Chalk and Cheese: BPR and ethnomethodologically informed ethnography in CSCW

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Recently a number of methodological approaches have been presented as proffering radical solutions to organisational change. This paper discusses one such approach, Business Process Re-engineering (BPR) and contrasts it with Ethnography, a method that has gained some prominence in CSCW. The paper suggests, using a number of empirical examples, that despite some superficial similarities, the two approaches differ markedly in their analytical purchase. In particular, ethnography's emphasis on understanding 'systems' within the situated context of the work setting rather than as an abstract model of process, has consequences for the successful identification and implementation of system re-design.

Introduction

> "Do you know what you are asking? You are asking, 'Could you tell me, without knowing what kind of world we are in, what a theory would look like?' ."
> Harvey Sacks

Sack's reply to a fellow sociologist's request concerning method was designed, as Lynch points out (1991), to question the widely held presumption that, regardless of subject matter, there can be a unitary method for scientific enquiry.We also wish to suggest that Sack's insight has as much relevance for recently developed policies for organisational intervention as much as it has for developing theories of human conduct.

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Our particular concern in this paper is to contrast one such programme of organisational intervention, Business Process Re-engeering (BPR), with ethnography, a sociological approach to work study prominent in CSCW. Both approaches challenge orthodox structured methods for system design and stress the vital importance of investigating organisations as a preliminary for proposing changes. However, beyond this there are some crucially significant differences between the two approaches which have a bearing on CSCW. We focus here on Business Process Re-engineering (BPR), not because it is the 'best' or even the 'trendiest' of the available programmes, but because it is self-confessedly the most 'radical', systematic, and far-reaching of the change management techniques now available.[1] We feel that an examination of its promise and some of its limitations is overdue not least because it poses a challenge to sociologists working in CSCW.

There is by now a substantial literature on BPR (see for example Hammer and Champy, 1993; Harrington, 1991; Davenport; 1993; Jacobson et al, 1995), and we do not propose to re-invent the wheel by elaborating its practices unnecessarily. Instead, we are concerned with the degree to which, if at all, BPR's systematic approach to work, organizations, and IT systems is likely to supercede the 'ethnographic'[2] practices of sociologists within CSCW. In examining the methodological presuppositions of BPR, therefore, we are not seeking to make a moral point, nor attempting to assess whether BPR can and does live up to its radical promise. Our interest lies precisely in the fact that a challenge to CSCW generally and to the sociological practice of ethnography is, implicitly or explicitly, being made.

The commitments of BPR

We suggest that, despite its varied guises, BPR can be distilled into a few essential methodological commitments.

Although BPR can be variously characterised as a recipe for fundamental change[3] or as a more modest and progressive refinement of business objectives in terms of core processes (Harrington, 1991), the role of IT is almost universally seen as critical. In particular, IT is significant because it is capable of magnifying the accuracy and the scope of measurement. Thus, "Measurements are key. If you cannot measure it, you cannot control it. If you cannot control it you cannot manage it. If you cannot manage it you cannot improve it." (Harrington, 1991). Nevertheless, despite placing IT at the centre of the change management process, BPR is predicated on the recognition that traditional design has, in many instances, failed to produce the productivity gains anticipated for business, especially in its 'white collar' sectors. That is, whilst being fundamentally a method for changing the organization, implicitly at least, it problematises and challenges both orthodox structured approaches to systems design and also some characteristic stances in CSCW. In the first instance, BPR proponents

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[1]   Proponents of BPR can make some startling claims Jacobson et al for instance point out, "There are estimates that 50 to 70% of companies that try it fail I think the risk of failure is even higher " (1995, preface) They are, of course, implying very high risk but even higher reward In other words, the word radical here has a surgical sense

[2]   We are extremely conscious of the extent to which this is a gloss on many and varied practices.

[3]   For instance by Hammer (1993) in his famous injunction to stop 'paving over the cowpath'.

create a distance from the modelling activities associated with traditional design by arguing that,

> "all these techniques come from the computer world. It is as though we learned to think in a way that works for computer systems, and we realized we could apply the same way of thinking to describe an organization   we find this unacceptable .. we shall introduce .... the basis for a modelling technique for people, not machines." (Jacobson et al, 1995: 36)

In this respect, it appears that BPR proponents are establishing analytic procedures which go to the very heart of CSCW concerns. It is certainly hard to read the claim that the design and implementation of IT systems must orient to business goals as anything but a demand for new approaches to 'requirements'.

