Information technology as disciplinary technology: being critical in interpretive research on information systems

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This paper argues that interpretive researchers need to consciously adopt a critical and reflective stance in relation to the role that the information technologies which they describe play in maintaining social orders and power relations in organizations. The concern of the paper is to highlight potential shortcomings in the treatment of technology in interpretive research on information systems, but also to present a specific approach to studying information technology and organization which may overcome these weaknesses. By utilizing a perspective drawn from the discursive and disciplinary work of Foucault and recent work on the sociology of technology, we can complement the thick description of interpretive research with the broader sweep of critical social theory.

Introduction

The collection, analysis and interpretation of data are always conducted within some broader understanding of what constitutes legitimate inquiry and valid knowledge (Henwood and Pidgeon, 1993). It is the methodology adopted by a researcher that is the dominant influence on the research process and findings, rather than the methods employed, which remain data collection techniques (Putnam, 1983, Llewellyn, 1993). By discussing methodology, we reveal our choices of method and define the way these choices fit the research problem (Dobbert, 1990). However, choices in research methodology can not be unproblematically explained away simply by recourse to a researcher's beliefs and philosophical assumptions (cf. Burrell and Morgan, 1979; Chua, 1986; Guba, 1990; Orlikowski and Baroudi, 1991).

Research methodologies are the products of (and are constitutive of) the social context in which they are invoked. Particular contexts legitimate, justify and authorize some research choices and not others (Tinker and Yuthas, 1994). For example, the assumptions which underlie New Right political thought can be argued to derive from positivistic conceptions of science (Dixon and Kouzmin, 1994): 'The claim to moral neutrality and scientific objectivity suits an age in which economy has come to be regarded as more important than society and in which a brand of economics has claimed scientific qualities' (Rees, 1995, p. 17). The increasing dependence of research on powerful external agencies encourages the uncritical adoption of images of society held by those funding the research (Joerges and Czarniawska, 1998). It could be suggested that the tendency for large scale (positivistic) surveys to be used in policy evaluation reflects a demand for rapid results and instrumental explanations of societal reality (Agar, 1980). Quantification and enumeration play an important role in the construction of a 'rational' modern society (Bloomfield, 1991).

The inevitable presence of value choices in the research process suggests that 'the choice of a particular value system tends to empower and enfranchise certain persons while disempowering and disenfranchising others. Inquiry thereby becomes a political act' (Guba, 1990, p. 24, emphasis removed). Putnam (1983) points out that much organizational research utilizes a managerial perspective and, thus, perpetuates the status quo. Positivist research, which has an orientation towards technical control, is particularly prone towards managerial-based definitions of organizational reality. However, this tendency is not an inherent feature of positivist research, and equally, unreflective and uncritical interpretive organizational research is capable of perpetuating the status quo.

The central concern of this paper is to highlight the dangers of an unreflective treatment of technology in the developing interpretive research tradition in information systems research (Kaplan and Duchon, 1988; Orlikowski and Baroudi, 1991; Walsham, 1995; Doolin, 1996; Lee *et al.*, 1997; Nandhakumar and Jones, 1997).

Technology is both a condition and a consequence of power relations in organizations and society (Knights, 1995), and in order for interpretive information systems research to be critical, the practices which surround and involve information technology need to be analysed in the context of a wider set of social and political relations. The suggestion made in the paper is that the potential lack of criticality in interpretive information systems research stems from a relatively unsophisticated consideration of technology which underplays the significance of technology proper. Without a critical consideration of technology, such research not only maintains taken for granted assumptions about technology, it also deflects criticism away from technology and encourages its reification (Joerges and Czarniawska, 1998).

The remainder of the paper is structured as follows. The paper first briefly reviews the basis for interpretive research in information systems and highlights the potential criticisms of such research which stem from its treatment of technology. The succeeding section discusses attempts to confront 'the question of technology' (Joerges and Czarniawska, 1998) in interpretive information systems research. A particular approach to studying information technology and organization which utilizes a perspective on technology and power drawn from the work of Michel Foucault is then presented. This approach is offered as a way of overcoming the weaknesses inherent in earlier treatments of technology in interpretive information systems research. The approach is then applied to a particular type of information system in the health care context to illustrate how information technology may act as a disciplinary technology.

