreparable misunderstandings and differences of opinion. In the next section, we consider the themes developed above in the light of an empirical illustration of project work in the consulting engineering sector, showing the co-evolution of space, time, and knowing in this setting.

Space, time, and knowing in the work of project teams: an illustration

The spatial, and particularly temporal patterning of project work has long been acknowledged as lending a problematic character to knowledge and communication practices (e.g. Burns and Stalker, 1961, Higgin and Jessop, 1965, Lawrence and Lorsch, 1967, Tavistock Institute, 1966). Characterised as occurring through temporary multi-organisations (Cherns and Bryant, 1984), project work is usually portrayed in terms of discontinuities and fragmentation. According to Bresnen *et al.* (2003, p.157), for example, "projects differ substantially from one another and significant discontinuities in flows of personnel, materials and information are created, it becomes difficult to develop steady state routines that maximise the flow of knowledge and the capture of learning from one project to the next ... such discontinuities are added to by the fragmentation of the ... project team into different professional disciplines". The implication is that the spatio-temporal characteristics of projects provide a difficult setting for the development of mutual knowledge because there is insufficient time to interact within the common space of project activities for this to occur. Consequently, dysfunctions and misunderstandings are common and often related to a lack of shared purpose associated with opposing identity constructions, failures to appreciate differences in background knowledge, inconsistent schemas between project members, and political struggles over alternative perceived interests. Meyerson *et al.* (1996, p.167) provide a neat summary of the paradoxes faced by project teams:

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Temporary groups often work on tasks with a high degree of complexity, yet they lack the formal structures that facilitate coordination and control ... They depend on an elaborate body of collective knowledge and diverse skills, yet individuals have little time to sort out who knows precisely what. They often entail high-risk and high-stake outcomes, yet they seem to lack the normative structures and institutional safeguards that minimize the likelihood of things going wrong.

They go on to argue that these tensions are manageable because of the existence of what they term 'swift trust', which is based on role expectations, evaluations of reputation, and an orientation towards completing the collective project tasks successfully. In terms of the concepts outlined earlier, this largely represents the enactment of generic subjectivity because of the strong emphasis on interchangeable role-based attributions. However, Weick (1995, p.174) has also suggested an opposite scenario in relation to project work where intersubjectivity is increasingly important:

... the current movement away from hierarchy and the vertical organization toward projects, horizontal structuring, and self-managed teams ... raise[s] doubts about the degree to which generic subjectivity remains a distinctive property of organizations. The routines, roles, and expectations that allow for generic subjectivity and interchangeability seem to be giving way to intimacy, discretion, close proximity, and smaller sized collectivities ...

Each of these accounts accord primacy to either generic subjectivity or intersubjectivity depending on their characterisation of the spatio-temporal properties of project work. For Meyerson *et al.* (1996), the need for generic subjectivity in project encounters is predicated on a predominantly time-based view of project work, highlighting its temporary and discontinuous nature. In contrast, Weick (1995) sees a greater potential for expressions of intersubjectivity in project settings because he focuses mainly on their spatial character, which he characterises in terms of proximity. Neither view is wholly adequate because each relies on a one-sided concern with either temporality or spatiality but not an interweaving of the two.

The following illustration indicates how time, space, and knowing are reciprocally and recursively constituted in a specific project setting. It suggests that generic subjectivity and situated intersubjectivity are not held in a fixed relationship with the spatio-temporal character of project practices. Instead, they are caught up in an interplay involving an unfolding series of transformations between different forms of subjectivity which themselves

influence shifting spatio-temporal practices and experiences of time-space. This illustration is drawn from research currently being conducted by the authors into knowledge and communication practices in projects involving greater or lesser degrees of geographical dispersal or concentration. In addition to a survey of project knowledge practices and the use of alternative communication media, the research has focused on the activities of pairs of project teams in five organisations covering a range of sectors including consulting engineering, computing, and defence technology. The results of the survey are reported elsewhere (Sapsed *et al.,* 2003), and we will concentrate here more on the qualitative elements of the research. This has been based on a combination of semi-structured interviews with team members, of which ninety have been conducted so far, and non-participant observation of teams in action, typically lasting between one and three weeks for each project. The latter has involved observing both the more informal interactions of team members as they go about their day-to-day work tasks, as well as, where possible, sitting in on more formal meetings, telephone- and video-conferences. There have also been opportunities for the analysis of project websites and electronic communications, such as extranet dialogues and discussion threads. The following illustration focuses on just one of the projects studied.

