EXPLORING KNOWLEDGE INTEGRATION IN ERP PROJECT TEAMS

Sue Newell,
Bentley College,
Department of Management,
Forest Street, Waltham, Massachusetts 02452-4705, USA
and Royal Holloway, University of London, UK,
Tel: +1 7818912399, fax: +1 781 8912896
email: *Snewell@bentley.edu*,
Jimmy Huang,
Nottingham University Business School,
Jubilee Campus,
Wollaton Road, Nottingham, NG8 1BB, UK,
tel: +44 (0) 115 84 66602 Fax: +44 (0) 115 84 66667
email: *jimmy.huang@nottingham.ac.uk*, *and*
Carole Tansley,
Nottingham Trent University,
Nottingham Business School,
Burton Street, Nottingham, NG1 4BU, UK,
tel: +44 (0) 115 848 4745, fax: +44 (0) 115 9486512,
email: *carole.tansley@ntu.ac.uk*.

ABSTRACT

Many companies are adopting Enterprise Resource Planning (ERP) systems in the hope that these systems will help them transform their organizational processes to improve efficiency and flexibility. Unfortunately, many organizations do not realize the hoped-for benefits, and indeed there have been some examples of disastrous failures. There are likely to be a variety of factors that influence the relative success of an ERP implementation project. In this paper we focus on the extent to which an implementation team is able to share and integrate disparate and ambiguous knowledge in a way that generates new ideas about organizational processes that can support transformational change. We compare two ERP implementation project teams in this paper; one achieved only a mechanistic pooling of knowledge while the other achieved more generative knowledge integration that supported some significant organizational change. Clear differences were observed in the ways these two project teams were managed and run. These differences are explored in relation to their impact on knowledge integration. This leads us to suggest some ways in which ERP projects can be managed to support a level of knowledge integration that is more likely to encourage transformational change.

1. INTRODUCTION

Project-based working forms a major component of work in many companies today, especially in relation to the design and implementation of new IT systems. Yet evidence suggests that many IT projects do not meet cost, schedule and functionality targets (Martin & Chan, 1996; Appleton, 1997). Moreover, even when an IT project was a 'success' in terms of being on time

and budget, it may still fail to really achieve the radical change that was intended or that was potentially available given the functionality of the technology (Cooper, 2000). In other words, IT is seen as an important factor in achieving and maintaining competitive advantage because it makes it feasible to reengineer an organization so that 'things are done differently', in ways that were not previously possible. Yet, in reality, studies have shown that, rather than contributing to significant organizational change, the implementation of IT often reinforces the status quo (Orlikowski, 1991). In this paper, we focus on the problems of using IT to facilitate organizational change through a consideration of the implementation of Enterprise Resource Planning systems in two case organizations. ERP systems are designed to manage all the internal operations of a corporation in a single powerful network. An ERP system will, thus, replace legacy systems, which often are not compatible, making it difficult to integrate information, with a standard system to be used across an organization. This means that standard processes will need to be identified and implemented across the organization. The objective is to make it easier to share information and also to use this shared information to better integrate organizational processes. However, this is not a simple matter, especially when the organization is large and globally distributed. In this paper we consider the problems of designing and implementing an ERP system in terms of the problem of sharing and integrating distributed knowledge.

2. THE IMPORTANCE OF KNOWLEDGE INTEGRATION

The importance of knowledge sharing for organizational success in general (Davenport & Prusak, 1998) and for project work in particular (Hargadon & Sutton, 1997) is well recognized. The general aim of knowledge sharing is to integrate the disparate and complementary knowledge of different people. Here we focus on this issue of knowledge integration. Knowledge integration is, we argue, a fundamental requirement during a large-scope IT implementation project.

