

COMMUNITIES OF PRACTICE IN TRAINING: THE MISSING LINK IN ENTERPRISE RESOURCE PLANNING IMPLEMENTATION

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ABSTRACT

Purpose of this paper

To examine which training methods are the most effective for an enterprise resource planning (ERP) system implementation.

Design/methodology/approach

A casework methodology was used to investigate the role of training in an ERP implementation in a large multi-business corporation. Data were gathered from a variety of sources through multi-methods over a six month period.

Findings

Dominant ERP implementation training approaches overvalue formal processes and disregard the role played by Communities of Practice (CoP) in effective training.

Research limitations/implications (if applicable)

The limitation of the study is that it is a single case study and the findings need to be examined in a greater range of contexts to determine if they have the wider applicability.

Practical implications (if applicable)

This study suggests that greater engagement with CoP in training has the potential to assist in reducing the current high rate of ERP implementation failures.

What is original/value of paper

Provides an explanation in social theoretical terms of why the dominant ERP training approaches are often ineffective. This in turn could impact the effectiveness of logistics.

Keywords: Communities of Practice, context, ERP, evaluation, training

1. INTRODUCTION.

Enterprise resource planning (ERP) is a company-wide computer software system used to manage and coordinate all the resources, information, and functions of a business from shared data stores. For most large corporations therefore ERPs have a large impact on how they manage their logistics (Boykin & Martz, 2004). There has been a great deal of discussion on success factors associated with ERP implementations (Motwani et al., 2005; Sun et al., 2005) and in many cases the literature indicates that the level of training is a critical factor to successful implementations (Bradford & Florin, 2003). Poor training is viewed as a key barrier to successful ERP implementations (Kumar et al., 2003; Tchokogué et al., 2005). It is unclear in the literature, however, whether “level of training” refers to the extent of the training or to its effectiveness. Our review of the literature indicates that the majority of commentators have looked at ERP training in terms of acknowledging the need for training and training inputs. Only a few papers have looked at the quality of training outcomes.

Determining the most reliable methodology to evaluate training is a vexed question, as suggested by the wide range of methodologies currently being used (Egan et al., 2006; Mehrens and Lehmann, 1984). There is a paucity of relevant studies which have employed training evaluation methodologies, such as a rigorous systematic cross-comparison of effectiveness in ERP implementations, for example. This may be due to methodological difficulties since ERP implementations tend to be large, one-off events in the life of a firm, and differences across countries, industry types, governance structures, cultural characteristics and implementation timeframes present difficulties in making valid comparisons. Given the limited investigations to date, there is a clear need to conduct more research into the effectiveness of training outcomes in relation to a successful ERP implementation.

The paucity of relevant research and the unique nature of ERP implementations strongly suggest that an inductive case study is best suited to initial research requirements. The study described here adopts such an approach. The specific research question is “How effective is the training for ERP implementations in a large organization?”

2. LITERATURE REVIEW

2.1. Theoretical perspectives on training

Defining training, let alone effective training, is not without its difficulties. At a conceptual level, the term training is presented as a foundational concept in a vast body of theories, the most notable being educational theory. Buckley and Caple (2000) suggest one useful distinction is to define training as being more job-orientated and education being more person-orientated. In addition, training is more mechanistic, predictable and uniform compared with education, which is more variable and less predictable.

In the interests of brevity, this literature review focuses on the three dominant theories which link training to ERPs and organizations. These theories are organizational learning (OL) (Garret, 1987; Ortenblad, 2004; Senge, 1990), knowledge management (KM) (Davenport et al., 2004; Griseri, 2003; Treleaven and Sykes, 2005) and communities of practice (CoP) (Adams & Freeman, 2000; Lesser and Prusak, 1999; Wenger, 1999).

OL as a theoretical perspective emerged from the 1980s (Admunson, 1998) and the concept of leveraging superior learning as a source of competitive advantage is now well established (DeGeus, 1997). Concurrent with this notion is the emergence of the learning organization concept, which was popularized by Senge (1990). Easterby-Smith and Araujo (1999) suggest there are two distinct strands of OL – a technical strand which has dominated much of the IT (information technology) literature, and a social strand. The technical strand sees OL as a matter of developing normative models and methodologies for change around processing, interpreting and responding to largely explicit, quantitative and qualitative information, in order to improve learning processes. The social strand focuses attention on different learning approaches (Argyris & Schön, 1978), different types of knowledge (Polanyi and Prosch, 1975), and the “stickiness” of knowledge which makes it hard to transfer across different social groups (Brown and Duguid, 2000).

