Mode 2 Management Research

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The terminology of mode 2 knowledge production has become increasingly prominent in discussions on the nature and purpose of management research. This paper attempts to move our understanding of this terminology forward, by providing a detailed exposition of the five features of mode 2 knowledge production in the context of management research and by offering an empirical account of a research project conducted in mode 2. The paper relates the established problem-solving management research traditions of action research, cooperative inquiry, grounded theory and clinical method to the conceptual territory of mode 2. It then considers a specific form of knowledge production where all five features of mode 2 appear simultaneously. The paper demonstrates how the terminology of mode 2 might provide a useful basis for dialogue between management researchers from different methodological traditions. Moreover, the paper concludes that the specific form of mode 2 where all five features are present (called here 5mode2) does differ, in both its conduct and the character of its output, from any of the established approaches considered in this paper.

Introduction

Between 1995 and 1998, the British Academy of Management (BAM) embarked upon a widespread debate about the increasing distance of research from its user base and a concomitant decline in its ability to influence policy development and practice.

Much of the discussion focused on ontological issues. What makes management research unique and different from associated disciplines such as economics, sociology, social psychology, psychology or anthropology? What makes for good quality management research? How might one recognize the boundaries of management research? How might we best recover the support and involvement of our user base? These themes have since been taken up by the US Academy (see Huff, 2000) and have been the focus of further debate in this journal (see Hodgkinson, 2001).

The initial discussions were led by the BAM Research Policy Committee and subsequently developed in Council, culminating in a paper by David Tranfield and Kenneth Starkey. The paper aimed to stimulate further debate on the nature of management research and highlight the potential of so-called mode-2 practice as an avenue for fruitful development (Tranfield and Starkey, 1998).

This paper offers a response to Tranfield and Starkey's discussion piece (1998) and contributes to the ongoing debate in two ways. First, we believe that the social sciences have an established tradition of conducting research in mode 2, albeit expressed in different terms. Indeed, some forms of management research might be said to be at the leading edge of a broader movement towards increased levels of mode 2 knowledge production. Whilst there is undoubtedly a wealth of material on approaches such as action research, cooperative inquiry and clinical method, a mapping of these practices onto the methodological territory of mode 2, as laid out by Gibbons *et al.* (1994), remains noticeably absent from the literature.

The other gap in the literature is the lack of empirical accounts specifically related to the detailed features of mode 2 proposed by Gibbons *et al.* (1994). The original work (predominantly

rooted in developments in the natural sciences and technological research) offers little to justify the authors' choice of descriptive features (as opposed to some other set of features) in the particular context of the social sciences. Indeed, if the features of mode 2 presented by Gibbons *et al.* are thought of as a set of ingredients, the various recipes which might be created from different combinations of these ingredients are not discussed – although there is passing reference to a form of research where all the features of mode 2 'appear together', signalling possible distinctiveness of this particular form (Gibbons *et al.*, 1994, p. 8).

This paper therefore has two aims. First, it attempts to relate established problem-solving management research traditions to the conceptual territory of mode 2. The second aim of the paper is to consider the specific form of knowledge production where all five features of mode 2 appear simultaneously. By reviewing an empirical example of this form of knowledge production, the paper aims to give readers a flavour of one particular form of mode 2 management research, and thus assist them in relating their own research practices to the concept of mode 2. This in turn should increase the scope for participation in the debate on the development of practice-oriented research, whilst offering insights into the practice of mode 2 management research on the other.

Management research – the ongoing debate

Management research is in the throes of a healthy debate on both its ontological status and the appropriateness of various research processes. This debate has been prompted partly by a recurring concern that much of the management research appearing in top-rated academic journals is of little relevance to most practitioners (see Schein, 1987; Gopinath and Hoffman, 1995; Starkey and Madan, 2001). More recently, the debate on research process has begun to focus on the differences between two distinct research approaches, which have been labelled mode 1 and mode 2 knowledge production (Gibbons *et al.*, 1994).

Pettigrew (1995, 2001) draws attention to the need for research to clear 'double hurdles' such as

simultaneously delivering practitioner relevance and scholarly excellence. He discusses the features of mode 2 knowledge production in relation to these double hurdles. Tranfield and Starkey (1998) use Becher's taxonomy to describe management research as 'soft, applied, divergent and rural'. They conclude that mode 2 reflects the ontological status of management research more faithfully than does mode 1. Their discussion of management research as mode 2 knowledge production culminates in the authors advancing a series of propositions and speculations ranging from themed centres of excellence, to calls for dialogue with (rather than adherence to) existing dominant (American) standards, and the need for researchers to avoid becoming trapped in either practice or academia in which they risk the perils of 'epistemic drift' or 'academic fundamentalism' respectively (p. 353).

In the USA, Anne Huff used her presidential address to the Academy of Management (AoM) annual conference to address issues of practitioner relevance, drawing attention to 'mode 1.5' as a term which she used to denote the combination of disciplinary scientific rigour normally associated with mode 1 and the practically valued problem-solving orientation of mode 2 (Huff, 2000). Further reflection led to a call for 'Mode 3' knowledge production (Huff and Huff, 2001). This highlights a growing interest in the nature and role of practice-oriented research in the US, as evidenced by AoM's research methods division's special theme on 'practice-grounded research' at the 2001 and 2002 conferences.

As stated in the introduction, the academic debate has thus far been conducted largely in committee or meeting rooms. The papers cited above attempted to open the debate to a broader audience but responses have been few and far between in the literature. We feel that contributory factors in this regard may be, on the one hand, a lack of empirical accounts which are explicitly mode 2 in orientation and, on the other hand, a general confusion around the use of the term mode 2 and its relationship with other terms such as action research. This paper thus attempts to deal with both these factors, starting with the latter. To do this, we will draw on the original work of Gibbons *et al.*, first presenting the concept of mode 2 in relation to mode 1 and then detailing the distinctive features of knowledge production in mode 2.

Mode 2 knowledge production

In the preface to The New Production of Knowledge (Gibbons *et al.*, 1994), Michael Gibbons draws the reader's attention toward a new form of knowledge production (mode 2) which, although originally an outgrowth from its traditional counterpart (mode 1), is becoming increasingly distinctive:

> 'our view is that while Mode 2 may not be replacing Mode 1, Mode 2 is different from Mode 1 – in nearly every respect ... it is not being institutionalised primarily within university structures ... (it) involves the close interaction of many actors throughout the process of knowledge production ... (it) makes use of a wider range of criteria in judging quality control. Overall, the process of knowledge production is becoming more reflexive and affects at the deepest levels what shall count as "good science".' (Gibbons *et al.*, 1994, p. vii)

Many of these themes are further refined as the key features of mode 2, which are contrasted with the features of mode 1:

> 'Mode 1 problems are set and solved in a context governed by the, largely academic, interests of a specific community. By contrast Mode 2 is carried out in the context of application. Mode 1 is disciplinary while Mode 2 is transdisciplinary. Mode 1 is characterised by homogeneity, Mode 2 by heterogeneity. Organisationally, Mode 1 is heirarchical and tends to preserve its form, while Mode 2 is more heterarchical and transient. In comparison with Mode 1, Mode 2 is socially accountable and reflexive.' (p. 3)

The authors then go on to discuss in some detail what they view as the key features of mode 2 knowledge production. These are depicted in summary form in Figure 1 and discussed in more detail below.
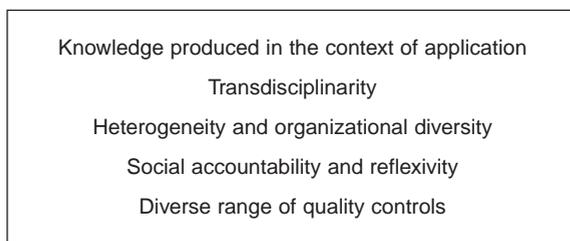

Knowledge produced in the context of application

Transdisciplinarity

Heterogeneity and organizational diversity

Social accountability and reflexivity

Diverse range of quality controls

Figure 1. The five features of mode 2 knowledge production

Knowledge produced in the context of application

This emphasizes the problem-solving nature of mode 2, in that knowledge production is organized around a particular application as opposed to the codes of practice of a particular discipline. It is perhaps this feature of mode 2 which most explicitly and directly links it to the perceived problems of user-distance and practitioner-irrelevance of management research mentioned in the introduction. The imperative to be practically useful is the dominant consideration in framing research aims, questions and practices which, given the dynamic nature of most organizations, 'are produced under an aspect of continuous negotiation' (Gibbons *et al.*, 1994, p. 3).