While many organizations in the past custom-built their IT to support their particular organizational practices and processes, the emphasis today is on implementing standard software. Buying standard software is cheaper for a company than developing this in-house. Moreover, a company that has implemented a standard package will be able to benefit from system updates, as long as it has not made major modifications to the package during implementation. The current advice is, therefore, to go for a 'vanilla' implementation – configuring the system within the parameters allowed by the software but without actually customizing the software. The organization is, therefore, changed to fit the software, rather than the software changed to fit the organization. This means that ERP projects typically involve both changing existing organizational processes as well as implementing new software (Robey et al., 2002).

Many organizations implementing ERP systems will, therefore, first embark on a business process reengineering phase (Hammer & Champy, 1993), where they consider how to streamline business processes to take advantage of the integrating capacity of the enterprise system. An ERP project team will typically be involved in both designing the organizational processes and configuring the software In terms of designing the organizational processes, the project team must map existing organizational processes ('as is'), identify the processes that are embedded in the IT software, and define new organizational processes that 'fit' both the software and the organization (Soh, Sia & Tay Yap et al., 2000). This process analysis and redesign is fundamental to the transformational potential of an IT system. The benefits from an

integrative IT system will only be marginal if they are simply layered on top of existing organizational structures and processes. As Willis et al., (2001) comment – 'a major problem with attaining a successfully integrated IT system is that the process requires virtually a life-changing experience for everyone involved'.

Zuboff (1988) refers to this as achieving transformational change. Unfortunately, as suggested, there is considerable evidence to suggest that many IT projects do not achieve such transformational change. This is especially the case when we consider ERP implementation projects. For example, Hershey Foods Corporation lost $100 million during Halloween, when a new ERP system did not come on-line as planned (Nelson & Ramstad, 1999). Other companies, including Allied Waste Industries and Waste Management, have cancelled ERP implementations after spending millions of dollars on their projects (Boudette, 1999). At the same time, there are examples of other organizations that have achieved dramatic benefits from adopting ERP systems.

Clearly, the factors that influence whether an ERP implementation is a costly failure or a dramatic success will be many and varied. Indeed, there are many lists of critical success factors for ERP implementations that already exist (e.g., Sumner, 2000; Holland and Light, 1999; Markus et al., 2000). None of these lists, however, includes the ability of the implementation team to integrate knowledge (although many of these authors have identified the importance more generally of good team work). In this paper we focus on this problem of knowledge integration. We are not suggesting that it is the only 'critical success factor', but we hope to illustrate its importance and demonstrate that it is a useful concept in so far as it helps to explain the difference between relative levels of ERP success. Specifically, we argue, that differences in the level of knowledge integration achieved are related to differences in the degree of transformational change achieved with ERP.

Knowledge integration was defined by Okhuysen and Eisenhardt (2002) as the process whereby 'several individuals combine their information to create new knowledge'. The problem with this definition is that it suggests a simple process whereby different people with different knowledge simply share and add together what they know. However, it is increasingly recognized that the sharing of knowledge is not so simple. This is the reason that so many so-called knowledge management initiatives have not produced the expected benefits (Newcombe, 1999; Tiwana, 1999). The difficulties of sharing and integrating knowledge arise because of the ambiguous (Tsoukas & Vladimirou, 2001) and distributed (Becker 2001) nature of organizational knowledge. Knowledge is not an 'entity' that can be passed from person to person like a ball. Rather, knowledge is socially constructed as people engage in active processes of knowing (Blackler, 1995).

Understanding knowledge as socially constructed and arising through interaction and dialogue, suggests that teams will achieve greater or lesser success in their ability to integrate knowledge so that it is important to consider different levels that are achieved. At the two extremes we can define mechanistic pooling (Knights & Wilmott, 1997) versus generative (Cook & Brown, 1999) knowledge integration. Mechanistic pooling occurs when each project member works independently on a set of clearly defined tasks or processes with which he/she is familiar and uses his/her existing knowledge to consider the potential of the new IT system on those tasks. The overall IT system is then perceived to simply fit together the independent pieces, like a jigsaw puzzle. This mechanistic pooling of knowledge is likely to result in an IT system that

simply computerizes the existing manual systems or replaces legacy systems. It is unlikely to lead to any radical change in tasks or processes.

