The Relationship between Process and Practice: The Case of a Sales Order Office

Roseanne Thomas
Wally Smith
Paul Jackson

School of Management Information Systems
Edith Cowan University
e-mail: w.smith@ecu.edu.au

Abstract

Process and practice have come to represent two opposing views of organisational knowledge. A case-study is reported which investigates the relationship between process and practice in the sales order office of a food production company. Interviews with staff reveal how they collectively exhibited the characteristics of a community of practice. However, it is also shown how different aspects of the community's contextual knowledge can be distinguished and understood in relation to a formal process model. The findings are discussed in relation to bridging the gap between process and practice perspectives.

Keywords

communities of practice; contextual knowledge; knowledge management; process modelling

INTRODUCTION

A central challenge in the field of knowledge management is to better understand the relationship between process-oriented and practice-oriented views of the organisation (Brown and Dugoid, 2001). In the process view, which is central to traditional systems analysis and design and business process re-engineering (Hammer and Champy, 1993), the work of an organisation is defined as a sequence of stages described in logical terms of what must occur and what inputs and outputs are needed. The employee's role is simply to implement one or more stages of such a formally defined process.

In contrast, a number of detailed studies have revealed the importance of what has come to be called the *practice* aspects of work. This research has looked at diverse areas, such as ship and airplane navigation (Hutchins, 1995a; 1995b), photocopier operation (Suchman, 1987), photocopy repair (Orr, 1996), insurance claim processing (Wenger, 1998), IT planning (Sahraoui, 2001), air traffic control (Hughes et al, 1995), and job scheduling in a print shop (Bowers et al, 1995). These studies, often involving intensive ethnographic investigation, show how people across various contexts do not rely on formal organisational procedures alone. Rather they evolve elaborate informal practices to handle frequent exceptions, irregularities and anomalies in their work.

The practice perspective has its roots in work on organizational learning where the terms 'espoused theories' and 'theories in use' (Argyris and Schon, 1978) mark a distinction between the formal accounts given of organisational function and the informal tacit theories underlying actual decision-making. An influential and recent formulation of a practice viewpoint is the notion of 'communities of practice' (Lave & Wenger, 1993; Wenger, 1998). Wenger showed how even apparently routine office work depends on subtle but necessary improvisations to 'get the work done'. A community of practice is a group of co-workers who continuously learn from each other about new and better approaches. Some critical characteristics of a community of practice are as follows. Work involves unofficial knowledge and activity to make processes run smoothly and to overcome exceptions and glitches that occur in a real, as opposed to a formal, world. Only by taking part in both the work itself and conversations about it with co-workers, do people acquire and maintain the informal practice knowledge needed to make processes work. Talk among co-workers makes extensive use of stories about how unusual circumstances have been handled. These stories convey valuable lessons and provide the means of sharing experience.

The concept of a community of practice is clearly consistent with some theories of knowledge management while inconsistent with others. In support, for example, is Nonaka and Takeuchi's (1995) observation of a socialisation stage during the creation of innovative knowledge. At odds with the community view, and its use of story-telling in particular, is Boisot's (1998) social learning cycle in which abstraction and codification of knowledge are prerequisites for diffusion.

Despite the contrast between process and practice in the literature, should they be regarded as fundamentally incompatible accounts of work? Much of the research into practice aspects of work (e.g Orr, 1995; Suchman, 1987) has been carried out under an ethnomethodological philosophy associated with the ideas of Garfinkel (1967). This philosophy of describing social phenomena 'rejects the very notion of abstract theorizing' (Dourish, 2001). Instead it stresses the importance of meaning expressed in the detail of actual behaviour in real situations. At its core then, much practice-oriented research rests on the belief that not even a social theory, let alone a formal business process, could account adequately for the nature of work. This philosophical position may be taken by some as a justification for maintaining a clear separation between process and practice; that is, a clear separation between formal process models and accounts of the characteristics of communities of practice. However, a counter view will be explored here. Just because many organisations have simplistic formal representations of their own processes, does it necessarily imply that no process-oriented theory could illuminate the nature of a community of practice?

To investigate the relationship between process and practice, a case study is reported here of a sales order office in a food manufacturing company (referred to as the Orders Office). One of the authors of this paper is a manager in the organisation and therefore has a potential interest in any improvement of sales ordering. However, although the work may form the precursor to a programme of action research, the study reported here focuses entirely on interpretive analysis of the current situation.