Being critical about interpreting information technology

Arguments advocating interpretivism as a legitimate basis for understanding human activity are well rehearsed in the organizational studies literature (for example, Burrell and Morgan, 1979; Putman, 1983; Chua, 1988; Dyer and Wilkins, 1991; Orlikowski and Baroudi, 1991; Walsham, 1993; Jönsson and Macintosh, 1997). Interpretivism asserts that the positivist methodology of the natural sciences is inadequate for the understanding of human action. The primary rationale for this assertion is that human beings enact their own reality. Human products such as society or organizations are objectifications of the human mind. A different method of inquiry to that of the natural sciences is needed, one which recognizes 'the actions, events and artefacts from *within* human life not as the observation of some external reality' (Hughes, 1990, p. 90; Lee, 1991; Harper, 1992; Henwood and Pidgeon, 1993).

Interpretive information systems research might be charactized by an intention to understand the implication of information technology in organizational activity through 'an understanding of the *context* of the information systems, and the *process* whereby the information system influences and is influenced by its context' (Walsham, 1993, pp. 4–5). It is based on the belief that: 'the same physical artefact, the same institution, or the same human action, can have different meanings for different human subjects, as well as for the observing social scientist' (Lee, 1991, p. 347). Although information systems have a physical component which permits their technical operation, they are designed and used by people operating in a complex social context. Thus, an information system is understood (constructed) differently by different individuals, and is given meaning by the shared understanding of such phenomena which arises out of social interaction:

> Events, persons, objects are indeed tangible entities. The meanings and wholeness derived from or ascribed to these tangible phenomena in order to make sense of them, organize them, or reorganize a belief system, however, are *constructed realities.* (Lincoln and Guba, 1985, p. 84)

From this perspective, an information system is a human artefact which is drawn on and used to create or reinforce meaning by the interacting human participants involved with the technological aspects of the system. The concept of dynamic process is important since the information system itself is not static, either in terms of its physical components and data or in the changing human perceptions of the information system and its output (Walsham, 1993). Viewed thus, information technology forms part of an environment, within which managers, developers and users interact in order to develop shared meanings and interpretations of an ambiguous social reality. These shared meanings form a basis from which action is constructed (Boland, 1979).

However, interpretive information systems research has been criticized for its failure to explain the unintended consequences of action, which cannot be explained by reference to the participants and which are often a significant force in shaping social reality. It has also been criticized for its frequent neglect of historical change, and a failure to recognize the inherent conflict and contradiction in social relations (Jönsson, 1991; Orlikowski and Baroudi, 1991). In particular, Tinker (1998) criticizes recent ethnographic research on information systems for what he perceives as its uncritical appreciation of the social and historical context of technological developments. He suggests that this unreflective accommodation with technology reflects an equivocation which inadvertently helps to legitimate

(and accelerate) technological changes which degrade the quality and quantity of work. (Of course, Tinker's argument is itself influenced by the values implicit in his particular approach to understanding technology and society. Hence his recourse to the literature on the deskilling aspects of technology (Braverman, 1974).) By disregarding the historical and social contexts in which information technology in organizations is designed and used, representations of information systems phenomena are grounded in the status quo (Orlikowski and Baroudi, 1991).

Many information systems researchers who would describe their research as interpretive would disagree with criticism of this nature. They would suggest that indeed it is hard to avoid being critical when conducting interpretive research (Walsham, 1993). Nevertheless, there is a danger that interpretive researchers may become preoccupied with exhaustive and comprehensive description in attempts to provide authoritative and definitive accounts of empirical reality (Knights, 1995). We need to consider the implications of unreflective accounts of technology in perpetuating the status quo in organizations. We can avoid this danger by connecting the interpretation to broader considerations of social power and control (Thomas, 1993). Interpretive information systems research can be critical by adopting a more politically informed position regarding the agency of information technology in social and technological change (Tinker, 1998).

By critical I mean questioning and deconstructing the taken for granted assumptions inherent in the status quo (Hull, 1997), and interpreting organizational activity and how information technology is implicated in it by recourse to a wider societal, historical, economic and ideological context. While interpretive information systems research is grounded in a desire to describe and understand organizational reality, it need not do so without questioning the power structures which maintain the status quo. Interpretive information systems research must extend beyond the historical development of information technology into the larger economic and societal framework within which such developments occur. The wider context of particular technological outcomes involves preconceptions of power that impact on present and future events – events which must be interpreted in light of these power relationships (Putnam, 1983).