The distinction between BPR and traditional approaches to design is further established by an argument which respecifies the relationship between 'what happens now' and procedures for respecifying activity. Whereas structured design has to a greater or lesser extent reduced the importance of the physical model of the current system (see Yourdon and Constantine, 1979; Benyon, 1992a; Benyon, 1992b), BPR seems to re-establish the problematic relationship between the two, something that ethnographers have also tried to do (Randall et al 1992). That is, it seems, as with ethnography, to be interested in the gap between actual practice and idealised conceptions of practice. Thus, Davenport argues that BPR "implies a strong emphasis on *how* work is done within an organization, in contrast to a product focus's emphasis on *what*." (Davenport, 1993) For those who see ethnography merely as a matter of data collection in naturalistic environments, BPR advocates seem to be suggesting something which is both consistent with 'ethnographic' enquiry whilst providing an answer to some critics of ethnography by providing strategies for 'envisioning' alternatives which meet at least one criticism levelled against ethnography, namely, that it is inherently conservative.[4] Harrington (1991) provides a more complete description of the appropriate methods, for instance, by emphasising the 'process walkthrough' as a principal method for understanding how work is done. Hence one finds:

> "One of the key activities in the BPI [Business Process Improvement] walk-through process is to observe the activity being performed. Immediately after the interview, the interviewer and the interviewee should go to the work area to observe the activity discussed in the interview. Observing the individual tasks being performed will stimulate additional questions As Dr. H. James Harrington puts it, "You never really understand the activity until you do it yourself. If that isn't possible, the next best alternative is to observe the activity while it is being performed, and ask a lot of questions." (Stowell, 1991)

Such insights would, at least as far as CSCW is concerned, be both modest and somewhat unoriginal were it not for the extra dimension which BPR seems to provide, that of socio-technical systematicity. The typical 'problem specifications' and comparisons one finds in BPR, for instance between the formal process and actual practice, the differences in the way employees perform tasks, the relevance of training requirements, the existence of process problems and 'roadblocks', and so on, constitute foci which all overlap to some degree with those of typical ethnographic studies.

Moreover, analysts such as Harrington recognise, as do ethnographers, that not only are process specification and the activity in question not the same thing, but that deviation from the specification is explicable by a whole range of factors, including the

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[4]   We do not, of course, accept that ethnography is a 'conservative' enterprise and have argued elsewhere that orienting to design is the fundamental problem (see Hughes et al , 1992)

possibility that there may be potentially positive reasons such as finding a better way to do things, or at least compensating for problems. In particular, BPR stresses the role of 'chronic' problems in working life, because, it is argued, chronic problems are often difficult to see. This in turn is because methods for completing processes often adapt to chronic problems. That is, people often find ways round persistent obstructions and the fact that work can be done effectively is sometimes despite problems of this sort. This is both an argument that ethnographers have advanced, and one which has a considerable, but sometimes unrealised, importance in the evaluation of technologies.[5]

To return to the main point, however, and in a nutshell, the systematicity that BPR offers may appear attractive because it addresses both the weaknesses of traditional IT design and the glosses on organizational context which CSCW has tended to provide by, on the face of it, providing both a concern for current context and practice and a systematic technique for producing alternatives. By way of example, an adequate picture of what is going on in the organization and how to transform it requires, for Davenport, a holistic approach which encompasses not only every dimension of an organization's activities, but also a method for designing the future. Thus, "The term process innovation encompasses the envisioning of new work strategies, the actual process design activity, and the implementation of the change *in all its complex technological, human, and organizational dimensions.*" (Davenport, 1993)

That is, BPR promises a complete and systematic understanding of how the organization currently functions and what has to be done in both work and technological terms to provide radical success in redesign. Nevertheless, asserting that one has provided an 'all singing, all dancing' solution to the problems raised within CSCW and elsewhere is a long way from demonstrating that the assertion is valid. Merely because a system is offered which *claims* to deal with problems of appropriate technology as well as appropriate organizational structure does not make it so. We reiterate that we are not trying to provide either an ethical critique of BPR nor trying to argue that it is unlikely to achieve the goals it sets. We do want, however, to raise issues that spring from the apparent similarity of some of its procedures to ethnography and, quite distinctly, from the apparent systematicity it offers.

BPR's commitment, and distinctively from ethnography, is conceptualizing what goes on in organizations as a matter of *understanding and defining 'processes'*. Moreover, these processes are unequivocally defined according to their measurable relationship to the customer. Thus, Harrington[6] describes a process as:

"any activity or group of activities that takes an input, adds value to it, and provides an output to an internal or external customer Processes use an organization's resources to provide *definitive* results."

A Business Process in turn is defined as,

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5   One caveat here is that occasional problems may be equally significant, but in different ways For instance, in Safety Critical environments occasional problems are potentially disastrous precisely because operators may be unfamiliar with them. One argument for ethnography is that prolonged exposure to the domain usually prompts recognition of occasional but nonetheless important 'problems'

6   We cite Harrington more than other proponents of BPR not out of any conviction that his work is the 'best' or even the most 'typical' of the field, but because he, in our view spells out the method in rather more detail than most

"All service processes and processes that support production processes. A business process consists of any *logically related* tasks that use the resources of the organization to provide defined results in support of the *organization's objectives*." (our italics).