Generative knowledge integration, on the other hand, occurs when there is joint knowledge production achieved through the combination and exchange of knowledge (Nahpiet and Ghoshal. 1998) between individuals from diverse backgrounds (Grant, 1999) so that new and novel ways of doing things are identified that could not have been predetermined by the independent parts (Cook and Brown, 1999). So, generative knowledge integration occurs when communication and exchange within a group or a team evokes novel associations, connections and hunches such that new meanings and insights are generated. In this case, knowledge integration involves a process of social construction in which organizational members negotiate, achieve and refine a shared understanding through interaction, sense-making and collective learning (Ayas & Zeniuk, 2001; Boland & Tenkasi, 1995) that provides the basis for creativity. Such creative, generative knowledge integration is much more likely to lead to the kinds of radical IT-led change that many companies are looking for and that many writers declare is possible (Davenport, 1993; Drucker, 1988; Applegate, et al., 1988).

In this paper, then, we explore the level of knowledge integration achieved by two different implementation teams in two case companies that were adopting ERP systems. We then examine differences between these two teams that may have influenced the differential level of knowledge integration achieved.

3. CASE RESEARCH

We attempt to unravel the factors influencing the level of knowledge integration achieved during an ERP implementation project. Two case studies (in QEL and IEL) were conducted. Both QEL and IEL are global, blue-chip engineering companies that are head-quartered in the UK. Both companies were implementing ERP systems at the time of the study. Each case involved a project team tasked with designing and implementing one pillar of a larger ERP system in its respective organization. The research adopted a comparative interpretivist approach, exploring and conceptualising meanings emerging from the interaction of social actors (Walsham, 1993) as they engaged in the various project activities. In both companies the ERP project covered many different functional areas and involved a number of different teams, each focused on one of the ERP pillars (e.g. HR, engineering, accounting). We collected longitudinal empirical material from one of these teams in each company.

The main method of data collection was interviews with project team members and other key actors that had an influence on the project. The project team members were each interviewed twice – once near the beginning of the project and once after about 9 months. Twenty one interviews were conducted in QEL and 37 interviews were collected in IEL. In addition, the authors spent considerable time in each company, familiarizing themselves with the project environment, observing team meetings and discussing the project informally with team members.

4. CASE ANALYSIS

The outcome of the work of the two ERP teams was very different. In IEL the ERP system was successfully introduced and resulted in significant benefits for the company. For example, the ability to collect systematic and similar information across all units allowed the company to

evaluate the cost base of production in different divisions and countries. This made it possible to compare performance, at either individual or group level, across the Production Division and to direct strategic effort at improving the performance of low performing units. In addition, as a result of the business process reevaluation, they decided to outsource aspects of component production, and substantially reduced the number of warehouses (from 144 to 51 worldwide). This led to significant cost savings. Moreover, the procurement of parts and components was centralized, and the number of suppliers and service providers was considerably reduced, again producing cost savings.

The results were very different in QEL. The team managed to start to configure the ERP system, based on an analysis of the existing processes as enacted at HQ where the team was based. However, as this work was ongoing they were asked by senior manager to provide a justification of the costs of the system. The team started to work on this cost-benefit analysis. However, they could demonstrate few dramatic benefits because essentially what they were designing was more or less a replacement of their existing legacy (or manual) systems. This suggested few significant benefits and the senior management team was not convinced by their arguments. Eventually, after about 11 months of work, the ERP project was put on hold because the justification was not seen to be acceptable.

This difference in success rate appeared to be related to differences in the level of knowledge integration achieved by the two project teams. Much more sharing and creative integration of knowledge was observed in the IEL team than the QEL team. Significant differences between the project teams were observed on a number of dimensions that appeared to influence their respective ability to integrate knowledge. These differences are described next.

