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Publication Date

2008-01-11

Peer reviewed

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November 2008

This work was supported by the Director, Office of Science, Office of Basic Energy Sciences, of the U.S.
Department of Energy under Contract No. DE-AC02-05CH11231

Examining technology, structure and identity during an Enterprise System implementation.

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Keywords: Enterprise systems, identity, user resistance, deskilling

Abstract

This paper presents a longitudinal study of an Enterprise System (ES) implementation by critically examining the discursive context in which an ES implementation unfolds. The findings show that users strongly supported the ES in the earlier stage of implementation when the technology was an imaginary phenomenon. However, in later stages, when the technology is in use, user support was not consistent. In this phase the ES produces loss of control and an inability to function as an arbiter of fairness (in allocating resources associated with the system) thereby directly challenging existing professional identities and roles. These outcomes, in turn, generate acts of resistance on the part of workers. Users reach inside the technology and reshape it by devising creative workarounds that produce a sense of reskilling to counter the deskilling produced by the loss of control and power. The analysis also shows that an ES is a complex social phenomenon that is intricately linked to and complicit in shaping organizational structure and identity. In particular this study shows how technology, structure, and identity are in a mutually constitutive relationship.

1. INTRODUCTION

In the last decade, organizations have moved to implement a class of packaged software called Enterprise Systems (ES) or Enterprise Resource Planning (ERP). The popularity of this software is evidenced by its explosive growth over the past few years. A sampling of growth statistics shows that by the year 2000 the ERP 'revolution' had generated over \$20 billion annually for suppliers and a similar amount for consulting firms (Willcocks and Sykes, 2000). Others have projected revenues of \$78 billion by 2004 for this market (Carlino, Nelson and Smith, 2000) much of which is expended on professional services needed for implementation. An ES is a complex suite of software modules that are composed of thousands of tables that require sophisticated knowledge to configure and install. It is no wonder that organizations of all types and sizes that are installing Enterprise Systems are incurring implementation costs five times the cost of the actual software license (Scheer and Habermann, 2000), with an average time of installation of approximately twenty months (Metagroup, 2003).

A significant body of academic research has emerged over the last few years that highlights the importance of understanding the organizational consequences of implementing these large and complex systems. This paper contributes to this literature by investigating the relationship between an ES, organizational structures and identity over a longitudinal timeframe. This empirical inquiry conceptualizes the workplace as a distinct discursive environment in which talk *is* action. In particular, this paper uses critical discourse analysis to analyze the social context of work. Discourse is defined here as a specific form of language use (either spoken or written) and a specific form of social interaction, both of which are understood as a complete communicative event in a social situation (Van Dijk, 1990). In this article attention will be given to semiotic structures at work in order to understand workplace interactions. In this sense, language in the workplace is seen as a social practice, as a mode of action that

is always socially situated (Fairclough, 1995). This paper expands previous work that examines technological and organizational change by focusing on polarizing forces that both promote and resist change (Robey and Boudreau, 1999). In other words, the arrival of a new technology may be seen as a welcome and needed addition by some and as a contested and resisted change by others. The contested reception creates anxiety, tension and an uncertain discursive domain in the workplace that occasions the re-negotiation of professional identities, power relations and institutional practices. By examining these contested social relations we can better understand how an ES is received by an organization and its consequences for structure, power relations and identity.

This research is part of a larger longitudinal study of an ES implementation. In earlier research (Alvarez, 2002), interviews between systems analysts and clients were examined to understand communication strategies during information requirements gathering. Researchers have argued that communication between analysts and users is often problematic due to cognitive limitations and vocabulary differences (Agarwal and Tanniru, 1990; Byrd et al., 1992). The research revealed that in fact, during the interviews, there were conflicting, inconsistent and competing viewpoints in which users and analysts did not share a 'consensual domain,' thus barring them from reaching agreements about requirements. Moreover, the research revealed the tension between two different framings of the interview, that of analyst and client. Other research (Alvarez, 2001) examined the discursive strategies and negotiations deployed by individuals to manage the decommissioning of the legacy information system that took place concurrent with the implementation of the ES. The research shows that during discussions of the legacy system and its proposed decommissioning, threats to 'face' and place within the organization were inescapable. In turn, individuals save face by valorizing the past. Face work is performed by individuals when they confess to previous transgressive acts when interacting with the system. This discursive move produces its performer as a technologically competent worker thereby securing an individual's place in the organization.

The research presented here is based on the same implementation site but involves newly collected data. Specifically, this paper analyzes data from the later stages of the implementation; when clients are using the system in everyday work practices. In particular this study examines the relationship between technology use (or misuse), organizational structure and identity. To do so, interview data is collected for an in-depth discursive analysis. The findings are somewhat unexpected. The discursive construction of these findings is examined in depth in this paper.

2. RELEVANT RESEARCH AND THEORETICAL FRAMING

Recently, there has emerged a linguistic 'turn' in information systems research. This turn points to the increasingly acknowledged symbiotic relationship by researchers between information technology and language. That is, in the information and knowledge based economy in which we live, the goods we produce are increasingly provided via language either spoken or written. In a sense we can say that organizations produce and provide semiotic services and products (Alvarez, 2005). This is especially true for information based industries, such as IT.

Information systems researchers have recognized the central role played by language at work and have used several approaches to study this phenomenon. Some of the more well recognized are Speech Act theory (Goldkuhl and Lyytinen, 1984; Winograd and Flores, 1986; Lehtinen and Lyytinen, 1994; Klein and Truex, 1996; Flores et al. 1998) and genre analysis (Yates and Orlikowski, 1992; Yates, Orlikowski and Okamura, 1999). However, close to the research presented here is work that uses various flavors of discourse analysis (Myers and Young, 1997; Wynn, Whitley, Myers, and DeGross, 2002). For instance, Wynn and Novick (1996) examine the issue of 'turns' during cross-functional meetings. They find that what is considered a 'valid' contribution is based on discourse style. In particular, listeners receive the

story versus the professional style of discourse differently. Sayer and Harvey (1997) study implementations and how an electronic mail system is used as a technology of power to manipulate discourses during a Business Process Redesign project. Suchman and Bishop (2000) examine discourses of 'innovation' that function to conserve rather than change existing institutional orders. And Wilson (2002) uses the social shaping of technology approach to examine discrepancies between 'legitimate' rhetoric and the actual use of the system. Kvasny and Trauth (2002) conduct a critical analysis of the responses from under-represented groups compared to the dominant discourses about power and found that these groups had different responses for coping with the notion of IT as a vehicle of power. Knights and Murray (1994) questioned the relationship between discourse and identity in the workplace arguing that particular identities or subjectivities attach themselves to certain practices and definitions of reality in relation to technology. Other scholars have examined identity and technology more recently by focusing on its expression online, in cyberspace (Wakeford, 1997; Bell, 2001; Nakamura, 2002; Rodriguez, 2003). These authors explore the ways people imagine and articulate their social and cultural identities, including race, ethnicity, class, gender, and sexuality.