In other words, BPR makes use of an orthodox rationalistic perspective on organizational goals, but orients it to a set of explicit change management objectives, such as improving effectiveness, efficiency, and adaptability or implementing control systems. The analytic work involves identifying a set of defined tasks which are to do with meeting organizational objectives, and which are construed in terms such as determining where the process boundaries will be, and what the inputs and outputs to the process are. Key aspects of this work might, for instance, include identifying suppliers to, and customers of, the process identified, along with "who is performing the key operations.". Thus, and for instance, determining process boundaries has to do with "identifying the ownership of the process and where it begins and ends." (Harrington, 1991), with a view to assessing the strategic relevance of each process.[7]

As one might expect from a largely top-down methodology, the point of investigating how operations are performed is to establish the 'health' or otherwise of the processes in terms of the business objectives of the organization. A sample method advocated by Harrington for doing precisely that is to identify 'multiple buffers', which produces the 'queuing up' of stages. Indeed, a recurring theme in all BPR versions is the distinction between the logical connection between activity, which tends to be horizontal, and the vertical connections of the organization. It is this distinction, perhaps more than any other which has informed the developing interest in Workflow. Workflow is defined in BPR as the method for transforming input into output, and is one of the primary characteristics of a process, and in many respects is the key to understanding what is distinctive about BPR.

That is, and to summarise, the analytic force of BPR, its interest in the observation of current practice is solely to identify, from the top down, what is wrong in terms of the specified business goals and the means for pursuing them. Further, what is wrong is to be defined in terms of measurable obstructions to efficiency with a view to producing alternative structures in which those obstructions have been eradicated. These obstructions may, of course, be of more than one kind and may include, for example, the generation of error, the existence of 'poor quality' costs (waste), and 'multiple buffers'. In any event, the presupposition is that analysing current work can unproblematically lead us to conclusions concerning what it is that causes 'problems' to arise. The presumption is that measurable benefits will be obtained precisely from the identification, measurement, and respecification of process. These benefits, and we highlight them only to provide a flavour of the direction in which this kind of analysis takes us, conventionally include the elimination of duplication, error proofing, automation, and standardization. It is the latter that will primarily concern us below.

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[7] It would, therefore, be a mistake to view BPR as a *naive* reformulation of Taylorist principles for the white collar world. Although aspects of BPR are unmistakeable Taylorist in their force, the method recognises that 'informal' aspects of organization may impinge on the success or failure of objectives. Thus and for instance, Harrington refers to the problem of qualifying the 'culture and politics' surrounding the process

The view from ethnography

It will come as no surprise that we do not, in fact, accept that the practices of the process walkthrough and related techniques are similar to the conduct of ethnography in any but the most superficial ways. Although on the surface, at least, much of what is being advocated here is similar to what has been claimed for ethnography, to restate a point we and others have made elsewhere (see Hughes et al, 1994; Button and King, 1992; Anderson, 1994; Pycock et al, 1994), ethnography is not in any sense a unitary method, if indeed the word method is applicable at all to its varied practices, but is a gloss on various and different *analytic* frameworks. Nevertheless, an ethnographic stance arguably entails a minimum orientation, which has to do with seeing the social world from the point of view of participants. One 'take' on this, and one which has strongly influenced our own work, is the ethnomethodological one, in which member's methods for accomplishing situations in and through the use of local rationalities becomes the topic of enquiry. The relevance of such a perspective to systems design issues lies in the fact that this respecification of sociology draws attention to the way in which orderliness can be viewed, *inter alia*, as a feature of the sense making procedures participants use *in the course of their work.*. The explication of sense making machinery has often invoked work activity as a manifest 'working division of labour' (See Anderson, et al, 1989, Hughes et al, 1994). In other words, and to put it simply, although individual workers have individual tasks to perform, they are also and necessarily individuals-as-part-of-a-collectivity, and much of their work consists in the ability to organise the distribution of individual tasks into an ongoing assemblage of activities *within* a 'working division of labour'. Individuals, that is, orient to their work according to 'egological' principles and their own 'horizons of relevance' but have to be attentive to the work of others in order to organise the flow of work in a coherent way. This focus has arguably provided an important analytic tool for the examination of work as lived experience, providing important clues as to both how work was accomplished and perhaps, from a systems analytic perspective, why work was done the way it was.