1. The way the project was divided up:
In QEL the project was divided up into a series of 'workpackages', and each workpackage was the responsibility of one team member. This individual worked alone on this workpackage with very little input from other team members. The team leader encouraged this by his own behaviour since he did not see the need for the team to work closely together. In IEL on the other hand, workpackages were assigned as a responsibility for more than one person and the team leader encouraged all the team to interact and work together as closely as possible. This provided more opportunity for dialogue and discussion – key ingredients of creative problem-solving.

2. The allocation of specialists to workpackage areas:
In QEL, each workpackage was allocated to the team member who was specialized in the particular workpackage domain. So, the payroll specialist on the team was allocated the payroll workpackage. This meant that the individual had preconceived ideas about how the particular activity 'should' be organized, based on existing experience. In IEL, given that people had joint responsibilities both 'experts' and 'non-experts' were involved in working on a particular part of the project. This meant that those involved were less constrained by pre-conceptions of 'best practice'.

3. The inclusion of different opinions from the process mapping stage:
In QEL each workpackage owner was tasked with bringing together a group of experts in the particular area to design new organizational processes to fit the software. However, given limited resources individuals relied on local experts from HQ. They did not attempt to include ideas from individuals in the global organization, even though the system was eventually

supposed to be rolled out across the global organization. In IEL, on the other hand, considerable time and effort was spent by the project team members in flying all over the world talking to individuals about existing processes and opportunities for change. The team, through this varied interaction, uncovered many differences in the ways that particular processes were currently run. Given the need to adopt standard processes these differences had to be resolved. This often generated conflict that took time to work through. However, over time, and with the support of senior management, these negotiations led to the identification of new processes that were often different from the existing processes in any area.

4. The involvement of the IT consultants:
In QEL the two IT consultants, from the outsourced IT department, saw their job as merely translating the process maps from the workpackage owners. They did not see a need to engage in any interactions with others from the organization. Indeed, observations showed that they remained seated at their desks, in front of their PCs for nearly the whole time, only interacting with either individual project team members or the whole team at project meetings. In IEL, the IT consultants on the project were very much part of the team and engaged in the process mapping exercises as well as actually undertaking the system configuration. This meant that they had a much better awareness of the practices and processes they were attempting to configure in the software. They were also better able to communicate to others beyond the immediate team, so that others could better appreciate the functionality and potential of an ERP system.

5. The understanding of ERP functionality:
In QEL the internal team members had very limited understanding of ERP at the outset of the project. Moreover, all bar one team member were not really interested in acquiring this knowledge, even though training courses were available to them. One individual, with a particular interest in IT, did attend this training, but saw no need to try and pass on this knowledge to other team members. The IT consultants did not help here. Not only did they not feel it to be important to understand the organizational processes they were configuring the system to support, they also did not feel it important for the rest of the team to understand the technology. In IEL by contrast, all team members from the outset were familiar with the basic functionality of ERP systems, having been selected to be involved in the project precisely because of this existing knowledge. All team members had been actively involved in an intranet discussion group that had started once the company made it known that they were looking in to the possibilities of an ERP system. This gave the IEL team members a better understanding of the opportunities potentially available from an ERP system.

6. The involvement of users:
In QEL there were some workshops put on to inform future users of the system about the project. However, these were done at a very early stage and at a time when the ERP team had done very little preparatory work. These workshops were run by the project team members. Given the limited understanding of ERP among the project team itself, these workshops were not seen to be very helpful by the users. Two of the authors sat in on one of these workshops and noted that the most prevalent feeling expressed was that the event had been a waste of time. In IEL on the other hand, an intranet was established for all employees, which provided information about the ERP project over the course of the implementation. Users were encouraged to look at this website and to ask questions and offer suggestions as the project progressed. Much effort was put into informing people about the ERP system being implemented and this encouraged users to actively contribute to the ongoing debates about

system design. While these contributions were often contradictory and not always clearly thought through, they nevertheless provided the project team with additional ideas about what kinds of changes could usefully be made to existing processes.