KM has emerged as a distinct body of theory under OL and seeks to overcome the main criticisms of OL by being far more precise in its concepts and measures. One useful distinction between these terms is that OL provides a framework to examine the creation and dissemination of new knowledge throughout and across organizations which, in turn, is critical to generating innovations (Darroch and McNaughton, 2002; Sveiby and Simon, 2002), whereas KM works within the OL framework. Knowledge has numerous definitions but Sveiby’s (2001) definition of “the ability to act” will suffice for this purpose. Knowledge is, therefore, more than information. Numerous writers argue that in a post-industrial society, knowledge has replaced traditional resources of production (land, labour and capital) as the main source of maintaining and sustaining competitive advantage (Kogut and Zander, 1996; Nonaka and Takeuchi, 1995; Quinn, 1992; Solow, 1997; Sveiby, 2001).

A distinction is made between tacit and explicit knowledge each of which requires different management processes (Nonaka and Takeuchi, 1995; Polanyi, 1969), different transfer processes (Connell et al., 2003) and different creation processes (Stein, 1997). Some argue that the widely accepted dichotomous tacit-explicit knowledge as a category perspective is incorrect and suggest a continuum as a better representation (Blacker, 1995; Spender, 1996). Overall the tacit-explicit knowledge distinction appears to be widely accepted in the literature. One of the criticisms laid at IS making claims on KM is the inability of technical systems to handle tacit information. The bulk of tacit information is difficult, if not impossible, to codify, and it exists within and moves across dynamic social systems. Electronic-styled training with a focus on efficiency and explicit knowledge deliberately seeks to eliminate the redundancy found in social systems by delivering training through a “one best way for all” approach. This approach has been criticized on the grounds of not allowing for differences among students in factors which impact upon the effectiveness of training. These factors include learning styles, gender (Darch and Lucas, 2002), communication channel preferences (Lind, 2001), age (Czaja et al., 1989), home language background (Perry et al., 1998), information literacy (Bruce, 1997) and personality traits (Crosby and Stelovsky, 2003). Apart from reduced effectiveness due to individual differences, Kallinkos (2004) points out that in the case of ERPs, implementation knowledge cannot be converted to procedural knowledge without considerable loss of some aspects of the total knowledge.

Communities of Practice (CoP) is the theory which foregrounds tacit knowledge and is premised on the importance of flexibility to address learning processes appropriate for the diverse learning requirements of individuals whilst also meeting common learning needs within a community. CoP has numerous definitions with many of its key concepts overlapping with those found in theories such as social identity (Boud and Middleton, 2003; Kogut and

Zander, 1996; Wenger et al., 2002); social networks (Alvee, 2001), KM (Zárraga-Oberty and De Saá-Pérez, 2006) and OL.

Within CoPs, knowledge is self-generating and perpetuating, and transferring knowledge within the CoP is a central activity (Adams and Freeman, 2000). Training within a CoP differs from traditional training methods commonly found in organizational settings. The traditional approach sees learning as a simple transfer of knowledge (explicit) from the head of one who knows to the head of one who does not know. It is widely known as the “transmission model” and has dominated in organizational and some educational setting for several decades. By contrast, CoP learning is unprompted by deliberate facilitation. Members of the CoP learn from each other in informal ways and almost always within specific contexts. CoP theory acknowledges the role of context. It views learning as a social process and recognizes that factors such as shared meaning, understanding and identity play a key role in effective learning (Kimble and Bourdon, 2008).

2.2 Training Evaluation Methodologies

Consensus on how to determine effective training does not yet appear to have been reached. Nah, et al. (2004) narrowed down their focus to ‘user acceptance’ by creating cognitive constructs and using existing literature on IT acceptance. Although some authors (Hedman and Borell, 1992) mention the need for interpretative research as a way of gaining a deeper understanding of ERP implementations, overall there appears to be scant literature dealing with complex systemic issues associated with an ERP implementation, such as working with a multitude of perceptions of users across a variety of departments.