It is worth noting that the critical interpretivism I am advocating is not necessarily reliant on the critical theory of Jurgen Habermas and the Frankfurt School. Although critical theory represents a valid approach for the critical interpretation of information technology in organizations, the position maintained in this paper is that interpretive researchers can be critically reflective while utilizing another theoretical apparatus. As Thomas (1993) notes, critical researchers range on a continuum of possible critical approaches. The use of critical theory and critical hermeneutics to inform a style of critical ethnography has been well developed in the information systems literature by Harvey and Myers (1995), Myers (1997) and Myers and Young (1997), and is not discussed further here.

Information technology, duality and determinism

An unreflective accommodation with technology in interpretive information systems research (Tinker, 1998) has its origins in received conceptions of technology and its relationship with the social. The information systems field, with its roots in engineering and social science disciplines based on a nature/society dichotomy, has difficulty in confronting technology (Joerges and Czarniawska, 1998). Early attempts to balance the technical with the social, such as the notion of socio-technical systems (Mumford and Weir, 1979) reflected this dichotomizing assumption. Even more sophisticated attempts to open up technology to social constructivist arguments tend to retain this implicit duality. The assumption of a dichotomy between the technical and the social leads to the adoption of various deterministic positions in relation to technology and technological development:

> If we reduce technology to machines, as something other than ourselves as social beings, it is easy to fall into the trap of asking how such machines were socially determined, or alternatively, how such machines determine how we are socially. (Bloomfield *et al.*, 1994b, p. 139)

Determinism is reflected in information systems research which treats information technology as having impacts. Either information technology is portrayed as the determining factor and users as passive, or users and organizations are viewed as acting in rational consort to achieve particular outcomes through the use of information technology (Kaplan and Duchon, 1988).

In the former portrayal, technology is assigned an internal dynamic, through which it becomes an autonomous and deterministic force in society (Winner, 1980; MacKenzie and Wajcman, 1985; Orlikowski, 1992). This technological determinism can be observed in the labour process literature, where specific aspects of technology are perceived to lead to the inevitable deskilling and degradation of work (Braverman, 1974). In the information systems field, the technological imperative is reflected in a technicist view of information technology, in which the computer is seen uncritically as an instrument of progress (Mowshowitz, 1981).

The implication is that an objective and neutral information technology impacts on the functioning and structure of its organizational environment, causing changes in the structure of organizations towards flatter or networked forms, changes in the nature of managerial work, and either the upskilling or deskilling of workers (Markus and Robey, 1988). Much has been promised of the ability of information technology to change organizational forms and processes (Miles and Snow, 1986; Drucker, 1988; Rockart and Short, 1991; Applegate, 1994) based on its ability to not only automate, but 'informate' (Zuboff, 1988) and even 'transformate' (Scott Morton, 1991).

In the second portrayal of information technology mentioned above, subjective social values shape the design and use of the emerging technology towards some intentional outcome. This corresponds to a position that Orlikowski (1992) terms 'strategic choice', which focuses on the way that organizational context and the strategies of technology decision makers influence technology. This perspective argues that technology is not autonomous, and that instead technology is shaped by social or political interests, and is the instrument of particular groups in society (Bijker and Law, 1992; Scarborough and Corbett, 1992; Bloomfield *et al.*, 1994a, 1994b). For example, Kling (1980) suggests that little causal power can be attributed to information technology itself. The 'social impacts' or 'consequences' of computers are the consequences of the underlying social processes by which they are developed, adopted and used. However, the social shaping or construction of technology is also a form of determinism.

The work of Zuboff (1988) is a widely cited illustration of the interpretive approach to information systems research. In a comprehensive and influential study, she considered the implications and outcomes of computerization in eight US organizations. From her research, Zuboff suggested that information technology could have either an automating effect or an 'informating' effect. By informating, she meant the capacity of information technology to generate ongoing information about underlying productive and administrative processes. Zuboff argued that traditional management control perverts the potential of information technology. Instead, information technology can and should be designed with the intention to informate work, and thus enhance worker flexibility and autonomy. Used in this way, information technology would enable the decentralization of organizational power in new forms of networked, learning organizations peopled by knowledge workers empowered through technology (Bloomfield and McLean, 1996).