Team Functioning and Knowledge Integration

These differences in the functioning of the two teams appeared to be related to the level of knowledge integration achieved. In QEL the project team managed no more than a mechanistic pooling of knowledge. The process mapping that they arrived at was essentially a mapping of existing processes, as currently practiced at HQ. There was little evidence of 'thinking out of the box' or of exploring new ways to conduct processes. In particular, there was no attempt to think about ways that an integrated IT system could help them do things in different ways. Of course, given that the project was abandoned we cannot say anything about actual implementation. We can only observe that, to the point when the project was put on hold, the activity had been directed at simply automating existing processes.

In IEL on the other hand, there was much more evidence of generative knowledge integration achieved by the project team. They were forced to resolve conflicts that they uncovered between processes as they existed currently because their methods of involving dispersed groups actually led them to identify these differences. Given the joint allocation of responsibility, the involvement of the IT consultants and the involvement of users, there was considerable scope for dialogue over these observed differences. This dialogue resulted in some very different ways of looking at the situation and ultimately new processes were identified that actually made use of the integrating potential of the ERP system. This resulted in significant changes being made to many existing processes as the system was implemented.

5. CONCLUSION

The comparison of these two cases highlights the importance of project management for facilitating different levels of knowledge integration. The way in which tasks were broken down and allocated and the extent of involvement of different stakeholder groups significantly influenced the level of knowledge integration achieved in the two cases. In other words, the project management processes in QEL were significantly different to the processes in IEL and these differences appeared to influence the level of knowledge integration achieved. We can briefly consider the differences in project management practices that were identified in relation to their influence on knowledge integration. First, our findings suggest that dividing up tasks into independent activities does not encourage high levels of knowledge integration. Becker (2001) identifies that one strategy for dealing with the dispersion of knowledge is to decompose organizational units into smaller ones so that each unit (in this case each individual) is responsible for one part of the larger problem. As Becker notes, this strategy of specialization reduces the opaqueness of complex problems. In the short-term this may be a benefit, but in the long-term it is problematic because the different 'pieces' must be integrated. Given the lack of discussion about the design of the different pieces this may be problematic and is certainly unlikely to produce generative knowledge integration at the point when the pieces are brought together.

Allocating specialists to tasks did not appear to be effective in terms of promoting generative knowledge integration but rather encouraged a more mechanistic approach to the task. This we

suggest is because these specialists had preconceived ideas about how the activities should be completed and so did not think about alternative processes that could be supported by the additional functionality of the ERP system. As Meacham (1993) states: 'Each new domain of knowledge appears simple from the distance of ignorance. The more we learn about a particular domain, the greater the number of uncertainties, doubts, questions and complexities. Each bit of knowledge serves as the thesis from which additional questions or antithesis arise' (p. 120). The point is that in QEL, individuals did not get past their 'distance of ignorance' because they believed that they already had the solution. In IEL on the other hand, because non-expert individuals were involved they were more likely to ask the questions that could identify the complexities of the situation and the alternative opportunities afforded by the ERP system.

This problem of not exploring beyond the known at QEL was further exacerbated by the approach that the team took to the process mapping stage of the project, where they only included individuals from HQ. This meant that there was very little difference of opinion that was voiced. Yet as Leonard-Barton (1995) reminds us, bringing together individuals with different views and backgrounds, can lead to 'creative abrasion' that results in new an innovative approaches being considered. This creative abrasion was much more evident in IEL where they purposefully sought out ideas from across the globally distributed organization. Creative abrasion, it appears, is necessary to achieve generative knowledge integration. Where this is avoided by seeking out only like-minded views, a more mechanistic approach to knowledge integration is more likely.