The research here builds on these literatures that use a varying critical lens to view discourse and identity in the workplace. In this paper, it is interactional talk that contributes to understanding identity and its relationship to organizational structure. Discourse is understood as constructing social reality, including, for example, professional identities. A fundamental observation of discourse analysis is that speakers' identities emerge from discourse (Bucholtz, 1999). In other words, speakers produce and authorize their social roles through language. However, identity is increasingly fragmented and fractured; constructed across different, often intersecting and antagonistic practices and positions (Hall, 1996). In recognizing this friction among the competing and perhaps contradictory positions and practices available, the question becomes not who we really are, but how we have been represented and how that bears on how we represent ourselves to others. Drawing on Michel Foucault, we can reconceptualize this friction as the flow of power to negotiate contradictory positions and threats to existing identities during an ES implementation.

Traditionally, legacy systems were based on functional specialization and customization that had as their focus existing processes and practices carried out by workers. Systems analysts and programmers were concerned with understanding the existing processes in order to identify the information requirements of users and codify those requirements into the information system. An ES, on the other hand, is claimed to be based on 'best practices' and process integration. 'Vanilla' installations, which require altering any existing organizational practices that do not fit with the inscribed rules of the system, are considered the ideal implementation. Therefore, individuals are forced to acquire radically new skills to work with the ES—skills that they may only somewhat understand—and unlearn skills used with a system that they understood perhaps quite well. The ES can therefore pose a direct challenge to entrenched organizational practices, structures and power relations that are intimately linked to organizational identities.

Observing and inquiring about recurrent work practices after an ES implementation allows us to see how opposing forces may work to reshape structures, practices and organizational identity. However, it also provides insights into how individuals may also work around the system as an act of resistance, often contradicting the intended outcomes of the software. The dialectic between old and new skills provides fertile ground for observing unanticipated adaptations, challenges to organizational identity and outright confrontation to the ES. In general, an analysis of how these forces interact can provide a useful tool for understanding contradictory or unpredictable outcomes of an ES.

Critical discourse analysis was selected *a priori* as the theoretical perspective used to identify competing interests and institutional investments and how these are manifest through language spoken by individuals. Critical discourse analysis views discourse as a form of 'social practice' (Fairclough and Wodak, 1997) which allows us to see how people enact and resist social and political structural

arrangements. Moreover, critical discourse analysis argues that the context of language is crucial, particularly the relations between language and power (Fairclough, 1989, 1992, 1995; Caldas-Coulthard and Coulthard, 1996). In examining discourse this way, we can see how discourse produces knowledge through language and the way this knowledge is institutionalized, thereby shaping social practices and setting new practices in motion at work (Du Gay, 1996). It contributes to both sustaining certain social arrangements and transforming them.

Unlike other forms of discourse analysis, critical discourse analysis denotes a concern with being 'critical.' Critical discourse analysis attempts to mediate between the semiotic and the social in order to expose underlying institutional and identity-based power relations. Through the identification of these relations of power we can demystify the processes that produce and reproduce these relations and eventually promote significant social change. Through the examination of discourse, power inequalities along the lines of race, class, gender, sexuality and occupation are exposed. Critical discourse analysis demystifies what is taken to be 'common sense' by defamiliarizing it. This demystification sets the conditions for possibly re-negotiating, resisting and transforming these social inequalities.

3. METHOD AND DATA COLLECTION

The organization selected for this study is State University,¹ a large public research university located in the northeastern United States. This research is part of a longitudinal study which began in late 1996. The data for this paper was collected at two points; the first was during the fall of 1998 and the second major collection point was between the fall of 2002 and the spring of 2003. The professional position of the researcher in the earlier phase of the data collection was that of assistant to the CIO. This role was disclosed to all organizational members involved in the project. The researcher collected and transcribed all data in the earlier project phase. In the latter part of the study, data collection was carried out by two research assistants. The researcher developed the semi-structured questionnaires used by the research assistants and worked iteratively in refining the questions after several initial interviews. There were a total of thirty hours of interviews with forty unique individuals, all of whom were women. These women were Scheduling Representatives (SR) who oversaw the scheduling of classes and the enrollment of students in the classes. Unofficially, many of the SRs had also taken on the role of an academic 'advisor' over the years, since many had become very familiar with the degree requirements of their respective departments. While men were sought out for interviews the overwhelming majority of persons involved in scheduling classes were women. Most of the interviews consisted of one staff member and one interviewer. One interview was a triad, with two interviewees and another was structured as a focus group with five staff, two research assistants and one IT staff member. All interviewers were young male doctoral students. The interviewees were selected based on the department they represented. The intent was to include a variety of departments, in terms of number of students served, type of major (sciences, humanities, professional, etc.) and level of technical support provided within the department.

After the interviews had been transcribed by the research assistants, ongoing qualitative analysis proceeded. The researcher was involved in every iteration in order to become 'intimately familiar' (Eisenhardt, 1989) with the data. The analysis advanced from open coding to axial coding (Strauss and Corbin, 1990). After coding, the three major themes that emerged were *loss of control*, *arbiter of fairness* and *acts of resistance*. These themes constructed a comprehensive story that described the implementation of the ES at State University.

In addition to qualitative data collection, this research also includes quantitative data collection. A survey was administered by the researcher at an early part of the project when the respondents had not used the ES. A survey was developed to assess exposure to the new ES, level of support for the new ES,

¹ Pseudonym is used.

and overall meanings attributed to the new ES. The survey used a seven-point Likert scale to assess level of support, and open-ended questions to assess meanings attributed to the new system. A second survey was administered by the university when the ES was implemented to assess the level of customer satisfaction. The findings from both these surveys are used briefly to illustrate the level of support for the ES before and after it was in use by clients.

For analytical purposes, the earlier and latter stages of the ES implementation are distinguished as *technology as imaginary phenomenon* and *technology as artifact* stages respectively. Technology as imaginary phenomenon marks the time when the ES existed as an idea in the imagination of users, but had not yet been purchased nor installed in development mode within the organization. During this early stage most individuals had not yet ‘touched’ the ES but had received a large amount of information about the technology from various sources. In the latter stage, during the semi-structured interviews, technology as artifact marks the period when the ES is ‘in use’ by a large number of individuals. The ES as artifact is now a durable item with certain material properties (i.e. disks, manuals, menus on a screen, relational tables, etc.). Using these temporal analytic devices allows us to see how individuals instill different meanings into the ES over time.

4. FINDINGS

4.1 Technology as Imaginary Phenomenon

The State University spent approximately four months evaluating several ERP finalists. Immediately after the ERP evaluation period, a survey was administered to 213 staff who attended vendor demonstrations or meetings relating to the new ERP. Findings show overwhelming support for the decision to implement a new system. Using a 7-point Likert scale to measure support, 97.7% either somewhat agreed, agreed or strongly agreed with the decision to purchase and install the new ES. The findings show that 46.5% of the respondents believed the new system would be ‘integrated’ and 24.4% believed it would be ‘distributed.’