Research by Gallivan et al. (2005) indicate that sending employees to training classes will not necessarily lead to better IT adoption. Gallivan et al. (2005:165) also suggest that in their study seventy percent of an employee’s IT usage was explained by a range of constructs including computer self-efficacy, the perceived quality of user training, co-workers’ IT usage and several others. Gallivan et al. (2005) claim that the older the person is, the less effective the e-learning strategy will be. This view is supported by a 1999 study conducted by the Department of Education and Training and Industrial Relations (DETIR), Queensland, Australia, which concluded that effective IT training programs for older adults required far more support and structuring than those for younger people (DETIR, 1999).

Endres and Kleiner (1990) describe the measurement of effective training as a “multifaceted task” (p.4) that can be divided into four areas: emotional reaction; achieved learning objectives; behavioural changes; and impact on the organization. Reich (2007) examined learning in IT projects and concluded that four types of knowledge were needed by an IT implementation team to be effective. These were process, domain, institutional and cultural knowledge. Process knowledge was about the operational aspects of the project, domain knowledge was about the industry and its current situation, institutional knowledge was about the power arrangements and structure of the organization while cultural knowledge was about the norms and cultural values of the organization.

The proliferation of so many evaluation schemas and methodologies available with none as yet achieving wide acceptance has implication for the research design. It is difficult to convincingly justify choosing one methodology over another. Therefore it is prudent to conceptualize effective training measurement methodologies as an open question at this stage. For the purposes of this study, effectiveness will be assessed in outcomes terms, namely, the ability of the individual to perform their work duties using the standard ERP tools without any additional support.

3. CASE STUDIES

The organization used for this study is a large, networked, government owned utility (a Government Owned Corporation) referred to from here as Utilcom. The organization has an annual turnover of over three billion dollars (AUD) and employs more than 14,000 people. The organization recently implemented the ERP, SAP R/3. The company was one of the last to both implement R/2 and then change from R/2 to R/3. It did not seek to upgrade to R/3 as it could not justify the costs. Rather, it was compelled to change as R/2 was no longer supported by the vendor and it lacked the in-house expertise to maintain the R/2 system. Whereas the R/2 implementation had been costly due to massive modifications to suit unique business requirements, the decision was taken with R/3 upgrade to avoid these costs by going “vanilla” and changing processes to fit into the configurations in the software. The implementation was designed to improve reporting and other functions, and involved 6,000 users. The modules involved in the implementation were: financial; material management; logistics; forecasting and planning; materials resources planning (MRP); human resources; information systems including executive information systems; project management; and office integration.

3.1 Method

It is widely accepted that casework is well suited to research involving the investigation of activities not yet well understood (Voss et al., 2002). Accordingly, a casework methodology consistent with Yin’s (1994) methodology was used for this study. Following protocol described in Yin (1994) a basic schema was developed to collect investigative data to examine the impact of training on an ERP implementation. This schema included triangulation of data sources to increase reliability. A combination of the sources used and their micro-methodologies are listed in Table 3.1.

Table 3. 1 - Data used for this Case Study

Source	Sources used in this case study
Documentation	Intranet postings, company annual reports and reports by the information technology section of <i>Utilcom</i> . The prime focus was on all types of training documentation.
Participant observation	Lead authors spent a three month period at <i>Utilcom</i> , participating in training and conversing with personnel.
Interviews	Semi-structured interviews administered to subjects shown in Table 3.2.

The vastness of an ERP system which touched almost every part of the organization necessitated restricting the research to those modules which had the greatest reach into all aspects of the organization. To this end, the centralized procurement function of the organization was chosen as it had the most modules (including all the logistics modules) of any function in the ERP system and the highest volumes of daily transactions, and it was involved in every part of the business in terms of procurement, inventory management (stock, records, movements, transfers and asset management) and payments. The transactions conducted in these modules accounted for the bulk of transactions across the corporation’s inbound supply chain. Details on subjects involved and data gathering methods used are detailed in Table 3.2.