The Hydro-Electric Power Project

Our illustration concerns a consulting engineering project for identifying and elaborating alternative design solutions for repairing or renewing part of the inflow system at a hydro-electric power facility originally constructed in the 1930s. The project, which was split into two phases, was of relatively short duration, lasting only eight months in total. It was also a small project in terms of the number of people involved. There were only five in the main consulting team (comprising a project director, a project manager, civil engineer, mechanical engineer, and electrical engineer), a handful of other technical specialists drawn upon when necessary, and four people representing the client organisation, of which only one had any major involvement with the project. However, despite its short duration and small size, the project was considered by the engineering team to be technically complex and challenging, involving technologies which were not usual for this kind of work. As the Project Director described it, "it's a small job, but quite complicated … it has a lot of issues raised for a relatively small job". It was the first time the consultant engineers (PowerConsult) had worked with this client (PowerClient) at this particular facility. A competitor of

PowerConsult had for many years provided engineering services for PowerClient on this site. However, managers at PowerClient had decided to award the contract for this project to PowerConsult on the basis of what was judged to be a more competitive and innovative bid. In responding to the tender, the PowerConsult bid team had particularly highlighted the use that would be made of a project extranet which was promoted on the grounds that "contributing managers, engineers, support staff and specialists will be able to keep daily track of events, transmissions, information and design developments as they happen, regardless of where they may be located". According to feedback from the client, the intended use of an extranet for the project was seen to be a distinguishing characteristic of the bid and played no small part in the successful winning of the contract. According to PowerConsult's Project Director, who had high level responsibility for the project, the extranet would permit the participation both of the client and of a variety of specialist engineers based in different offices. It was presented as an integrating device or, according to the mechanical engineer, a 'common space', enabling different participants in the project to interact and share information around collective tasks.

However, despite the emphasis on the extranet as an integrative technology for bringing project participants together in a shared virtual space, there was a strong appreciation among project team members that there was nothing inherent in this technology which meant that such interaction and collaboration would actually take place. Indeed, to the extent that the extranet became a shared focus for team activities, it was a progressive development moving from initial reticence to more involved participation, reflected both in the quantity and quality of communications flowing through this medium. In part this was an expression of a gradual and contingent process of relationship-building between participants as they engaged in ongoing communications around different activities, not only within the confines of the extranet, but also through face-to-face meetings, regular telephone calls, and occasional video conferences. These sequences of interaction helped to constitute the spatio-temporal patterning of the project through different interlocking rhythms and intensities, which in turn influenced the precise character of subsequent engagements. This is consistent with the characterisation of project work in terms of a *punctuated equilibrium*, involving more stable time segments of ongoing work and interaction punctuated by key transition points (Gersick, 1988, 1989). It is also similar to the example provided by Maznevski and Chudoba (2000, p.486) where face-to-face project meetings were seen to provide "a heartbeat, rhythmically pumping new life into the team processes before members circulated to different parts of the

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world and task, returning again at a predictable pace". This was evident in our example where key members of the consulting team and the client's managers and engineers met on a periodic yet regular basis at predefined points during the project corresponding to the milestones established in the project plan.