The difference between the two teams in terms of the role and involvement of the IT consultants was significant because it related to the degree of understanding that the rest of the team had about the potential functionality of the ERP system. Earl and Skyrme (1992) talk about the importance of hybrid IT professionals – individuals who have both the technical and the business knowledge. The IT professionals in these two project teams were very different in this respect. The QEL IT members were certainly not hybrid professionals, while the IEL IT consultants were much more so. This difference influenced the degree of understanding about the ERP system among the rest of the team, with QEL team members remaining relatively ignorant about the actual functionality of the system throughout. This appeared to significantly restrict the degree to which they could think creatively about the system. Bruner (1983) described creativity as 'figuring out how to use what you already know in order to go beyond what you currently think' (p. 183). This implies that an important impetus to creativity is knowledge about the issue you are dealing with. We have already considered how existing knowledge can be a barrier to creative thinking, but it is also the case that without knowledge there can be no creativity. Certainly in the case of QEL, the lack of knowledge and understanding about the ERP system itself appeared to be a barrier to their ability to think creatively about how the ERP system might facilitate change. The result was that they relied on their existing knowledge of organizational processes and mechanistically thought about how the new ERP system could support these existing processes. The greater understanding of ERP functionality in the IEL case appeared to support a more generative approach to knowledge integration.

Finally, there were differences in terms of the involvement of users. The importance of user involvement for successful ERP implementation has been well-documented (e.g., Markus & Keil, 1994). Involving users can help to encourage commitment to the project. Additionally, users can be a source of creativity if they are given the opportunity to voice their ideas about

alternative processes and practices. In IEL this was encouraged through using the intranet both to inform the wider user community about the progress of the project, but also to encourage them to make suggestions through the discussion capability of the website. This discussion, while meandering and at times offering conflicting suggestions, nevertheless provided the ERP team with a significant source of ideas. In QEL there was no attempt to involve users in this way.

One point to note is that the transformational potential of an ERP system may not necessarily be realized during the implementation phase, but may be promoted once the system is adopted and users begin to improvise and adapt the system (Orlikowski, 1996). Thus, Robey et al., (2002) talk about the difference between a concerted and piecemeal approach to ERP adoption. With the piecemeal approach, the aim is first to replace legacy systems and then gradually introduce new business processes. Conversely, with the concerted approach, the organization plans to introduce business process changes along with software implementation. Importantly, they also note that most organizations expect to continue to make changes well after the ERP system has been implemented. In this research we have focused on the implementation period. Future research could usefully consider whether, in the long-run, the piecemeal or concerted approach is more likely to lead to the generative knowledge integration that we argue here, is more likely to support the kinds of transformational change that many organizations are looking for when the introduce ERP.

In conclusion, there were significant differences between the two ERP implementation teams in terms of the ways that the projects were managed and run. These differences help to explain, at least in part, the differential success of the two teams in terms of the level of knowledge integration achieved. In essence, we can conclude that the QEL team was working towards a common goal but in a very mechanistic way that limited the extent of transformational change that they could anticipate. In IEL, the team was working much more collaboratively and this allowed them to interact and share knowledge more synergistically and creatively so that they were able to generate ideas about the use of the ERP system that could encourage more transformational change. We have identified some important project management practices that are likely to encourage such generative knowledge integration.

References

Appleton, E. (1997). How to survive ERP. *Datamation*, 43, 3, 50-53.

Applegate, L., Cash, J. and Mills, D. (1988). Information technology and tomorrow's manager. *Harvard Business Review*, Nov-Dec, 128-136.

Ayas, K. and Zeniuk, N. (2001). Project-based learning: Building communities of reflective practitioners. *Management Learning*, 32, 1, 61-76.

Becker, M. (2001). Managing dispersed knowledge: organizational problems, managerial strategies, and their effectiveness. Journal of Management Studies, 38, 7, 1037-1051.

Blackler, F. (1995). Knowledge, knowledge work and organizations: An overview and interpretation. *Organization Studies*, 16, 1021-1046.

Boland, R. J. and Tenkasi, R. V. (1995). Perspective making and perspective taking in communities of knowing. *Organisation* Science, 6, 4, 350-372.

Boudette, N. (1999). SAP's U.S. unit to enhance relations with clients. *Wall Street Journal*, Nov. 4, 12.

Bruner, J. (1983). *In search of mind.* New York: Harper.