Transdisciplinarity

Transdisciplinary problem solving involves the integration of different skills in a 'framework of action' (Gibbons *et al.*, 1994, p. 4) in which interwoven empirical elements and theoretical consensus arise and accumulate throughout the project as practical solutions and theory building which cannot be reduced to disciplinary parts. These are then diffused through the subsequent actions of those who participate in the project. This gives rise to an unpredictable dynamic which is difficult to direct, characterized as 'problem solving capability on the move' (p. 5).

Heterogeneity and organizational diversity

Transitory, multi-faceted problems require transient heterogeneous teams whose members come and go as the situation organically unfolds. This is enabled by technologies that allow teams to flourish between and beyond the ties of any one institution on the one hand, and by a more socially distributed research capability on the other.

Social accountability and reflexivity

Greater levels of communication and transparency; increased sensitivity to issues of governance and inclusion; and growing public interest in the purpose, nature and outcomes of research have led to much greater diversity of interests and involvement. These factors, along with the transdisciplinary team make-up, require participants continually to approach research from the standpoint of the other participants as part of the ongoing process

of negotiation. This in turn leads to a much more reflexive form of research with a deeper understanding of the research process itself.

Diverse range of quality controls

In mode 1, the quality of knowledge produced is judged from the standpoint of the discipline, its senior luminaries and peer evaluation processes, whereas, in mode 2, quality controls have to reflect the concerns of a substantially broader community of interest. This might include for example, the practicality of any proposed solution to the problem under investigation. Whilst it is conceivable that possible compromises introduced as a means of satisfying a broad range of stakeholders with different interests (e.g. time-scales) might undermine the standard of such work, Gibbons *et al.* point out that, 'it does not follow that because a wider range of expertise is brought to bear on a problem, that it will necessarily be of a lower quality. It is of a more composite, multidimensional kind' (p. 8).

Mode 2 and management research

Translated into the context of management research, the criteria laid out by Gibbons *et al.* paint a picture of research as a high involvement, problem solving, theory building dynamic. Such descriptions of management research are not new. Indeed, we have already hypothesized that a great deal of research, using a number of methodologies that are well established in the field of management, can be regarded as being conducted in mode 2. In this section we will examine a number of these approaches and consider them in relation to the features of mode 2 identified in the previous section.

A number of the features attributed to the broad term 'mode 2' might equally be applied to an array of established approaches, e.g. action research, action science, participatory research, action learning, grounded theory, clinical method, cooperative inquiry, etc. An exhaustive mapping and comparison of all such approaches is beyond the scope of any one paper.

Faced with the need to narrow our focus somewhat, we first considered Crotty's (1998) work on the foundations of social research, which offers a useful schema for classifying research. He argues that any given piece of research can be described in terms of its epistemological position,

the theoretical perspective taken, the methodology employed and the specific methods chosen. His careful analysis helps to ensure an 'apples with apples' comparison and, using this schema, we have chosen to assess different methodologies in relation to the features of mode 2. In Crotty's terms, a methodology represents a framework within which particular methods might be deployed, e.g. ethnography (a methodology in his terms), might involve participant observation or conversation analysis (methods in his terms) (Crotty, 1998, p. 4).

Having identified the category we are interested in for our comparison (i.e. methodologies, in Crotty's terminology), we are still faced with the problem of choosing a limited number from a wide range of different methodologies. To illustrate this problem, consider the case of action research which can be traced back to Lewin's work in the 1940s (Lewin, 1946). Action research has been characterized as research resulting from involvement with an organization over a matter of genuine concern, where there is the intention to take action on the basis of the intervention (Eden and Huxham, 1996). However, the term is regularly used with a variety of different meanings, to the extent that the phrase itself has 'lost some of its original weight' (Reason and Bradbury, 2001, p. xxiv). Indeed some argue that it may be more helpful to consider 'action-oriented research' as an umbrella term (Park, 1999, p. 142) in much the same way as that in which mode 2 might be used.

Given that entire special issues of this journal have been devoted to delineating between variants of action research (see Human Relations, 1993 and Management Learning, 1999), we have elected to focus here on two variants of action research. The first is a relatively straightforward approach which still holds traditional views on the objectivity of the research process and envisages a clear division of labour between academic and practitioner, as characterized by Eden and Huxham (1996) and the second, an explicitly group-based approach called cooperative inquiry, where all those involved act as 'co-researchers and co-subjects' (Heron, 1996).

Our third choice is grounded theory, a methodology which its originators describe as 'the discovery of theory from data' (Glaser and Strauss, 1967, p. 1). The two key features of grounded theory approaches are theoretical sampling (i.e. data collection is guided by the

emerging theory) and constant comparison (i.e. continuously flipping back and forth between data coding and data analysis). Partington's recent contribution sets out grounded theory in more detail and begins to build some links to the concepts of mode 2, highlighting its problem solving capabilities (Partington, 2000).

Our final choice is Schein's clinical method (1987), which he describes using the analogy of medical practice, where analysis and publication of selected cases helps to build knowledge for fellow practitioners. The research is initiated by the practitioner and focused on an issue identified as important by them, and the researcher in these settings is called in because of his or her 'helping skills' (Schein, 2001).

The contrast between mode 2 and more traditional mode 1 forms of knowledge production is marked and has already been dealt with both here and elsewhere. However, the relationship between the features of mode 2 and the four methodologies we have selected is less clear. We have attempted to summarize these distinctions in Tables 1a–1e in the appendix.

On the basis of the comparisons shown in Tables 1a–1e, we would argue that research conducted using each of the four selected methodologies could be regarded as producing knowledge 'in mode 2', reinforcing our view that management has a long tradition of conducting research in mode 2 and is, in many ways, further advanced than some of its natural science counterparts in this regard.

We will now move on to consider an empirical account of a research project conducted in mode 2. In this particular project, the research was undertaken with all five features of mode 2 as simultaneously coexisting aspects of the process. Indeed, Gibbons *et al.* (1994) point out that the features of mode 2 'do, when they appear together, have a coherence which gives recognisable cognitive and organisational stability to the mode of production' (p. 8). The project which follows represents our attempt to offer an empirically driven investigation of this claim.

An example of mode 2 management research

In this section of the paper we aim, as stated in the introduction, to give readers a flavour of one particular form of mode 2 in practice and thus assist them in relating their own research practices to the concept of mode 2 as defined by Gibbons *et al.*

Moreover, by considering a project in which all five features of mode 2 simultaneously apply, we hope to address the question implicit in the previous section, as to whether the qualities of mode 2 practices are primarily characterized by the specific cocktail of the five features employed. We will do this by examining whether there is anything particularly distinctive about the limiting case where all five features occur simultaneously within the confines of a single project.

We begin by providing some background to the mode 2 project concerned. The project spanned a period of over 12 months, with one- or two-day meetings at least once per month and many additional conversations, telephone and email exchanges in between. The account presented here is therefore selective, seeking to highlight features of the project which may help to cast some light on the characteristics of the research process. The account also downplays the research content of the project in order to focus on the implications for research process. Appropriate pointers are given for those interested in the specific content of the research.