The interesting point here is that these milestone meetings provided a shared sense of the unfolding of the project which allowed for a common experience of time between different project participants. In between these meetings, interactions would take place in a more regular yet spatially distanced fashion. Members of the core consulting team were in almost daily communication with the client's engineering representative by telephone and there was a constant stream of e-mails, discussion threads, and documentation through the extranet. These also influenced the degree to which the perception of time between different parties could be brought into alignment. This was particularly important for the client team whose main focus of attention was on the day-to-day operation and maintenance of the hydro-electric power facility and for whom the engineering investigation being carried out by PowerConsult was of somewhat less central relevance than it was to members of the consulting team, particularly those involved in the project on a full-time basis. According to the client's engineering representative, these regular telephone conversations and the ability to follow the progress of the project through the extranet allowed him to feel closer to the everyday comings and goings of the project than otherwise would have been the case. Members of PowerConsult's team also saw the benefits of more continuous interaction with the client team. As one civil engineer commented, "it's a lot easier in terms of what output of the project's required because the client's got more of an idea what's going on. It's not you meet him on Day One and he'll tell you what to do and then a month, six months later you come back with something which he doesn't really want … which is quite a big problem". As well as promoting greater feelings of involvement on the part of the client team, ongoing interactions also helped members of the consulting team develop a greater appreciation of the day-to-day constraints of keeping a hydro-electric power plant in operation. This was a major consideration in developing possible design solutions for carrying out the repair because any disruption to the work of the plant would involve expensive downtime and PowerClient's managers and engineers were able to underline their preference for repair options which could be conducted under full operating conditions. At the same time, the consulting team was worried about whether or not the amount of contact they had with the client's engineering representative was excessive. As the project manager described it, "we

were concerned about overloading him with minor queries and niggles where in the end he's going to go, 'Oh God, you guys again on the phone'. He hasn't taken that attitude yet, but we're always very conscious of overloading with silly little queries".

Face-to-face meetings throughout the project were seen as important for developing a shared understanding of the different time constraints of the various parts of the team. This was important because inconsistencies in assumptions about time schemes can easily lead to misunderstandings (e.g. Packendorff, 1995). Both the spatial and temporal conditions faced by the client and consultant teams were quite distinctive. For PowerClient's managers and engineers based on site at the hydro-electric power plant, there is a continuity and regularity in their dealings with the facility which lends their experiences a place-bound character, heightened in many cases because their involvement with the plant has stretched over several years. On the other hand, this was the first time the consulting team had been involved with this facility and their orientation towards it was one of temporary, if intensive engagement. The project plan, with its sequenced breakdown of tasks and activities and its deadlines for the delivery of various drafts and versions of the engineering report, provided an important artefact around which members of the team conducted their activities and supplied a constant reminder of the one-off and time-limited character of their work. Thus, there was a contrast between more continuous and more discontinuous time frames in the experiences of the different members of the project team. The periodic project meetings were an opportunity for the client and consulting team to gain something of an appreciation for each other's contrasting experiences of time-space. In this sense, they were about developing some understanding of the specific dispositions of the different parties regarding the relative position of the project as a temporary engagement in the more continuous time-space of the day-to-day operation of the plant. By holding meetings on site at the plant, the client team developed an awareness of the pacing of the project, partly through the periodisation of these meetings, which corresponded with the main stages of the project, as well as providing an opportunity to talk about progress. Similarly, by talking to the engineers and managers at the plant and listening to them describe its operational constraints, the consulting team gained an insight into the ongoing nature of work at the facility.

Visits to the plant were also regarded by the core members of the consulting team as invaluable for gaining a visual appreciation of the design problem they were facing. In the early stages of the project, before any such visits had been made, the consulting team was