Cooper, R. (2000). Information technology creativity: A case study of attempted radical change. *MISQ*, 24, 2, 245-276.

Cook S D.N. and Brown J.S. (1999) Bridging Epistemologies: The generative dance between organizational knowledge and organizational knowing. *Organization Science*, 190, 381-400.

Davenport, T. and Prusak, L. (1998). *Working knowledge.* Boston: Harvard Business School Press.

Davenport, T. (1993). *Process innovation: Reengineering work through information technology.* Boston: Harvard Business School Press.
Drucker, P. (1988). The coming of the new organization. *Harvard Business Review*, 66, 1k 45-53.
Earl, M. J. & Skyrme, D. (1992), Hybrid managers: what do we know about them? Journal of Information Systems, 2, 169-187.
Grant, R. (1999). *Prospering in Dynamically-competitive Environments: Organizational capability as Knowledge Integration.* Boston, MA: Butterworth-Heinemann.
Hammer, M. and Champy, J. (1993). *Reengineering the corporation: A manifesto for business revolution.* New York: Harper Collins.
Hargadon, A. and Sutton, R. (1997). Technology brokering and innovation in a product development firm. *Administrative Science Quarterly*, 42, 716-749.
Holland, C. and Light, B. (1999). A critical success factors model for ERP implementation. *IEEE Software*, 16, 30-36.
Knights, D. and Wilmott, H. (1997). The hype and hope of interdisciplinary management studies. British Journal of Management, 8, 9-22.
Leonard-Barton, D. (1995). *Well Springs of Knowledge: Building and sustaining the sources of innovation.* Cambridge, MA: Harvard Business School Press.
Markus, M.L. and Keil, M. (1994). If We Build it, They Will Come. *Sloan Management Review*, 35, 2, 11-25.
Markus, M. L., Axline, S., Petrie, D., and Tanis, S. C. (2000). Learning from adopters' experiences with ERP: problems encountered and success achieved. *Journal of Information Technology*, 15, 245-265.
Martin, A. and Chan, M. (1996). Information systems project redefinition in New Zealand: will we ever learn? Australian Computer Journal, 28, 1.
Meacham, J. (1983). *Wisdom and the context of knowledge.* In: D. Kuhn and J. Meacham (eds.), Contributions in human development, 8, 111-134. Basel: Karger.
Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23, 242-266.
Nelson, E. & Ramstad, E. (1999). Trick or treat: Hershey's biggest dud has turned out to be its new technology---at the worst possible time, it can't fill its orders, even as inventory grows. *Wall Street Journal*, Oct. 29, A1.
Newcombe, T. (1999). Knowledge management: New wisdom or passing fad? *Government Technology*, June.
Okhuysen, G. and Eisenhardt, K. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science*, 13, 4, 370-386.
Orlikowski, W. (1991). Integrated information environment or matrix of control? The contradictory implications of information technology. *Accounting, Management and Information Technologies*, 1, 1, 9-42.
Orlikowski, W. (1996). Improvising organizational transformation over time: a situated change perspective *Information Systems Research*, 7, 1, 63-92.
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.
Soh, C., Sia, S. K., and Tay-Yap, J. (2000). Cultural fits and misfits: Is ERP a universal solution? *Communications of the ACM*, 43, 47-51.
Sumner, M. (2000). Risk factors in enterprise-wide/ERP projects. *Journal of Information Technology*, 15, 317-327.
Tiwana, A. (1999). *Knowledge management toolkit.* New York: McGraw Hill.
Tsoukas, H. and Vladimirou, E. (2001). What is organizational knowledge? *Journal of Management Studies*, 38, 7, 973-993.
Walsham, G. (1993). *Interpreting Information Systems in Organizations.* Chichester: Wiley.
Willis, T., Willis-Brown, A. and McMillan, A. (2001). Cost containment strategies for ERP implementations. *Production and Inventory Management Journal*, 42, 2, 36-42.
Zuboff, S. (1988). In the age of the smart machine: the future of work and power. Oxford: Heinemann.