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AUDIO DIARY AND DEBRIEFING FOR KNOWLEDGE MANAGEMENT IN SMES

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Site managers meet complex problems in their day-to-day work and have to find solutions promptly. However, the industry does not capture this valuable experience and may even not realise its significance. If this knowledge is collected, structured and disseminated, there would be significant benefits to the companies as well as the whole construction industry. This research is to test and improve a simple yet robust approach for this purpose. The site managers keep an audio diary of a problem-solving event by Dictaphone each week which contains their personal knowledge and thinking. Then the managers are debriefed about the set of their recorded events each month in order to explicate the significance embedded in these events and to transform it into knowledge accessible to a wider audience. With the participation of site managers from a dozen small and medium sized construction companies across the country, the event recording and debriefing process last for six months. The preliminary findings from the research indicate that audio diary and debriefing as a tool for knowledge management are effective and efficient for practitioners to capture and distil their learning and tacit knowledge.

Keywords: audio diary, debriefing, knowledge management, SMEs

INTRODUCTION

It is generally accepted that knowledge management, i.e. knowledge identification, creation, acquisition, transfer, sharing and exploitation, is vital for efficient working in projects and for improving organisational competitiveness (Egbu, 2000a; 2001). Knowledge management can also promote innovation and business entrepreneurship, help manage change, and emancipate and empower employees (Nonaka and Takeuchi, 1995; Egbu, 2000b; McAdam and McCreedy, 2000). This view is supported by UK government in White Paper (DTI, 2000).

But knowledge management is a complex process which involves the management of explicit and tacit knowledge (Nonaka and Takeuchi, 1995). Explicit knowledge refers to the knowledge which can be articulated in formal language such as grammatical statements, mathematical expressions, specifications, manuals, and thus can be transmitted across individuals formally and easily. On the contrary, tacit knowledge refers to the knowledge which is hard to articulate with formal language, but is personal knowledge embedded in individual experience and involves intangible factors such as personal belief, perspective, and value systems (Nonaka and Takeuchi,

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1995). There is evidence to suggest that it is tacit knowledge that contributes more to organisational innovations and competitiveness (Boyd and Belcher, 2002). Compared to explicit knowledge, tacit knowledge is more difficult to access, communicate, share and audit and human behaviour is vital in its transmission (Nonaka and Takeuchi, 1995).

The increasing attention levelled at knowledge management is unsurprisingly targeted at very large multi-national enterprises (MNEs), with little at the small and medium enterprises (SMEs), and even less at construction-related organisations. However, SMEs are not small MNEs, and not many SMEs want to be MNEs. SMEs and MNEs are like different animals living in different habitats, and must behave in different ways in order to adapt and succeed. They need different sources and types of knowledge and technology to remain nourished and healthy. The fact is in 2002, 99% of the UK construction companies have less than 59 staff, but they employ 62% of the industry's workforce and deliver 44% of the industry's workload (in monetary terms) (DTI, 2003). Compared to large companies, these SMEs usually are technologically weak, cannot invest heavily in innovation and development, and take a less-formal strategy in management. With limited, and often very stretched, staff resources in SMEs, their people need a broad range of skills and experience to undertake multiple tasks (Sexton and Barrett, 2003).

SMEs see the world in an operational way. Their biggest operational issue is cash flow as they will be out of business if they cannot get the money in (Storey, 1994). Their main strategic concern is survival in the fiercely competitive market. The knowledge in SMEs is also different. It tends to be small, oral, tacit and contextual. And they expect some immediate outputs which can be put into use straight away. Some of the knowledge management concepts and methods developed from MNEs may not apply to SMEs. Therefore, there is an urgent need to develop knowledge management approaches suitable for SMEs in construction. Such approaches of sharing knowledge or tapping into the knowledge pool must be simple, straightforward and efficient in order to encourage employees' participation and maximise the benefits of knowledge management (Alazmi and Zairi, 2003).

Much activity in construction SMEs takes place far away from head office. For example, site managers and project managers solve complex problems in their day-to-day work by using their experience and intuition, i.e. their tacit knowledge. These complex problem-solving events are rich with knowledge that the industry fails to even acknowledge, never mind capture. If this knowledge is collected, structured and disseminated, there would be significant benefits to the companies and the industry as a whole. A simple yet robust knowledge management approach for SMEs targeted at this knowledge was devised and the aim of this research was to test and develop this to improve SME economic, social and sustainable performance. The approach involves individuals dictating a problem-solving event they have experienced into a Dictaphone each week. These recordings contain their personal knowledge and thinking. The participants are debriefed each month about the set of recorded events to explore the significance of these events and to transform the knowledge in order to make it accessible to others. Once the significant knowledge is made explicit, it can then be disseminated within the company and the industry. The ultimate objective is that the companies can operate this approach by themselves for knowledge management.