The results of this survey suggest that there was very strong support by staff to purchase and implement a new ERP. The survey shows that respondents believed that the new system was integrated and distributed even though the vast majority of those responding to the question (76.7%) did not have any hands-on experience with the new ES. These appeared to be positive characteristics that were supported by upper management. Attributing fairly positive characteristics to the ES is consistent with research by Newell et al. (2003) who propose the notion of ‘conceptually ambiguous.’ A conceptually ambiguous fad tends to gain widespread diffusion because individuals are able to select the characteristics that most strongly resonate with them and inscribe them onto the ambiguous entity. In the earlier stages when the ES functioned as an imaginary phenomenon, it was indeed conceptually ambiguous given that the majority of the organization had not used it and its characteristics were in the realm of the imaginations of users. During this imaginary phase the ES was interpreted by individuals as a fairly positive entity that offered the hope of integrating the enterprise and distributing access to information. But as Markus et al. (2000) show, success at one point in time of an ERP implementation may only be loosely connected to success at another point in time. The next section examines interpretations and interaction with technology during another temporal frame, when the ES is a material artifact on their desktop.

4.2 Technology as Artifact

Two weeks after the State University went into production with the ES, slightly more than 17,000 students used the ES to register into approximately 95,000 course seats. The ES was now a material reality for most of the institution. A university administered survey showed that approximately 2 out of 3

students who responded (n=373) favored the new ES over the old system of registration and 86.9% rated it as fair to excellent. Clearly, customers (i.e. students) appeared to be satisfied with the new ES.

However, the new ES was also being used by approximately 1000 staff who were not surveyed but were using the system on a daily basis to provide a host of administrative services to the students and faculty. Had support for the ES remained consistent or changed among these users? What interpretations did the staff who previously supported the system have now that the technology was no longer conceptually ambiguous? How was the new ES interacting with existing practices, processes and positions associated with the system? What other social implications did the ES have? To address these empirical questions, a series of semi-structured interviews were conducted during the fall of 2002 and spring of 2003 with staff. At the time of the interviews all staff were using the ES to carry out their daily administrative tasks.

The interviews were transcribed using the conventions below based on the work of Riessman (1990) and Gronn (1983, 1985) (adapted from Stubbs, 1983) but adapted for readability. Symbols used in the transcribed extracts are:

- SR scheduling representatives
- INT interviewer
- // overlapping talk from the first to the last slash
- (x) pause of x seconds
- [] explanatory note
- { } nonlexical utterances
- italics* word emphasized by speaker
- :: extension of the sound of syllable it follows (more colons extends the stretch)

4.2.1 *Loss of Control*

A prevalent theme that emerged was a 'loss of control' that was experienced by the SRs in relation to scheduling classes. The following passage is an example of how this theme was articulated during an interview. Below, the Scheduling Representatives were asked how the new ES had changed their working relationships to students and faculty and, more generally, changed how they perform their tasks.

Passage 1

- 1 SR2: I count on the system to:: as a and use it as a tool
2 INT: mhmm
3 SR2: so that I can umm advise the students
4 properly and and help them solve problems that they you know messes they've made er you know somehow and and I
5 umm if you're tools don't work (.3) pfff (.3) they don't if it doesn't give you the information you need
6 SR1: yeah you know we're attracted to what you have control over
7 SR2: right (.3) and that's why I'm now
8 saying legal studies that's all I will do with you is /legal studies
9 SR1: and that's/ still a mistake you can fix so that's why you're only
10 going out that far on that limb
11 SR2: right
12 SR1: /you know
13 SR2: right/
14 SR2: if you misadvise somebody or the student's
15 wrong you can't fix it you don't
16 SR1: right
17 SR2: square to it
18 SR1: and the in the past I, you know, would tell the
19 students I will give you some pointers about your language requirements and /your

20 INT: mhmm/
21 SR1: general education things
22 umm you still have to, because I still don't have control over them, you still have to, for the final answer go there but I
23 see some problems here and here
24 INT: yeah
25 SR1: so go to these people and talk to them (.5) I don't even wanna
26 look at it now
27 INT: mmhmm
28 SR1: becau:::::se (.2) its just (.2) you know, I just, I just tell, I just say to them I'm
29 not gonna look at it you have to go to these two places to deal with /it
30 SR2: well cuz/ you can't feel confident about what you
31 see:: and if the problems aren't picked up
32 SR1: /the problems
33 SR2: so:::::/
34 SR1: yeah
35 SR2: its more onus that's on the student and
36 that's gonna be tough because that probably means that they're just gonna (.4) /come up later
37 SR1: blow it off/ right
38 SR2: yeah
39
40

Passage 1 shows the signs that we expect to be present when speakers are upset or distressed: false starts, hesitations, nonlexical expressions, overlaps, and interruptions. For instance, in line 5 SR2 uses the nonsemantic sign of 'pfff' which is preceded and followed by hesitations, to emphasize her statement that the ES is a tool that does not work. Again in line 28 SR1 prolongs her word 'because' as she begins to tell the interviewer why she sends students to another place to get answers to their problems. Preceding her extended 'because' is a narrative in which she reminisces about the past when she used the legacy system. The narrative begins on line 18 with 'in the past.' Through this time traveling linguistic device, SR1 takes us back in time when she would give students advice about using the old system by reviewing their entire academic profile and identifying problems. In the narrative of the past, SR1 confesses to advising beyond the scope of her immediate department; she gave student's 'pointers' about language requirements, even though she is not in a language department. SR2 also appears as an advisor; helping students 'solve problems' (line 4), get out of 'messes' (line 4) and, overall, being willing to advise beyond her required duty.

SR1 then leaves the past and returns to the present where the ES is now an artifact. In this frame the SR1 is an advisor who can't get access to the information she needs to properly advise students, rendering her ineffectual in this role. In the narrative of the present, which she begins with 'now because' (line 26-28), we see SR1 as someone who feels justifiably released from the responsibility of advising students because of her broken tools and loss of control. She therefore sends students away to find answers to problems and the students later 'blow it off' (line 37). SR2, who shares in her discontent with the lack of control she experiences with the ES, feels concerned that there is 'more onus that's on the student' (line 35) now that she can't offer the same type of support she did before. As SR1 describes how she has limited her willingness to go 'far out on that limb' (line 10) with only department specific advice, SR2 interrupts twice in agreement, which punctuates her support for SR1's statements.

