Learning in IT projects- The Importance of Situated Practice as well as Formal Project Methodologies

Sue Newell,
Bentley College,
Waltham, USA
(snewell@bentley.edu)
and
Gary David,
Bentley College,
Waltham, USA
(gdavid@bentley.edu)

Submitted to OLKC 2006 Conference at University of Warwick, Coventry
on 20th – 22nd March 2006

INTRODUCTION

Enterprise Systems (ES) are being widely adopted by all types of organizations and there is now considerable research on the impact of such systems (Holland and Light, 1999, Howcroft et al., 2004; Robey et al., 2002; Shang and Seddon, 2002). The promoted strategic advantage of an ES is that it can integrate business functions into a single system with a shared database (Lee and Lee, 2000), allowing organizations to develop a homogenous enterprise-wide information systems infrastructure. At the same time as providing integration, the organization can

simultaneously rid itself of legacy systems, many of which will have operated independently and will have been customized to reflect ingrained and localized practice (Gupta, 2000). Large organizations will often have several hundred, often duplicated legacy systems, which are costly to maintain and support. Many multinational enterprises have, thus, adopted ES with the intention of leveraging productivity and efficiency gains in order to improve organizational competitiveness (Davenport, 1998, Wagle, 1998).

These potential benefits are certainly attractive and explain why so many organizations have chosen to adopt an ES. However, the reality of implementing an ES can be problematic as many such projects often involve significant implementation delays and budget over-spends, as well as sometimes outright failure (Parr and Shanks, 2000; Robey et al., 2002; Wagner and Newell, 2004). Given the organizational stakes involved in the implementation of an ES, a great deal of research has been done to identify the critical success factors (CSF) for IS generally or for ES success specifically (Bajwa et al., 2004; Holland and Light, 1999; Holland et al., 1999; Markus et al., 2000a and 2000b; Nah et al., 2001 and 2003; Parr and Shanks, 2000; Sousa and Collado, 2000; Sumner, 2000). While these general recommendations provide a helpful starting point, existing research does not consider why so many companies fail to achieve these CSF. In other words, while the CSF provide a roadmap to success, organizations never the less "get lost" when trying to follow the directions. This paper addresses the question: why are so many of the factors that research has identified as critical to ES implementation success problematic to maintain in practice, even when those involved are well-aware of their importance?

We use an exploratory case to examine whether and why CSF are difficult to sustain. Based on our analysis, we argue that adopting a complimentary practice-based orientation to ES implementation (that pays attention to what people *actually* do rather than what they are

supposed to do) can help to keep a project on-track even when some of the CSF have deteriorated. The foundations of our practice-based orientation come from theoretical perspectives that emphasize the situated nature and social embeddedness of work, including the situated learning perspective (Lave and Wenger, 1991; Wenger, 1998) and workplace or ethnographic studies (see Suchman, 1987; Luff, Hindmarsh, & Heath, 2000, Button, 1993). Both perspectives share an emphasis on the emergent properties of knowledge and learning, rooted in the everyday interactions between people with the artefacts that occupy work spaces. This focus on practice in the workplace can be juxtaposed to the existing CSF literature that tends to focus on developing the formal processes associated with managing a project, implementing a new system and managing the organizational change process. These formal processes involve creating representations of the project methodology and of the to-be-implemented ES – a vision and goals, a project plan, and technical documents – that will guide the project. Focusing on what occurs in practice provides organizations with a more realistic understanding of the difficulties they are likely to face.

We do not want to suggest that formal project management processes are insignificant. Rather, the practice-based compliment offered here draws attention to the equally important task of encouraging user knowledgeability, which is produced not only by forming mental representations of the new system but also through embodied participation in a particular social practice. As our case illustrates, recognizing informal, emergent and unplanned learning surrounding an ES implementation project provides a more realistic account of what happens in the actual planning, implementation, and use of an ES. Moreover, from a practitioner perspective, we suggest that the manager should take advantage of the structure and discipline formal project management methods provide, without losing sight of both the necessity and

opportunity associated with the use of informal practices. In other words, the results of this study propose a more equal relationship between formal process and situated practice.

BACKGROUND

ES projects are large, costly and difficult, relying on many different types of expertise (Rowe, 1999). Often the implementation process proves to be slower and more cumbersome than was originally predicted (Cliffe, 1999; Davenport, 2000). In attempts to help companies deal with this complexity, authors have developed lists of factors that have been found to be critical to the success of an IT or an ES implementation. While a variety of lists provide different perspectives on success factors, a distinction between *organizational*, *project*, and *technological* issue critical success factors emerged from the research of both Wixom and Watson (2001) and Parr et al., (1999). Based on this common ground, Wixom and Watson (2001) concluded that the categorization scheme provided a good generic "macro-level model for understanding the success factors associated with infrastructure projects that can be used in future research" (p. 38). We therefore use this categorization, grouping the CSF as contributing to either: a) organizational implementation success (the degree to which the new system is accepted and integrated into work processes); b) project implementation success (the degree to which the team meets its time and budget targets); or c) technical implementation success (the degree to which the new system is technically functional).

Table 1 provides an overview of the framework. It should be noted that Wixom and Watson (2001) recognized some of the CSF are relevant in relation to more than one of the three categories. For example, having necessary resources was associated with both project implementation success and organizational implementation success. For simplicity, we have

categorized each success factor under only one of the three headings, based on where they appear to have the strongest association. We also include the reason why the different sets of factors are considered to be important. Specific reference to the literature associated with these different CSF is covered in the results section of the paper when we consider each of these different factors as related to the case.

Insert Table 1 near here

In this categorization of CSF, any real acknowledgement of how people learn in practice appears to be missing. At the same time, implementing an ES is by definition a learning experience for all those involved. In other critical success frameworks, some general processes are identified that *might* be thought of as helping to support learning through practice. For example, Slevin and Pinto (1987) refer to the general importance of communication and trouble-shooting through all stages of a project. However, they do not relate these general processes specifically to encouraging situated practice. Rather, the various success factors included in these different models concentrate on ensuring that people have the knowledge, information and resources that are needed to plan and implement the ES project. Another way of looking at this is to say that much of the CSF literature appears to over-emphasize the importance of providing representations of the ES, such as:

- the vision and goals which represent how the organization will benefit from the ES and what and how organizational change will be managed (organizational CSF);
- the documents about the technical infrastructure that represent how the IT will be configured and tasks carried out to use the new ES (technical CSF);

- the project management plan which represents how the project will be enacted to ensure that the organizational and technical challenges will be accomplished (project CSF).