The project was initiated shortly after a research seminar on a prior project on complexity theory and corporate transformation. During the seminar, questions concerning the roles of reflexivity, intuition and emotion in influencing emergent outcomes of corporate transformation projects were raised, giving rise to related research questions and the desire to investigate them empirically.

Subsequently, at the request of the chief executive of the Scottish Health Advisory Service (SHAS), we became involved in a complexity-based transformation project which allowed us to pursue our research interests whilst aiming to help SHAS develop a more distinct identity and new, more effective ways of working in existing and new areas. This desire was influenced in no small part by the general upheaval in the National Health Service (NHS) and the recent establishment of the Scottish Parliament.

SHAS audits the provision of healthcare to particular care groups in Scotland (mental health, the elderly and those with learning disabilities). The organization consists of a small core team,

and a much larger reviewer network of several hundred people. Any given audit is led by an advisor from the SHAS core team and a group of 6–8 volunteers drawn from the reviewer network. Each audit starts with an orientation day for the team followed by a one-week visit to the particular healthcare unit being assessed. The review team then disperses at the end of the week but participates in the writing of a report which is then fed back to the relevant health board or NHS trust. Follow-up visits by members of the SHAS core team may then be arranged if required.

Whilst the SHAS inspection and follow-up visits were generally seen to be highly successful, a burgeoning workload, environmental turbulence and numerous opportunities to engage in new areas of work were stretching the somewhat informal and person-dependent management processes within SHAS to the limit. In particular, the chief executive felt that there was a clear need to transform working practices so that key decisions and initiatives were less critically dependent on her direct involvement.

The SHAS core team felt that this required the development of a collective approach that would harness the distinctive strengths of individual members, but which could operate professionally regardless of which individuals were involved in specific projects. There was also a unanimous feeling that, in order to capitalize on opportunities to grow and extend influence in existing and new areas of work, SHAS had to develop a more coherent external identity in tandem with its new internal processes.

The project was thus concerned with the strategic transformation of SHAS both internally in terms of its management processes, and externally in terms of its desire to leverage core capabilities, enter new areas and increase the breadth and depth of its service delivery. The project was also intended to help sharpen the organization's identity and image. The interest of the chief executive and the rest of the core team in trying to apply concepts from complexity theory to organization and management, enabled a genuine convergence of interests between the academic researchers and the SHAS staff – resulting in a constructive and mutually sympathetic approach throughout.

A central feature of the project was a series of what can best be described as qualitative changes in the nature of the project itself. These changes corresponded to changes within SHAS and tended to be concentrated into a series of unplanned (and to some extent unexpected) episodes with incremental development and refinement occurring between episodes. Such episodes can be thought of as periods during which a system suspends its routine structures allowing for reflection on, and change of, these structures (Hendry and Seidl, 2002). This account will focus on these episodes since they are the most revealing aspects of the project in terms of the research process.

Of particular note was an event which occurred in the very early stages and which influenced both theory and practice within the project. The group was discussing a recurring and problematic pattern. Whenever a key decision or breakthrough was about to be made, progress was suspended by the intervention of some emergency or other. This emergency inevitably dragged the chief executive away from the rest of the core team and progress was effectively paralysed by her absence (for the reasons of dependence mentioned earlier in the paper), leaving the team feeling frustrated and unable to proceed.

As discussion of this issue unfolded at one of the first project meetings, just such an emergency arose and there was debate as to whether or not the meeting could be taken any further. Indeed the survival or otherwise of the whole research project was raised in a somewhat panic-stricken and fraught response. The concept of emergence[1] was introduced to the discussion, and the group decided to use the opportunity to deal with the recurrent pattern there and then. The emotional atmosphere of the room turned from one of despondency and frustration to one of optimism and even celebration in which the emergency was embraced as an opportunity to deal 'live' with what was seen as the key issue facing the organization at that point in time.

The team's response was to articulate 'ground rules' concerning the way members should interact with each other. These ground rules allowed those present to respond, knowing that they would have the support of those who were absent. There was a general view that this agreement on how team members thought they should interact

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[1] Goldstein (1999) offers an overview of the concept of emergence and further details of our own work on emergence in the SHAS case study can be found in MacLean *et al.* (2001).

was made meaningful by the crisis. From that point onwards the ground rules were referred to as the Cromlix principles and they governed intra-team interaction, (in the parlance of complexity theory, these might be called order-generating rules).[2] During the project, they were frequently referred to, and were invoked by participants when progress during meetings seemed laborious.

In this instance, a recurring and problematic pattern was identified and a response to the pattern was negotiated. Ironically, and perhaps significantly from a psychoanalytic perspective, this was followed by a rapid dissipation of the crisis, and the threatened departure of chief executive never came to pass. Discussions then returned to the concept of emergence and the way in which the incident concerned seemed to transcend the familiar management dichotomy of planning and acting. There was general agreement that the meaningfulness of the incident was somehow or other tied up with its unplannedness and, moreover, that the accompanying emotional atmosphere was somehow responsible for the team's positive response. Developing a new pattern of interaction required a simultaneous appreciation of the experience, and a distancing of oneself from it, in order to appreciate the patterns at play.

From our point of view, the project had already begun to deliver insights into the roles of reflexivity, intuition and emotion in transformation projects. Reflexive processes both identified the crisis as the recurrence of a pattern, and in this case helped team members themselves to transform practice from a somewhat indisciplined, individual-centred series of exchanges to a more harmonious group process underpinned by the Cromlix principles. The change in 'atmosphere' associated with the episode is perhaps most readily described as a change in the emotional state of the members of the group, recognizing that the emotional dynamics of the event were both evident and significant in shaping what transpired.

In research terms what had unfolded was in the broad area of the project's remit, but totally unanticipated in terms of detailed content and timing – driven, as it was, by the problems faced by SHAS and the dynamic of which they were part. Complexity theory, management and psychoanalytic perspectives were used in conversation to help interpret events, spot patterns, diagnose responses and ultimately agree practical steps forward in which the distinctive theoretical origins of inputs receded into the recent past. As a practical way forward for SHAS gained acceptance, conversation turned to the research questions and a more introspective examination of what had unfolded in terms of interpersonal dynamics, unplannedness, emotion, intuition, control, etc.

The project moved into a period of more conventional work on scenarios, systems boundaries and possible conflicts with adjacent agencies, using strategy workshops and other mechanisms. During this period of the project, new practices and service areas emerged from a series of conversations and interactions which were ostensibly governed by the Cromlix principles. Throughout these meetings, a bi-focal stance was adopted. On the one hand we dealt with the micro-issues involved in allowing the project to progress (New Product Development forms, changes to report formats, IT/training issues etc.) as individuals and in subgroups. On the other hand, the whole group engaged in a collective endeavour to stand back from the details of their activities and look for patterns, different feasible interpretations of developing situations, possible trends, etc. This more detached, collective view in turn fed back into the individual micro-processes and ongoing activities in problem-solving and research process terms.

At around the halfway stage, during a reflection session, different members of the group volunteered that patterns of behaviour and relating had changed significantly since the start of the project. According to those within the organization, SHAS now had a clearer identity, work requests from outside were addressed to SHAS rather than to individual members and internal preoccupations had moved away from interpersonal relationships and toward how the organization as a whole related to its environment. There was general agreement that, at some stage over the preceding month or two, SHAS had emerged as a new organization. There was growing coherence apparent in the activities of SHAS, many of which were initiating in new areas of endeavour, though this was intermittently overwhelmed by a 'return to the old ways'.

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[2] Complexity theory argues that order can be thought of as resulting from the repeated application of a simple set of order generating rules. Coveney and Highfield (1996) offer an overview of this issue and further details of our own work with order generating rules can be found in MacIntosh and MacLean (1999).