The passage above and many others similar to it show that rather than having an 'integrated' view of information, as imagined by users, the image that emerges of the ES is as a tool of control that has compartmentalized work. The SRs express clear displeasure with the ES perhaps because their ability to provide a holistic service to students has been severely narrowed as has their professional identity which SR2 performs in line 3, when she states that she 'advises students' thereby establishing her role. Contrary to being interpreted as integrated, which was how the ES was perceived when it was still an imaginary

phenomenon, as an artifact we see the emergence of the ES as a somewhat fragmented, narrowly defined, and controlling system.

The ES is now directly implicated in structuring the daily activities of the SRs. Other research has argued that information technology is intimately implicated in the structuring of individual work; it provides the means to accomplish tasks, imposes certain schedules and routines, introduces new vocabularies to mediate the meanings ascribed to events, and, finally, coordinates tasks over time and place (Orlikowski, 1992). In the case of State University, we see how the ES has certain embedded 'best practices' that impinge upon the structure of daily work life for the SRs. In this situation the ES provides fairly complex security algorithms that allow for very focused and discrete access to information, thereby limiting how the SR provides advice, resulting in an emphasis on the departmental major only. Through interactions with the ES and its embedded rules and routines, the act of advising loses its meaning, or, at a minimum, the meaning that it had in the past. It is now a very focused and limited event.

The ES also contributes to creating interdependence among SRs. Because they are limited in what they can see in the new system, the SRs must send students to other departments to get more information in order to get the courses they need. From the point of view of the SRs this is perceived as a form of dependence on other departments, a dependence that was not present when the legacy system was in use. However, if we look at this from a management perspective, it is also possible to view this dependence as a form of 'integration.' What we witness, via the discourse of the interviewees, is a system that requires interdepartmental communications, which is perhaps a managerial goal, but at a cost of decreased independence and autonomy for workers.

The restructuring of responsibilities that is produced through interaction with the ES contributes to reshaping the professional identities of the SRs who work with the system. With the legacy system, the SRs performed more as 'generalists,' extending support beyond their 'call of duty' to advise students in more comprehensive manner. With the ES their professional identity has changed to one of 'specialist.' The following passage illustrates this change.

Passage 2

SR: yeah and just kinda like strategizing with them how to go about getting into different classes and um the advising kind of changed it wasn't just talking about what courses and how things are going with their classes

Passage 3

SR: yeah uh because I really can't spend the time that I used to with helping the students with real problems because I felt like a cop directing traffic

A: mm

B: uh because they would come in and and I would have to like be a detective to find out why something wasn't working for that particular student

This passage begins with a performative act that marks a shift for the SR from an advisor who helped students 'with real problems' to a traffic cop. This marks a shift in her professional self-image as one of having status and value to one in which she is merely directing others through strict adherence to policy and rules. The new ES constrained the ability of the SR to function as this comprehensive advisor and instead favors an SR who is more of a 'specialist' who gives advice about the specific departmental major. What we witness is the emergence of structures of technology in use, or what Orlikowski (2000)

has termed ‘technologies in practice’ which involves sets of rules and resources that are re-constituted through an individuals’ engagement with the ES. Specifically, the ES in practice re-structures the relationship of the SR to the student such that the SR is no longer able to provide the service of advising beyond the major. Beyond shaping structure and action, the ES also directly shapes professional identity. Moreover, the legal metaphors of cop, strategist or detective are thus particularly interesting, because they establish the SRs sense that she needs to negotiate and work around the interests of the institution that are inscribed in the new ES.

6.2.2.2 *Arbiter of Fairness*

Another emergent issue is that of ‘fairness.’ When the SRs used the legacy system, most spoke of the amount of discretion they were allowed in determining which students were assigned to which courses. The new ES severely curtailed this discretion and therefore the amount of control they were able to exercise.

Passage 4

1 SR: so before I'd be able to go and count all the, it was a lot of work for me
 2 INT: right
 3 SR: it was a lot of work I have /to
 4 INT: yh/ yeah
 5 SR: admit but you know I got to the point where I counted all the may um senior majors and junior majors and they stayed
 6 in
 7 INT: so you had prioritized /the people as uh huh
 8 SR: prioritized I said/ until the capacity's reached you know cut off freshmen sophomores
 9 and keep cutting them 1 2 3 in this order /until
 10 INT: mhmm/
 11 SR: capacity's reached
 12 INT: mhmm
 13 SR: and that just seemed fairer and
 14 then we didn't have to deal with the nonmajors and them not having their schedules set like everybody else does you
 15 know
 16 INT: so now:: in that same situation with a capacity of 40 it's just on a first come first serve ba/sis
 17 SR: yeah/
 18

In the passage above, the SR begins by invoking a narrative of the past which starts with ‘before I’d be able to’ (line 1). This expression along with ‘before I used to’ were common in the discourse of a number of SRs. They spent a great deal of time recounting their processes of the past. Before the SRs experienced more control over the tools they used. In the passage above the SR references that time, when she would, in fact, not use the legacy system but rather use a somewhat labor intensive process to determine the allocation of resources (classes) to students. Even though the process was ‘a lot of work’ (line 1) for her, she felt it ‘seemed fairer’ (line 13) than the more impersonal first come first serve approach taken by the new ES. She clearly sees her determination of ‘fair’ in direct conflict with the institution’s or at least that which has been inscribed into the system as ‘first come, first served.’ In her manual allocation system and using her discretion, she determined the criteria for allocation, in this case upper division students and those that were in her major. She took care of those that she determined were in most need of the classes first. The SR’s identity as an arbiter of fairness emerges through this discursive passage.

In the following passage an SR talks about the ideas of fairness and identity.

Passage 5

1 SR: it's harder to give them a fair shake I mean there's always people unfortunately who fall through the cracks for one
2 reason or another either it's our mistake or they're just out to lunch
3 INT: mhmm
4 SR: u::m but I think it's harder it's a lot
5 harder cuz I mean in order to treat students fairly I have to set the bar a lot higher for all of them you know and in in
6 other words I, you know, I have to say well if the system says if the system doesn't tell me you're a junior I need a
7 printout or a something signed from admission or transfer affairs otherwise if I just take your word for it then I'm being
8 unfair to all these other students who are in the same situation as you so it was just it's just a lot harder /you know
9 INT: mm/
10 SR: it
11 just creates a lot more work for everybody
12 INT: does u::m I mean compare especially comparatively maybe to how you
13 how you used to work things does it feel like it's harder to be fair cuz you have less control or is it or
14 SR we hh it's
15 harder to be fair because we have less ability to manipulate things
16 INT: compared /to how
17 SR: u::m/
18 INT: you used to
19 SR: we have
20 yeah we have less I mean you know in the past we could let like I said let juniors register for senior seminars if there
21 were too many then we took them out and that was a pain in the butt too but at least they had that chance
22

In this passage the SR is describing how she enforces 'identity checks' with students. Although she does not do it now, it seems as though before she was able to take students' 'word for it' (line 7) while maintaining the ability to 'manipulate things' (line 15) to allocate resources based on her judgment. But from this passage and those above, we see that the ES has certain embedded rules that don't allow the SR to function as the final word in determining the allocation of classes. She seems to defer to the system, with no ability to argue or contest a decision and no ability to manipulate the ES. The system appears to be indisputable. In reaction to the new ES, the SR has now set the bar higher and created more formal and bureaucratic structures that require students to seek more approvals. The ES in practice has restructured her relationship to students. She might have imposed these rules in order to create an external structure that appears to be 'fair' to all students since she no longer had the discretionary power to allocate the resources herself. Now the ES has assumed the role as arbiter in granting resources to clients. One can imagine that the ability to perform this task is something that gives the SRs quite a bit of power vis-à-vis her clients; power that is now threatened by the new arrangement. The SRs, however, are neither passive nor naïve about how this new structural arrangement has shifted the power of allocating resources from them to a computerized system. They had in fact developed and implemented a number of creative workarounds that allowed them to maintain a fair amount of control over their work process and resist the rules put in place by the ES.