The broad question motivating the study is, *How might the knowledge of a community of practice be better understood in terms of process?* With the rich history of systemic thinking (e.g. Flood, 1999) this is clearly a vast project. However, the aim here is to compare, for a single work situation, a simple process model with a practice view of the work. The comparison seeks to establish how process is reflected in the practice. A sub-question addresses the claim that practioners are focused 'laterally' on the details of their own activity, and are not focused 'longitudinally' on enterprise-wide processes (Brown & Dugoid, 2001). By analysing practice in comparison to an enterprise-wide model of process, it was possible to evaluate this claim for the situation studied.

THE CASE-STUDY: AN ORDERS OFFICE

The organisation and the Orders Office

The organisation studied is a food manufacturer dealing with a range of customers from the major retailers to small deli's and corner stores. There are 350 products lines and 4000 customers. The sales order office receives and processes orders which are placed electronically, by fax and by telephone for delivery on the following day. The orders are entered into an ERP providing support for production, inventory, sales reporting, purchasing and accounting. About 800 to 1000 orders are taken every day for delivery on the same day or the following working day. About 300 to 400 are received electronically via handheld devices from representatives in the field, 100 are received by fax and have to be keyed into the ERP and the balance are phoned in and keyed directly into the ERP.

Prior to the study, there had been a turnover of staff for a period of two months with only one experienced operator left on the day shift and one on the night shift. In addition the supervisor had left and been replaced by someone with experience in another industry and using different software. This situation caused significant problems with the wrong delivery and wrong invoicing of orders delivered. In turn, this prompted the exploration of issues surrounding the retention of knowledge within the organisation.

Data collection and interpretation

Structured interviews were carried out with five members of staff in the Orders Office, both day-shift and night-shift, and with the supervisor. The questions were designed to probe the staffs' account of what knowledge they used to accomplish their work.

Walsh and Ungson's (1991) taxonomy of organisational memory 'retention bins' was used to organise questions into categories: 'individual' (memory, recollections of events); 'culture' (group and organisational characteristics); 'transformations' (how processes are carried out); 'structure' (organisational structure); and 'ecology' (the physical workplace). Although the research questions here are not framed in terms of organisational memory, the use of Walsh & Ungson's scheme provided an effective stimulus for interviewees to address the issues concerned, and it avoided any explicit reference or direction from the questioner to the ideas of communities of practice and business process design.

The statements of interviewees were audio-taped and transcribed. An interpretive analysis was carried out using 'open coding' and category testing based on Strauss and Corbin (1998). These techniques were not used here for building a new grounded theory, but rather the microanalysis of interviewee statements aimed to find

confirmation, disconfirmation or qualification of the existing concepts of communities of practice, such as improvisation. The novelty of the current work came from comparing the existence of these phenomena with a process model of the same situation. This process model was built from information provided by the interviewees and other sources in the organisation.

ANALYSIS OF INTERVIEWS

The analysis of the interviews is presented in the following way. First, a process model is described which provides a formal view of ordering as it exists in the organisation as a whole. This will orient the reader to the organisational role of the Orders Office. Second, and in contrast, the detailed practice aspects of the work of the Orders Office is revealed through interview excerpts which show how staff worked as a community of practice. In the third subsection, the two perspectives are combined by providing an account of staff's contextual knowledge in terms of the formal process model. That is, the process model is used as a framework to understand the different aspects of contextual knowledge.

A process view of the Orders Office

A simple process model was constructed in the form of a data flow diagram (DFD) of the enterprise-wide ordering process shown in Figure 1. The DFD also shows contextual knowledge boxes which are explained in a later section.

The construction of the DFD drew heavily on the knowledge of one of the authors who was a manager in the organisation under study. To achieve our goal of examining the relationship between process and practice, the model was deliberately constructed at a high level of abstraction and with a correspondingly low level of detail. This was intended to make it as distinct from a practice view as possible, and to provide a stronger test of whether such a model can contribute to understanding practice. The model was constructed to depicit a logically correct and widely held process view of how orders are handled. It did not matter for our purposes that the model is incomplete. Examples of things omitted from our analysis are messages about orders that are not received and messages to alert production planning about especially large orders. Another important issue that falls outside of the present scope is a comparison with the formal model implicit in the ERP software used by the company.

As shown in Figure 1, the physical sub-systems of the organisation involved in the enterprise-wide ordering process are: the mobile Sales Reps who visit customers, the Orders Office itself, the Despatch department where goods from a Warehouse are selected ('picked') and packed, and Delivery, comprising drivers and their vans.