In the latter stages of the project, another significant episode occurred. SHAS members arrived for one of the project meetings somewhat panicked and forlorn. The reason for this was a letter received from senior civil servant in the Scottish Executive containing recommendations about how SHAS should change its service. The core team's initial reading of the letter was one in which the message was taken as a thinly veiled threat to SHAS's continued operation, trying to manoeuvre it into an unattractive and untenable position. The letter was seen as the herald of a forthcoming crisis and the response of the SHAS team closely resembled the pre-Cromlix pattern. A reflection session focused on SHAS's interpretation of the letter, the team interaction associated with that interpretation and possible alternative (more distanced) readings of the situation. This culminated in general agreement that the letter was formally asking SHAS to enact changes which SHAS had itself developed as desirable options during the project and which may well have been informally signalled to the civil servant in question.

The letter was thus transformed from a perceived threat to a perceived endorsement. As the group reflected on this shift in perception, there was agreement that the Cromlix principles were in operation during the reflection process but had not been during the initial reading of the letter. It was also agreed that the perceived crisis associated with the letter had largely been created by SHAS and indeed may have served the purpose of effecting a transition to the enactment of the Cromlix principles. There followed a more general discussion of the role of perception, intention and emotion in the creation of emergent properties. This discussion drew on concepts from both complexity theory and psychodynamics. The group seemed to have increased its awareness of the role of expectations and the quality of interactions in creating, in real time, the reality of their current experience and future trajectory from a range of possible options.

Again the team had observed a recurrent pattern in its own behaviour, whereby crisis and a qualitative change in interrelating went hand in hand, each one in part being created by the other. In contrast with the Cromlix event, which effected a change to internal patterns of interacting, one might say that this particular episode bore all the hallmarks of the earlier one (threat to survival,

crisis, reflection, harmony, etc.), but was concerned largely with SHAS external relationships.

To summarize this brief overview of the project, we observed a series of 'unplanned' crises which facilitated (or coincided with) a qualitative shift in reflexive practices. These were nearly always manifest as a threat to the survival or continuation of the organization, the project or the meeting in question. Each time such a threat appeared, new practice emerged. In terms of our original research question(s), we had developed insights into the roles of intuition, emotion and reflexivity in organizational transformation and emergence. These insights were grounded in unplanned episodes that occurred whilst working on a series of specific organizational problems.

Both the transformation of SHAS and the conduct of the research occurred in a single knowledge-producing process, the broad nature of which can best be described in metaphorical terms as an ongoing, constructive and creative conversation with occasional bursts of new emergent order and insight during episodes of turbulence in an otherwise relatively smooth unfolding flow.

Insights from the practice of mode 2 management research

Having presented an account of a mode 2 project, we can now relate this example to the five features of mode 2 laid out earlier in the paper. We have dedicated more attention to the section on knowledge production in the context of application, partly because we feel that it needs most explanation, and partly because it best illustrates the means of delivering in the academic and practical dimensions of the project whilst providing a detailed context for discussion of the other features.

SHAS and knowledge produced in the context of application

By way of scene-setting, we should point out that this project is part of an ongoing series of problem-solving engagements through which we were exploring the applicability of complexity theory to organizations in partnership with a network of practitioners (MacLean and MacIntosh, 2002, offers an overview of these projects as a

set). Without being diverted from the main thrust of this paper, there was broad agreement within our network that complexity theory held some promise, but that much of what had been written was opaque on key issues (interested readers are referred to MacIntosh and MacLean, 1999, 2001; MacLean *et al.*, 2001 for details on the content of this research).

Specifically, we felt most management writings on complexity theory fail to address (at least explicitly) the question, 'how do the distinctive attributes of human beings affect the applicability of complexity theory, as developed in the natural sciences, to human systems?' Bypassing decades, if not centuries, of debate in social theory and philosophy, the majority of organizational complexity theorists offer radical insights into the working of organizations on issues such as strategy, change and creativity without considering the difficulties introduced by say, the action-structure debate, the introduction of reflexive capabilities or the role of self-awareness. At the outset this was a concern shared by both the academics and the chief executive of the organization concerned.

As we have stated, our initial research question was then translated to become: what are the roles of intuition, emotion and reflexivity in transforming SHAS?

In relation to SHAS's practical concerns, the question of complexity theory applied to social systems became translated into a concern for the appearance of new patterns of internal and external interaction for SHAS. This is equated to the development of new micro-processes of working and relating within the core team, new strategies for SHAS at the business level and a stronger collective identity for the organization.

That such developments would be relevant to the organization should be self-evident. The research questions were thus 'framed in the context of application' as befits a mode 2 project, attempting to deliver benefits to the organization, whilst generating data and insights in relation to the roles of intuition, emotion and reflexivity in organizational change.

Having described the initial conditions of the project, we can now attempt to summarize what was produced in terms of knowledge as the dynamic evolved and unfolded.

First, in relation to practical knowledge for SHAS in the conduct of its business, several key developments occurred. Perhaps the most significant of these was a realization that the organization was seeking to express its internal management processes in ways which mirrored the processes which underpin its audits. This has resulted in explicit plans and actions to develop management processes which are distinctive to SHAS and its history, as opposed to yielding to external pressure to conform to types and styles which are prevalent in adjacent government organizations. This has also been instrumental in building SHAS's identity, since the inspection process is something which all core team members practise and with which they all identify but which, until recently, they had viewed as separate from the management processes of SHAS as an organization. In a real sense this issue was the culmination of the project, since it gave rise to simultaneous developments in internal and external interactions whilst focusing and strengthening SHAS's identity. The Cromlix principles remain central to SHAS's view of how it aims to organize itself and conduct its activities.

In addition, SHAS developed a clear view of possible moves into new areas of activity, a new communications strategy and a new means of prioritizing initiatives and allocating resources, all of which emerged during project interactions and through engagement in dialogue addressing practical issues.

As regards the academic dimension of the work, we feel that our understanding of transformation processes within organizations developed considerably as a consequence of the project described here. From a broad question at the outset, the project was characterized by a progressive focusing around key issues and insights generated by the key episodes described in the empirical account.

A full account of the theory building dimension of the project in relation to emergence and strategic change is presented elsewhere (see MacLean *et al.*, 2001) but, in summary, we appear to have a situation where new patterns or strategies emerge episodically when individuals reflexively interact to transform their own emotionally stimulating unplanned experiences into collective interpretations and coordinated interactions. Our current position in relation to the research content of the project is that a particular process of inquiry triggered by unforeseen events both recognizes and gives rise to the occurrence of patterns, which, in stark contrast to views espoused in the majority of management writings on complexity

theory, we believe can be shaped and managed by coordinated reflexive practices which fully acknowledge the emotional and intuitive dimensions of the participants in the process.

In relation to the problem-solving nature of the work as described by Gibbons *et al.* (1994) and summarized earlier in this paper, it is perhaps worth noting that an 'aspect of continuous negotiation' was indeed a feature of the project. In this case, negotiation took two main forms; on the one hand there was an ongoing process of adjusting agreed practical actions and timescales to accommodate changing priorities and unforeseen developments in the internal and external context of the project. These negotiations were not so much around departures from a predetermined plan as they were about crafting an agreement on how to approach an unfolding reality which is largely unknowable in advance. On the other hand, negotiation focused on reaching (or not) collective interpretations of events and apparent patterns in behaviour – which in turn fed back into the other category of negotiation.

In this particular project, the negotiations were conducted in the spirit of the Cromlix principles, and were inextricably bound up with the reflexive nature of the work.