Our point is that, despite the apparent similarities, the *analytic* interest of BPR investigation is irrevocably different from that of ethnography as outlined above. This is not to claim that BPR is somehow mistaken or misguided, but that methods must be judged on the problems they are designed to deal with. BPR's strategy is decompositional. It derives from its clearly stated objectives, which include providing a measurement system for organizations and a means to standardize processes. 'Problem' and 'solution', that is, exist in a hermetic relationship in which each can only be understood as aspects of 'healthy' and 'unhealthy' processes. Observation of the current state of play is conceived in terms of the analysis of task performance, the obstructions which may be associated with it, and evaluation and comparison of different task performances. In other words, and put simply, when a BPR analyst is observing work, s/he is either looking for what is wrong with it, and defining it as process failure, or at examples of 'good' strategies which can be codified into the new processes. At root, although sources of discretion and variation may be of some interest, the task of BPR is either to eliminate them or provide methods for their universal application. The solution to organisational 'problems' lies in understanding

how, for instance, 'culture and politics', methods of 'task performance', or what have you can be conceived as variations which can be removed, wherever possible.

Now there may be many good reasons from a business point of view, for undertaking such analyses, and discovering sources of error, redundancy, or obstruction is likely as not going to prove valuable to the organization. The key question, however, is whether understanding these issues as *process failures* is either necessary or adequate. After all, practitioners of differing styles of observation, whether it be ethnography, task analysis, BPR process walkthroughs, or participative design techniques, will all recognise occasions when they have construed situations as 'obstructions', 'duplications', or 'problems'. In BPR, however, they are problems of process because the analyst has defined them that way according to the hierarchy of measurable goals and means which constitute the organization's objectives. That is, any possibility that such problems can be understood in several ways, including the perspective of the participant to the work, *and that participants' perspectives may have consequences for organizational objectives*, is excluded.

Specifying a 'problem' in other words is not, as it would be for the ethnomethodologically informed ethnographer, a matter of understanding local rationales for 'doing work'. The point is that the strategies for 'doing work' uncovered by the latter analytic are likely to be explications of *reasons for doing it this way* as well as some problems encountered.

The particular claim of ethnography, at least as we understand and practise it, lies less in its ability to identify 'why a current system is not working', which is the force of BPR analysis but, at least in a sense, 'how it *is* working'. That is, the ability of the BPR analyst to identify processes as meeting, or not as the case may be, the organisation's objectives, depends critically on the system-oriented approach. In contrast, the value of ethnography for systems design cannot be separated from its focus on the accomplishment of work from the point of view of parties to the work. Ethnographic methods seek to uncover features of the sociality of work and its organisation; how the work 'gets done'; the conversations, gossip and asides; the interruptions and mistakes; the details of the how the paperwork and computer work are practically accomplished as part of routine, ordinary, taken-for-granted, 'real world' work activities. A related focus is *making visible the judgement and discretion* that workers need to use in response to the various contingencies that arise in even apparently routine activities. Making visible because the range of tacit skills and local knowledge can be elusive, 'taken for granted' and so on such that they may otherwise, perhaps, become visible only when routines or organisations break down.

This approach to work as socially organised is designed to illuminate the rationale brought by people at work to the various tasks, their 'problems', and the 'things to do' that they are confronted with in the course of their daily working lives. In a nutshell, the ethnomethodological interest in how work is done highlights the fact that human activity in work may be deeply relevant to the working of the organization in ways that are not apparent when one only looks for what is wrong. The consequences of such a choice, we would argue, are substantially different from those that result from BPR analysis. That is, the point of ethnography is not to highlight various obstructions and 'blockages' that exist in the system, for this is something that may be more or less

adequately done by various kinds of analysis, including those done by members themselves, of which BPR is only one.

We should perhaps stress that our task is not to deny the possible benefits of process redesign exercises to particular organisational interests, for it would be quite plausible to claim that such benefits do indeed, at least sometimes, accrue. Rather, we are attempting to problematise BPR as a *systematic* solution to business problems by proffering ethnographic analysis as a complementary mode. In what follows we use vignettes drawn from organisations in the retail financial sector where both ethnographic studies and process re-design activities of some kind have been undertaken. What we are aiming to show is how some typical categories that might be deployed in ethnographic analysis are radically different in consequence to those typical of BPR, such as 'duplication elimination', 'error proofing', 'standardization' and so on. Here, and they are merely exemplars, we utilise categories such as skill and local knowledge, although we might equally well have dealt with issues of time, unpredictability and interruption, and hope to do so elsewhere.