Table 3.2 - Users in the SAP system

SAP Users	Number	Avg. Length of Service - yrs	Type	%	Method of Data Collection
Supply (procurement) Division	68	14 years	Heavy full time use #	6.2	Participant Observer -12 weeks
Managers/Supervisors	16	29 years	In charge of 68 Full of heavy users – minor use	1.5	Semi-structured Interviews
Outside main Supply Division	200	16 years	Mainly full time users and dispersed	18.5	Help Desk Staff and Data *
Outside Divisions	Various 800	18 years	Light part time use	73.8	Help Desk Staff and Data *

* A help desk with five full time staff provided corporate-wide post implementation assistance.

4. FINDINGS

Documentation - The bulk of documentation (hard copy and on screen) associated with the ERP upgrade in general and training in particular, portrayed a positive slant to the implementation and the processes involved. All forms of documents extolled the benefits to staff of the ERP implementation, such as simplification of work flows, less stress due to a “single point of contact (truth)” and not having to be delayed by inter-dependencies on other staff in getting information due to having direct access to the system. None of the documents expressed concerns or criticisms about possible limitations of the ERP implementation.

Both the Intranet postings and other documents emphasized the need for training and the urgency to have as many staff as possible trained before the “go live” date. This urgency to train as many people as possible was all pervasive in the organization and was spread not only by the documentation but also by word of mouth from the implementation team to managers, from managers to staff, and from staff to each other. The word of mouth messages were somewhat at odds with the official documentation. The former conveyed an extreme sense of urgency and compromise in order to meet the go live date while the documentation placed emphasis on achieving effectiveness and improvement.

Participant Observation - The first author spent three months working with and going through the same experiences as the 68 intense user subjects. These experiences included working through a software training package delivered using an “on demand” approach. The training package was a multimedia packaging tool designed specifically for training the staff of Utilcom. Training success was determined by the user working through each module and passing the test of completion (as determined by the software). Each employee had to complete the training to obtain a certificate indicating that they were “SAP ready”, that is able to operate the SAP software.

Many trainees confided to the researcher (second author) that despite the outer appearance of comprehensive and complete training, it was in fact problematic. As a direct result of the imperative to complete the task in the shortest possible time, many just completed the “do” component by mechanically hitting the “enter” key. The reasons they gave for this were time constraints, and boredom with the learning material. They were completely oblivious to, or disinterested in, content, and moved straight to the multiple choice section (with the answers provided by other employees who had completed the program). This seemingly blasé and indifferent attitude to formal training made more sense when it was discovered that they had access to a dynamic, informal training system to help them master the ERP.

The informal training system had two distinct manifestations. The first manifestation relied on the tacit knowledge held by local experts situated in the work context who could provide advice and training when difficulties were encountered performing work duties. This tacit knowledge was the least readily observable of the two as it was embedded in the social system and was not shown until trust was established with the researchers. It was concentrated mainly in older staff with process knowledge or young staff with a high level of software skills. The staff with tacit knowledge also made some of their knowledge explicit in feral systems. Feral systems were defined by Kerr et al. (2007, p.142) as “*an information system [computerized] that is developed by individuals or groups of employees to help them with their work, but is not condoned by management nor is part of the corporation’s accepted information technology infrastructure.*” These initially hard to find systems, once revealed, provided clear empirical evidence of alternative electronic information systems at play. These feral systems were developed by local experts for the dissemination of explicit knowledge in the local work context.

The second manifestation of the informal training was found, paradoxically, in a formal corporate system which included the ERP itself – it was the Help Desk. While the Help Desk was designed to help with complex problems that went beyond those encountered in formal training, in reality employees used this resource as an alternative to basic training. The Help Desk staff involved in this official corporate system responded to all enquiries across the entire corporation. All calls they answered were recorded and classified. Therefore very accurate data was available on trends and they clearly showed that much of the time in the first month after implementation was really little more than covering matters that should have been addressed in the initial training. As a result of these activities, Help Desk staff gained a very large body of knowledge which they tried to make explicit by developing a site with answers to the most frequently asked questions by suggesting improvements that could be made to the system itself. However, despite their efforts to make their knowledge explicit, they also held a vast body of tacit knowledge.