These representations are then assumed to be unproblematically applied during the implementation as long as there are sufficient resources, a competent project team and ongoing communication and trouble-shooting. Success therefore can be programmed through the project plans, as long as the project representations are followed and enough resources are given to the project. The project then becomes about maintaining control and using resources to accomplish the pre-specified technical and organizational tasks.

At the same time, there is a considerable emerging literature that is calling into question the applicability of rules and plans in ES implementations. While this perhaps is a new argument, it is rooted in long-standing philosophical questions regarding meaning and social order (Button and Sharrock (2003). For instance, Wittgenstein (1953) challenged the notions of how rules can be proscribed and followed as indications of exact practices. This point was further established by the work of Harold Garfinkel in his study of *member's methods*, or what he termed as *ethnomethodology*. This indicates that in order to understand meaning and behaviour, it is vital to examine the institutional and situated context in which it occurs. Using rules and methodologies as an interpretative frame can obscure the details of the situated action.

More generally, considerable evidence now exists that demonstrates how employees use *ad hoc* practices and decision-making, rather than formalized rules and processes, in the course of getting work done (see Crabtree, 2003; Garfinkel, 1967; Heath and Luff, 2000; Luff and Heath, 2000) and that improvisation and tinkering is widespread as individuals learn to use new systems (Ciborra, 2000; Orlikowski, 1996; Suchman, 1987). Ad hoc refers to Garfinkel's notion

that there are gaps that exist in any “rules” or formal procedures that must be filled in by in-situ sense making. Wenger (1998) notes it is not that the formal representations are unimportant in organizations, but rather that we need to understand that in practice, these formal representations will be interpreted and enacted in very different ways as an outcome of people’s daily engagement in the lifeworld of the organization.

In this paper we use Wenger’s (1998) conceptual distinction between reification and participation to understand this interaction between the formal processes that are the focus of the critical success factors literature (the “reification”) and the informal practices through which these are enacted in ongoing processes of social interaction (or “participation”). Reification refers to “the process of giving form to our experience by producing objects that congeal our experiences into ‘thingness’” (p. 58). The CSF literature, by-and-large, concentrates on ensuring that the objects are available that provide the various stakeholders with representations of the ES and the process of ES implementation. There is less attention given to participation, which Wenger defines as “the social experience of living in the world in terms of membership in social communities and active involvement in social enterprises” (p. 55). Participation in this sense refers to engagement in the social world as part of one’s daily life experience that includes a host of informal social interactions that help to provide meaning to that experience. In this respect communities of practice (Lave and Wenger, 1991) are important since it is within such communities and within the localized settings that this sense-making occurs.

The crucial point of Wenger’s argument is that a balance is needed between reification and participation. If there is concentration on reification alone there may not be “enough overlap in participation to recover coordinated, relevant, or generative meaning” (p. 65). In other words, learning must involve opportunities for shared experiences and interactive negotiation, as well as

the provision of “enough material to anchor the specifications of coordination and to uncover diverging assumptions” (p. 65). If balance is achieved then learning will be afforded, including learning that was not anticipated or planned for (Cook and Brown, 1999).

Processes of participation are less controllable than are the processes of reification. Managers can provide or at least monitor the objects that set the vision and goals, determine the project management methodology, provide the technical blueprint etc. However, how these objects are actually used in practice depends on the much less controllable aspect of participation. This perhaps is a major reason why managers rely so extensively on reifications: they provide a sense of order in a process that can be “messy.” When things do not “go according to plan,” the plan is still the thing that gets the attention. Nevertheless, acknowledging the importance and significance of these social processes of participation during an ES implementation is, we argue, likely to provide a more complete (and realistic) conceptual and practical account that can supplement the CSF literature.

METHODOLOGY

In this paper we use a case study of a large consultancy firm, hereafter called XYZ that was in the process of implementing a major ES across its global business. A single case was appropriate in this context as we wanted to explore in depth how and why it was difficult to sustain the CSF over time (Eisenhardt, 1989). We had no specific hypotheses to test but we did have the CSF and situated learning frameworks from the literature review that were guiding our collection and analysis of the data (Stake, 1994). In the words of Walsham (1993) we aimed to produce ‘an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context’ (4-5). Our questions were thus

directed at helping us to obtain a better understanding about the previously identified CSF and also explore how useful a situated learning perspective might be as a compliment to this success factor analysis.

The main method used was the exploratory interview. We interviewed people who were involved in the core ES project team as well as people involved in the marketing module implementation, which was the module that was still in development. We interviewed 15 people in total, all of whom could be described as middle managers in the case organization. All those involved also had external consultancy ES implementation experience and were thus able to talk about the problems experienced in their own company in comparison with other companies they had been involved in. This broader experience was helpful in terms of considering how far the case example was unique. We would have to conduct many case studies in different organizations to gain access to the type of diversity in ES implementations that these interviewees could share. We wanted to restrict this study to a single case as it was an exploratory study examining 'how' questions – how do the practical realities of working in an organization influence the sustenance of CSF and encourage (or discourage) learning. Thus, we wanted to gain access to rich, qualitative data rather than quantitative data that could have been collected by a survey instrument.

In addition to these interviews we also collected documents related to the project, including methodology and planning documents. The purpose of collecting data from multiple sources was to enrich the depth of the study, and to triangulate the data to ensure the validity and reliability of the findings (Denzin, 1989).

CASE DESCRIPTION

XYZ is a very large global organization manufacturing and retailing both PC and high-end computer systems. It also has large global consultancy businesses that focus on both general business services and IT-related implementation and support services. Given the focus of this paper, we present data relating to the key problems that emerged in relation to XYZ's own ES implementation project as they pertain to the success factors in our framework above. We also draw upon the more general experiences recounted by the interviewees about these success factors to identify the extent to which the XYZ experience is generalizable. In this section, we will describe the ES Siebel project undertaken by XYZ, and the proposed project methodology meant to provide the blueprint for the project. We will then follow in the next section with an analysis of what actually took place.

The Siebel Project at XYZ

Siebel is an enterprise-wide customer-relationship management (CRM) ES that the company decided to implement in 1999. XYZ had already developed its own CRM systems, but the CEO decided they needed to "web-enable" this application. Since it was determined the development efforts required to migrate the home-grown legacy CRM to the web were too significant, the decision was made to buy an external package. Siebel was selected primarily because of its scalability and ability to support the breadth of the XYZ corporation. In total, about 50,000 users were already using the CRM system. The project was kicked off in 2000 and was still ongoing in 2004. Some of those in the leadership positions had been involved in the project for four years.