The enterprise-wide process runs as follows. Raw orders, meaning orders expressed in the vernacular of various customers, are received either directly by the Orders Office or via Sales Reps in the field. The Orders Office produces a 'picking slip' and sends it to Despatch where goods are selected from a

warehouse and packed and left in the particular warehouse. Despatch staff mark the picking slip and return it to the Orders Office to show what they have actually packed to indicate any variation from the precise order. The Orders Office use the marked picking slip to prepare a two-part invoice that is sent to Delivery who collect the goods from the warehouse and deliver to the customer with the invoice. Delivery staff return one signed part of the invoice to the Orders Office which is held as confirmation of delivery.

Within the Orders Office, the process runs as follows. Once the orders have been picked by Despatch, the quantities shipped are entered into the ERP and invoices are produced. All of the order entry is performed by a day shift. The day shift also does the pick/confirming and invoicing for country and interstate orders, which are shipped on the same day. The nightshift does the pick/confirming and invoicing for metropolitan orders and aggregates the documentation by delivery round for the vans to start at 6.00am on the following day.

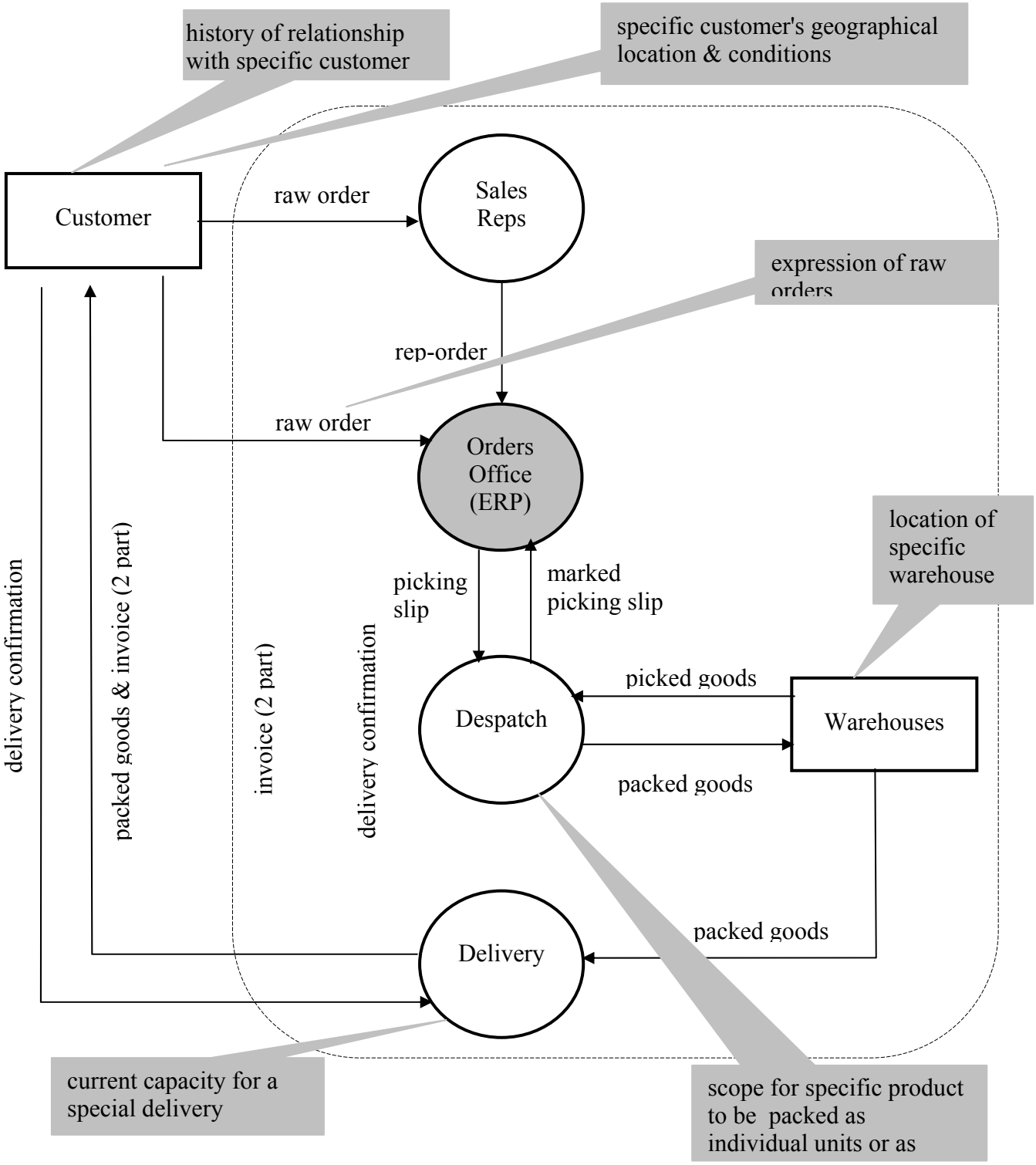

Figure 1. A physical data flow diagram, used as a process view of enterprise-wide ordering, with contextual knowledge factors that characterise the community of practice that staffs the Orders Office