Skill acquisition from this initial training was considered low by many respondents and it was generally accepted that skill acquisition back on the job was far higher. The reason subjects gave for superior on the job skill acquisition was that they were far more motivated to learn as it was important for them to master skills in order to be able to execute the duties for which they were held accountable.

The motivation to learn was accompanied by a desire to seek out trainers who were seen to have high credibility, usually demonstrated by being highly proficient in using the ERP programs. This proficiency was seen to be associated with a range of factors such as age, experience and the ability to learn quickly. With respect to age, younger people were seen as more computer literate. More experienced employees who had been in the organization for in excess of ten years had a sound understanding of the basic supply function processes. While not necessarily SAP R3 literate, they used their knowledge of the underlying management

process to master the technology over a short time period. A small minority of staff members were also seen by the majority of staff to be good at learning from the official ERP training in that they could understand and apply the classroom learning back on the job.

Interviews - Thematic analysis of the semi-structured interviews revealed four overlapping, yet distinct, themes – governance, data integrity, trust, and tacit knowledge.

Governance issues were associated with the imposition of the ERP and its designed purpose to meet the information needs of centralized groups at the expense of those working in the processes. For example, *“There is poor alignment between corporate strategy and business process and this is due in large part to not having business process governance in place.”* (Specialist Advisor). And yet another *“What is optimal for the corporation is rarely optimal for a specific process.”* (Senior Manager).

With respect to training, the point being made was that staff were being trained in systems designed to meet the needs of the central office staff rather than their unique local needs.

Data integrity was frequently raised as an issue from three perspectives. Firstly, despite positive messages around the ERP implementation solving data accuracy issues field, staff still continued to miscode data. The net result was that despite the costs and efforts associated with the ERP implementation, it did not result in any improvement to data quality. *“The approach that seems to happen is that people basically pick a number and put it into any part of the GL so you can no longer question [the system] based on coding for particular products.”* (Manager/Supervisor). When pressed further, this manager directly linked training to the apparent failure of the ERP implementation to improve data quality. *“It’s a matter of training - there are no checks when you’re coding things that get the system to say no you can’t do this.”*

The second issue raised was around the lack of sophisticated tools in the system to help deal with the masses of data the system produced. Again expectations around enhanced technical capability had been raised – for instance, *“[It’s] just frightening the amount of data they collect.”* (Manager); and yet another, *“it’s just finding an appropriate method for reporting that is capable of extracting the data that we need.”*

The third issue related to the complexities and confusion caused by making different systems have to interact, for example *“the figures seem to be different in a business warehouse to an SAP type figure. Queries get run and you get results, the level of confidence just isn’t there.”* (Manager).

The first two themes (governance and data integrity) link into and support the third – trust. Staff have little faith in the data and the analytic tools used by the system to make sense of the data. As a result, staff were less motivated to engage with the training. Some staff also expressed the suspicion that the corporate governance framework was being used to set rules which served the needs of the few in head office ahead of those in the actual processes.

This fourth theme of tacit knowledge recognized that much of training needed to make things work was not captured in the ERP system because it was held in people’s heads. For example, *“I do have a gut feeling that a lot of things don’t even make it in to SAP because it is local knowledge”.* (Manager) This widely held belief in turn also helped reduce the credibility of the training. Yet another manager commented on the stickiness of tacit knowledge with the observation *“We have a lot of tribes who work and learn in very different ways. This is not surprising given they work in different businesses and in very different parts of the country.”*

An overall summary would be that for approximately eighty per cent of staff, the official training had no or little immediate impact in terms of ability to perform at work. However,

once staff were linked to the ERP and needed to engage with the system in order to do their work then they appeared to become highly motivated in engaging with gaining an understanding of how to use the system. The key point is that they did so through the use of feral systems and informal social networks which were at odds with the stated aims of the organization to capture and use all of its knowledge around procurement activities within the ERP. Both the ERP implementation team and corporation appeared to have a form of blind faith that the ERP would deliver the promised benefits. This faith was suggested by the absence of a well-defined methodology to measure costs and benefits of activities such as training over the long-term life cycle of the ERP.