However, Zuboff's work has been criticized as naive and optimistic in the way it assigns an inherently progressive and liberating role to information technology in the transformation of organizational structures and processes (Knights and Murray, 1994).* Her emphasis on the autonomous informating power of information technology seems to make recourse to technological determinism. Orlikowski (1991) challenges this deterministic view, noting that 'there is nothing inherent in technology's informating potential that ensures a transformation in the workplace' (p. 34). At the same time, Zuboff suggests that it is the strategic choices of managers which influence the design and use of the emerging technology towards some intentional outcome. Information technology is viewed either as potentially empowering, liberating and upskilling or as disempowering and deskilling, *depending on how it is applied*. This simultaneous appeal to technological and social determinism appears unresolved:

> The task now is to determine the likelihood of such organizational innovations. It means exploring the relationship between managerial authority and the autonomous informating power of the technology. Can the technology transform authority? Or will authority impose restrictions on the informating process? (Zuboff, 1988, p. 218).

If we wish to go beyond such dichotomies, we need to replace the dualism usually assumed between the technical and the social with a view of reality as materially heterogeneous. In such a view, the social and the technical mutually define one another (Law, 1991, 1992, 1994; Knights and Murray, 1994; Latour, 1994; Law and Mol, 1995). For instance, Bloomfield (1991) suggests that information systems represent the organization, in that the collective understanding of the organization is mediated and redefined through the fabrication of the system. He argues that the fabrication of an information system presupposes certain organizational changes, rather than leading to change through the impact of the system upon the organization. Thus, information technology does not cause organizational changes so much as reflect them. However, the visibilities mobilized by the use of an information system may lead to other changes. The characteristics of a particular information system may open up new choices and constrain others, while a dominant organizational culture may promote certain ways of working at the expense of others (Kimble and McLoughlin, 1994).

Viewed in this way, information technology is neither the outcome of the logic of some technological reality, nor the reflection of social and organizational variables, but part of a process in which both technology and

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*For a critique of the technological optimism in recent stories of empowerment through information technology see, among others, Lyon (1988), Knights and Murray (1994), Bloomfield and McLean (1996) and Willmott (1996).

organization become redefined (Bloomfield *et al.*, 1994a). Technology and organization cannot be separated out. The study of modern organizations cannot exclude a consideration of technology, while technology is always developed in and for organizational contexts. Each presupposes the other. Social relations are instantiated and mediated through technology, and organizations are made relatively cohesive and stable by the way they are intimately bound up with the technical. Technology is society made durable (Latour, 1991; Callon and Latour, 1992; Bloomfield *et al.*, 1994a; Bloomfield, 1995).

> Technology does not *impact* on organizations or society; a change in social relations, task, skills and knowledge is already prefigured in the way that the technology is conceived of and constructed. Machines do not *control* social relations: they presuppose, mediate and reinforce them. (Bloomfield, 1995, p. 497).

In some ways, the apparent opposition between technological determinism and technology as the instrument of human agency can be read as a debate over whether the 'power' of information technology is ultimately enslaving or emancipating. Such views take for granted a simplistic equating of information with power, and thus information technology with power. This is a zero-sum notion of power which implies that shifts in organizational power are the result of corresponding changes in the organizational distribution of resources (such as information) which confer power on their possessors (see, for example, Pettigrew, 1972; Markus, 1981; Pfeffer, 1994). The weakness of such a mechanical and possessive conception of power is that it fails to consider that power must also be a property of relations (Clegg, 1989; Bloomfield and Coombs, 1992).

If reality is materially heterogeneous and relational, then we need to utilize a conception of power which is relational in its exercise. We need to be sensitive to the exercise of power in studying technology without reducing technological developments to either technological or managerial imperatives (Bloomfield and McLean, 1996). Although the development of information technology may be deliberate, with the intention of changing the nature of management and organizational practice, unintended consequences may arise from the contesting of information and representations of organizational reality between different groups (Bloomfield *et al.*, 1994a). Foucault (1977, 1980) offers such a relational notion of power.