Ethnographic approaches seem especially valuable and insightful in discovering and 'unpacking' the often highly situated and tacit notions of skill that promote the practical accomplishment of work as a 'routine, everyday' activity; subtle notions that may well prove essential if 'skills' are to be understood as relevant to system design. The sense of 'skill' that we are interested here is that of 'knowing how', or competency. In this respect the competencies involve making sense of, and thereby being able to make available to others, what is 'going on'. These could be described as competencies required for 'mutual intelligibility' on the part of the members of a work team - in producing what might be accepted as visibly 'rational' decisions or actions - 'rational' that is, in the context in which the decision is made. Space precludes detailed analyses of the various 'skills' we might find deployed in different contexts within the sector, and we focus here on one specific example - the skills of lending- specifically because it resonates with the use of decision support technology which was implemented precisely with standardization and error proofing in mind.

Skill

In this financial organization, the production of 'rational' lending decisions are seen as important in both the 'mass market ' and the 'small business' sector. In both instances, software exists to support lending decisions, and in the mass market the 'risk grades' produced by the software, as one Assistant Manager said, are;

> "... a lot more process driven ..the machine will give you a recommendation . .if the machine says 'no' and that decision is overridden, its 90% likely to 'go down the pan'... loans "down the pan" have reduced considerably since the introduction of machines.."

In this way, we can see that the standardization of decision-making here was introduced by the codification of 'expert' rules into software, along with a number of structural changes which need not concern us here. The Lending Process was respecified in order to address the unacceptably high number of 'bad' decisions. This does not, however, mean that the process is no longer accompanied by skilful work, and in higher value lending this became particularly clear, especially in terms of the work of accounting for, or justifying, decisions. A number of features of 'business' lending appeared to involve the utilisation of a range of 'skills'; an appreciation of

'paperwork' and the affordances of paper; the use of computers to support relationship building, local knowledge and decision making; the deployment of local knowledge and local 'logics' in guiding and supporting notions of 'rationality' and rational decision-making - notably in the lending acronym 'campari and ice' (character-ability-means-purpose-amount-repayment-insurance-interest-commission-extras) which relates to lending proposals.

It is a mechanism for assessing risk and reward which is enshrined in the Bank's manual, but is more 'honoured in the breach' than in practise in one important respect. Attention to all its details, as opposed to its general spirit, appeared relatively rare. It is in the appreciation of this balance, between application and non-application of 'the rule' that at least part of the 'skill' of lending resides. The other part of the 'skill' is in the construction of a rationale to justify any decision. In the following extracts a Business Manager is making lending judgements supported by a range of local and informed knowledge of the customer accumulated from the skilful use and linkage of information from paperwork, computerwork and personal interview. He, along with an assistant, is considering a request for a £100K loan to a college for more building work;

1 Looking at draft accounts - some problem over ownership of land.

2. Developing some questions for answers from college - agreement in principle to loan with some conditions - fixed price contract; staged payments; site visits.

3. Discussion of criteria for borrowing

4. Assistant- GAPPing accounts[8]

5. Interruption - instructions for GAPPing - talk about problems.

6 Phoning college - arranging papers - Principal not available

- another problem over the constitution of the College - whether they are legally allowed to borrow money etc - lending - problem of powers of college to borrow money 3 main worries - land; powers; ability to repay - re. £40K deficit

7 Calculating depreciation.

8. Using computer - BAF - to work out possible repayments - problems with password.

9. Inquiries menu - repayment info menu - various options = O/D; loan - fixed term, loan - fixed repayment, actuarial structured loan (BDL) - types in figures - £23K per annum.

Business Manager's Assistant - GAPPing

Next.

1 Balance sheet carding - taking college accounts and putting onto balance sheet card - 'Balance Sheet Carding for individuals and Firms' - when finished will put on screen and then GAPP them

2. Problem with GAPPing - advice from Region applies to Polys and Unis not Colleges

3 Still working on Balance sheet

4. Using screen - 'update financial accounts' - enters figures from balance sheet onto screen

5. Looking at guidelines from UKBB on Colleges

6. Interr - C ..- has found diff set of accounts - show a surplus - management figures - "Which shall I enter?" "I don't know"

7 Back looking at instructions/guidelines

8. GAPPed - Risk Grade 6 - "I just followed the instructions - I'll send it to Region now and they can play around with it"

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[8]   Grading and Pricing Policy- the decision support software

Next.

1. Still working on college report/interview preparation.

2. Discusses with C....- rates for loan, had phone conversation with principal re: land; talk about alternative uses etc. (alternative uses of buildings and land etc. - effects valuation for security) (tape)

3. Filling out 2 loan forms - 50K OD; 150K 10 yr. BDL.

4. Calculating rates for loans

5. C dictating letter to college - Assistant still filling out forms

6. Asks C...to sign and then she'll key it in. Gives him to sign - looking at form "its a matter of interpretation isn't it?" - filling in managerial details.