4.2.2 Acts of Resistance

Subverting the new ES was another key theme that emerged during interviews with SRs. Although the system was fairly new to most of the SRs, many of them had developed 'workarounds' for the new system that allowed them to manipulate the outcomes such that the allocations of courses or access to online resources occurred in a manner that was more under their control.

In the following passage the SR is asked about faculty use of the new ES and interactions with faculty now that the new system is in place.

Passage 7

1 SR: I don't really interact with them very much /except

2 INT: mhmm/
3 SR: to make sure that the student who comes to me near the end of
4 add drop has actually been attending class or that a student who doesn't have a certain prereq does actually have
5 permission from the instructor to take the class u::m if their class is really full then I'm interacting with them a lot
6 going cuz all that stuff we take offline so u::m I'm interacting with them a lot in terms of who can I put into your
7 class /and can't
8 INT: mm/
9 SR: who I can't we take some of our courses offline during add drop I thought about trying to
10 use the wait list system
11 INT: m/hmm
12 SR: I'm/ very glad I didn't it would have been a nightmare
13 INT: mm
14 SR: u::m yeah yeah um it
15 would have been a disaster I think so:: as a result we're we take our courses offline during add drop and (2) um I do it
16 by
17 hand
18 INT: so you used to keep um things offline during /add drop
19 SR: yeah we've been we've/ done that
20 INT: mhmm/ mhmm
21 SR: because we want
22 our seniors to able to get the seminars that they need we want our juniors to be able to get the seminars that they need
23 and some people have special circumstances that we want to be able to take into account there's no way to program a
24 computer for that
25 INT: mhmm
26 SR: u::m there's just not any way to tell a computer if the student is going abroad you
27 know /{laughs}
28 INT: right there's too many details/
29 SR: yeah
30 INT: yeah
31 SR: there's too many ifs
32 INT: mhmm
33 SR: u::m and u::m and
34 we have few enough classes and small enough classes that we can do that
35 INT: yeah
36 SR: we can be very selective and
37 a lot of times it ends up being you know eh if the class is overenrolled or close to full that's no problem I just take the
38 piece of paper and process it
39 INT: mhmm
40

In the passage above the SR describes her practice of resistance to using some of the main functions of the new system; assigning courses to students in real-time versus batch mode. The SR confesses to taking courses offline, thereby rendering them inaccessible via the new ES. She tells the interviewer that she, rather than the system, ultimately decides which students get placed in the offline courses. The SR also indicates that she decided to not use 'the wait list system' (line 10). Mentioning this has the effect of presenting her as someone who is technologically knowledgeable (the wait list system is the option for addressing overenrolled courses) but elects to use a manual process which gives her control over allocating course seats. The manual 'workaround' is intentional and not done simply out of ignorance or a shortcoming of the system.

As the interview progresses we see the SR legitimate her transgression in two instances. In the first instance she suggests that if she applied the ES solution to overenrolled courses it would have been a 'nightmare' and 'disaster' (line 12 and 15)—although she does not elaborate why. She follows these utterances with an extended 'so::' to emphasize the confession that follows where she describes that she takes her courses offline and then another pause (line 15) to tell that she does it 'by hand' (line 16/17). Her second instance of justifying her resistance to the system's automated allocation of courses is done in lines 21-33. Here she tells of how her manual process allows her to assign courses to 'our seniors,' 'our juniors' and students with 'special circumstances.' This is a statement of ownership and attachment to

students and it is therefore her responsibility to ensure that they are assigned the courses to which they are entitled. She then finishes the justification by indicating that life's complexities, such as 'going abroad' (line 26) can't be programmed but rather need her human intervention. Here the implication is that the computer cannot replace the human who understands life's complexities.

The practice of taking courses off line was fairly widespread among the SRs even though it was very much frowned upon by the IT staff and Student Registration office. These unexpected adaptations show how the SRs circumvent the inscribed ways of using the ES by working around its perceived limitations and constraints. Going 'off-line' was a way for the SRs to circumvent the institutional surveillance of the University. In observing these local 'disruptions' (Knights and Vurdubakis, 1994) we see a process unfold that was not anticipated by university management or the designers of the ES. The SR in the passage above, as well as many others, implemented somewhat complex workarounds that allowed them to maintain control over the allocation of courses. The 'misuse' of the system, then, allows them to resist the ES' inscribed rules. The ES is no longer a necessarily fixed constraint imposed on their workplace structure or identity.

5. DISCUSSION AND CONCLUSIONS

This research explores the organizational consequences of an ES implementation at State University over a period of five years and two temporal frames—technology as imaginary phenomenon and technology as artifact. The findings show that prior to its adoption, when the ES was introduced as an imaginary technological phenomenon, there was overwhelming support for the new system. The yet untried ES, moreover, was inscribed with favorable characteristics, such as integrated and distributed, that seemed to stand in opposition to the existing legacy system. The support for and favorable feelings toward the idea of a new ES can be seen as a consequence of powerful narratives that pervaded State University during this time.

One of the merits of a longitudinal study, however, is its ability to identify patterns of influence over time and document an historical account of organizational transformation. If we looked at this study standing solely within the technology as imaginary phenomenon frame, research would suggest that the actual use of the technology would be strongly influenced by individuals' understandings of the properties of a technology which are in turn influenced by the rhetoric, ideologies, and demonstrations provided by intermediaries such as vendors and champions (Orlikowski et al., 1995; Woolgar, 1996). These narratives can be so powerful so as to continue to shape users' interpretations of systems even after they are installed and used (Kling, 1992). For this research, then, we would hypothesize that users would continue to understand the ES as integrated, or at a minimum, as contributing to an integrated business environment. Yet this study shows quite the opposite as we move across time. In practice we find that the 'integrated' aspects of the system that users initially championed later required them to share or negotiate power with peers and higher ranking faculty and staff rather than making unilateral decisions. The worker's professional status, wielding power over those in a subordinate position, namely students, must now be negotiated with other members of the institutional hierarchy. Users resist the loss of their autonomous control and power. In general, the examination of these findings over time, point to the value of exploring the tensions and disruptions between technology as imaginary and artifact, as well as the relationships between these two formulations.