Interviewees admitted that the success of the project was difficult to judge given that it had spanned such a long period of time, overlapping many other projects and organizational change initiatives. XYZ was described as becoming 'a very different and much more nimble

organization' over this period, and Siebel was seen to be at least a factor in contributing to this change. In more tangible terms, the Siebel project had not been a complete success. One of the major business rationales for the project was that by replacing many customized and independent legacy systems with a single "vanilla" application, maintenance costs would be significantly reduced. To achieve this transformation, the project plan had a built-in schedule for 'sunsetting' existing applications, with the intention that users would have to interface solely with the new ES. However, four years on, only one of the scheduled legacy systems had actually been phased out and as one of the project leaders admitted: "We are a little off-track!"

More generally, there had been significant delays in implementing the various ES modules. For example, the sales module had been delayed by one year and the marketing module by two years. Moreover, the human cost of the project was very high, especially among the core team, who were described as 'burnt-out':

> "When we are talking about four years, it's an awful long time to put people onto a project like that. And one of the aspects of that is that some of the executive team has been on the project now for four year and are burned, burned to crisps. And these are people who are used to working extremely hard on extremely complex projects, and they are literally burned to crisps right now. In my own case, I can no longer sustain an 80-hour work week". (Core team member)

Thus, the project had been problematic in terms of reducing reliance on legacy systems, had been significantly delayed and had involved considerable human cost. In this way, the project had been far from successful.

This raises the question of whether XYZ had recognized the importance of the CSF identified in the literature and whether it had been able to adhere to them. In order to gauge this we begin by examining the project deployment methodology. The methodology document set out the way the project was supposed to be carried out to meet the organizational and technical

goals. As such it provided a representation of what should have happened during this ES implementation project, in relation to both technical and organizational success.

Siebel-XYZ Project Methodology

The Siebel CRM deployment methodology, which was described in a 70 page manual, was based on "several years experience deploying change internally within [XYZ]" in relation to implementing packaged IT solutions (Siebel project consultant). The stated purpose of this methodology is: "to enable rapid deployment and to coordinate the parallel efforts of several projects. It is designed to reduce start-up efforts of each team and to provide a mechanism to accumulate learnings of each CRM2000 project development team". The focus of the methodology encompasses both the organizational ('people or user enablement for change') and technical ('technology or IT enablement') change elements required by the Siebel roll-out: "Deployment is defined broader than IT deployment. Deployment also encompasses those activities that involve enabling the user to rapidly accept and adopt a specified change". Overall, the methodology prescribes the creation of both user enablement deployment plans and infrastructure deployment plans.

The methodology prescribes a series of phases, each of which has a statement about the overall purpose and then the specific events, activities and steps that need to be covered: Concept phase – 8 steps; Planning phase – 50 steps; Development phase – 36 steps; Qualify phase – 20 steps; Deployment phase – 23 steps. The activities involved in the steps are various. For example, during the planning phase, steps involve creating plans (e.g., creating a change management plan); creating documents (e.g., prepare the scope and approach document); carrying out reviews (e.g., conduct user workstation inventory); conducting meetings (e.g., geography planning meeting); and actually carrying out work to move the project forward (e.g.,

perform IT/Gap analysis). The document notes that there will be considerable iteration across these phases as there will be multiple releases that gradually provide more application functionality from the Siebel package across more users: “One reality that complicates planning is that changes will occur throughout the project. Deliverables from development will change, infrastructure constraints will alter the target audience, and business needs will change who the individuals in the target audience are”.

The methodology document goes on to say the project must, therefore, be “nimble to react to these changes without noticeably slowing down the deployment roll-out”. Thus, despite the fact that there are explicit instructions and details regarding how the ES should be developed and implemented, at least within the methodology there is the recognition that all may not go according to plan and situational requirements need to be kept in mind. However, there is no specific comment or advice about these situational requirements. Standard project plans are provided and the methodology asks each project team to “customize it to meet their business unit needs and requirements”. There are also standard monthly reporting forms for each project team covering the deployment schedule, dates when legacy systems will be sunset, milestone status and deployment tracking. Communication is stressed throughout all the phases of the project: “Communication is a critical success factor for deployment and should receive strong focus. Regular ‘meetings’ (conference calls) should be scheduled for both cross-communications and for plan tracking”. Overall, the project methodology provides a very structured environment meant to guide and instruct action, providing a list of roles and responsibilities that need to be covered.

Based on our review of the project methodology, it is clear that the methodology document addresses much of what the literature suggests are critical to project success. Given

this attention to the CSF, one might anticipate that the project would in fact be successful. However, as we were told by project personnel, this has not been the case. This raises important questions regarding: a) whether following the CSF are enough, and b) whether the CSF in fact can be followed. In other words, if action cannot be specified in detail such that it can be constrained and instructed by rules, then managers and consultants need to rethink how closely they adhere to these steps. Furthermore, this suggests the importance of emergent and situated learning as a primary component of ES implementations. In the analysis section we consider how in practice these CSF became problematic.

ANALYSIS: SUSTAINING CRITICAL SUCCESS FACTORS AT XYZ

This analysis highlights the situational components that make following the ES methodology difficult. At the same time, emergent practices rooted in institutional contexts are crucial for situational learning. This tension is examined through the course of our analysis and discussion.

Project Success factors

Formalized project management methodologies are seen to be a key to successful ES projects (Holland and Light, 1999, Sumner, 2000), offering a set of techniques and tools to carry out systems development work within a defined framework. It is commonly held that the formal project management structure should be based on a clear business plan (Wee, 2000), which is effectively communicated to all stakeholders (Falkowsi et al., 1998), and constantly evaluated and monitored (Holland and Light, 1999). Moreover, the project team itself should include people who have been selected based on their skills and expertise (Case and Shane, 1998), so

that there is an appropriate mix of team members, each of whom will presumably add value to the implementation.

As the description of the project management methodology illustrates, XYZ did follow a structured methodology that covered both organizational and technical success factors. However, the interviewees also noted that the formal methodology alone is insufficient. Interviewees stressed that although formal project management plans provided a necessary framework for directing each implementation phase, they failed to adequately address the inherent "work arounds" or interventions introduced by participants in an effort to keep a project moving. Working around the formal system was described as necessary at 'crunch' times, when problems were encountered, especially when these problems had the potential to negatively impact the project's critical path. At these times, informal networks were used. One Siebel interviewee described it as, "to get things done in the end, as opposed to simply transferring information". An example of the informal system at work was described by one of the project leaders:

> "Right now I have an out-plan item, which is the deployment of marketing in Asia-Pacific. We have no money to do this. But we figured out with the AT guys that we can actually do it as a skunk work if we can get everybody onboard and just get shit done. So what I did was I called one of the guys who used to work for me in my old job, who is now the relief manager, and I said I want to hide this. I want this to happen, but I don't want it be in front of everybody's face until we know more about it, to know how deep this bread box is we are looking in. Can you help us just go ahead and do some of the preliminary work we have to do to size it before everyone starts shutting us down because there is no budget?"