This extract shows the ways in which computer support for decision-making is enmeshed within a working division of labour, and its usage as part of the process of rational decision-making. The various programs were intended both to support decision making and to improve the speed of processing thereby giving staff more time to be 'pro-active'. The GAPP was used to calculate Risk Grade of Businesses (1-9; 1 = "substantially risk free"; 9 = "loss likely"); and the pricing policy that should be adopted. The program gave a margin within which pricing could be negotiated.

It is important to recognise and emphasise that GAPP was an addition to the existing risk assessment and pricing 'devices' - in some senses simply automating what had previously been done (and continued to be done) manually. The fact that GAPPing, although incorporated into the lending process appeared as a mere additional check in that process rather than integral to it, meant that GAPPing seemed less important as a decision-making device than as a 'security blanket' for decisions already made; and the starting point for negotiation (particularly over pricing) with the business concerned. As an Assistant Manager said;

"you cannot say straightaway...just because the computer program says 1% higher ..you cant just impose a 1% rise...you've got to use it as a tool..."you've got to sum up how much the overdraft is and whatever.."

Using the software to confirm rather than determine decisions - may have arisen as a consequence of the inclusion in the program of 'non-financial' information which could significantly influence the risk grade obtained and which was dependent on the Manager's store of local and anecdotal knowledge; e.g. "are there any signs of creative accountancy?"; "are there any anecdotal signs of problems?". Such 'anecdotal' evidence should not, however, be sneered at since in at least one instance - a double glazing firm - no indication of trouble was revealed by any of the computer packages or printouts and only became evident when the firm appeared on the 'receivership and liquidation' perusal form.

Local Knowledge - "he's a God to this Branch."

It is a commonplace observation (e.g., Suchman, 1987) that work 'routines' are not slavishly adhered to but, typically, involve the considerable exercise of judgement and the deployment of a variety of 'skills'. Such discretion 'typically' concerns the circumstances under which a routine is to be strictly followed and the circumstances under which modifications or 'short-cuts' may be employed through, for example, the utilisation of informal teamwork or 'local knowledge' and is a matter for 'occasioned determination' in the course of the work. The significance of such an observation can

be assessed by the fact that problems arose, for example, when staff absence, or a need to clear a back-log of work, required the employment of part-timers unfamiliar with the particular office or the redeployment of staff unfamiliar with the particular processes. This was noted in the fieldwork observations with reference to attempts to clear a backlog of Standing Orders following a Bank Holiday;

"for these staff, the first day or two in a branch are largely unproductive A considerable amount of time is spent in orienting to local practice   staff were not always familiar with the available technology .and frequently had to ask others what the appropriate codes for various screens were..".

A number of other comments and typical exchanges from the fieldnotes support this view;

"Ask X, she might know"

"To be honest with you, I don't know how it works ..I've only done this job for a week. what's your phone number? I'll find out and ring you back."

On the phone ."Your charging structure   we used to charge them...how does it work now?"

"The girl there thinks its...but she's not that sure"

This seems to problematise the relationship between standardised processes and 'local' knowledge. That is, the above examples demonstrate that in important senses standardised operations articulate with local knowledge to produce practise. It may, of course, do so in ways that are inconsistent with the bank's purposes. In one instance complaints arose from the fact that customers were charged as a result of the delayed processing of standing orders which, at the time of the observations, had a five day backlog of work. The failure to cancel standing orders in time occasionally meant that the account became overdrawn and incurred charges. Bank charges were automatically triggered on the computer when the agreed limit for the account was exceeded. When the initial mistake was rectified - typically after a customer complaint - and the money paid back into the account, the charges levied were often overlooked, so initiating a further complaint from the customer. As a Manager commented: "people aren't instructed to think through the effect of that change - they're only interested in putting it right". This example serves to make the point that it is in the articulation of standardised procedures- rules- and local knowledge and practise that work gets done. When assessed according to some hierarchy of goals or means it may or may not be done well, but in either event it makes no sense to emphasise the procedure alone, as though the procedure guarantees meeting objectives.

Fieldwork observations in the Bank have consistently identified the extent to which the accomplishment of work tasks was frequently associated with informal teamwork, 'constellations of assistance' and the use of 'local knowledge'. Such 'local knowledge' consisted of knowledge of individual customers or particular processes and routines and was used mainly to avoid lengthy perusal of 'action sheets' or the 'PIF' manual of job processes. 'Local knowledge' incorporates ideas about methods for short-cutting or facilitating tiresome and time-consuming routines comprising what Bittner (1965) calls 'gambits of compliance'; that is, techniques that enable workers to 'get the work done' whilst giving the appearance of complying with the formal rules. An example from the fieldwork notes on the cashiers illustrates this point;