Barley (1986) suggests technology is not the cause or constraint on structure, but rather an occasion for investigating the change in structures, processes and social action. To examine this occasion, this research peered into the 'window of opportunity' (Tyre and Orlikowski, 1994) that exists when users view a new technology as a distinct artifact. Data collected during this time yield interesting insights

about the ES system and its relationship to the context of use and adaptation before it becomes 'part of the furniture.' The findings show that users felt a loss of control with the new ES. Unlike the experiences in the earlier phase, the system was now perceived as fragmented. In fact, we see that the embedded 'best practices' in the ES contributed to a sense of compartmentalization and dependence on other staff that did not exist before. The rules and routines inscribed into the ES had the effect of limiting individuals' view of information and thereby their ability to provide the breadth and depth of services to their clients that they had in the past. In terms of professional identity, it also shifted their institutional status from 'advisor' a designation with greater, if unofficial, status and autonomy, to an SR who merely serves to carry out the institution's interests.

In a sense, the dominant interests of management are inscribed into the technology (Latour, 1992) which then has a direct influence in shaping the actions and identities of workers. The priorities and institutional investments of the University, such as 'first come, first served' were coded into ES in ways that would discipline SRs into following the Institution's, rather than the users' definitions of efficiency and fairness. Nevertheless the SRs continually found ways to subvert the Institution's intended desires and avoid surveillance through practices such as going off-line. This alternative view provides us with an understanding of how technology can be used as a potential tool to steer, rule, hold in check, in sum, to administer the actions of users. Drawing on Foucault, the ES can be seen as a technology of power, one which allows us to investigate the ways in which subjectivity is an essential object and target for certain procedures within the institution (Foucault, 1979, 1982; Miller and Rose, 1988, 1990). In this way, we can see how, through the interaction with the ES, power works to create, shape and utilize human beings as subjects, users as 'cops' and 'detectives.' Power then, works through and not against subjectivity.

Perhaps one of the more interesting findings of this study is that while changes in structures and process did occur over time, the introduction of an ES directly challenged and reshaped perceptions of professional identity. Some have argued that there is an inherently 'social' nature of much service work that has contributed to transforming work identities (Urry, 1990). In service work there is a direct relationship between one or more service providers and one or more service consumers, thereby eroding the traditional distance between 'production' and 'consumption' characteristic of manufacturing work. The social nature of this new service work requires a focus on the distinct change in the cultural relations of the workplace. The SRs performed information service work for clients which highlight the importance of cultural relations among those involved. The SRs provided clients with comprehensive advice about their education or courses that went well beyond the narrow definition of Scheduling Representative. This comprehensive service allowed them to take on a more expansive role with some clients. The practices associated with providing this comprehensive service became embedded over time creating organizational structures and identities that became somewhat 'enduring' for the staff. With the implementation of the ES, however, existing organizational identities were challenged. Historically, the role of SRs had depended on having fairly broad discretion in allocating particular courses or other resources to clients. Through workarounds with the legacy system, they were able to be 'fair' to people in allocating resources. With the arrival of the ES, their role as 'arbiters,' one which directly challenged the institution's economic interests, was seriously challenged and went from comprehensive advisors for students to specialists that focused narrowly on particular services much to the dismay and resistance of many of the staff.

The findings show that upon its arrival the ES challenged the amount of control SRs exercised, which in turn generated resistance. Acts of resistance on the part of staff produced unanticipated adaptations of the technology. These acts allow users to reach inside the technology and reshape it such a way that it ceases to be a fixed constraint (Orlikowski and Robey, 1991). In removing the fixity of this constraint, we move away from a deterministic analysis that might conclude that the ES was deployed in a manner that reflected the inscribed dominant managerial interests and which sustained unequal power relations. What we see, instead, is that staff are not docile or in any way ignorant of the loss of control and sense of

deskilling they experience. As a result, the staff employ creative workarounds which allow them to reshape and, in some instances, re-establish their identity. Contrary to skilling/deskilling hypotheses that posit the consequences of technology in polar extremes (Attwell and Rule, 1984), the ES can be seen as having both deskilled and reskilled this particular group of users. It deskilled staff in that they were no longer allowed to provide comprehensive support to students. Yet at the same time, it reskilled them by prompting them to more actively engage the technology they inherited in order to devise new complex workarounds. Thus, these technological adaptations allowed them to subvert and, in some fashion, mitigate a system that many felt stripped them of their autonomy and professional identity.

There are several observations that can be gleaned from this research. First, through the lens of time, this study has provided insights on organizational transformation that would not have been available had we simply examined one slice of time. Much like the research focusing on information technology and time in one form or another (Tyre and Orlikowski, 1994; Sahay, 1997; Lee, 1999; Markus, et al., 2000; Sawyer and Southwick, 2002) this research shows that time is a useful analytical lens that illuminates complex and somewhat unpredictable social change that occurs in an organization.

Second, this study shows that information technology is a complex and contested social and imaginary phenomenon as much as it is a technical one. This socio-technical process is intricately linked to and complicit in shaping organizational structure and identity. In fact, there is recognition in the field of IS that structure and technology exist in a co-constitutive relationship (Orlikowski, 1992). Yet this study also shows the equally important relationship that identity has to organizational change. In a sense, this study shows how technology, structure, and identity are multiply constitutive. The type of challenge that an ES can pose to this relationship, as we have seen, is therefore very unique. In the past, legacy systems were built either to support or enhance existing practices. Systems developers worked with staff to identify information requirements, develop specifications, code, test, and implement legacy systems. With an ES the organization is faced with an existing system that arrives relatively complete at their doorstep. The ES is touted as enabling (if not outright requiring) an organization to fundamentally alter their business processes to fit the best practices embedded within the technology. What this study has shown is that these 'best practices' can be imbued with institutional interests. If so, we can see how the ES can then function to produce and act upon particular kinds of subjects. Therefore, it follows that a 'successful' implementation of an ES will require changing not only existing structures but also professional identities.

This study has attempted to provide a critical view into the unique challenges that were produced during an ES implementation by providing insight and critique. However, this research does not provide a specific recommendation for transformation – the usual third concern of critical researchers (Alvesson and Deetz, 2002). There are no prescriptive guides that would function as a blueprint for emancipation from oppressive social relations. Unlike traditional forms of critical inquiry, the work presented here falls into a form of critical research in practice that departs from the Habermasian tendency toward prescription and more toward the Foucaultian tendency toward deconstructive analysis (Brooke, 2002). Therefore, there is no normative guide for action or the more conventional prescriptions for practitioners. Instead the research here has attempted to perform critique through revelation. As Doolin and Lowe (2002) argue, to reveal is to critique. This study has made evident the hidden aspects of power relations during an ES implementation by interrogating how identity, technology and structure are inextricably entangled. As Foucault contends throughout much of his writings, power is most effective when it is hidden. Moreover, "where there is power there is resistance" (Foucault, 1980, p. 95). The narrative presented here, exposed how the practices that produced a loss of autonomy, isolation, and fragmentation were institutionalized all in the name of an "integrated" ES. It has also shown how this power coexists with variegated forms of resistance. Perhaps the transformative contribution of this paper is that it has

offered a genealogical² analysis of resistance, one that explores what is not evident because of the institutionalization of knowledge, and has thereby exposed how power works to create intolerable situations in the workplace but also instigates new possibilities for resistance.