The methodology behind this work is action research in the sense of researching practice in order to increase the understanding of it whilst at the same time changing practice (Easterby-Smith et al, 1991). This inherent duality of aim can cause methodological problems, however, the outcomes are more purposeful and richer (Boyd and Wild, 1994). As regards the research, the approach is a tool to be used to engage more effectively with individuals and companies. Access and engagement is one problematic area of all research (Gummesson, 1991). The research in knowledge management is based on determining how construction individuals and organisations make ‘sense’ (Weick, 1995) in events and how this ‘sense’ is propagated through the organisation. In contrast, the testing of the approach is part of the action to change the companies. In this, it is pragmatically rather than theoretically derived.

After describing the theory behind this project, this paper presents some preliminary results generated so far from which some brief conclusions are made.

THEORY BEHIND THE APPROACH

An approach to capturing, structuring and disseminating knowledge was piloted (Boyd and Robson, 1996) and this has allowed the development of a comprehensive, yet simple, tool for knowledge management, which is suitable for SMEs. The theory behind this centres on the Kolb learning cycle (Kolb, 1984) and is shown in Figure 1.

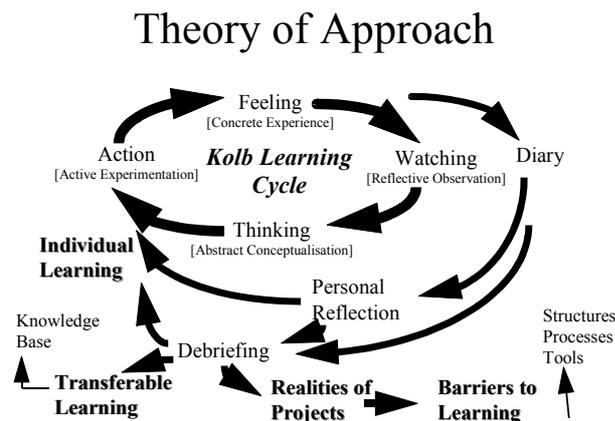


Figure 1 Theory of the Approach

Here, capturing knowledge from experience involves two operations. The first is based on recording events i.e. audio diary and the second is based on personal reflection and abstract conceptualisation of the events i.e. debriefing.

Personal knowledge that is involved in day-to-day events is very complex and is not generally available outside the person. However in practice, sometimes knowledge transformation and dissemination does take place through people telling stories about the events they have experienced. Zimmerman and Weider, (1977) proposed diaries as a simple tool for encouraging people to capture events. A diary is a record of events, maintained by the subject over time, which can then be reviewed and analysed (Burns and Grove, 2001). It provides the participants in the research an opportunity to record their experiences, perceptions and feelings about their daily operations on site relatively soon after they occurred. But diaries require writing skills and time for

composition, which are barriers in SMEs. Indeed, construction practice communicates substantively using spoken language. It is rich in meaning because of nuances of delivery, body language and context which provide many dimensions of information useful for practice. It is this multi-dimensional world of oral communications which contains much of the tacit knowledge and also the ability to transfer it. In order to relate better to construction SMEs an oral method of diary keeping is required. Therefore, it was proposed that audio diaries were used to collect events in this research. This also would minimise the disruption to the participants' daily work, encouraging their participation and cooperation.

Diary keeping forces participants to reflect on events. Reflection challenges perceptions and it is at this point when past thinking is shown to be inadequate that new theories are built (Boyd and Wild, 1996). This is a fertile time for knowledge management, however, this needs to be formalised to try to make the new knowledge more generally available. In addition, knowledge transfer of tacit knowledge requires socialisation (Nonaka and Takeuchi, 1995) and so, this knowledge can only be brought out and developed in dialogue with others. Debriefing was taken as a sufficiently formalised technique of dialogue to be useful in this approach. Thus, after a number of audio diary entries, participants are debriefed to analyse their learning and to provide a deeper interpretation of the events. Debriefing is a powerful tool, which can make explicit the tacit learning so that it can be transferred to a wider audience and ultimately to the knowledge base of the industry. Originally, debriefing was a term in military campaigns and war games, which meant to question and examine persons who had returned from a mission or exercise to determine what had occurred and then to develop new strategies as a result of the experience (Pearson and Smith, 1985). Now, debriefing refers to a purposeful reflection in a social interaction which assists learners to develop generalisations and to transform experience into learning. The rationale behind debriefing is that the individual learning can be enhanced by this purposeful reflection, and the individual lessons can then be aggregated, validated, and synthesized to produce organizational learning. It is this second operation of debriefing that involves the transformation of tacit knowledge to explicit knowledge thus formatting it for dissemination.