"Customer who wants to cash a cheque from another branch...handed over to section head to ring for authorisation rang several times, branch continually engaged....phone still engaged, trying to

contact bank via switch message . after 35 minutes no reply to switch and phone still engaged...customer asked if he wanted to reduce the amount to £300...his cheque was then cashed"

The existence and utilisation of informal teamwork and 'local knowledge' is hardly a novel discovery but a persistent finding of most empirical CSCW research. Nevertheless their importance needs to be recognised, particularly with regard to attempts to redesign the work process. In the bank study, for example, while occasionally semi-formal teams were created to deal with a particular 'problem' or task, usually a backlog of work, these often appeared to be inefficient, primarily because they often failed to incorporate the personnel possessing the kinds of local knowledge that would facilitate task completion.

One of the intentions behind the re-design of Bank operations, through the creation of specialised processing units, was to increase standardisation of operations and thereby remove any dependence on 'local knowledge'. However, and perhaps surprisingly, the use of local knowledge remained a regularly observed feature of the work in the specialised units. In the Foreign section, for example, workers were familiar with the specific requirements of particular (usually 'awkward') customers but there were also other instances when local knowledge was used to speed up the work process;

5. Phoning - re: urgent fax - transfer of funds Unable to identify the customer on the phone and therefore there is a problem over the release of funds.

6 Goes to see Supervisor.

7. Back on phone - decides to phone customer and tell them to go to Branch and ask for original with signatures - or if manager is prepared to sign fax (some faxes they will accept - they have a list - but this is not one)

8. Phoning customer - wants identification.

9 Decides to send money - explains to Supervisor that customer was always getting trouble with X Branch, that he knew people in Commercial & Foreign; that he sounded genuine(?)

10 Gets details of Bank for correspondence book

11. Keying details into screen...

Although this might be viewed as merely a reconfiguration of local knowledge, the important point to make is that it remains local and derived directly from the experience and knowledge of the work itself and provides a resource by which the procedures are made to work more smoothly than they might otherwise in avoiding problems that might arise through a strict use of procedure. Such an advantage is most clearly seen when processes, automated into some form of 'expert system' suddenly become redundant or inapplicable as a consequence of change. One example of this in the bank was the 'TS' software package, used for the taking, maintaining and releasing of securities guaranteeing loans. This system was heavily rule driven with each set of 'formalities' having to be completed before continuing to the next stage. Consequently, when action had to be taken quickly and securities released before the paperwork became available workers were forced to the expedient of 'telling lies' to the machine in order to expedite the process.

Conclusion

A key insight of BPR is that technology is but one feature of a wider 'system' and that its design must orient to the system in the large. Insights obtained from ethnography's focus on social organisation is that 'functionality' cannot be considered to be a systematic property at all, but rather a relation between system and the use to which that system is put, understood in and through the mutually accomplished purposes of participants. Ethnographic approaches view computers, procedures and rules as enmeshed in a system of *working* - incorporated into the flow of work in highly particular ways, including being misused, modified, circumvented and ignored. One of the virtues of ethnography lies in revealing these myriad usages in the context of 'real world' work settings; highlighting those 'human factors' which most closely pertain to system design, whether 'system' in this context is restricted to technology, or is expanded to include organizational processes. Ethnographic methods thus seek to understand 'systems' within the situated context of the work setting and not an abstract model of process, thereby identifying the subtle and often unremarked cooperative aspects of work, the small scale constellations of assistance and deployment of local knowledge that enable the work to be accomplished. Ethnography involves, therefore, far more than 'mere' detailed description but bring a particular focus to the analysis of systems in use and thereby outline the 'play of possibilities' for systems design;

> "to enable designers to question the taken-for-granted assumptions embedded in the conventional problem-solution design framework" (Anderson 1994:170)

Or, as it has been put elsewhere, ethnography affords the prospect of 'respecifying the problem' (COMIC Deliverable 2.1). Once this is recognised, the apparent similarity between ethnography and some of methods employed by BPR practitioners dissolves. Thus, conceptualising 'doing work' as egologically organised, through 'bridesmaid' concepts like skilfulness and local knowledge, enables us to demonstrate not only that it can be counterposed to notions of standard process, but that it examines aspects of organizational life which are entirely, and necessarily, left out of BPR analysis. Where BPR should be assessed in terms of standardisation and suchlike, ethnography must in contrast be assessed by what it says about aspects of working which are complementary to process.