Acknowledgements: A thank you to Juana Maria Rodriguez, a humanist, who critically interrogated the intersection of technology, power and performativity in this article and to the reviewers who, amongst other contributions, challenged me to articulate a broader understanding of critical research.

This work was supported by the Director, Office of Science, Office of Basic Energy Sciences, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

References

- Agarwal, R. & Tanniru, M.R. (1990) Knowledge acquisition using structured interviewing: an empirical investigation. *Journal of Management Information Systems*, **7**, 123-140.
- Alvarez, R. (2001) 'It was a great system': face-work and the discursive construction of technology during information systems development. *Information, Technology and People*, **14**, 385-405.
- Alvarez, R. (2002) Confessions of an information worker: a critical analysis of information requirements' discourse. *Information and Organization*, **12**, 85-107.
- Alvarez, R. (2005) Taking a critical linguistic turn: using critical discourse analysis for the study of information systems. In: *Handbook of Information Systems Research: Critical Perspectives on Information Systems Design, Implementation and Use*, Howcroft, D. & Trauth, E. (eds), pp. 104-122. Edward Elgar Publishing Ltd, Cheltenham, UK.
- Alvesson, M. & Deetz, S. (2000) *Doing Critical Management Research*. Sage, London.
- Attwell, P., & Rule, J. (1984) Computing and organizations: what we know and what we don't know. *Communications of the ACM*, **27**, 1184-1192.
- Barley, S. R. (1986) Technology as an occasion for structuring: evidence from observation of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, **31**, 78-108.
- Bell, David. (2001) *An Introduction to Cybercultures*. Routledge, London.
- Brooke, C. (2002) What does it mean to be 'critical' in IS research? *Journal of Information Technology*, **17**, 49-57.
- Bucholtz, M. (1999) Transgression and progress in language and gender studies. In: *Reinventing identities: The gendered self in discourse*, Bucholtz, M., Liang, A.C., Sutton, L. A. (eds), pp. 3-24. Oxford University Press, New York.
- Byrd, T. A., Cossick, K.L., Zmud, R.W. (1992) A synthesis of research on requirements analysis and knowledge acquisition techniques. *MIS Quarterly*, **16**, 117-138.
- Caldas-Coulthard, C. R. & Coulthard, M. (1996) *Texts and Practices: Readings in Critical Discourse Analysis*. Routledge, London.

² Commentators generally characterize Foucault's genealogical period, in contrast to his archeological period, as beginning with the publication of *Discipline and Punish* (1979). In the former archeological period, he argued that systems of thought (epistemes) and knowledge (discursive formations) are governed by rules, beyond those of grammar and logic, that operate beneath the consciousness of individual subjects and that define a system of conceptual possibilities in a given domain or period (c.f. *The Archaeology of Knowledge, The History of Madness and The Order of Things*). In contrast, for Foucault, the term genealogy implied "the union of erudite knowledge and local memories, which allows us to establish a historical knowledge of struggles and to make use of this knowledge" (1994, p. 42). Thus, genealogical analysis tries to uncover power relations that are at work in constituting a domain of objects. It explores what is not evident, because of the institutionalization of practices, and the creation of objects through these practices (Dreyfus and Rabinow, 1982, p. 104).

- Carlino, J., Neslon, S., Smith, N. (2000) *AMR Research Predicts Enterprise applications market will reach \$78 billion by 2004*. AMR Research, Boston.
- Dreyfus, H. L. & Rabinow, P. (1982) *Michel Foucault: Beyond Structuralism and Hermeneutics*. Chicago: The University of Chicago Press.
- Du Gay, P. (1996) *Consumption and Identity at Work*. Sage, London.
- Eisenhardt, K. (1989) Building theories from case study research. *Academy of Management Review*, **14**, 532-550.
- Fairclough, N. & Wodak, R. (1997) Critical discourse analysis. In: *Discourse and Social Interaction*, Van Dijk, T. (ed), pp. 258-284. Sage, London.
- Fairclough, N. (1989) *Language and Power*. Longman, London.
- Fairclough, N. (1992) *Discourse and Social Change*. Polity Press, Cambridge, MA.
- Fairclough, N. (1995) *Critical Discourse Analysis: The Critical Study of Language*. Longman, London; New York.
- Flores, F. (1998) Information technology and the institution of identity: reflections since understanding computers and cognition. *Information, Technology and People*, **11**, 351-372.
- Foucault, M. (1979) *History of Sexuality, An Introduction Vol. 1*. Vintage, New York.
- Foucault, M. (1980) *The Will to Know, Volume One of the History of Sexuality*. Vintage, New York.
- Foucault, M. (1982) The subject and power. In: *Michel Foucault: Beyond Structuralism and Hermeneutics*, Dreyfus, H. & Rabinow, P. (eds), pp. 208-228. University of Chicago Press, Chicago.
- Foucault, M. (1994) Genealogy and Social Criticism. In S. Seidman (ed.) *The Postmodern Turn: New Perspectives on Social Theory*. Cambridge, MA: Cambridge University Press. (reprinted from Foucault, M. *Power/Knowledge*. Pantheon Books, 1977).
- Goldkuhl, G. & Lyytinen, K. (1984) Information system specification as rule reconstruction. In: *Beyond Productivity, Information System Development for Organizational Effectiveness*, Bermelmans, T. (ed), pp. 79-94. North-Holland, Amsterdam.
- Gronn, P. C. (1983) Talk as work: the accomplishment of school administration. *Administrative Science Quarterly*, **28**, 1-21.
- Gronn, P.C. (1985) Committee talk: negotiating 'personnel development' at a training college. *Journal of Management Studies*, **22**, 245-268.
- Hall, S. (1996) Introduction: Who needs identity. In: *Questions of Cultural Identity*, Hall, S. & DuGay, P. (eds), pp. 1-17. Sage Publications, London.
- Klein, H.K. & Truex, D. (1996) Discourse analysis: A semiotic approach to the investigation of organizational emergence. In: *Signs of Work: Semiosis and information processing in organisations*, Andersen, P. B., Holmquist, B., Klein, H. (eds), pp. 227-268. Walter De Gruyter, Berlin.
- Kling, R. (1992) Audiences, narratives, and human values in social studies of technology. *Science, Technology & Human Values*, **17**, 349-365.
- Knights, D. & Murray, F. (1994) *Managers Divided: Organizational Politics and Information Technology Management*. John Wiley, West Sussex, England.
- Knights, D. & Vurdubakis, T. (1994) Foucault, power, resistance and all that. In: *Resistance and power in organizations*, Jermier, J., Knights, D., Nord, W. (eds.), pp. 167-198. Routledge, London.
- Kvasny L. & Trauth E. M. (2002) The digital divide and work and home: the discourse about power and underrepresented groups in the information society. In: *Global and Organizational Discourse about Information Technology*, Wynn, E., Whitely, E., Myers, M., DeGross, J. (eds), pp 249-272. Kluwer Academic Publishers, Boston.
- Latour, B. (1992) Where are the missing masses? The sociology of a few mundane artifacts. In: *Shaping Technology/ Building Society: Studies in Sociotechnical Change*, Bijker, W. E., & Law, J. (eds), pp. 225-258. MIT Press, Cambridge MA.
- Lee, H. (1999) Time and information technology: monochronicity, polychronicity and temporal symmetry. *European Journal of Information Systems*, **8**, 16-26.
- Lehtinen, E. & Lyytinen, K. (1994) Action based model of information system. *Information Systems*, **11**, 299-317.