PRACTICING THE THEORY

The study reported here is using these techniques to track a number of projects in construction SME organisations over six months in the first instance. A number of participants on each project will be involved. These include projects in the development, design and construction phases to explore the suitability of the techniques in the different commercial and professional environments.

About 30 site managers, quantity surveyors or project managers from a dozen small and medium sized companies are participating in the audio diary recording and debriefing process. They are mainly from general contractors, with some from design-build contractors, specialist contractors and consulting companies. All the participants were briefed thoroughly before they started in order to eliminate operational ambiguities.

Audio Diary

The main tool for capturing oral knowledge in the form of an audio diary is a Dictaphone. This is a relatively low cost and readily available device. The participants are asked to record an event each week that they think stands out. The event may be

challenging, successful, worrying, complicated, difficult, frustrating, and/or annoying. The event may relate to technical issues, organisational process and/or relationships between people. In order to make the diary more structured, a set of questions is listed to help the participants record their stories:

- ❑ What was the context of the event?
- ❑ What should have happened?
- ❑ How did people react?
- ❑ What did you feel?
- ❑ What lesson did you learn?

The participants complete the diary weekly and send back the tapes to the researchers in pre-addressed and stamped envelopes. The tape recordings are transferred onto a computer for easier storage and use in the debriefing.

Confidentiality was always a concern as participants fear leaving themselves open to blame or giving away secrets. They were then assured that their stories would not be made available to any third party or used in any published material, except in a general and anonymised form. This helped to encourage more controversial stories.

Once it commenced, the biggest challenge was to make the participants keep on recording stories. This was not unanticipated as the participants are site managers, quantity surveyors or project managers who are, just like one participant described “the spider in the centre of the web”, always busy and having to deal with all kinds of pressing issues. Therefore, the participants were reminded regularly by telephone, email, and/or text message. Another obstacle was that some of the participants found it difficult to find an event to report. One site manager’s statement was representative: “we don’t have problems on site. We only have solutions.” Sometimes, problems as well as problem-solving seem to be too routine or too trivial for them to notice and report. This showed the lack of value placed on this knowledge by the industry and also the lack of reflection by the managers (Boyd and Wild 1994). To deal with this, the participants were reassured that it is exactly this problem-solving that this research was looking for, no matter whether the problem was big or not. As an alternative, they could also reflect on their previous experience at this time in other projects.

After a few weeks’ trial, most of the participants felt at ease recording their audio diaries. After they saw the value of the output from the debriefing session, they were encouraged to continue and they became more open and the quality of their submission became better. When they first started, they tended to relate more procedural events, but later they started to talk about their own doubts and even mistakes. Their stories covered technical, operational and relationship issues, and their lengths vary from a couple of minutes to over ten minutes. This provided a rich source of data for debriefing in order to explore the deeper meaning of their stories.

For example:

T, site manager on a small site, told the story of how the sand he had ordered for one day did not arrive. This was planned for making mortar to lay bricks that day. His problem-solving dilemma was whether to lay off the bricklayers for the day and upset them as they would not get paid, keep the bricklayers on but lose the cost of the work time, or to buy some very expensive sand from a retail source which loses time as well as cost. The solution taken was a compromise in that he talked to the bricklayers to engage them with his problem and lay them off for only half a day (loss of 4 hours money).

This was, we discovered, a common event and all part of normal day-to-day duties of the manager. However, as will be shown from the debriefing it had: a great deal of depth in seeing it in the wider operation of the business and industry, and also, the potential for more efficient and satisfactory processes.

Debriefing

After four or five audio diary recording, the participants are visited and a debriefing session is conducted. The debriefing lasts about half an hour to one hour depending on the complexity of the events, and involves a review of the events with a question and discussion session. This helps the participants be more analytical about their everyday experience and determines how the projects really operated. The participants are also encouraged to suggest any improvements to the operation of the project, organisation, industry or applicable to their future projects. Here, the importance of developing a relationship of trust and confidence between researcher and the subject who completed the diaries and debriefing is essential as some of the output is confidential. The debriefer/facilitator also requires a good knowledge of design and construction activities in order to understand the situations and processes being described.