The Orders Office as a community of practice

Alongside the formal process of ordering, the Orders Office staff can also be described in terms of a community of practice as defined and investigated by Wenger (1998). Improvisation to meet the particularities of each context was a strong feature of work in the Orders Office. The contextual knowledge needed to improvise was part of the informal organisation, as shown in the following excerpt:

> *'I never liked to do Bunbury and I really didn't like to do the butcher shops. I hated doing the butcher shops, but now I can just whiz through them like nothing, because it's the experience that you do with them and you get to know 'Well, he's left that product code off and I know what that is because that's what they ordered that last time.' But you just know it, that's not written down, but you just know that.'*
>
> Night-shift staff

Further evidence for the way work involves improvisation within the context of individual orders, is provided in the next section. Knowledge for handling such irregularities in work is largely tacit until it is shared through informal talk interspersed with work.

> *'It's all in your head and it's hard to teach people a lot of little things, they've got to learn them for themselves, if you know what I mean. Or, they ask questions and you can tell them. That's up to them if they want to make notes, but there's a lot of little things you can't put down on paper.'*
>
> Day-shift staff
>
> *'Yes, yes. If I happen to know a short cut or, yes, I will. Barbara says I've been helpful to her because I've shown her things, you know, and we've shown Keli and Mandy and I think they've picked up quite a bit. We do talk.'*
>
> Day-shift staff

This informal knowledge is spread in the community of practice, discussing and instructing on an ad hoc basis, and by a network of knowing who to ask about what.

> *'... we all share, even Annette, she'll say to me something about a code or a thing on the computer and ask what am I doing, I'd show her. Most people know a bit about the system, so we'd talk it over by ourselves or we'll ask somebody else.'*
>
> Day-shift staff
>
> *'... I mean, me, I would share everything, which is what the job's all about and now I find that it's absolutely fantastic. It's better than what it was before because you each take a turn at doing things. If one's having a hard time, everyone pitches in, everyone helps. '*
>
> Night-shift staff

Formal procedures manuals are largely eschewed by Orders staff in favour of sharing knowledge through talk or sometimes informal documentation.

> *'I've never looked at that, no. I look at the manual that Gill made up, and she printed the screen so to lead us through export. She actually did a big folder and she did it for invoicing, orders, she did the whole lot. So, every time I get an export, I grab for that because that's my bible, to make sure I'm doing it right.'*

The staff show great concern and dedication to seeing that the work is done despite the many possible glitches.

> *'I get a bit, not upset, but I get a bit anxious when things do go wrong and I think that maybe I could have corrected it this way. So I get a little bit anxious if it's not right. But, overall, my job is to do the best job that I can to make sure that when the people come in, in the morning, there's not a lot of problems, the drivers can come in, take their rounds, go and get their orders and go out.'*
>
> Night-shift staff

In summary then, the staff of the Orders Office exhibited the following characteristics of a community of practice: improvisation to handle context, the tacit and informal nature of contextual knowledge, the sharing of knowledge during interspersed work and talk, awareness of who to ask about what, and commitment to getting the work done.

Contextual knowledge and its relationship with the process model

In this section, we now consider in more detail what contextual knowledge Orders staff bring to bear when making the process work. The different strands of context, described as contextual factors, are seen to be related to the different components of the process model shown in Figure 1: the Customer (their expression of raw orders and their geographical location), the Despatch subsystem, the Warehouse subsystem, and the Delivery subsystem.

Contextual factor: The expression of raw orders

Customer orders are expressed in a way that may be incongruous with both the way they are represented in the ERP, and the way products are available to be packed and delivery. A common example is discrepancies in language referring to quantity, and assumptions that specific customers have about the number of items per carton or other packing unit. Based on the context of the specific customer, the Orders staff must make a translation from expressed order to its representation within the ordering system.