SHAS & transdisciplinarity

In terms of transdisciplinarity, the research was mainly informed from three angles – complexity theory, management (strategy) and psychology (psychoanalysis). At the outset, management theory was primarily concerned with issues of *what* SHAS did and might do. Complexity theory, perhaps the dominant input in this case, typically addressed *how* changes came about and the psychoanalytic theory most often addressed issues of *why*. It is worth noting that in this case (and possibly in most management research), the transdiciplinary nature of the project stems partly from the transdisciplinary nature of management itself (see Tranfield and Starkey, 1998), and partly from the transdisciplinary nature of complexity theory. However, our sense of transdisciplinarity in relation to this project is that it is primarily a consequence of the problem-solving nature of the project and that in Tranfield and Starkey's piece there is an unarticulated (and debatable) assumption that all management research is, or should be, of this type.

The kind of problem addressed in this example requires action which is informed from a variety of angles and, in the process of synthesizing new knowledge, delivers innovations which cannot then be reduced to the original inputs. It is therefore the action which delivers transdisciplinary outcomes from initially interdisciplinary processes, where the action is tightly bound up with the evolving problem. As the project evolves, transdisciplinary outcomes reflexively feed back in to the project, in the 'process of ongoing negotiation' and the project develops a more genuinely transdisciplinary feel over time.

This was exemplified in this project by our experiences of infusing complexity theory with psychoanalytics or vice versa, resulting in a possible development which would be neither wholly complexity theory nor wholly psychoanalytics, a transdisciplinary framework emerging in context from interdisciplinary beginnings.[3] We would therefore argue that transdisciplinarity develops from interdisciplinary, or intertheoretical perspectives in a way that is largely shaped by the nature of the problem and the key players in crafting solutions in the twists and turns of context. This is perhaps what is meant by 'problem solving on the move' (Gibbons *et al.*, 1994, p. 5).

SHAS: heterogeneous and diverse organization of research capability

That the research capability in the SHAS project was socially distributed derived partly from the division of labour as regards specialisms and skills within the group and partly from a more distributed appreciation of strategy and management. As regards the latter for example, some members of the SHAS staff had received training in management and research; one had an MBA, another a PhD etc. In relation to different skills and specialisms which might help with problem solving, the group (including the academics) had a range of capabilities to draw on ranging from IT, through team-building to PR and business planning.

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[3] There are some difficulties associated with the notion of transdisciplinarity in this context, e.g. Tranfield and Starkey (1998) argue that management itself is transdisciplinary, and similar claims are also made about complexity theory (see Waldrop, 1992).

These different skills were used to varying degrees at different stages of the project's evolution during the process of ongoing negotiation discussed in the previous section. Processes of analysis, interpretation and decision-making were largely concentrated into the reflection sessions where the majority of team members were present, although during such sessions individuals also presented opinions, reports etc. based on work which had taken place in SHAS, on an individual or collective basis, since the previous session.

Meeting locations moved around from SHAS's premises to the university and a variety of other private venues. The atmosphere in the research team was focused but relatively informal and certainly amicable, with research meetings bridged by relaxed social occasions and team meals on many occasions. Towards the end of the project, the team had cemented to such an extent that a frequent topic of conversation and occasional anxiety on all sides was 'life after the project'.

This being said, the internal constitution and behaviour of the team was relatively fluid. Only two meetings had all members present; one member departed about a third of the way through and an additional academic member joined for the second half of the project. Who was there was partly determined by, and partly a determinant of, what happened at the meeting.

It cannot be emphasized enough that everyone had a contribution to make to the research process which, in this case, is simply a different facet of the problem-solving process. Whilst at the outset there were clear distinctions in terms of primary goals and contributions, these had blurred considerably by the end, with the project almost tending toward homogeneity internally, the heterogeneity being preserved by influences and activities of individuals when working outside the project.

Of particular note is how this blend of heterogeneity and homogeneity evolved over time. In the first half of the project, the team might best be described as a heterogeneous array of skills and specialisms integrated by a 'framework of action' (Gibbons *et al.*, 1994, p. 4) which sought primarily to find ways of solving 'the problem'. However, by the second half of the project, the distinctions and boundaries between people and their respective areas of expertise seemed to give way to a

process whereby, through the transfer of skills and understanding between members, internal differentiation diminished to the extent that the team was composed of generalist co-researchers, willing to contribute to whatever needed doing, be it theory building or management process development, or whatever.

This internal homogenization seemed to go hand in hand with the development of genuine transdisciplinarity mentioned earlier, and is evidenced by such features as the contribution of SHAS's chief executive as a co-author of this paper, or the key role played by one of the academics in the subgroup which drove the adoption of a new product development process. The team-development dimension of this project and the notion of co-research (with the participation of team members as equals in one another's original domains) is a key consequence of both diversity at the outset and the onset of harmonization as the project unfolded and reflexive processes took effect.

SHAS and socially accountable and reflexive processes

Theory building and consensus on problem-solving activities were largely concentrated into the one- or two-day meetings described earlier. Each project meeting tended to contain a review of developments to date alongside reflections on possible interpretations and future possibilities. These sessions were concerned with viewing accounts and conversationally searching for insights and potential actions from the various theoretical perspectives, professional viewpoints and common-sense approaches at play. As such, the process tended towards the subjective and creative end of the spectrum, rather than the distanced and objective description often associated with some forms of action research.

The various lines of accountability involved in the project influenced, either directly or indirectly, the individuals at each meeting. For example, SHAS reports directly to a senior minister of the Scottish Executive, which has committed itself to improving the provision of healthcare in Scotland. As a result, the performance of bodies such as SHAS is under constant review. Moreover, healthcare is a matter of public interest and SHAS's activities are regularly scrutinized by both the press and a variety of pressure groups.

Team members also have accountabilties and standards in mind with regard to their individual professions (e.g. medicine, nursing, psychology and management) as do academics with regard to research standards, theory building, publication, etc. There are also a variety of day-to-day considerations such as interpersonal dynamics, project timescales, budgets etc. and, critically, delivery of practically useful results.

With all of these factors at play, it should be clear that the research team could not have functioned if it were not possible for the members to adopt other perspectives, so that project activities and outcomes were sensitive to the interests, aspirations and powers of those involved. Reflexivity was the engine of collective creativity for the project. For this particular project team, collective reflexivity was underpinned by the Cromlix principles and the success or otherwise of the project may be traced to the effectiveness of them in helping align individual reflexive processes.

The reflexive dimensions of the project were however not solely concerned with considering the perspectives of others. Indeed, they extended to, and became primarily concerned with, the processes of collective knowledge production both in terms of problem solving and theory building. Here, the project displayed an interesting dynamic. Whilst both dimensions were present throughout, in the first half of the project collective reflection sessions were more concerned with practical problem solving related to the development of SHAS than with the theoretical details of the research question. In the second half of the project, the balance tilted the other way. This may be a natural evolution in all such projects or particular to this case only, but is worthy of further investigation.

SHAS and a diverse range of quality controls

We have already cited Pettigrew's notion of the 'double-hurdles' facing management research, and in particular the need for scholarly quality to be combined with practitioner relevance.

Dealing first with the issue of practitioner relevance and value, the real evidence of value for SHAS must lie in the behaviour of the organization itself. In essence this highlights the link between change processes and organizational outcomes or performance, a dimension which Pettigrew

et al. (2001) identify as under-researched and poorly understood.

While there is not always a straightforward link between a particular initiative and overall performance, the negotiation of acceptable diagnostics and measures should be an ongoing facet of any project and, in this case, was addressed at virtually every meeting. As described earlier, the practical concerns of the SHAS management team focused on the development of new patterns of internal and external interaction. This equated to the development of new micro-processes of working and relating within the core team, new strategies for SHAS at the business level and a stronger collective identity for the organization. Our report on the development of SHAS in terms of both identity and working practice are in part endorsed by the contribution of the organization's chief executive to this paper and the fact that the academic institution was paid for our involvement as agreed at the outset – subject to the delivery of value to the organization.