A "skunk work" is a reference to a secret project that is meant to take place off-the-books. The term has its origins in Lockheed Martin and its development of top secret aerospace engineering (see Rich and Janos, 1996). It is used here to demonstrate how work is getting done in the context of the ES implementation outside of the project methodology. This comment also stresses the importance of working around the formal project plans at certain points during the

project lifecycle when unforeseen circumstances occur. At these times the way to keep the project moving forward is to work outside the plan and the formal system. In working around the formal process, informal and personal networks were used to mobilize support, get favours done, and identify solutions to problems that were outside the scope of the formal project plan.

In relation to having competent project team members who could work effectively together, the core team had recognized the importance of this and engaged in considerable team building, especially at the beginning:

> "(we were in) each other's pockets for about six or eight weeks to begin with, and we got to know each other extremely well, which was great because it carried us through the hiatus when we didn't get to see each other very much… Most of us have worked together for four years now. There is a great deal of trust and liking amongst the executive team" (core team member).

However, there were problems in relation to other project teams, in particular because there was a great deal of churning in membership as different people got involved in projects working on the different modules. For the first module that was deployed (the call-centre module) they had kicked-off the Siebel project with a 2-week launch which included the call-centre project development team. At this meeting they had discussed the project – its objectives, how it was going to transform the organization, the problems and opportunities of the project etc. This had provided a lot of energy for all team members at the outset. Over time, new team members joined new project development teams. These people had not been at this initial kick-off meeting and the launch of each project development team during the concept phase was more focused on getting on with the particular module implementation rather than providing a general overview of the CRM project. This created problems in terms of both commitment to and understanding of the project. As one of the core team members commented:

> "If I were to run a project like this, the lessons I have learned about people on the project is we need to be re-educating them on how you want the project to work; otherwise, they will reinvent it".

The project methodology then becomes a key component to keep the project "on track." At the same time, strict adherence to the project methodology can obscure important situational factors. It may be that the project is in need of reinvention. Of course, any reinvention risks extension of an already long and difficult process, making for a classic Catch-22. The data thus stresses the importance of building and using social relationships, both internally within the project teams and externally between the project team and the wider stakeholder communities. The internal cohesiveness within the project teams was strengthened by the informal activities outside the project itself, as individuals socialized at lunchtimes and in the evenings. Despite the importance of such settings for building rapport and transferring tacit knowledge (see Orr 1996), less emphasis was put on building this team cohesiveness and commitment to the project goals as the project progressed, leading to problems in following the defined project methodology.

Organizational Success Factors

In terms of organizational success factors, top management support in general (Sumner, 2000, Bingi et al., 1999) and a project champion in specific (Sumner, 2000, Rosario, 2000) are seen to be critical to the success of any large organizational project, such as the implementation of an ES. Senior leadership provides the vision and the goals that define the organizational benefits and must also ensure that there are sufficient resources to support an organizational change management program to get buy-in to this vision (Rosario, 2000).

We have seen in the Siebel project how the project methodology stresses the organizational as well as the technical aspects of the project. Thus, at the very outset of the project, the change management and relationship issues were seen to be central and resources

were allocated to ensure that initiatives were introduced which focused on extensive user education and general user adoption issues. Yet in reality, very early on, as soon as the project hit some technical problems, funds got diverted from the human to the technical and these resources were never subsequently restored. As one core project team member commented:

> "I have this chart that we developed in the first two months of this, which said one of the biggest issues to deal with is people change. We have to focus on that and we really have to make sure that we have that under out belt. And then we promptly forgot about it and we didn't do nearly as much from the people change aspects as we originally had planned to do… The IT side wasn't bedded in, so we gave up funding for people management in the early part, believing that we could put it in later in the season. You can solve the people issues as you go, or theoretically as you go, but you can't solve the IT issues as you go. You need to solve them right now because they stop us… I have yet to see a company, even one that is as enlightened as [name of company] on some of this stuff, be able to sustain the dollars for people change".

This demonstrates how the organizational change aspects of IT-type projects can easily become swamped by the technical challenges that inevitably arise and how decisions about the use of resources are responsive to the demands of the moment rather than the formally created plans and goals.

Moreover, while senior managers were supporting and championing the project these people changed. For example, there were three different people in the role of senior VP of CRM deployment over the four year period. Each of these leaders had a different style and approach and was more or less able to provide the internal focus and external support for the project team. Thus, the Siebel project demonstrates how difficult it is to achieve sustained senior management support and a focus on the organizational change issues in the context of a complex ES project spanning multiple years. The people working in the organization and on the project are often left behind as new senior management comes in with their own visions of success. Interviewees

noted from their experiences outside XYZ that maintaining this focus on organizational change was a challenge:

> "As much as we would like them to be [about organizational change] and we try to drive that, a lot of the time they're not. So they'll look at what standard [name of ES] provides. They'll look at what they have today. And try to go through as least change as possible and that's the way I can describe it".

Technical Success factors

Finally, the CSF literature suggests that an ES is more likely to be successful if it is being implemented in a context which is stable and successful (Roberts and Barrar, 1992). This suggests a context where reengineering has already taken place. Moreover, with packaged software, the advice is that the organization should change to suit the software rather than visa versa (Holland and Light, 1999) so that the 'vanilla' ES is implemented with minimum customizations (Nah et al., 2001 and 2003).

In the Siebel case, reengineering had, as prescribed, been previously undertaken. Thus, while the original legacy CRM systems were not integrated and worked off multiple independent databases, they had been based on a reengineering analysis that had been undertaken at the time that XYZ was significantly downsizing during the mid 1990s. During this reengineering effort, the aim had been to define common processes and procedures so that the way of interacting with customers was common across all geographies and business units. The prior establishment of these common processes meant that those involved anticipated that the introduction of Siebel would be relatively easy. However, this did not prove to be the case. So, in the initial IT-fit exercise the PDT team found that:

> "There is an interesting difference between the process documents – how they say the job is done and the people at the keyboard actually doing the job – they don't match. You get very clever people who learn their own short-cuts and unless you are a practitioner you don't learn these things".