Standardized procedures in principle confer a number of advantages, notably that they should be easy to understand, the training overhead is reduced, staff should become to a degree interchangeable and ambiguity is removed. However, our argument has been that, even when standard procedures are implemented, local knowledge and skills are both persistent and indeed necessary to the very flow of work that is presumed to result from process design. Further, and given BPR's emphasis on new technologies as a vehicle for providing organisational gains, it is as well to remember that the fieldwork observations further suggest that in a number of instances the deployment of local knowledge and instigation of informal teamworking, such as asking for codes to enter screens, how to complete routines; etc., was effectively constituted as 'ways to cope' with the inadequacies of the computer systems; that is, and to adapt a phrase of Garfinkel's (1967), there are 'bad organisational reasons for good organisational practices". What local knowledge and skill is, and how it is deployed is hardly likely to be incidental to the concerns of process redesign. After all,

even if one accepts that it is a sensible task to reduce discretion down to a lowest common denominator, it is likely to prove useful to know how it is constituted and how it relates to existing processes, technologies, and what have you. The importance of, for instance, the computer interface in making the machinery 'useable' is by now well-attested. However, here and elsewhere, we have tried to emphasise how 'useability' itself can be a function of the mutually elaborated character of work activities, whether it is accomplished by operatives, or as we have observed elsewhere (Randall and Hughes, 1994; King and Randall, 1994) by operatives and customers working together. In the later case, our interest lay in the work of the clerk or cashier processing transactions, generated either by interactions with customers or by organisational requirements. Our interest in 'what needs to be done' led in turn to an understanding of the role of the customer in initiating, structuring or enabling the work of the cashier. The inherent unpredictability of customer demands, we argued, had considerable significance for the design of the interface. Customers in a very real sense are participants to the ordering of the flow of work and the use of systems, especially the direct interaction of officers with the database, can usefully be comprehended as customer driven. It was one of our purposes, in short, to demonstrate how it is that in and through the demands, enquiries, requests, and so on that customers bring to encounters that the ordering of the process, the structure of database interrogation, work priority, and the spatial organisation of work in hand is determined. As we have seen, BPR has the customer as the primary focus of the process chain, but nowhere is it recognised that what customers *do* might be just as important as their statements of need, and the fact that customers can be construed as 'doing work' just as operatives can is very relevant to the technologies that are intended to support the business process.

Our brief examination of some features of 'working' in the financial services sector raises a number of questions which we can only attend to in outline. They are nevertheless important questions for BPR if we are to accept it at face value as a systematic strategy for addressing the problem of technologies in organisational contexts.

Firstly, the question of the allocation of function is pertinent. As we have seen in our discussion of lending, the use of instinct, 'gut feeling' or intuition is hardly eradicated when a standardising system is brought in, and this seems to suggest that it is not adequate to effective performance.

Secondly, the question of what kind of knowledge base is relevant, and how should it be distributed is raised. Workflow, however it is conceived, is unlikely in our estimation to provide methods for recognising or supporting those aspects of the 'process' in which tacit, invisible, taken for granted local knowledges are responsible for the quick and straightforward accomplishment of the task.

Thirdly, and related to the above points, there is in our view a question concerning what standardisation actually is. What is construed as standardisation is, we believe, in reality nothing quite so simple. In particular, we have serious doubts about the universal appropriateness of measurement as the basis of standards, because on this assumption processes are only externally identical to the observer. This kind of measurement gives us no purchase on the significance of activities to the participant. This may have some fairly obvious consequences. In the first instance, it means we

may have no means to distinguish between on the one hand wasteful duplication of effort and on the other checking work which is designed precisely to avoid wasteful mistakes. Similarly, because to a very large degree measurement processes are averaging processes, and our observation suggests this is a particular problem of workflow measures, no means is available for understanding the significance of rare events. In contrast, we would argue, these are analytic issues which ethnography specifically does provide for.

The sociological attentiveness to the routine and ordinary way in which work is mutually accomplished as meaningful activity specifically complements the focus on data and process associated with most models, including that of the business process model. None of this would matter a great deal outside of our own sociological 'church' were it not for the claim that the analytical attentiveness brought by the kind of enquiry we advocate does have consequences for effective design decisions, even when these design decisions orient to the business process rather than 'mere' technical functionality. We remain convinced that it does. Our purposes are not 'conservative' in that we are not making an implicit defence of current practice, nor or they in any way a political critique of BPR. Rather, they are to understand how, while some aspects of work activity can be shown to be constraining in that they are time consuming, repetitive, or unnecessarily complex, they at the same time may afford certain possibilities that good design should not merely ignore. Of course design work must orient to problems of efficiency, effectiveness and adaptability, but these objectives may be a function of complex articulations of process, technology, and the skilful deployment of situated knowledge. The latter, one of the proper concerns of ethnographic enquiry, is precisely what the modelling activities of BPR wish to gloss as either 'healthy' or 'unhealthy'. Real organisational life will always be complex, and this is no argument against the design of procedures to ensure the success of working arrangements in principle. It is an argument about the likelihood of success in practice.

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