completely reliant on drawings, specification documents, operational data, and photographs supplied by the client team for getting a feel for the problem. However, as the project manager explained, "it's all very well putting these drawings out and all that sort of thing, but you just can't get a feeling or a grasp for the problem until you're actually in it". Consequently, efforts were made to ensure that all of the main consulting team members made at least one visit to the facility. According to the civil engineer, this was extremely helpful because he "got a good feel for the area. And then you see one photograph and you can recall things like site access. I feel I can discuss it with the site more, whereas if you're just given small pieces of it … again it's giving a small bit of the picture until you go and view it and see the whole picture yourself. You see there's bits missing". The ability to visualise the site and to draw on memories of having been there in person, appreciating the sheer scale of the operation and how the various parts connect up, was important for the project engineers because it was mutual knowledge which allowed them to conduct more informed technical discussions with the client's engineering representative. Not having the same detailed knowledge of the facility, the consulting team was strongly dependent on the client's engineering representative for local knowledge about the idiosyncrasies of the plant. Having a cumulative history of piecemeal repairs and modifications over the seventy year life of the facility, not all of which were captured in documentation about the plant, it was only through extensive involvement that awareness of these particularities could be developed. The consulting team did not have the time to develop this awareness themselves, and so they relied vicariously on the experience of the engineering representative on site. The regular telephone calls from members of the consulting team mainly involved questions about the specific lay-out, configuration, and performance of the facility and what implications these would have for the different design solutions being developed. However, because the consulting team had visited the site, its members could rely on at least some collective appreciation of what it looked like and where different elements were in relation to each other. These memories were transposable to the extent that they were actively drawn upon in subsequent conversations conducted with the client's engineering representative at a distance. They made the co-ordination of such conversations easier because there was less need for both parties to spend time explaining exactly which part of the facility they were talking about. Without this shared appreciation there was a greater likelihood of talking at cross-purposes with each party mistakenly thinking the other was focusing on the same element of the design that they were. It is considerably more difficult and demands intensive effort to

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repair such misunderstandings when people involved in a conversation neither share the same time-space nor are able to draw upon mutual background knowledge about the issue at hand.

The joint awareness of context, whereby different project members through ongoing interaction developed an overlapping sense of their differing perceptions of time and space, was part of a wider series of transformations from generic subjectivity to situated intersubjectivity. Since the client and consulting teams had not worked together previously, they tended to rely in the earlier project stages on generalised role-based expectations and broad dispositions concerning how to conduct the relationship. These were particularly evident in the concerns of the consulting team about how open to be in its dealings with the client. This issue was of particular relevance because the decision to highlight the use of an extranet for this project was accompanied by a rhetoric of openness and client involvement where the activities of the consulting team would be available for scrutiny, in the words of the project director, "warts and all". However, apart from signalling expectations of openness, the simple introduction of an extranet did nothing in itself to resolve this issue. The project manager described how, in the early stages, the client team was only able to access an extremely limited subset of the information and correspondence posted within the extranet. There was then a gradual process where the client's access rights were progressively extended. The initial cautiousness was guided by role-related expectations about 'the client' as a generic, collective category, and gradually fell away as this generic characterisation was augmented by a growing appreciation of the specific attributes and responses of 'this client'. The initial worry was that the client team, able to see the messiness of work-in-progress of the consulting team, would draw negative conclusions about their professionalism. As the electrical engineer explained, "I was quite reluctant to post what I was doing on the extranet because I thought, you know, if this is inaccurate or it's wrong, they're going to see this and think who are these jokers on the project".

The early disposition of members of the consulting team towards the client was influenced by their previous individual and collective experiences, as well as by stories they had picked up from colleagues about working with other clients. For example, the project manager related an incident he had heard where "some of the other guys had tried to use the extranet in here before a year or two ago on a job in Spain … and they had an absolute nightmare on it". In this case, the extranet was perceived as an instrument of surveillance and the team was worried that the client could use its access to correspondence to pursue claims of non-

compliance. As the project manager went on to explain: "they were worried because you had a … there was a response time that they were meant to respond to any queries from the client, so they were posted up on the extranet and then you could see the time that it was responded at, and if they failed to do that it caused problems, it was like a non-compliance … So they were constantly monitoring it. They saw the extranet as a Big Brother … What they were also worried about was say five months down the line everything goes pear shaped and it goes to adjudication or there's a major, major claim on it, they've got this exact record of when each one was responded to".