In a sense we are addressing Pettigrew *et al.*'s (2001) concern for a better understanding of the link between process and performance by focusing away from notions of performance in a more abstracted, benchmark format toward performance as a negotiated, context-specific agreement on desired outcomes as expressed by the key stakeholders in the project (in this case the SHAS core team and the academic researchers). We would argue that such a focus is more consistent with the broad principles of mode 2; just as knowledge is produced in the context of application in the general sense, so knowledge relating to performance is inextricably bound up in a particular context.

The exchange of researchers' time for direct payment is something of a soft target for those who, for whatever reason, prefer to see contract or applied research as a necessarily less valuable, less pure form of engagement. The propensity for scientific objectivity to fall victim to the machinations of commercialism has been pointed out elsewhere (see Eden and Huxham, 1996). Undoubtedly, sloppy research and thinly disguised consultancy could be conducted under the auspices of mode 2. However, we would argue that as management scholars, the willingness of practitioners to pay directly for our research is one sensible diagnostic of the value which they attach to the process. Receiving payment usually

signals that the detailed terms of a problem-solving contract have been met. The fact that many practitioners would be unwilling to pay directly for involvement in a research project, or in some cases even to participate in research which has been heavily subsidized by another (often government) funding agency, would seem to substantiate claims that management research holds little of value or direct relevance for them, in the short to medium term at least.

However, the availability of direct funding and the satisfaction of practitioners in no way guarantees the academic quality of the research conducted. In this regard, the question of quality centres on academic output in general and, in particular, whether a system which is predominantly mode 1 in orientation can do justice to the outputs of mode 2 projects.

In our reading of Gibbons *et al.* (1994), the authors appear to adopt the view that in mode 2 processes, the knowledge produced is transient and context-specific to the extent that no generalizable theory can be developed and that theory is transferred by individuals moving between contexts and projects. If this is indeed the case, it represents a major obstacle to mode 2 researchers. In our experience however, this is not the case (though we should acknowledge that we are probably drawing on more project experiences than the single case reported here, in stating this view).

In the specific example of research into organizational change processes, mode 2 projects represent an opportunity to experience the issues which are being explored. This leads to a mirroring of content and process which, in turn, renders generalizable, process-level, theory building possible. If this argument is accepted, it may well point towards a typology of project for which mode 2 is a suitable method.

We would argue that mode 2 is particularly suited to addressing issues of change and knowledge management, which may in turn go some way towards explaining current interests in the approach. We feel that there should be no reason in management why mode 2 papers are any less acceptable to peer-reviewed journals (although perhaps only to those where a positivist bias does not exist). The need for new quality controls is thus debatable; the need for a broader range of controls in order to incorporate the interests of practice is not.

Discussion

Having reviewed the way(s) in which the features of mode 2 manifested themselves in the SHAS project, we can begin to address the other aim of the paper, i.e. the question of what, if anything, is distinctive about the version of mode 2 described in the SHAS project in comparison with its more familiar counterparts as detailed in the mapping presented earlier?

First, we believe that in discussing the individual features presented in the previous section it becomes apparent that they are actually overlapping facets of a single dynamic. Transdisciplinarity, context-specificity, research organization, reflexivity and quality control are mutually interdependent, increasing the significance of all five features being present in a particular project. In the light of this statement, the optional status of the five features in, say, action research (as argued earlier) takes on new importance. It could be argued that the complex pattern set up by the interaction between these features will be qualitatively different depending on the number of them (2, 3, 4 or 5) which are simultaneously present.

Second, the knowledge production process in the project developed in a way that was beyond the direct control of any individual or subgrouping. In that sense, what actually transpired was not designed in detail, since the existence of a detailed design may have unnecessarily constrained the project as it unfolded. In essence the details and features of each project emerged out of a heterogeneous network of interacting concerns, skills and perspectives. There was, however, clear agreement on the processes of relating and interacting between team members, particularly concerning ways of dealing with the uncertainty which the project would encounter and indeed create.

Third, whilst it is not immediately apparent from the example given here, there is a cumulativity of issues and outcomes at work across projects – as we state in the introduction to the project, the research questions in this case were generated through work on a prior project (and have given rise to related questions in subsequent projects as described in MacLean and MacIntosh, 2002).

Although it could be that this is just a coincidental feature of our own work, we believe that it is precisely this cumulativity which provides

both the academic and practical benefits which derive from mode 2 research at the level of substantive content (as opposed to process). This cumulativity is most easily and identifiably located in the realm of theory development which raises a question about the issue of generalizability.

In contrast with Gibbons *et al.*'s view of theory as context specific and transient in mode 2, Eden and Huxham (1996) point out that, with action research, generalizable outcomes are generated at the theoretical level and they invoke this as a measure of the quality of the research being conducted. We would not dispute this claim in some cases (for example on change management projects as argued in the previous section) but would suggest that the real issue is not that of generalizability but that of transfer.

As each project proceeds, theory is experimentally adapted and built. This 'interim theory' can of course be diffused through the process of publication, but is also held as a set of unanswered questions and embryonic concepts in the repertoires of those involved in the work. It is natural that these questions and models express themselves in subsequent, and apparently, unrelated projects.

Because of the interaction between theory and practice in mode 2 research, this cumulativity applies also to practice, although in a weaker form. We would suggest that it is this process of transfer that leads to the application of general theory, which is in fact interim theory, in new contexts and that this is most readily effected by the researcher through practice.

We would further argue that the publication aims of mode 2 research should not simply be 'generalizable' theory (since there are, after all, no generalized contexts), but rather a presentation that illustrates the process of both theoretical abstraction and meaningful contextualization, i.e. the general theory which might flow from mode 2 work is process-level theory, such as the theory of transfer that we begin to explore above.

Conclusions

In this paper we have sought to investigate the relationship between mode 2 as described by Gibbons *et al.* (1994) and a range of established management research approaches. We have also attempted to identify, what, if anything, is distinctive about the particular form of mode 2 research where all five features are simultaneously present in a single project. However, before drawing our conclusions, it is worth noting that in a critique of Levi-Strauss's structuralism, Patrick Baert points out that epistemological difficulties may arise 'when the object of research is also the medium through which that research becomes possible' (Baert, 1998, p. 28). This is precisely the situation we find ourselves in here.

We are engaged in a knowledge production process, the purpose of which is to examine the nature of knowledge production processes. We therefore proceed to draw conclusions with some caution.

Returning to the first aim of the paper, we have attempted to relate mode 2 as a concept to action research, clinical method, grounded theory and cooperative inquiry since each of these approaches may make a legitimate claim to producing knowledge 'in mode 2'. The process of relating them to the framework developed by Gibbons *et al.* has highlighted possibilities for the development of each approach, as well as providing a useful basis for dialogue between researchers from each school of thought. We will aim to provide an example of input to such dialogue below as we address the second aim of our paper.

We have also argued that the specific form of mode 2 where all five features are present (we will call it 5mode2) does differ, in both its conduct and the character of its output, from any of the other approaches we have considered in this paper.

5mode2 is similar to action research (or at least in so far as it is depicted in Table 1b) but action research does not necessarily require diversity in terms of either the disciplines, participants or organizational location(s) involved. Action research of the type depicted in Table 1b also tends to emphasize a relatively objective and scientifically distanced stance (see Eden and Huxham's twelve contentions for action research including references to orderliness, triangulation, validity and generalizability, 1996, p. 84), which differs from the more subjective and interpersonally creative nature of the outputs from the 5mode2 project presented here.

5mode2 is closer still to cooperative inquiry, in that we have stated that the SHAS project progressively migrated towards a position where the participants became equal co-researchers. However,

many of the cooperative inquiry projects reported in the literature take place within a single organizational setting, a single disciplinary setting or both (Heron and Reason, 2001). The SHAS project did encompass different disciplinary perspectives (complexity theory, management and psychodynamics) but even this example could have featured more organizational diversity by for example including representatives from government, healthcare providers or pressure groups in the research team.