Information technology and disciplinary power

According to Foucault, power is exercised from within the social body. His concept of disciplinary power oper-

ates by enhancing the calculability of individuals. It is constantly exercised by surveillance, observation and comparative measures that reference the norm (Foucault, 1977, 1980).* Power is manifested in the ubiquitous heterogeneous instruments, techniques and procedures brought to bear on the actions of others, some concentrated and hierarchically organized and others socially dispersed (Hindess, 1996). Various technologies of evaluation and calculation make visible the activities of individuals and calculate the extent to which they depart from a norm of performance (Johnson, 1993; Miller, 1994). Contemporary examples include the comparative application of performance information, or other forms of surveillance (such as supervision, routinization, rationalization, formalization, mechanization) which seek to increase control of organizational members' behaviour (Clegg, 1989).

Linked to a centre of calculation, the individual is made calculable and made to calculate. Individuals learn to survey themselves and discipline themselves through forms of self-regulation and self-control (Clegg, 1989; Coombs *et al.*, 1992). Their actions are influenced through a mechanism of self-monitoring, rather than direct control and supervision. That is, individuals are constitued as subjects capable of operating a regulated autonomy (Miller and Rose, 1990; Rose and Miller, 1992; Humphrey *et al.*, 1993; Miller, 1994). What emerges is a regulated subjectivity (Miller, 1987), in which individuals are transformed into subjects who secure their sense of meaning, identity and reality through their participation in a range of disciplinary and discursive practices. These discourses and practices which they reproduce constitute the truth of what is normal in social and organizational relations. As Knights and Willmott (1989) note: 'the very exercise of power relies upon the constitution of subjects who are tied by the sense of their identity to the reproduction of power relations' (p. 537).

Increasingly, information technology mediates this process. Disciplinary power operates through the internalization of social and institutional norms and the construction of particular understandings of organizational reality among organizational participants. Information

*Foucault (1977) uses Jeremy Bentham's central elevated watch-tower, the Panopticon, as a metaphor for the exercise of disciplinary power (Burrell, 1988). The impossibility of avoiding the supervisory gaze of the all-seeing (but unseen) observer in the tower, engenders a realization in the occupants of the surrounding cells that they are always subject to surveillance. The occupant becomes his or her own guardian. Even in the absence of the supervisor, the apparatus of power still operates, continuous, disciplinary and anonymous. This constitutes a new, internalized, discipline of norms and behaviour (Dreyfus and Rabinow, 1982; Clegg, 1989).

systems play an important role in mobilizing these values and norms through which individuals derive meaning and identity. Calculative practices such as those facilitated by information systems render social phenomena visible in a particular way. Some activities are given an existence and attention, while others are unrecognized. In the fabrication of information systems, the constitutive concepts of the dominant discourses and knowledges instituted in organizational practices have to be defined and organizational phenomena reconciled with them. Information systems thus mediate and reinforce certain views and meanings, mobilizing particular representations of organizational reality. In doing so, they underpin the framework of meaning within which organizational participants regulate their own behaviour in accordance with the norms and values associated with these knowledges and discourses (Orlikowski, 1991; Bloomfield and Coombs, 1992; Bloomfield *et al.,* 1994a, Knights and Murray, 1994).

The majority of attempts to apply a Foucauldian perspective to information technology have been concerned with the capacity of information systems (the informational dimension of information technology) to make visible aspects of organizational activity. Surveillance and control is facilitated by giving complex, ambiguous phenomena 'hard' numerical values (Morgan and Willmott, 1993). Information technology facilitates enumeration, which can underpin categorization and, thus, what is made visible. Such technologies privilege formal, quantitative information, aiding in the construction of calculative realities (Webster and Robins, 1989; Bloomfield, 1991; Bloomfield and Coombs, 1992). However, the development of information systems to monitor and scrutinize particular organizational activities facilitates control by making individuals within an organization both calculable *and calculating* with respect to their own actions. This invokes the notion of an electronic panopticon, in which organizational participants are enlisted in their own control through their belief that they are subject to constant surveillance (Orlikowski, 1991; Sewell and Wilkinson, 1992, Webster and Robins, 1993; Bloomfield *et al.,* 1994a).

For example, Orlikowski's (1991) study of how the deployment of a particular information technology affected production workers in a single multinational software consulting firm provides a critical consideration of the way that information technology can reinforce established forms of organizing and intensify existing mechanisms of control. Orlikowski suggests that the mediation of work processes by information technology creates an information environment which enables a disciplinary matrix of power, knowledge and control. The way in which information technology 'renders events, objects, and processes so that they become visible, knowable, and shareable in a new way' (Zuboff, 1988, p. 9), lies at the heart of disciplinary power. The implication is that technology's informating capacity can be used to facilitate a more embedded and repressive means of control in organizations. Information technology is more likely to reinforce hierarchical power than undermine it (Orlikowski, 1991; Knights and Murray, 1994; Willmott, 1996).