The project director was well aware of the potential problems and acknowledged that "you do get clients who just like to find fault with everything you do". However, he thought that such difficulties could be minimised by establishing a clear working relationship as early as possible in the project, for which he saw face-to-face meetings as absolutely essential. His perspective on this was influenced by a recent project experience where there had been a number of technical misunderstandings and differences of approach which took a considerable amount of time and effort to resolve. This led him to comment that "in retrospect I would have been better to have … spent a bit more on the budget in getting more people together. And I'm regretting now that I didn't do that". As a consequence, he ensured that for the hydro-electric power project a series of meetings were built into the project plan and suitably resourced. According to the project manager, these meetings were "very good for a sort of direction point of view and gaining even more understanding of their drivers, their commercial, their overall drivers … trying to understand the structure of their business as well". They were perceived as important for building up a relationship with the client team expressed in terms of confidence for how they would respond to different issues. In other words, they were about a growing sense of predictability of conduct which progressively reduced the original concerns about how the client team would react. This increased confidence comes across clearly in the following statement by the project manager:

> I think it's because we now know more how they operate and we know that they have got a lot of good information. They're not just … some clients just aren't particularly … not clever, but aren't as competent perhaps as these guys are … These guys are doing the job day-in, day-out and are very good at what they do, so we feel comfortable going to them and asking them. There's obviously an initial perception they'll think we don't have a clue, but they realise it's a pretty unique thing going on here as well, so they're more than willing to contribute.

The mechanical engineer similarly saw value in face-to-face meetings: "the places where face-to-face meetings become invaluable is where human frailties come into play … negotiations, difficult issues, when you're having to read what the other person's reaction is to what you've just said and modify what your going to say next based on that". This largely taken-for-granted monitoring of how members of the client team reacted in face-to-face meetings was the start of a more drawn-out process of developing confidence in how they were likely to respond, not all of which was accomplished through face-to-face interaction. Indeed, there was a recognition that it was the episodes of coming together which made it easier to manage the periods of being apart. As the mechanical engineer suggested, "the only reason that works is because we did have a … period of time together, so we are aware that we are a team. Then we moved apart and now we work together collaboratively at a distance". The intervening communication by telephone and through the extranet also became part of this ongoing monitoring of the relationship. In the case of the extranet, this took the form of a cautious experiment whereby gradually the client team was exposed to more and more elements of the consulting team's day-to-day practices. The project manager described this in the following terms: "we have started putting up more discussions that are, you know, it's almost opening up an argument, trying to open a can of worms to see if people respond to it … seeing what their feelings are". This resulted in a mutually reinforcing situation where, having received positive responses from the client team to the issues raised, more information was released, and so on in an ongoing, although potentially reversible, cycle. There were also indications that the client team was becoming more confident in the relationship. Interestingly, this was reflected in a purposeful change to the previous spatio-temporal pattern of interactions. As the second phase of the project approached, another face-to-face meeting was planned to ensure that the direction of the project was maintained. However, the client team decided that it was not necessary. As the project director explained: "I said I wanted a kick-off meeting [for the second phase] and the client said no you don't, but we'll have a review later. So there the client felt that we were well enough on board we didn't need a kick-off meeting, because by that time we all knew each other".

This suggests a rather different and more dynamic relationship between the spatio-temporal character of project interactions and transformations between different forms of subjectivity than outlined earlier. In this instance, despite the lack of time for sustained interrelating, it was not a case of the distancing of project interactions across time and space being based in paradigmatic norms of generic subjectivity, as suggested by Meyerson *et al.* (1996).