In other words, people had developed adaptations to ‘common processes’, so the common processes had gone through natural erosion over time. The erosion is predicated on a user desire to have more control over the how the system is used, rather than having use dictated solely by the ES. One of the selling points of a vanilla ES is its standardized environment, which makes support and upgrade much more cost effective for the organization. Here we see this selling point coming up against local practices. This introduced enormous problems for creating the unitary database and interfaces for Siebel. For example, to create the common marketing database they had to clean-up data from many different legacy systems, all based on common processes (how work *should* be done) but with a lot of diversity (how work *actually* was done):

> “So you end up with a huge amount of different data formats and different legacy databases… the people are doing the best they can and also people using the fields for something in which it was never intended, either because it was never really closely defined or because tactically they had to do something so they did that”.

Each of these legacy systems had grown and developed overtime so that there were many examples of the idiosyncratic use of particular fields even though all were ostensibly following the same business processes and using a common (although not integrated) system. For example, one of the interviews recounted how in Spain, where people tend to have double-barrelled surnames, they had used a field to include the second surname, which was not intended for this purpose and which was used in a completely different way in other countries. Another example was provided of the use of the customer number:

> “A rather amusing example that is probably (XYZ) specific; but we had something call the customer number. It’s supposed to be a unique identifier for a customer. Which is actually legacy thinking if you think about it because if you’ve got a customer database that’s got separate address lines, customer lines, you don’t actually use the proxy which is the customer number. Now the customer number works fine until you end up with duplications because then you end up with more -you have two customer numbers. When you merge them (the files) together which customer number do you use? ”

This interviewee went on to say that there were *six times* as many customer numbers as customers. Given the customer number is obsolete in the new system, the simple fix would be to delete all the customer numbers. However, this had not been done because there was resistance from users who had always relied on customer numbers and could not understand how they would not be needed in the future. As a result of localized practices and legacy systems, cleaning up the data so that the databases could be integrated into a single database was a major undertaking, especially because of the frequency of duplication records. The problem was enormous given the numbers of accounts that needed to be integrated into the common database. Thus, what was initially perceived as a relatively straight-forward task of unifying legacy systems based on common processes ended up being, in reality, a major undertaking. This was because of how people go about carrying out work on a daily basis. The divergences across the systems were the result of workers discovering ways of doing their jobs. At a conceptual level of understanding regarding process, the organization employed the same approach. At the level of actual details in terms of how work was done, the organization was an amalgam of practices. The workplace practices, while largely transparent and non-problematic to employees, befuddled the consultants who were charged with implementing a system that was supposed to be used around the globe.

The critical issue of 'vanilla' implementation was also problematic in the XYZ case, despite the initial goal of minimizing customization. In relation to the first call-centre module, mutual discussion among the participants during the IT-fit week led to the identification of the differences between the way people wanted to or were used to doing their job and how the Siebel tool enabled or required them to do it. Through this process, the first group identified over 600 requirements for customization. However, as was noted, the implementation plan was to keep

customizations to the absolute minimum, and consequently in the first release of the software only 8 of the suggested customizations had been developed and put into production, mostly related to nomenclature and terminology. The rest of the suggested customizations were disregarded as non-essential. However, while the project team was able to get users to accept the 'vanilla' system in this instance, they were less successful for the other modules. For example, users in sales were reluctant to accept changes to their existing practices, not only holding out against them, but also imposing additional modifications to the system:

> "The sales team basically stuck their tongue out and said screw you; we ain't going to do this unless you do it our way, which has led to a number of compromises [customizations] in how we actually implemented the package, some of which are good, some of which aren't good".

This had similarly happened in relation to the marketing module, resulting in a two year delay to the implementation. Eventually a new manager was brought in to try and resolve this setback. His view was that if you lead the implementation from a purely organizational perspective, it would be too expensive and too time-consuming. Instead he advocated getting the system up and running, believing that users would be able to adapt their practices to the system:

> "The piloting and working forward I think are the absolute key ingredients because otherwise you can get a committee working and discussing it for years and they'll come up with something they think is absolutely perfect and it will fall apart within two weeks of going live because there's so much stuff they didn't know, or the world moved on, or you know it wasn't supposed to be like that, you told me this field was unique, it's not. I thought it was. And suddenly you have all these other issues. So I think getting on and doing it is absolutely important".

The person went on to say that by giving people something that they can work with, you can get them to begin the process of incremental change. Thus, despite technical problems being seen as relatively straight forward in terms of being rooted in working out the technological requirements of an implementation, this demonstrates that implementations are much more than

technical affairs. Furthermore, this raises the issue of whether the ES should be adapted to the work, or the work adapted to the ES, an issue discussed in the next section.

DISCUSSION

From a situated learning perspective, this messy and informal reality of project work is expected since social processes and informal networks are seen to be as influential as plans or manuals in guiding behaviour. For example, Crabtree (2003:36) observes, “rules and other formal procedures do not determine the performance of work activities and do not, therefore, determine how coordination gets done on each occasion of work”. Therefore, one should not expect the work of designing and implementing an ES to be done through rules and other formal procedures alone. More importantly, the situated learning perspective not only stresses the inevitable influence of these informal social processes but also demonstrates how they can actually be very productive. The famous example provided by Orr (1996) demonstrated how technicians were able to solve problems through the informal sharing of stories much more effectively than using the manual that was provided by management. And the literature on communities of practice more generally (Lave and Wenger, 1991) demonstrates how practice and participation can help to guide problem-solving and learning more effectively than simply following plans and instructions. These informal networks and communities may lead to disruptions to the project plan, as when the community of sales users refused to accept the goal of a ‘vanilla implementation’. However, these disruptions may be reflections of how the process does not coincide with practices. Furthermore, the informal networks can also help to overcome obstacles and solve problems, as in the example of using informal networks to do some ‘skunk work’ to keep the project moving forward.

The situated learning perspective helps to explain why formal project management plans are, in practice, supplemented through informal community networks. Moreover, given the importance of communities of practice for learning, we suggest that it would actually be helpful to encourage informal community networks to flourish around an ES implementation project in order to stimulate longer term learning and emergence from project participation. In order to maintain communities of practice, it is important to maintain the practices that make members of the community recognizable to one another. In terms of maintaining the communities of practice and the situated learning that arises within them, it is vital that any ES implementation support rather than supplant this social glue. We term this approach *facilitative adaptation*, where technology is used to facilitate adaptation in the workplace practices (as they emerge in the setting), rather than being used as a determinant of practice (as it is often conceptualized in re-engineering). The success factor literature confines the project factors to implementing the ES, ignoring the opportunities for developing communities of practice that can continue to learn together well after the ES has been implemented and the formal project team disbanded. A focus on enabling communities of practice to flourish through the project process would provide opportunities for a much broader and longer-lasting significance than seeing the project teams merely as vehicles for the ES implementation.