> *'Yes, I think the manufacturing multiples is what's in the computer. So, if I put in a carton of shaved ham, well, that one will come out right. Say if I put in the customer wants a carton of Krakowurst, that comes out at about seventy, but we know that's how they are in the chiller maybe, but we sell them individually, so that's different again. Even like one kilo or one little polony knob. They might want a box, but they mean ten or twelve, you learn that with experience with the stores what they expect, but you can't send them forty because they'd never sell them.'*
>
> Day-shift staff

> *'But we know, you've got to know up here and the code, you know there's only eight in a box and down in our despatch they don't open a box to take one or two out, so you've got to take it by the box. But then the box they're ordering of ten, isn't what our computer gives us. Our computer, because it's to do with the factory, there might be sixty, seventy or forty-four in a box. So, you can't put your orders in cartons. If someone says they want a carton, you've got to put it in as a unit, like change it in your head to key it in, because of the way it's packed and it's in the computer. '*
>
> Day-shift staff

> *'And some weigh, and some are packets, and some are strings, and some are Cryvac packs ... It's just experience as you go along. It's just something you learn as you go along. I found that through the day when I worked the times through the day, I looked at it and I thought 'My goodness, I'm never going to learn this'.'*
>
> Night-shift staff

Contextual factor: customer's geographical location

The geographical location of the specific customer can bear on the way an order is handled because of things like climate differences, or the capacity of a remote outlet to cope with over and under-ordering. This contextual factor can interact with others such as the expression of raw orders and the quantification of products, as in the following example dealing with the remote parts of north-west Australia.

> *'People up north are still ordering in cartons, but I've told Chris, you've got to be very careful because they don't want seventy sent up to Halls Creek and then if they don't want them, how are we going to get them back and what are we going to do with the product, we're going to lose it. So you've got to be very careful with the north west ones, yes.'*
>
> Day-shift staff

Contextual factor: Despatch subsystem

If the translation of raw orders is not done appropriately, it can create knock on problems. Here a knowledge of the Despatch subsystem is illustrated:

> *'Passing on the information, yes. Because if you don't ... do that when you take the order over the phone, when it goes down to despatch, they have to alter all the figures. That means when it comes back to me, I've got to maintain that order of all those things that are wrong before I can invoice it. So virtually by putting the wrong figure in it's making a lot of work for everybody else. So there's a lot they order, there's three they order in tens and I know for a fact that they only come in eights. So, you either tell the customer as you're taking the order or if they order ten, you just key in eight because you know that's all they're going to give them in the factory, in the despatch. It is. There's just a lot of little things like that you've just got to cotton onto yourself.'*

Day-shift staff

Contextual factor: Warehouse subsystem

A further contextual factoring bearing on each specific order is the Warehouse used. Orders staff have to be aware of what Warehouse is involved for each product and why it is used. Further complexity existed because that Warehouse codes did not always refer to a physical storage location. Warehouse codes were also used by the organisation as a categorisation scheme for analysing sales patterns. This meant the code could sometimes refer to a virtual Warehouse, and the same product could have a different code for a different customer or other defined situations.

'Because, you do have to know warehouses, your type and whatever it is up the top, you've got the two numbers, type and something else. So you've got to make sure you know them and why you use them. I think a lot of them took a while for them to learn the different warehouses. Mainly because they either hadn't been in the industry before and they just thought, why do it, why change it, just leave it. But you can't because of how the factory works and how the office works.'

Day-shift staff

Contextual factor: Delivery subsystem

Knowledge of the Delivery system provided a context which is seen in the way urgent orders are handled. The Delivery system does not deliver to every suburb every day, but special one-off deliveries can be made sometimes. An interpretation is made by Orders staff as to what can be handled.

'You get a few people that don't, they all of a sudden realise that they haven't, they've forgotten an order, or that they've run out of stock if they had a very busy day. That's when we have to establish that yes, we can get it out to you tomorrow and make sure that it's got urgent on the invoice, not just on the picking slip, so that the driver can see that and understand that the customer needs it that day and not on another day. A lot of times he may have to go out of his way to deliver that.'

Office supervisor

Further, Orders staff must keep a collective tally on customer requests for irregular orders and attempt to modify customer behaviour. This kind of monitoring of the behaviour and status of customers is held in the collective knowledge of the Orders Office community and would be difficult to represent formally in the ERP or otherwise:

'But when you've got so many girls just at random taking the calls, it's something that you would just have to be aware of, you'd have to be alert. Other than something could pop up in the computer and say it's the same thing again. No, I don't think there's an easy solution. There's certain things that you just have to do, have to remember and be aware of it.'