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Certainly the different participants in the project initially brought their own category assumptions about how the different members of the project might be expected to behave, which in turn disposed them to act in certain ways. However, these dispositions did not blindly determine how the project relationships unfolded, but instead were subject to modification and updating. Thus, for example, despite exhibiting strong reservations about clients in general, this did not prevent the consulting team from developing an appreciation of this client in particular which, as it turns out, undermined many of their assumptions and concerns about how clients were expected to behave. In other words, there was a shift from paradigmatic role-based expectations to increasingly syntagmatic and personalised expectations, progressively arising through the ongoing interactions of the project team. The spatio-temporal practices of the project team were not incidental to this development. In particular, the rhythm face-to-face meetings with the client was seen as important for developing a reciprocal appreciation of the different contexts within which the two main elements of the team operated. This was partly about understanding the different temporal frameworks influencing the work of each group, but also about developing a mutual understanding of the locational specificities of the hydro-electric power facility, and learning more about the respective background and orientations of the different parties. It was this which made the intervening periods of more distanced interaction more likely to be conducted effectively and with fewer misunderstandings. In this sense, it was not a reliance on generic subjectivity which encouraged the stretching of the relationship across time and space, but rather the emergence of a context-specific and particularised intersubjectivity. The implication is that, in opposition to the earlier point made by Weick (1995), intersubjectivity is not a purely local affair in time and space. While conditions of co-presence may indeed provide the most likely setting for evolving intersubjective understanding, participants are not trapped in local circumstances of interaction at all times. Their pathways intersect in time and space and then move apart, but in moving apart they are able to draw upon memories of previous encounters, shared background knowledge, and personalised orientations which colour their more distanced interactions.

Conclusion

An important implication of the following account is that the introduction of a more explicit consideration of the spatio-temporal character of organisational knowing tends to disrupt many assumptions about the meaning of situation or setting in practice-based approaches.

Certainly these approaches have done much to counter the worst excesses of cognitivist perspectives with their tendency to emphasise the free-floating decontextualisation and mobility of knowledge. However, there is the danger that this is achieved at the expense of an interpretation which regards knowing as so tied to localised circumstances, constituted through ongoing participation in specific times and spaces, that the potential for any time-space distancing appears to be effectively excluded. Although this has been moderated somewhat through more recent contributions to the practice-based literature, there is still considerable confusion about the interplay between time, space, and knowing. In an effort to think more directly about these issues, we interrogated a range of ideas from social theory, particularly the work of Bourdieu and Giddens, which have grappled with conceptions of time and space in considering the constitution of social action and interaction. The notion of habitus provides one interesting approach to the transferability of practices across time-space. Its emphasis on the generative capacities of dispositions that can be transposed across different times and spaces, but which nevertheless are judged more or less adequate according to the particular fields within which they are enacted, offers a way of steering a course between conceptions of the total fixity or complete mobility of practice. Similarly, the idea of time-space distanciation, with its allied concepts of contextualisation, social integration, and system integration, suggests another way that practices can be stretched across time and space.

However, these ideas arguably do not go far enough in severing the commonly held association between, on the one hand, 'the local' as the site of particularity, concrete practice, and 'authentic' sociality, and on the other, 'the global' as the domain of generality, abstraction, and regularisation. Thus, in the work of Giddens, it is difficult to avoid the conclusion that social integration is solely achieved through co-present interactions in the here-and-now, while system integration is purely an effect of normalising and institutionalising practices stretched across time and space. Equally, the distinction between generic subjectivity and intersubjectivity discussed by Weick (1995) draws a strong connection between generalised, interchangeable, role-based orientations and the extendability of organisational practices, and between particular, personalised, and context-specific orientations and practices localised in time and space. However, if we relax the one-to-one connection between particular forms of spatio-temporality and alternative modes of subjectivity, it becomes possible to recognise a series of more heterogeneous associations between time, space, and knowing. To follow organisational actors as they collectively

constitute spatio-temporal patterns through their ongoing practices, describing what Pred (1977, p.208) characterised as "a weaving dance through time-space", and considering how this establishes different zones of manoeuvre for their unfolding actions and interactions, is to begin to appreciate the much more differentiated and contingent relations between time-space and organisational knowledge practices. Our illustration of the hydro-electric power project offered a counter-example to the binding together of the local with the particular and the global with the general. Instead, it suggested a more dynamic process whereby varying rhythms of coming together and moving apart, and transformations between generic subjectivity and intersubjectivity, unfolded in a series of mutually constituting relationships. This is not to deny the situated and context-dependent nature of knowing, but it is to cast doubt on the necessary spatio-temporal localisation of local knowledge.

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