We have also considered the contexts within which a 5mode2 approach might be best suited. We have argued that in 5mode2 projects, the separation of a dynamic into a problem-solving and a research dimension is somewhat artificial. This being the case, it may be that 5mode2 research processes are best suited (and perhaps only suited) to the investigation of situations in which action leads to change; indeed, we might argue that mode 2 is perhaps the only consistent way of looking at change, i.e. 'from the inside' of a dynamic which can only be accessed through experience. Furthermore, we have argued that, in these specific conditions, the practitioner might (and perhaps should) be willing to pay directly for the research.

Our experiences in the SHAS project have led us to question the nature of knowledge produced in 5mode2 projects. Here, we are reminded of Susman and Evered's arguments surrounding a shift away from positivist grounds (1978) and the somewhat depressing response that nineteen years later, Eden and Huxham (1996) report action-oriented approaches still experiencing difficulty in finding acceptance on the grounds that they are 'not science' (p. 78). We believe that 5mode2 has much to offer both the academic and practitioner communities, but that a serious debate about the epistemological nature of management knowledge, with a more open embrace of constructionist perspectives than has been the case to date, should increase in priority.

Finally, we would like to finish the paper by highlighting an obvious area for further work. We pointed out in the introduction to the paper that we would simply accept the five features of mode 2 presented by Gibbons *et al.* Undoubtedly for us, the combination of these features in what we have called 5mode2 has produced an enjoyable, rewarding and valued (by the practitioners concerned at least) research process. However, given that we have argued that it is the precise cocktail of these five features which give 5mode2 the characteristics we have described here, it would seem obvious to question the choice of these five features.

In the first instance, these questions might relate to the appropriateness of Gibbons *et al.*'s chosen features in the context of management research as opposed to the natural sciences and technological research where they were developed. A secondary set of questions might be associated with the features themselves in terms of both number and character, e.g. why not 3mode2 or even 7mode2?

Having argued for the value of using 5mode2, we feel that there is also a need for a more considered theoretical examination of the choice of features. Interest in mode 2 provides a welcome opportunity for management research to embrace practice-oriented approaches and bridge what Starkey and Madan describe as 'the relevance gap' (2001). The features of mode 2 also provide a framework within which meaningful dialogue might take place between users of the various approaches discussed in this paper (along with users of many other approaches which we chose not to consider). Hopefully in time that debate may turn its attention to Gibbons *et al.*'s (1994) presentation of mode 2 itself, and thus generate a version better suited to dealing with the specifics of management research.

Acknowledgement

References

Baert, P. (1998). *Social Theory in the 20th Century*. New York University Press, New York.

Coveney, P. and R. Highfield (1996). *Frontiers of complexity*. Faber & Faber Ltd, London.

Crotty, M. (1998). *The Foundations of Social Research: meaning and perspective in the research process*. Sage Publications, London.

Denscombe, M. (1998). *The Good Research Guide for Small Scale Social Research Projects*. Open University Press, Buckingham.

Eden, C. and C. Huxham (1996). 'Action research for management research,' *British Journal of Management*, **7**(1), pp. 75–86.

Gibbons, M., C. Limoges, H. Nowotony, S. Schwartzman, P. Scott and M. Trow (1994). *The New Production of Knowledge: the dynamics of science and research in contemporary societies*. Sage Publications, London.

Glaser, B. G. and A. L. Strauss (1967). *The Discovery of Grounded Theory: strategies for qualitative research*. Aldine, New York.

Goldstein, J. (1999). 'Emergence as a Construct: History and Issues,' *Emergence*, **1**(1), pp. 49–72.

Gopinath, C. and R. C. Hoffman (1995). 'The Relevance of Strategy Research: practitioner and academic viewpoints,' *Journal of Management Studies*, **32**(5), pp. 575–594.

Hendry, J. and D. Seidl (2002). 'The Structure and Significance of Strategic Episodes: social systems theory and the routine practices of strategic change,' paper presented at EURAM II, Stockholm, May 2002.

Heron, J. (1996). *Co-operative Inquiry: research into the human condition*. Sage Publications, London.

Heron, J. and P. Reason (2001). 'The Practice of Co-operative Inquiry research "with" rather than "on" people'. In: P. Reason and H. Bradbury (eds), *Handbook of Action Research: participative inquiry and practice*. Sage Publications, London.

Hodgkinson, G. P. (ed.) (2001). 'Facing the Future: The Nature and Purpose of Management Research Re-Assessed', *British Journal of Management*, **12**, Special Issue, pp. S1–S80.

Huff, A. S. (2000). 'Changes in Organisational Knowledge Production: 1999 Presidential Address,' *Academy of Management Review*, **25**(2), pp. 288–293.

Huff, A. S. and J. O. Huff (2001). 'Re-focusing the Business School Agenda,' *British Journal of Management*, **12**, Special Issue, December 2001, pp. S49–S54.

Lewin, K. (1946). 'Action Research and Minority Problems,' *Journal of Social Issues*, **2**, pp. 34–46.

MacIntosh, R. and D. MacLean (1999). 'Conditioned Emergence: a dissipative structures approach to transformation,' *Strategic Management Journal*, **20**(4), pp. 297–316.

MacIntosh, R. and D. MacLean (2001). 'Conditioned Emergence: researching change and changing research,' *International Journal of Operations and Production Management*, **21**(10), pp. 1343–1357.

MacLean, D., M. Mayer, R. MacIntosh and S. Grant (2001). Reflexive Strategizing, Proceeding of the Workshop on *Micro Strategy and Strategizing*, European Institute for Advanced Studies in Management, Brussels, 1–3 February 2001.

MacLean, D. and R. MacIntosh (2002). 'One Process, Two Audiences: on the challenges of management research,' *European Management Journal*, forthcoming.

Park, P. (1999). 'People, Knowledge and Change in Participatory Research,' *Management Learning, special issue: the action dimension of management: diverse approaches to research, teaching and development*, **30**(2), pp. 141–158.

Partington, D. (2000). 'Building Grounded Theories of Management Action,' *British Journal of Management*, **11**(2), pp. 91–102.

Pettigrew, A. (1995). Distinguished Scholar Address to the Organisation and Management Theory Division of the US Academy of Management, Vancouver, August 1995.

Pettigrew, A. (2001). 'Management Research After Modernism', *British Journal of Management*, **12**, Special Issue, December 2001, pp. S61–S70.

Pettigrew, A. M., R. W. Woodman and K. S. Cameron (2001). 'Studying Organizational Change and Development: challenges for future research,' *Academy of Management Journal*, **44**(4), pp. 697–714.

Reason, P. (1999). 'Integrating Action and Reflection Through Co-operative Inquiry', *Management Learning, special issue: the action dimension of management: diverse approaches to research, teaching and development*, **30**(2), pp. 207–226.

Reason, P. and H. Bradbury (eds) (2001). *Handbook of Action Research: participative inquiry and practice*. Sage Publications, London.

Schein, E. (1987). *The Clinical Perspective in Fieldwork*. Sage Publications, London.

Schein, E. (2001). 'The Clinical Method'. In: P. Reason and H. Bradbury (eds) (2001). *Handbook of Action Research: participative inquiry and practice*. Sage Publications, London.

Starkey, K. and P. Madan (2001). 'Bridging the Relevance Gap: aligning stakeholders in the future of management research,' *British Journal of Management*, **12**, Special Issue, December 2001, pp. S3–S26.

Susman, G. I. and R. D. Evered (1978). 'An Assessment of the Scientific Merits of Action Research,' *Administrative Science Quarterly*, **23**(4), pp. 582–603.