Office supervisor

The contextual influence of the delivery system is also seen interacting with the context of customer geographical location

'I just go there and say look, okay we've got an order for the Eastern States, we've got that much Eastern States work now. You've got to know what product they take, how you put the order through. You've got to know the transport, when it's going, con notes, all that sort of thing. So, if you're not sure you ask Phil, or if you get an order you let Phil know straight away so he can follow up on the production of the product. The people that were here today were the Subway people, we're getting a lot of orders for them, so you've got to make sure they're right because they go all the way to Queensland. You can't send the wrong product, or the wrong amount or things like that, so you need to know all these little bits, who you've got to notify and what you've got to do. You need to know it.'

Day-shift staff

In summary, different aspects of contextual knowledge of Orders staff can be identified and related to the various components of the enterprise-wide ordering process, namely the Customer and the subsystems for Despatch, Warehouse and Delivery.

An example of systemic thinking about practice: coordination

The finding, for this Orders Office, that practice knowledge is in fact heavily process-oriented, suggests that further use of systemic concepts might illuminate the subtleties and significance of practice. As an illustration, the central systemic concept of coordination between subsystems is considered.

What is seen in the case of the Orders Office, drawing on concepts from Beer's 'viable system model' (e.g. Beer, 1985) is that not only does it carry out its operational function of processing orders, but also it acts intelligently to 'absorb the variety' of information received (an 'attenuator' function) and also to convert incoming information into a form that will have the right consequence inside the organisation (a 'transducer' function) - a chief example being the 'picking slip' sent to Despatch. Further, the Orders Office takes on part of the overall management function of coordination. It does this by maintaining an understanding the dynamics of other subsystems and compensating for potential mismatches in behaviour - a kind of coordination by 'mutual adjustment' (Mintzberg, 1979). This type of distributed coordination, as opposed to a top-down 'supervisory coordination', is similar to the behaviour observed in teams of navigators (Hutchins, 1995a). A basic cybernetic principle comes into play here: for any system to control another it must have a model of the to-be-controlled system. The contextual knowledge of Orders Office staff can be considered a shared model of the process shown in Figure 1 augmented with an understanding of each component's capability and current state. It is this shared model that is refined and updated during talk.

Therefore, having considered the coordinative role of the Orders Office, it seems that systemic concepts can offer more general expression of the practice nature of work.

SUMMARY AND CONCLUSIONS

To investigate the relationship between process-oriented and practice-oriented theories of organisations a study has been reported of an Orders Office in a food production company. The staff in the office were seen to conform to the notion of a 'community of practice' (Wenger, 1998) in the following way. The work of processing orders, although formally straightforward, was in fact characterised by irregularities and anomalies that required improvisation and contextual decision-making. Staff acquired the knowledge to improvise and contextualise by working in the office and taking part in informal conversations about current and past episodes of order handling. This practice view of work is often contrasted with a managerially sanctioned process viewpoint in which employees are described as executing stages of a clearly defined process (Brown and Dugoid, 2001).

What is revealed in the analysis of the Orders Office, and in other studies, is the richness and subtlety of practice relative to a simplistic process model. However, to ask our main question, does it follow that a process view is fundamentally incompatible with practice, as is implied by the ethnomethodological standpoint underlying much of the practice-oriented research? Or instead, might a process description provide insights into the nature of practice?

By mapping out the subsystems of the ordering process used by the company, it was possible to show how the contextual knowledge used by Orders staff could be categorised according to the components it addressed in the wider system. Contextual knowledge was concerned with understanding the dynamics of the components individually, and their interaction. This observation qualifies, to some degree, previous descriptions of practice as inwardly focused (Brown & Duguid, 2001). Rather, in this case at least, the knowledge underlying a community of practice appears to be intimately related to an enterprise-wide process.

This observation, if substantiated in other contexts, has relevance for knowledge management initiatives. In general it suggests that enhancing communities of practice and developing formal models of the enterprise may be mutually beneficial. First, the finding points to the value of constructing and internally publishing simple enterprise wide process models. These models are not inevitably top-down prescriptions of process to be worked around. If carefully designed and modified through consensus, these models may provide a framework for the expression of community knowledge. Second, consideration should be given to the value of enterprise-wide knowledge residing in communities of practice. For example, the design of procedures and technologies to facilitate virtual communities of practice, such as an expert discussion forum, should promote the application of expressed knowledge outside of the particular area where it arose.

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