- Markus M.L., Axline S., Petrie D., Tanis S.C. (2000) Learning from adopters' experiences with ERP: problems encountered and success achieved. *Journal of Information Technology*, **15**, 245-265.
- Metagroup (2003). *Deriving Value from 21st century applications*.
- Miller, P. & Rose, N. (1988) The Tavistock Programme: the government of subjectivity and social life. *Sociology*, **22**, 171-192.
- Miller, P. & Rose, N. (1990) Governing economic life. *Economy and Society*, **19**, 1-31.
- Myers, M. D. & Young, L. W. (1997) Hidden agendas, power and managerial assumptions in information systems development. *Information Technology & People*, **10**, 224-240.
- Nakamura, L. (2002) *Cybertypes: Race, Ethnicity, and Identity on the Internet*. Routledge, New York and London.
- Newell, S., Huang, J., Galliers, R., Pan, S. (2003) Implementing enterprise resource planning and knowledge management systems in tandem fostering efficiency and innovation complementarily. *Information and Organization*, **13**, 25-52.
- Orlikowski, W. J. & Robey, D. (1991) Information technology and the structuring of organizations. *Information Systems Research*, **2**, 143-169.
- Orlikowski, W. J. (2000) Using technology and constituting structures: a practice lens for studying technology in organizations. *Organization Science*, **11**, 404-428.
- Orlikowski, W. J., Yates, J., Okamura, K., Fujimoto, M. (1995) Shaping electronic communication: the metastructuring of technology in use. *Organization Science*, **6**, 423-444.
- Orlikowski, W., J. (1992) The duality of technology: rethinking the concept of technology in organizations. *Organization Science*, **3**, 398-427.
- Reissman, C. K. (1990) *Divorce Talk: Women and Men Make Sense of Personal Relationships*. Rutgers University Press, New Brunswick, NJ.
- Robey, D. & Boudreau, M.C. (1999) Accounting for the contradictory organizational consequences of information technology: theoretical directions and methodological implications. *Information Systems Research*, **10**, 167-185.
- Rodriguez, J. M. (2003) *Queer Latinidad: Identity Practices, Discursive Spaces*. NYU Press, New York and London.
- Sahay, S. (1997) Implementation of information technology: a time-space perspective. *Organization Studies*, **18**, 229-260.
- Sawyer, S. & Southwick, R. (2002) Temporal issues in information and communication technology-enabled organizational change: evidence from an enterprise systems implementation. *The Information Society*, **18**, 263-280.
- Sayer, K. & Harvey, L. (1997) Empowerment in business process reengineering: An ethnographic study of implementation discourses. In: *Proceedings of the eighteenth ICIS*, Kumar, K. & DeGross, J. (eds), pp. 427-440. Atlanta, GA.
- Scheer, A. W. & Habermann, F. (2000) Making ERP a success. *Communications of the ACM*, **43**, 57-61.
- Strauss, A. (1987) *Qualitative Analysis for Social Scientists*. Cambridge University Press, New York.
- Strauss, A., Corbin, J. (1990) *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Sage, Newbury Park, CA.
- Stubbs, M. (1983) *Discourse Analysis*. Basil Blackwell, Oxford.
- Suchman, L. & Bishop, L. (2000) Problematizing 'innovation' as a critical project. *Technology Analysis and Strategic Management*, **12**, 327-33.
- Tyre, M. J., Orlikowski, W. J. (1994) Windows of opportunity: temporal patterns of technological adaptation in organizations. *Organization Science*, **5**, 98-118.
- Urry, J. (1990) Work, production and social relations. *Work, Employment and Society*, **4**, 271-280.
- Van dijk, T. A. (1990) Social cognition and discourse. In: *Handbook of Language and Social Psychology*, Giles, H., & Robinson, W. P. (eds), pp. 163-186. John Wiley and Sons, NY.
- Wakeford, Nina. (1997) Networking women and grrrls with information/communication technology: Surfing tales of the world wide web. In: *Processed Lives: Gender and Technology in Everyday Life*, Terry, J & Calvert, M. (eds), pp. 50-66. Routledge, London and New York.

- Willcocks, L. P. & Sykes, R. (2000) The role of the CIO and IT function in ERP. *Communications of the ACM*, **43**, 32-38.
- Wilson M. (2002) Rhetoric of enrollment and acts of resistance: information technology as text. In: *Global and Organizational Discourse about Information Technology*, Wynn, E., Whitley, E., Myers, M., & DeGross, J. (eds), pp. 225-248. Kluwer Academic Publishers, Boston.
- Winograd, T. & Flores, F. (1986) *Understanding Computers and Cognition: A New Foundation for Design*. Albex, Norwood, NJ.
- Woolgar, S. (1996) Technologies as cultural artifacts. In: *Information and Communication Technologies: Visions and Realities*, Dutton, W. (ed), pp. 87-102. Oxford University Press.
- Wynn E.H., Whitley, E.A., Myers, M.D., DeGross, J.I. (2002) *Global and Organizational Discourse about Information Technology*. Kluwer Academic Publishers, Boston.
- Wynn, E. & Novick, D. (1996) Relevance conventions and problem boundaries in a work redesign team. *Information Technology & People*, **9**, 61-80.
- Yates, J. & Orlikowski, W. (1992) Genres of organizational communication: a structural approach to studying communication media. *The Academy of Management Review*, **17**, 299-326.
- Yates, J., Orlikowski, W., Okamura, K. (1999) Explicit and implicit structuring of genres in electronic communication: reinforcement and change of social interaction. *Organization Science*, **10**, 83-103.