Tranfield, D. and K. Starkey (1998). 'The Nature, Social Organisation and Promotion of Management Research: towards policy,' *British Journal of Management*, **9**(4), pp. 341–353.

Waldrop, W. M. (1992). *Complexity: the emerging science at the edge of order and chaos*. Touchstone, New York.

Appendix

Table 1a. Mode 1 and the five features of mode 2

	Mode 1
Knowledge produced in the context of application	Like mode 2, mode 1 characterizes a range of methodologies which might be described as traditional or positivist science. However, across the range of approaches which might be regarded as mode 1, the knowledge is not produced in the context of application. Rather it is framed, driven and produced in a predominantly theoretical context.
Transdisciplinarity	Gibbons *et al*. point out that mode 1 is disciplinary as opposed to transdisciplinary (1994, p. 3).
Heterogeneity and organizational diversity	Whereas mode 2 focuses on multi-faceted problems, which are typically addressed by heterogeneous teams populated from a range of organizations, this is not the case with mode 1. In mode 1 problems are usually tackled by homogeneous teams from a single (academic) organization.
Social accountability and reflexivity	Given the prevalence of both theoretical and organizational homogeneity in mode 1, it is less likely to produce true social accountability. Also its preference for positivist approaches reduces the likelihood of reflexivity being a key feature of the knowledge production process, or at least the likelihood of this being an acknowledged feature of the research.
Diverse range of quality controls	Mode 1 is typified by a comparatively uniform approach to quality control. Outputs are generally evaluated from the standpoint of the particular discipline concerned and the evaluation itself is usually driven by senior academic peers.

Table 1b. Action research and the five features of mode 2

	Action research (Eden and Huxham, 1996)
Knowledge produced in the context of application	Although we have chosen to work with a particular definition of action research, almost all of the variants which we are not explicitly considering would also sympathize with the need for knowledge to be produced in the context of application. Indeed this seems obvious given the 'pragmatic focus' of action research and the fact that it necessarily involves a matter of 'genuine concern' to the organization (Eden and Huxham, 1996).
Transdisciplinarity	The transdisciplinarity (or otherwise) of action research is not typically a key feature of discussions of the methodology. Undoubtedly a transdisciplinary approach is possible but it is not a prerequisite condition for most forms of action research.
Heterogeneity and organizational diversity	Mode 2 highlights the use of heterogeneous teams and action research typically involves teams of practitioners and at least one academic. In this sense the team is heterogeneous and spans at least one organizational boundary. Again, it is possible for an action research intervention to incorporate far more diversity (either in terms of team membership or organizational location) but this is not necessary.
Social accountability and reflexivity	Given the level of interaction with the user community, action research might reasonably claim increased levels of social accountability over more traditional (mode 1) approaches. It is also true that action research is reflexive in that it should generate 'emergent theory' and that a 'high degree of orderliness is required in reflecting about, an holding on to, the emerging research content of each episode of involvement in the organisation' (Eden and Huxham, 1996).
Diverse range of quality controls	Action research has a long history of use in the social sciences. It operates within, and can survive, the peer-based evaluation process linked with mode 1 (as witnessed by journal articles, books, etc). However, Eden and Huxham point out that the 'the history and context for the intervention must be taken as critical to the interpretation of the likely range of validity and applicability of results.' (1996).

Table 1c. Cooperative inquiry and the five features of mode 2

	Cooperative inquiry
Knowledge produced in the context of application	'Co-operative inquiry is . . . a form of action research: it is concerned with revisioning our understanding of the world, as well as transforming practice within it' (Reason, 1999, p. 208). From this description it is obvious in cooperative inquiry, as in more traditional forms of action research, knowledge is by definition produced in the context of application.
Transdisciplinarity	Cooperative inquiry involves a group of people coming together to explore ideas. This collaborative dimension to the research process may increase the likelihood of crossing disciplinary boundaries but many cooperative inquiry projects are successfully performed within the confines of a single discipline.
Heterogeneity and organizational diversity	This approach is described as being 'research with people rather than research on people' (Reason, 1999, p. 208). However, as with action research the heterogeneity or homogeneity of the research team is a design choice made by the participants in the process. The same choice applies to the organizational diversity of the inquiry group, with some projects reported as being conducted within a single organization and others involving more disparate membership.
Social accountability and reflexivity	The research process associated with cooperative inquiry is explicitly participative, with everyone having a say in the questions to be addressed, the concepts used and the conclusions reached (Reason, 1999). In this sense cooperative inquiry provides greater accountability than many research methods (arguably including action research) where these issues are the domain of the academic expert. The process also features 'intentional interplay between reflection and sensemaking on the one hand, and experience and action on the other' (Heron and Reason, 2001, p. 179).
Diverse range of quality controls	Proponents of cooperative inquiry argue that the outcome of good research is 'not just books and academic papers . . . but also the creative action of people to address matters that are important to them' (Reason 1999, p. 208).

Table 1d. Grounded theory and the five features of mode 2

	Grounded theory
Knowledge produced in the context of application	The originators of grounded theory developed the approach to ensure closeness to the context of application, in their view research conducted in this way is practically oriented in that it is 'grounded in the data' (Glaser and Strauss, 1967). The approach is also characterized by the 'constant checking of the theory against the findings DURING the process of research' (Denscombe, 1998, p. 215).
Transdisciplinarity	Given that grounded theory attempts to build theory from the data available it has been observed that 'grounded theories are not necessarily reliant on established theoretical perspectives' (Partington, 2000, p. 93). In this sense, grounded theory ignores rather than transcends existing disciplinary boundaries.
Heterogeneity and organizational diversity	As with action research and cooperative inquiry, grounded theory is compatible with the principles of heterogeneous research teams located across different organizational settings. It is not, however, a requirement, nor perhaps even a common feature, of cited applications of the approach.
Social accountability and reflexivity	Grounded theory projects are typically led by the academic community and might therefore be viewed as less socially accountable than some methodologies. However, theories developed in this way are the result of 'continually testing and modifying the coding scheme' (Partington, 2000, p. 99) which requires the researcher to adopt a role which is both creative and reflexive.
Diverse range of quality controls	Grounded theory focuses on the discovery of theory rather than the verification of theory (Glaser and Strauss, 1967). This in itself introduces difficulties in terms of quality control but interestingly a review of exemplary grounded theory studies described their output as predominantly 'of the mode 1 type' (Partington, 2000, p. 95).

Table 1e. Clinical method and the five features of mode 2

	Clinical method
Knowledge produced in the context of application	In research conducted using the clinical method, the focus is on an issue identified by the organization (Schein, 1987). This sounds very similar to the definition of action research offered by Eden and Huxham, but Schein argues that clinical method studies are initiated by the practitioner, whereas action research is initiated by the academic (Schein, 2001).
Transdisciplinarity	As with the other approaches, any given clinical method project could adopt a transdisciplinary stance, but this is not a central feature of this style of research. Indeed it might be argued that since such projects often feature the interaction of a single 'clinician' with an organization, transdisciplinarity is unlikely.
Heterogeneity and organizational diversity	Each clinical intervention necessarily involves a qualified clinician who is external to the organization concerned but again this is a comparatively limited form of heterogeneity and organizational diversity in the research process.
Social accountability and reflexivity	Given the acknowledged similarities between this approach and consultancy, its social accountability as a research methodology might be called into question. What is not in question however, is the highly reflexive nature of the process, for the clinician at least (Schein, 2001).
Diverse range of quality controls	Since this approach is initiated by the practitioner, quality is often assessed in terms of success (or failure) to resolve the issue(s) concerned. Academics using the clinical method may well face difficulties in satisfying these criteria whilst simultaneously attempting to meet the requirements of more traditional, peer-based, mode 1 quality standards.