Debriefing as a technique of learning and research had been conducted with part-time MSc students (Boyd and Wild, 1996). The major difference between the students and the participants in the research is that the students knew some learning theories such as personal construct theory (Boyd and Wild 1996) and experiential learning. In this research, a more structured and defined approach was determined through a set of pilot sessions. Using the principles of debriefing (Pearson and Smith, 1985; Department of the Army, 1993) and the feedback from the pilot debriefing, a set of questions was designed, tested and refined for the debriefing in the research. These questions are grouped into three categories:

- ❑ The acknowledgement of the events: to review and clarify the events;
- ❑ The reflection of the events: to explore the participants' pre-understanding (Gummesson, 1991) of the events and the impact of the events;
- ❑ The conceptualisation and generalisation from the events: to explicate what lessons have been learned and what they will do differently in the future.

The debriefing practice helps the participants start to think about other options to the problems they faced on site and propose alternative solutions.

For the example event above, in the debriefing session, the site manager revealed that:

- ❑ *material delay was very common on construction sites*
- ❑ the delay in delivery of building sand was due to three factors:
 - the supplier had obtained too many orders to undertake and only considered their own business benefits.
 - that his company selected suppliers solely on the basis of price.
 - that he might not be strict enough with the supplier so that he was put into a lower priority when the supply was short.

His reflection was that he should be stricter on the suppliers in the future and might put in orders earlier if the site space and cash flow was available. His argument on letting the bricklayers off was that he was more concerned about balancing the book than keeping people happy at that moment. In the deeper discussion the following was determined:

- ❑ Bricklayers are a labour only subcontractor (effectively self employed).
- ❑ T had set up a good relationship with bricklayers.
- ❑ Relationship in future with bricklayers is now at risk so that T may lose them or be beholding to them.
- ❑ Good bricklayers are a scarce resource.
- ❑ Small site means T has no space to store materials and any storage needs to be moved or it gets in way of operations on site.
- ❑ Site managers are responsible for site economics supervised by head office contracts managers.
- ❑ Site managers are on a bonus for bringing project in below budget.
- ❑ Ordering of sand is done by head office from a merchant at the start of the job.
- ❑ This order is done on the lowest cost basis.
- ❑ Deliveries are then called down in batches as needed.
- ❑ The selection of merchants is done on a lowest cost basis for the total quantity required throughout the project.
- ❑ Feedback about the service received from the merchant is longer term.
- ❑ Not viable to cancel order with this merchant and try to re-negotiate with another merchant.

Thus the wider learning issues for knowledge dissemination were:

- ❑ Setting up good working relationships with subcontractors and individual workpeople allows you more flexibility and minimum disruption from problems.
- ❑ The service from a merchant needs to be negotiated as well as price.
- ❑ The relationship between Head office and site needs to be clearer as regards responsibilities for site costs, site performance and individual bonuses.

DISCUSSION

So far, over one hundred and eighty audio diaries have been collected and about fifty-five debriefing sessions have been conducted. Even though some of the events the participants recorded are project and/or company related, many of them are industry-wide problems, such as: lack/error of design information, health and safety on site, late payment and theft and vandalism on site. This indicates the necessity for the industry to capture and share the knowledge that already exists and improve the performance of the whole industry.

As in the example above, debriefing has revealed a great deal of rich information about the operation of projects and the complex decision making that managers have to undertake. This approach values the work of these managers higher. In addition, it is providing issues which need to be communicated to other managers to ensure more effective practice. Some of these issues challenge current conceptions within companies and thus are positive drivers of change. As well as this, some issues are at a higher level about inter-organisational relations or even industry conduct.

The research project is working on refining debriefing in order to allow it to be used by people within the industry. The issue of dissemination is also being investigated and a number of novel approaches will be tested.

CONCLUSIONS

As the nature of industrialised economies has moved from being reliant on natural resources to being more intellectually driven, knowledge is rapidly becoming the most

important asset of organisations. Construction organisations are no exception. The ability to manage and exploit knowledge will be the main source of competitive advantage for the construction industry of the future. Effective knowledge management practices are going to be important for the future development of SMEs, in their quest for sustainable business practices, making them less vulnerable to the economic cycles of the industry.

This research designed and tested an approach for knowledge management for SMEs. The practice of audio diary recording among thirty participants from a dozen construction companies across the country has generated a series of events that cover technical, operational and relationship issues. The follow-up debriefing session on those events was found to be able to assist the participants to reflect on their experience and transform their personal experience into explicit knowledge, making ways for a wider range of knowledge sharing and dissemination. This proves that audio diary and debriefing are effective tools for knowledge management for SMEs. Further research is being carried out to find ways to allow the organisations themselves to conduct this knowledge management practice independently.

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