In terms of the organizational success factors, we have seen how they focus on ensuring that there is a clear representation of how the organization will benefit from the implemented ES through organizational rather than mere technical change. This representation is manifested in the vision and goals articulated by senior leaders and champions, who also need to ensure that the resources are available to support the change process. However, we have seen that in practice leaders change, especially over projects of long duration as in XYZ's Siebel project,

with different leaders more or less able or willing to promote the vision and protect the project. Moreover, resources for the organizational change effort get diverted by the more immediate technical challenges that emerge on this kind of complex IT project. To dismiss this degradation of these critical success factors as poor management and organization is to ignore the socio-political realities of organizational life. As noted by ethnomethodologists engaged in studies of workplace settings, ad-hoc processes and decision-making are the norm rather than the exception (Crabtree, 2003; Garfinkel, 1967; Knorr-Cetina, 1999; Luff and Heath, 2000; Lynch, 1993; Suchman 1987). Even under the best and ideal circumstances, the methodologies and formalized structures would not provide adequate instruction in terms of specifically how an implementation would progress. When formalized structures are given precedence over situated learning, then organizations lose out on valuable opportunities to facilitate the emergence and development of essential communities of practice.

Moreover, the identified organizational success factors ignore opportunities for ‘dynamic affordance’ (Cook and Brown, 1999). Dynamic affordance represents situated learning as being a continuous refinement and progression of knowing through the interplay between what learners know, what they do and what (objects of the social world) surround them. The vision and goals provide an object or representation of what can be achieved, but the notion of affordance captures how through participation people can learn how benefits can be derived from the ES that were not and maybe could not have been anticipated in advance. This suggests that it may be useful to have a vision statement that admits and even encourages emergent benefits from an ES and supports dialogue and interaction around the vision and goals, rather than treating these as the sacrosanct preserve for the senior elite to decide. While the Siebel methodology admitted to iteration and communication, this solely was to ensure the established vision and goals of the

project were understood: “Target users are educated, the application or release is made available to them, unrequired applications are sunset (or user access to them is terminated)” (Project methodology document). Drawing upon situated learning theory suggests that it would be beneficial to see the vision and goals as themselves open to change as learning is accumulated through user participation. In other word, while societal laws provide the outlines and boundaries of behaviour, they do not instruct everyday action. Similarly, visions and goals might provide the direction for action, but not the action itself.

Finally, in terms of technical success factors, the stress is on providing a representation of how the IT will be configured, how the work will be done with this new ES and how to get users to accept the vanilla system. Yet, as we have seen in the case company, practices diverge very quickly from formally prescribed processes and users may reject the ES if it requires them to make fundamental changes to their current practices. To dismiss this as simply demonstrating poor managerial control over work and workers, again ignores the pervasiveness of such improvisation (Ciborra, 2000; Orlikowski, 1996) and the inevitability of politics in organizations (Pfeffer, 1992) and in projects (Pinto, 2000). Indeed, the fact that the agreed common processes had already begun to diverge after only a short time period in the Siebel case attests to the power of these improvisational abilities. Thus, blueprints of work processes quickly become out-dated given the rate of organizational change, as noted in one of the quotes above which identified that a project team can spend a lot of time in developing what they think is the perfect solution, only to find that in practice it is no longer applicable. Moreover, not all employees are willing to adapt so readily to the vanilla blueprint, as evidenced by the sentiments expressed by the salespeople in XYZ. Rather than amending their work to the technology, they sought to amend the technology to their work. In the end, as a situated learning perspective recognizes, implementation is a

process of negotiating visions of what the system should be. In order to get employee buy-in, it is important to create the sense that the technology is working for the personnel; rather than the personnel working for the technology. A situated learning perspective can focus our attention on this process of negotiation (Wagner and Newell, 2004).

Thus, the situated learning literature demonstrates how workers develop work-arounds and short-cuts regardless of what the formal system prescribes (Orlikowski, 1996 and 2000; Ciborra, 2000). Moreover, Suchman (1987), in comparing plans (or formal processes and methodological conceptualizations of work) to situated actions (or how work actually gets done as an everyday practical achievement), describes how incongruities between the two can result in significant design flaws in technological systems that actually impede productivity rather than enhance it. Providing users with a tool to support their work, rather than a tool that prescribes their work, may therefore be a more effective approach to the technical design of an ES. In so doing, the organization would be recognizing and valuing the flexibility and the improvisational skills of the users (Orlikowski, 2000). This does not diminish the technical challenges associated with creating 'clean' data but it does suggest less emphasis is placed on detailed process analysis and more emphasis on user improvisation and learning once the ES is in place.

Insert Table 2 near here

Drawing upon a situated learning perspective, then, helps us to identify three aspects of participation that can supplement the (reified) success factor literature: 1) opportunities for the dynamic affordance of organizational benefits; 2) the emergence of communities of practice that can support long-term learning around the ES; and 3) opportunities for improvisation to exploit the functionality of the ES. Table 2 sets out these relationships. Moreover, these three situated learning processes that we have identified are likely to be mutually supporting. Encouraging the

development of communities of practice as part of the project process is likely to facilitate more improvisational learning once the technology is in place, which in turn can afford benefits from the ES that are emergent and were not anticipated. The key seems to be to provide users with the functionality that they can use in their day-to-day practice, albeit in a slightly different format with the new ES. Then allow users to ‘play’ with the system with the idea of exploiting its potential. This will involve providing employees with opportunities to experiment with the system, perhaps by using the development system rather than production environment, so that real company data is not compromised. The outcome is very likely to be that they will soon begin to exploit the added functionality of the ES, as long as this will indeed make their jobs more efficient and effective. Individuals may well exploit the system differently, but ideas can be shared through communities of practice. From this perspective, the concern about providing resources for a major organizational change effort will be less important since the emphasis will evolve to providing a system that users can learn to exploit through their day-to-day improvisational practices. Given the difficulties of sustaining resources for the organizational change effort when faced with unplanned technical road blocks, this is also likely to be the most realistic way to exploit the system.

Also, morale of those working with the ES can be negatively impacted if it appears that they are being made to completely forgo their workplace practices as established around the legacy system. Undoubtedly, some change will occur. The issue is whether this change will be disruptive or enriching. By empowering workers to have ownership over the change, there is a greater likelihood of buy-in. This goes beyond including people on the project teams or ‘user involvement’. It involves attending to the in-situ workplace practices as they occur on a daily basis, and a willingness to allow these practices and tacit knowledge to be given priority.