5. DISCUSSION

While the training had some minor successes the overall findings tend to refute the effectiveness of the present widely used training approach for ERP implementation. Gallivan et al. (2005, p.155) state: “To presume that sending employees to training classes will necessarily lead to IT adoption, acceptance, and use for designated tasks is to overlook the other forces that influence employee’s behavior” and this appears to accurately summarize the conclusion of these findings. The findings also provide strong support for the training approaches which stress the importance of context. As stated in the literature review, OL and KM theories have been conceptualised as splitting into two streams – context free and context dependent. The data in this study suggest that giving primacy to the context free training is not justified. Of the three major theories, CoP is best supported by the data. CoPs appear to have played a major role, as the bulk of skill acquisition which could then be applied occurred back within the work team context. While an individual within the team may have contacted the Help Desk to access this concentrated explicit knowledge, they would often share this information with colleagues within their work team or the wider community with which they identified. These findings support a wider body of criticism, namely, that the impact of context on organizational behaviour has not been sufficiently recognised and appreciated by researchers (Johns, 2006).

Of particular note within the work team context is the influence exerted by the experienced co-worker in regard to the transmission of training. The knowledge these employees had acquired as a result of working in the key processes over many years meant they had an ability to not only adapt their thinking to make the processes fit the ERP, but to also successfully pass these insights on to others. This finding contradicts much of the literature which suggests that it is older workers who gain the least from e-learning.

There are several reasons for these findings being at odds with the wider literature. Firstly Gallivan et al. (2005) did not consider the ‘process knowledge’ of older workers and that this could make them valuable participants above and beyond the e-learning system. The participant-observer activities and transcript analysis indicated that employees aged between 45 and 50 were able to understand the ERP and take to it “*like a duck to water*” (Manager). Secondly Harrison and Rainer (1992) found a negative correlation between age and IT skill proficiency based on limited exposure to IT. The older subjects in this study had prior exposure to IT through years of operating in an earlier ERP (R/2) and worked in a large corporation. Thirdly the DETIR study was within small to medium enterprises (SMEs) while the subjects were from a very large corporation. Therefore age alone would not appear to be the only variable involved in ineffective training.

It is speculated that the older employees had, through experience of manual systems acquired a great deal of knowledge of the overall process. They were also involved with the original ERP (R/2) system prior to receiving training so it is likely they had knowledge of both the information systems and work flow processes and were able to integrate and apply this knowledge back on the job. These employees were recognized by younger staff as “local experts” and the role they played was analogous to consultants in the “resident expert” approach to training from Nelson and Cheney (1987). This approach to training is to let the user ask questions of experts rather than attend a specific course or consult the book. The difference in this case is that the resident expert is an employee who has more understanding of the context and the underlying business processes involved and is not usually expert in the use of the computer technology. These employees were able to understand how the ERP works through their deep understanding of the specific underlying business processes used by the company; however, they have no special attachment to the ERP and its usage. In fact there was clear evidence that when they found the ERP lacking they had no hesitation in using or developing feral systems to work around perceived limitations.

The Reich (2007) view that for an IT implementation team to be effective requires four types of knowledge (process, domain, institutional and cultural knowledge) was also supported. While ERP experts may have process knowledge, the latter three types of knowledge are all contextually based in the organization. The thematic analysis and constructs around data integrity and governance also suggest that knowledge around power relationships and cultural factors impact upon ERP implementation. This research indicated that the self-organizing systems in the form of CoP were more popular with staff as a way of acquiring skills as CoPs also possessed to varying degrees the latter three forms of knowledge. This self organizing approach was achieved through an informal training system that consisted of different trainee types, each with unique experiences and questions that led to the development of various aids to help them with their work. These aids included several feral systems that only had meaning for a local team or CoP.

If it is assumed the implementation team had process knowledge then a plausible explanation for the failure to transmit the necessary skills is offered by Brown and Duguid, (2000). Specifically their contention on the stickiness of knowledge and how it tends to cluster within CoPs but not flow easily to dissimilar groups would provide some explanation of why the formal training did poorly at skill transfer. The implementation team shared few similarities with, and had less success than, the CoPs in transferring skills to the target subjects. It could be argued that the success of the CoPs is overstated on the grounds that the prior on-line training was a necessary but not sufficient condition for assisting the effective CoP with its informal training. This argument is difficult to support as many staff achieved training accreditation in the official system without knowledge of the content. Specifically once other staff told them what key strokes were needed to complete the official training or what the correct answers they simply ignored the lesson and got through it as quickly as possible in order to get accredited. Also as the training styles were very different (formal vs. informal) it is difficult to justify the two events as connected in a sequential learning process.