Casemix information systems as a disciplinary technology

In another study, Doolin (1998) uses a Foucauldian perspective to examine the power effects involved in the deployment of a 'casemix' information system in a hospital context. A casemix system is an information system which links detailed information on individual patient clinical activity with the associated costs, for use by managers and service providers as a basis for contracting and for revealing the relative efficiency of clinical resource usage (Packwood *et al.,* 1991). The information provided by casemix information systems mobilizes new categories for construing medical activity (Bloomfield, 1991). Scrutinizing clinical procedures and explicitly linking patient treatment decisions to standard costs, makes clinical activity visible and susceptible to intervention by management, who can influence decisions on admissions, treatment, length of stay and discharge. Casemix systems provide a view on clinical practice which highlights variances between the performance of individual clinicians or clinical specialities. The intention is to place clinical activity under scrutiny and to persuade clinicians to confirm to 'normal' work practices (Feinglass and Salmon, 1990; Bloomfield and Coombs, 1992; Chua and Degeling, 1993; Covaleski *et al.,* 1993).

The detailed information provided by the casemix information system studied by Doolin (1998) offered hospital management the possibility to increase control over health professionals, either directly or indirectly. Direct control was attempted by monitoring and making visible the financial implications of clinical decisions. Using this information, managers could make stronger truth claims (Boland and Schultze, 1996) in their attempts to contain clinical resource usage. While the inscriptions generated by the casemix information system facilitated the attempted direct control over the financial aspects of clinical practice, surveillance through this system also had the potential to engender a degree of self-control in clinicians' behaviour. Through the provision of appropriate casemix information, it was hoped that a sense of resource efficiency would be induced in the clinicians as the consequences of their patient treatment decisions were made visible.

Management's view was that the provision of objective information on resource usage would lead to rational decision making by clinicians and to more efficient and responsible medical practice as less expensive treatment protocols were pursued.

However, while managerial intentions behind the introduction of the casemix system may have related to increased control over medical professionals, resistance by the clinicians was possible. Foucault (1981) argues that the articulation of power relations requires that those over whom power is exercised are recognized and maintained as people who act. That power is exercised only over subjects who are free to act implies the necessary existence of resistance in power relations. Power effects have to be reproduced and are subject to the ambiguity of human agency. They are the contingently produced outcomes of the actions of people who could 'do otherwise' (Knights and Willmott, 1989; Knights and Morgan 1991). The result is a disciplinary, rather than a disciplined, society (O'Neill, 1987; Hindess, 1996). Disciplinary technologies such as comparative surveillance information systems are not exclusively constraining. Instead they open up a new and legitimate discursive space for action (Bloomfield and Coombs, 1992; Bloomfield *et al.*, 1994a). Organizational participants may appropriate and manipulate the information and rhetoric of such systems, diverting disciplinary practices to their own ends (Covaleski *et al.*, 1993; Whittington *et al.*, 1994).

Various strategies were utilized by clinicians in the hospital studied by Doolin (1998) to resist the monitoring and scrutiny afforded to management through the casemix information system. Clinicians were effective in resisting the application of a comparative surveillance system by challenging the validity of the construction of the casemix information or by pointing to other factors that potentially explained clinical outliers or variances between individual clinicians' practices. The 'double-edged' nature of the power exercised through the casemix information system meant that some clinicians were able to divert the casemix information towards their own ends, principally in arguing for more resources. Indeed, some of the senior clinicians had begun to explore the possibilities offered by the casemix system in assuming new roles as clinician managers (cf. Bloomfield and Coombs, 1992).

Casemix information systems increase the transparency of professional knowledge, expertise and work processes. The deployment of this comparative information provides management with both the technology and a rational justification for increased intervention in medical practice (Chua and Degeling, 1993; Davies and Kirkpatrick, 1995). Further, casemix management is becoming the prevalent framework within which discussions on resource allocation in health care are structured. Even to contest claims that are made on the basis of casemix information, one must use the medium of the disciplinary practices associated with casemix management (Covaleski *et al.*, 1993). Casemix information becomes the 'currency of debate, the principal media through which claims to legitimacy and control are processed' (Morgan and Willmott, 1993, p. 12). In reproducing the practices associated with the casemix information system, clinicians internalize the norms and values inherent in the particular discourse in which case mix management is grounded, opening up the possibility of their self-control as self-disciplined subjects. This would represent a more subtle exercise of power than deliberate strategies to modify clinical behaviour through strengthening general management in hospitals or imposing a computerized surveillance on clinical activity.

