Intelligent Management of Call Centre Knowledge

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ABSTRACT

In the spirit of web-forums and internet wiki-style open knowledge sharing we have adapted a knowledge acquisition technique which has found great success over the last decade in offering diagnostic support to the pathology profession, to create a collaborative web-based knowledge acquisition tool that will support the acquisition and re-use of troubleshooting knowledge in a 24x7 information intensive high-volume and complex global IT support centre.

Our solution focuses squarely on capturing the crucial and otherwise unspoken vectors of tacit troubleshooting knowledge. We offer a software framework that allows users to link explicit problem classes to explicit working solutions in a collaborative and evolutionary manner. The solution fits well in the dynamic knowledge environment presented by the Help-desk, Call Centre and Support Centre. As well, it is a general solution that could easily be applied to other domains.

In this paper, we use some of the concepts from Communities of Practice (Community Intelligence Labs, 2003) to identify features of the call centre environment that particularly lend it to this type of decision support system. Our research is based in a Sydney-based Support Centre that serves the Asia-Pacific geographic region for a large multinational IT company.

INTRODUCTION

A primary objective for the customer service organisation is to learn how to solve technical problems with minimal heartache (for the sake of the customer), headache (for the sake of the staff), and resources (for the sake of the business). Improving the acquisition and re-use of knowledge is therefore central.

The Ripple Down Rules knowledge acquisition technique was first introduced by Compton, Kang, and Preston (1989) and later refined as Multiple Classification Ripple Down Rules by Kang and Compton (1995). Pacific Knowledge Systems (PKS) was founded in 1996 and has found great success in commercializing this technique and offering it in the pathology domain, to assist with laboratory disease diagnosis, for example using blood and urine samples (see http://www.pks.com.au).

Previously we have provided a detailed technical description of the MCRDR rule tree and algorithm, and we have presented our solution which adapts MCRDR to facilitate the collaborative acquisition and reuse of troubleshooting knowledge in the call centre (Vazey and Richards, 2004a).

As well, we have previously evaluated alternate expert system approaches and vendor solutions for the help-desk / support center, we have reviewed the many and varied RDR implementations, and we have addressed issues with corporate culture and workflow (Vazey and Richards, 2004b).

In the following sections, we examine the nature of knowledge in the Support Centre; we use concepts from Communities of Practice to identify the islands of knowledge that can contribute to problem resolution; we discuss the impact of low staff retention rates on the Support Centre's knowledge capital; and we identify some of the current problems with knowledge repositories. Finally we present our conclusions.

COMPLEX AND DYNAMIC KNOWLEDGE

From our Support Centre study we surmise that the following factors contribute to the complexity of troubleshooting problems in the IT support environment:

- *Technology Convergence* – many technologies coming together into integrated multi-function solutions.

- *Vendor Divergence* – many vendors providing solutions in the same technical space but with different and sometimes conflicting interface requirements.

- *Knowledge Evolution* – greater collaborative human understanding of the problem domain with the passage of time, and iterative software and hardware product releases leading to multiple layers of potential problems and solutions.

These factors create a complex and dynamic knowledge milieu in which the Support Centre must operate, and a seemingly endless search space for solutions.

THE SUPPORT CENTRE COMMUNITY OF PRACTICE

Communities of Practice (CoP) is a term that refers to the way in which people naturally work together (Community Intelligence Labs, 2003). CoP recognises the power of informal peer networks, their creativity and resourcefulness in solving problems, and their ability to create easier ways to reach their goals.

> "[They] are peers in the execution of 'real work'. What holds them together is a common sense of purpose and a real need to know what each other knows."
>
> - John Seely Brown, VP and Chief Scientist, Xerox Corp

> "A community of practice is a group of people who are informally bound to one another by exposure to a common class of problem."
>
> - Brook Manville, Director of Knowledge Management at McKinsey & Co.

Support Centre personnel are continuously exposed to common classes of problems, and they share a desperate need to know what each other knows in regard to solving new / repetitive / time consuming / or technically challenging problems.

Via collaboration and the establishment of relationships between the various participants in the Call Centre we hope to develop value networks that provide value chains, with expertise and knowledge being the currency of exchange.

ISLANDS OF KNOWLEDGE

While studying our target Support Centre, we found that personnel were relying on at least four disparate sources of (explicit) knowledge when solving problems:

- *Engineering Knowledge*: How does the product work?

- *Operational Knowledge*: How do you use it?

- *Interoperability Knowledge*: How does the product interact with third party products?

- *Problem Solving Knowledge*: How do you fix it?

As well, we found that the troubleshooting process required personnel to use a great deal of unspoken (tacit) knowledge, including:

- *Problem Determination* Knowledge i.e. what is the class of problem on-hand?

- *Search Location* Knowledge i.e. where should we search for a solution?

- and the *Search Criteria* to be applied i.e. what parameters should we use in our search for a solution?

Further, we found from studying the value networks that:

- Much of the knowledge was stored in people's heads (i.e. tacit) rather than documented in technical references (i.e. explicit).

- Existing documentation often missed the necessary detail or was ambiguous, and a significant amount of technical product information was cryptic at best, coming in the form of abbreviated slides, videos, or emails.

- Personal relationships were extensively and often exclusively relied upon to source basic product knowledge from pockets of information scattered throughout the company.

In the worst case, the impact of this fragmented framework of knowledge is a poor level of knowledge re-use that results in increased frustration levels amongst customers and staff, duplication of effort by support and engineering personnel, slower problem resolution, customer dissatisfaction and overall organisational inefficiency.

STAFF TURNOVER - AN IMPERATIVE FOR CHANGE

Support Centres can be difficult environments in which to work. Work may be sporadic, often stressful, and there may be a perceived lack of career progression opportunities. Anecdotally, the staff retention period for Support Centres in the IT industry is around 18-24 months. Generally speaking, low retention rates coupled with poor knowledge re-use has an obvious human and business impact: operational funds are spent training new-hires using limited training and technical resources while those with experience and knowledge walk out the door.

There is an obvious need to turn the support centre's islands of knowledge into knowledge sharing value networks.

KNOWLEDGE REPOSITORIES

A typical approach used by Support Centres is the use of a repository of solutions that are statically indexed by cases. Typically Knowledge Engineers are recruited to verify new knowledge before it is added to the database. Unfortunately, the knowledge engineering function often becomes a workflow bottleneck.

Our research indicates that to a large degree, the knowledge system needs to be self-maintaining. The system needs to be accessible by each and every user who can make a positive contribution to the knowledge. As well, the system should be able to rely on people's inherent self-interest for its maintenance, that is, that people will maintain the system because it benefits them to do so.

CONCLUSIONS

Support Centres can be complex dynamic knowledge environments in which personnel are continuously exposed to common classes of problems, and share a desperate need to exchange and refine their knowledge. In this environment, knowledge repositories can be easily bogged down by a seemingly endless set of problems and solutions requiring "expert" review.

While not described in detail here, we hope that readers will source our other papers to understand in further detail our adapted MCRDR solution. One key feature of this solution is that it captures three crucial vectors

of tacit troubleshooting knowledge: the *Problem Determination*, *Search Location*, and *Search Criteria* knowledge.   As well, it allows Support Centre personnel to link explicit problem classes to explicit working solutions in a novel, collaborative and evolutionary manner.

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