While CoPs accounted for much of the knowledge management and skill transfer activities, *Utilcom* also recognized the need to have more formal knowledge management systems in place. The Help Desk had this formal role. Both the CoPs and the Help Desk dealt with tacit and explicit knowledge and, therefore, with skill training. The CoP did so in an informal way, as demonstrated by feral systems. The formal approach of the Help Desk combined with the use of organizationally endorsed information systems was far more effective than CoPs in terms of organizational reach, reducing corporate risks around knowledge capture and data

accuracy. In terms of skill training, the Help Desk “*was pushed beyond breaking point for the first two weeks from go live with calls asking how to use the system.*” (Manager). It should be noted many of these calls were from less frequent users of the ERP system, but who nonetheless had received the same on-line training as heavy and mainly full time users.

While more work needs to be done to determine optimal trade-offs between CoPs and a corporate help desk approach, it is interesting that the heavy users showed a bias for CoPs. The standard online training approach made no allowance for individual differences in learning styles. However the fact that users with different usage patterns chose to acquire similar skills from different sources suggests this may be a factor worth considering for future implementations. Such a consideration would need to also investigate if these differences are due to systemic factors such as job categories or individual psychological differences. Irrespective of what conclusion may be reached, it is clear that standardized formal training programs need to be augmented by one or both of these types of on-going support to ensure effective implementation and this agrees with other studies such as (Nelson and Cheney, 1987)

The emergence of CoPs to assist with ERP training strongly suggests that much of the hype around electronic technology transforming the way humans organize and seek knowledge and being able to speed up the delivery of effective training is not justified in all contexts. By their actions, it appears the staff in this study railed against the artificial fragmentation of knowledge and demonstrated a strong preference for training which was more connected to their everyday learning and demonstrated more coherence in their work environment. CoPs appear to avoid knowledge fragmentation by providing a setting which integrates all four elements of Reich’s (2007) model that are required for effective skill transfer. Brown and Duguid’s (2000) model provides a setting which acknowledges how group identity impacts upon training. In the case of action learning and the need for reflection, it provides an environment where staff can reflect with others as they engage with tasks in their own environment. While more research needs to be done to determine the theoretical basis of CoPs in regard to IT systems training, the role played by CoPs would appear to be sufficiently large to justify the effort.

6. LIMITATIONS

Limitations include the lack of generalisability from a single case study; data were gathered during a stressful period around implementation and therefore may not be typical; the lack of widely accepted agreed methodology on how to measure effective training and the study was largely limited to the use of qualitative research methods.

7. CONCLUSIONS

To return to the original question “How effective is training for ERP implementations in a large organization?” the answer would appear to depend on the type of training used and in what context. This study has uncovered problems with training for the ERP implementations, which appear to be related to a range of contextual variables. Traditional individually focused on-line training packages appear the least effective. A Help Desk approach based in KM principles proved more effective than the formal training approach in terms of making staff workplace-capable across an entire organization. The CoP approach was found to be the most

effective as measured by the perceptions of managers and supervisors around staff performance. It also seemed the approach best equipped to deal with work team cultures. However, it was less effective at being able to spread this training technique beyond small and often localized communities. The clear inference drawn from this study is that the traditional ERP implementation training has been overly simplistic due to underestimating the importance of contextual factors. To that end, CoP appears to provide promising theoretical foundations for ongoing research.

Not having a formal evaluation system in place to either define or assess the effectiveness of the overall ERP implementation let alone the training component is indicative of a wider weakness in the ERP training literature. Deciding on an effective evaluation methodology remains a complex topic in its own right. There is, therefore, an urgent need to develop a widely accepted and validated ERP training evaluation methodology to enable the progression of longitudinal comparative research in order to gain a more comprehensive understanding of how to improve ERP implementations.

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