Conclusion

The intention of the paper was to discuss how interpretive information systems research can involve a critical appreciation of the way in which information technologies are implicated in organizational activity. From an interpretive perspective, the requirements for researching information technology in organizations include focusing on action and interaction in organizational settings, analysing specific situations in which individuals experience phenomena, and recognizing the symbolic uses of technology while transcending the actors' purely subjective interpretation (Boland and Pondy, 1983). Accompanying these requisites should be a willingness to challenge commonsense assumptions and to question the status quo. In other words, to open up the 'black box' of information technology and scrutinize the power relations inscribed within it which may repress or constrain (Thomas, 1993; Knights and Murray, 1994).

In order for interpretive information systems research to be critical, information technology needs to be analysed as a condition and a consequence of a broader set of social and political relations. As Knights and Murray (1994) note, organizational realities are constructed, reproduced and changed within historically and spatially specific conditions of possibility. A critical approach to interpretive information systems research confronts issues of power in organizational and technological change. It challenges taken for granted notions regarding the inherently progressive nature of technology and avoids reducing technological developments to either technical or managerial imperatives (Bloomfield and McLean, 1996).

Interpretive research on information technology should go further than demonstrating the problematic

and socially constructed nature of organizations by, for instance, attempting to show how particular technological outcomes define and stabilize (albeit temporarily) particular representations of organizational reality. That is, how the ensemble of practices, language, techniques *and* artefacts that make up information technology are implicated in the governance of the conduct and subjectivity of organizational participants (Knights, 1995; Hull, 1997). Using the relational notion of power developed by Foucault (1977, 1980), the concept of information technology as a disciplinary technology was outlined. The potential for this concept to provide a critical dimension in interpretive information systems research was discussed in relation to attempts to apply a Foucauldian perspective to studies of information technology and organization.

A hospital casemix information system provides an interesting illustration of information technology as a calculative and disciplinary technology. The increased monitoring and surveillance of clinical activity through a casemix information system is consistent with the concept of disciplinary power and 'the uninterrupted play of calculated gazes' (Foucault, 1977, p. 177). In this conception of power, disciplinary technologies of surveillance enhance the calculability of individuals through the comparative application of measures that reference the norm. Calculative practices such as those facilitated by casemix information systems render social phenomena visible in a particular way. In the health care context, the development of these sophisticated comparative information systems stems from the recognition that the control of health expenditure lies at the point of intervention by individual clinicians. Under the banner of improved financial efficiency and effectiveness, hospital management have attempted to intervene more directly in clinical practice and to demand greater cost consciousness from clinicians (Chua and Degeling, 1993).

However, casemix systems cannot be understood simply as management control pursued by electronic means, constituting clinicians as passive victims of surveillance. Power is always subject to resistance. Those over whom power is exercised are recognized and maintained as people who act and could do otherwise (Foucault, 1982; Knights and Morgan, 1991). There is a general tendency among those subject to power and control, to resist by means of challenging or diverting the systems and rules imposed on them (Clegg, 1989; Covaleski *et al.*, 1993). At the hospital discussed in the paper, surveillance through the casemix system was open to the circumvention of clinicians. Clinicians both challenged and diverted the casemix system in order to 'escape the implications of the gaze of normalizing judgement' (Chua and Degeling, 1993, p. 309).

To the extent that Foucauldian studies of technology and organization are able to assimilate the social and the technical in their treatment of technology, they offer a useful approach to studying technology in organizations from a critical perspective. However, Joerges and Czarniawska (1998) suggest that Foucauldian studies have often gone too far in their use of technical metaphors for organizational discipline, power and control to overwrite the social with the technical. Technology proper becomes once again largely taken for granted, its significance residing in its involvement as the material component of human practices (Hull, 1997; cf. Joerges and Czarniawska, 1998). To avoid an unreflective accommodation with technology, we need to retain a view of reality in which the social and the technical mutually define one another.

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