This focus on participation that is provided by the situated learning perspective thus offers a more realistic view of what will happen during an ES implementation – there will be affordance, communities of practice will emerge and users will improvise – and helps to explain why organizations find it difficult to sustain the CSF over time, with informal participation leading to a negotiation and reinterpretation of the formal plans, goals and blueprints. Indeed, the CSF literature could be described as falling into the trap of naïve realism, believing that visions, plans or manuals reflect or unproblematically direct practice. Moreover, providing more opportunities for such situated learning through participation is likely to have generative effects that will be absent if such participation is not positively encouraged (although of course it can never be abolished because it constitutes the fabric of daily life in any organization). The representations emphasized in the success factors literature are important but participation can lead to the emergence of communities of practice that can continue to support learning long after the project team is disbanded; participation can lead to improvisations that exploit the technology in creative and unanticipated ways; and participation can afford unexpected benefits.

Of course, the results of participation may not only be positive – participation can afford unintended negative consequences; participation can lead to the emergence of communities of practice that prevent rather than embrace learning and change; and participation can lead to improvisations that reduce the quality of processes. For example, with respect to affordance, Cook and Brown (1999; 389) note: “this sense of affordance is reflected in everyday objects in ways that can attract a great deal of conscious attention or none at all. This is particularly true of objects that are the product of human design. What they afford can give rise to shape and fluidity or incoherence and clumsiness in our activities”. But negative outcomes are perhaps more likely if participation is suppressed rather than embraced and encouraged. We suggest that encouraging

participation (which we have defined in a much more specific way from the situated learning perspective than the communication and trouble-shooting or even user involvement that is described by the CSF literature) as part of an ES implementation is more likely to generate positive effects than suppressing it so that it emerges in more reactionary and personally rather than organizationally motivated ways.

Situated learning – and its manifestations in affordance, communities of practice and improvisation - cannot be explicitly controlled by management, unlike the creation of the representations that are stressed by the CSF literature. However, as we have seen, in practice, participation and social learning inevitably distort the plans, vision, and blueprints that are the output of following the CSF literature. But this distortion is not necessarily negative and indeed, as we have identified, can provide opportunities for more benefits to be realised from the ES than anticipated, greater organizational learning, and more effective work practices.

Table 1: ERP Critical Success Factors

PROJECT SUCCESS FACTORS	
Definition	Project implementation methodology/ team competence/ user involvement
References	Case and Shane (1998); Falkowsi et al. (1998); Holland and Light (1999); Sumner (2000); Wee (2000).
Reasons for importance of success factors	Project plans set out how the various tasks will be carried out in a coordinated way to meet project targets and team skills determine whether those with necessary skills to successfully complete these tasks are on the team.
ORGANIZATIONAL SUCCESS FACTORS	
Definition	Management support/project champion/resources to support organizational change
References	Bingi et al. (1999); Rosario (2000); Sumner (2000).
Reasons for importance of success factors	Vision and goals of management and champion provide rationale for how the organization will benefit from the ES and resources ensure that there is an organizational change effort to enact this vision.
TECHNICAL SUCCESS FACTORS	
Definition	Infrastructure readiness for ES/ knowledge about ES/ 'vanilla' implementation
References	Holland and Light (1999); Nah et al. (2003); Roberts and Barrrar (1992).
Reasons for importance of success factors	Provide documentation of current and future technical infrastructure that provides blueprint for how IT will be configured and work will be done in new ES environment that will support users in their work and exploit integrating potential of ES.

Table 2: Problems associated with the different types of critical success factors and consideration of how a situated learning perspective can help to mitigate these problems

Project Success Factors	
Critical Success Factors	Project implementation methodology and competent team
Short-comings of Factors	Things not on plan because of complexity/ Team membership fluid so cohesion limited
Situated learning Perspective	Encourage not simply development of a team(s) to carry out project work but the facilitation of **communities of practice** that will continue to support learning long after the project has been completed and the team(s) disbanded
Organizational Success Factors	
Critical Success Factors	Top management support/ project champion/resources for change
Short-comings of Factors	Leadership changes over long duration of project/ Sustaining resources for organizational change
Situated learning Perspective	Encourage continuous stakeholder participation that facilitates emergence and **affordance** of business benefits that were not anticipated
Technical Success Factors	
Critical Success Factors	Infrastructure readiness (prior BPR) and vanilla implementation
Short-comings of Factors	Practices differ from blueprint processes/ Users resist vanilla functionality
Situated learning Perspective	Recognize and encourage **improvisation** so users are provided with a tool that can support their work rather than a tool that will dictate their work

REFERENCES

Bajwa, D., Garcia, J. and Mooney, T. (2004) An integrative framework for the assimilation of enterprise resource planning systems: Phases, antecedents and outcomes. *Journal of Computer Information Systems*, Spring, 81-90.

Bingi, P., Sharma, M. and Godla, J. (1999) Critical issues affecting an ERP implementation. *Information Systems Management*, 16, 3, 7-15.

Button, Graham. (1993) *Technology in Working Order: Studies of Work, Interaction, and Technology*. Taylor and Francis, Inc.

Button, G. and Sharrock, W. (2003) Plans and situated action ten years on. *The Journal of the Learning Sciences*, 12,2, 259-264.

Case, R. and Shane, S. (1998) Fostering risk taking in research and development: The importance of a project's terminal value. *Decision Sciences*, 29, 4, 765-84.

Ciborra, C. and associates (2000) From control to drift: The dynamics of corporate information infrastructures. Oxford: Oxford University Press.

Cliffe, S. (1999) ERP Implementation. *Harvard Business Review*, 77, 1, 16-18..

Cook S. D. and J. S. Brown (1999) Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing. *Organization Science*, 10, 381-400.

Cordella, A. and Simon, K. (2000) Global and local dynamics in infrastructure deployment: The Astra Hassle Experience. In C. Ciborra (Ed.), From Control to Drift. Oxford: Oxford University Press.

Crabtree, A. (2003) *Designing Collaborative Systems: A Practical Guide to Ethnography*. London, UK: Springer.

Davenport, T. (1998) Putting the Enterprise into the Enterprise System, *Harvard Business Review* (76:4), pp. 121-133.

Davenport, T. (2000) The future of enterprise-system enabled organizations. *Information Systems Frontiers*, 2, 2, 163-180.

Denzin, N. (1989) *The Research Act*. Prentice Hall, New Jersey.

Eisenhardt, K.M. (1989) Building Theories form Case Study Research. *Academy of Management Review*, 14, 4, 532-550.

Falkowski, G., Pedigo, P., Smith, B. and Swanson, D. (1998) A recipe for ERP success. *Beyond Computing*, 44-5.

Garfinkel, H. (ed.) (1986) *Ethnomethodological Studies of Work*. London: Routledge & Kegan Paul.

Garfinkel, H. (1967) *Studies in Ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.

Gupta, A. (2000). Enterprise resource planning: the emerging organizational value systems. *Industrial Management & Data Systems*, 100, 3, 114-118

Heath, C. and Luff, P. (2000) *Technology and Social Action*. Cambridge, UK: Cambridge University Press.

Holland, C. and Light, B. (1999) A Critical Success Factors Model for ERP Implementation. *IEEE Software*, 16, 3, 30-36.

Holland, C.P., Light, B. and Gibson, N. (1999) A Critical Success Factors Model For Enterprise Resource Planning Implementation. *Proceedings of the 7th European Conference on Information Systems,* Copenhagen, 273-287.

Howcroft, D., Newell, S. and Wagner, E. (2004) Understanding the Contextual Influences on Enterprise System Design, Implementation, Use and Evaluation (editorial). Special Issue of *Journal of Strategic Information Systems*, 13, 4, 271-277.

Knorr-Cetina, K. (1999) *Epistemic Cultures: How the Sciences Make Knowledge*. Harvard University Press.

Lave, J. and E. Wenger (1991) *Situated Learning: Legitimate Peripheral Participation.* Cambridge University Press, Cambridge.

Lee, Z. and Lee, J. (2000) An ERP Implementation Case Study from a Knowledge Transfer Perspective. *Journal of Information Technology*, 12, 2, 281-288.

Luff, P., Hindmarsh, J., and Heath, C. (2000) *WorkPlace Studies: Recovering Work Practice and Informing System Design.* Cambridge University Press.

Luff, P. and Heath C. (2000) *Technology and Social Action*. Cambridge, UK: Cambridge University Press.

Lynch, M. (1993) *Scientific Practice and Ordinary Action: Ethnomethodology and Social Studies of Science*. Cambridge University Press.

Markus, M.L., Axline, S., Petrie, D. and Tanis, C. (2000a) Learning From Adopters' Experiences with ERP: Problems Encountered and Success Achieved. *Journal of Information Technology*, 15, 245-265.

Markus, M.L., Tanis, C., Fenema, P. C., (2000b) Multisite ERP Implementations. *Communications of the ACM*, April, Vol. 43, No. 4

Nah, F. F., Lau J. L., Kuang, J. (2001) Critical factors for successful implementation of enterprise systems. *Business Process Management*, 7, 3, 285-296

Nah, F., Zuckweller, K. and Lau, J. (2003) ES implementation: Chief information officers' perceptions of critical success factors. *International Journal of Human-Computer Interactions*, 16, 1, 5-22.

Orlikowski, W. (1996) Improvising organizational transformation over time: a situated change perspective. *Information Systems Research*, 7, 1, 63-92.

Orlikowski, W. (2000) Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, 11, 4, 404-428.

Orr, J. (1996). *Talking about Machines*. ILR Press, Ithaca NY.

Parr, A. and Shanks, G. (2000) A model of ES project implementation. *Journal of Information Technology*, 15, 289-303.

Parr, A., Shanks, G. and Darke, P. (1999) Identification of necessary factors for successful implementation of ERP systems. In: O. Ngwenyama., L. Introna., M. Myers. And J. DeCross (Eds.), New Information Technologies in Organizational Process. Kluver Academic Publishers, Boston, pp. 99-119.

Pfeffer, J. (1992) *Managing with power: Politics and influence in organizations.* Harvard Business School Press, Cambridge, MA.

Pinto, J.K. (2000) Understanding the role of politics in successful project management. *International Journal of Project Management*, 18, 2, 85-91.

Rich, B.E. and Janos, R. (1996) *Skunk Works: A Personal Memoir of My Years of Lockheed, Vol. 1*. Back Bay Books, Boston, MA.

Roberts, H. and Barrar, P. (1992) MRPII implementation: Key factors for success. *Computer Integrated Manufacturing Systems*. 5, 1, 31-38.

Robey, D., Ross, J. and Boudreau, M-C. (2002) Learning to implement enterprise systems: An exploratory study of the dialectics of change. *Journal of Management Information Systems*, 19, 1, 17-46.

Rosario, J. (2000) *On the leading edge: Critical success factors in ERP implementation projects*. Business World, Philippines.

Rowe, F. (1999) Coherence, integration informationelle et changement: esquisse d'un programme de reserche a partir des Progiciels Integres de Gestion. *Systemes d'Information et Management*, 4, 4, 3-20.

Shang, S. and Seddon, P. (2002) Assessing and managing the benefits of enterprise systems: The business manager's perspective. *Information Systems Journal*, 12, 4, 271-299.

Slevin, D.P., & Pinto, J.K. (1987) Balancing strategy and tactics in project implementation. *Sloan Management Review*, 23 (1), 33-41.

Sousa, J.E. and Collado, J.P. (2000) Towards the unification of critical success factors for ERP implementations. *Published in 10th Annual Business Information Technology (BIT) conference*, Manchester.

Stake, R. (1994) Case Studies. In N. Denzin and Y Linclon, (Eds.), *Handbook of Qualitative Research.* Thousand Oaks, Ca: Sage.

Suchman, L. (1987) *Plans and Situated Actions: The Problem of Human/Machine Communication*. Cambridge, UK: Cambridge University Press.

Sumner, M. (2000) Risk Factors in Enterprise-wide/ERP Projects. *Journal of Information Technology,* 15, 317-327.

Wagle, D. (1998) The Case for ERP systems. *The McKinsey Quarterly* 9, 130-138.

Wagner, E. and Newell, S. (2004) 'Best' for Whom?: The tension between best practice ERP packages and the epistemic cultures of an Ivy league university. *Journal of Strategic Information Systems*, 13, 4, 305-328.

Walsham, G. (1993) Interpreting Information Systems in Organization. Chichester: Wiley.

Wee, S. (2000) Juggling toward ERP success: Keep key success factors high. *ERP News*, February, available: http://www.erpnews.com/erpnews/erp904/02get.html

Wenger, E. (1998) Communities of Practice: Learning, meaning and identity. Cambridge: Cambridge University Press.

Wittgenstein, L. (1953) Philosophical Investigations. (G.E.M. Anscombe, trans.). Oxford, England: Blackwell.

Wixom, B. and Watson, H. (2001) An empirical investigation of the factors affecting data warehousing success. MIS Quarterly, 25, 1, 17-41.