

# Knowledge Capture at Source. Developing collaborative shared resources

Michael Verhaart  
Eastern Institute of Technology, Hawkes Bay  
New Zealand  
[mverhaart@eit.ac.nz](mailto:mverhaart@eit.ac.nz)

## Abstract

*Today's organisations have well developed systems for capturing financial data and producing reliable and accurate information. An area that is often overlooked is the importance of knowledge held by individuals associated with the organisation. This is also true in an educational setting, where learners can often contribute real-world and personal experiences.*

*The difficulty of capturing this knowledge provides many challenges, in both business and educational settings. In order to be of any use, this knowledge has to be captured at its source and easily disseminated among those who will be interested or affected by this knowledge. The World Wide Web may be a potential technology platform.*

*The research in progress looks at whether this data/information can be effectively and efficiently captured, managed and retrieved, in an educational context. It will further look at whether generalisations can be made across different domains, including Business and Government.*

## 1. Introduction

As an educator in a Tertiary Institution for many years the author has been involved in building a substantial knowledge base built around the subjects being delivered. Currently the static web based system has about 4,000 individual web pages, and the maintenance and updating of the material has become practically impossible. Further, the students involved often have knowledge either through their own research or from life experiences that would make a significant contribution to the quality of the resources being studied.

The shortfalls of the current system and its unwieldy nature required a different approach.

So research into alternative methods was undertaken. A simple database prototype that would replace the static pages was developed. This was completed and the prototype was able to deliver the resources in both printed and overhead form.

The requirement to deliver on a web platform was investigated. So at this point the author undertook a *knowledge interrupt*, and developed skills in developing database systems on the Internet.

The next requirement was to enable capturing of the student knowledge. Adding the ability to annotate and to open up the database for the addition of new material by the student was next developed. So, source data capture became possible.

Many new issues now surfaced. Pedagogical considerations became important, and the ability to provide scaffolding and Exploration Space Controls became necessary.

In developing the system it became apparent that the technologies being investigated could be generalised into commercial applications. It is anticipated that the research will develop into this area.

## 2. Knowledge capture at source

In the book Knowledge Management [1] it is stated that "the way these [modern successful] companies create wealth has precious little to do with the physical assets they own and almost everything to do with the people who work for them and the systems they have in place to enable these people to be creative and innovative".

From the author's observation in an educational setting, students can provide valuable resources in one of two ways. Firstly, from their own "real-world" experiences. For example, while teaching coding systems a student who was also a bank employee discussed how account numbers were codified. Secondly, students are often researching the topic whether in a learner directed mode or discovery learning mode. This contribution to the topic knowledge base is often held by the individual and most often lost to their peers.

A second and equally important part of that the students can play is that of moderation of resources. In one instance recently, a resource indicated that a "modern computer that would support multimedia was a 486 with a large 20MB Hard Drive!". Clearly, the ability to indicate that this information is in dire need of updating becomes

important to maintain the credibility of the whole resource. Hence the ability to add "annotations" directly to the offending resource is desirable.

### 3. A database solution

Davidson, C. & Voss, P[1] further discuss that the "obvious ways that information technologies can support knowledge management is through the creation of a database to store explicit knowledge." and goes further and indicates that "done well, such databases can pay big returns".

As indicated in the introduction, with a static web site of in excess of 4,000 pages, a database approach was considered, and a prototype developed. In the first instance the ability to replace the static pages was required. The concept of a small logical piece of knowledge evolved. In some systems (for example, Hyperskript) this is known as a fragment but to enable a progressive definition, the term **snippet** has been coined. The second phase of the prototype was to add the ability to add new snippets and add annotations to the snippets.

Once information became available in the prototype database, retrieval becomes an issue. In an education setting, the way data is displayed and retrieved is an issue. The ability to incorporate pedagogical concepts such as scaffolding and Environmental Space Control [2], and others is being explored. Design issues such as cognitive loading will need to be explored, and the possibility of providing an adaptive interface. This needs to be generalised to other settings to determine if the same systems can be adapted to a different environment.

### 4. Web based collaboration of Knowledge capture

Once the knowledge was stored and organised in a database, the issue of multiple users needs to be explored. The initial prototype was developed in MS-Access so web development was undertaken using Microsoft's Active Server Pages.

### 5. Education applications

To test the workability of the database solution, a literature review database is currently one of the trials in progress. Issues that this has highlighted are those of knowledge source recognition and copyright. This is both from the creator of the knowledge (using a Dublin Core term rather than author), and any reference that may have been used (such as a journal article). While not attempting to reach the sophistication in applications, such as *end-notes* it has been shown that an efficient collaborative system is possible.

A second trial involves the theory component of an Internet theory and design course.

At this stage the ability for the prototype to perform the same functions as the original static pages has been successfully trialled, and the collaborative features of users adding additional material and annotating current material is being investigated.

### 5.3 Transferability to a non-education setting

As indicated earlier, databases that can capture institutional knowledge (explicit, tacit and the knowledge held by specific individuals but required in their absence, termed missing knowledge) well can pay big returns. Can the meta-data schema developed for the snippet database be generalised into a non-educational setting. To answer this question two areas need to be researched. The first is the current state of knowledge capture in organisations. In order to keep the scope of this research manageable and relevant, it is proposed that focus will be on New Zealand based companies and government. The second is to apply the model developed to a non-educational setting.

## 6. Conclusion

The focus of the proposed research is in knowledge capture at its source. The initial development is set in an educational context and early research indicates that this is both achievable and workable. As knowledge and knowledge capture is important to organisations, the ability to transfer this research to a commercial setting needs to be carried out.

Preliminary feedback of the concept has been positive, with many additional features and considerations such as alternative user interfaces surfacing. The research is still in its formative stages and needs to be clarified further to avoid the scope expanding too far.

### References

- [1] Davidson, C. & Voss, P. (2002) Knowledge Management. An introduction to creating competitive advantage from intellectual capital, Tandem Press. <http://www.tandempress.co.nz>. ISBN 1-877178-94-2
- [2] Akiihiro Kashihara, Kinshuk, Reinhard Oppermann, Rossen Rashev and Helmut Simm (2000) A Cognitive Load Reduction Approach to Exploratory Learning and Its Application to an Interactive Simulation-based Learning System. Journal of Educational Multimedia and Hypermedia, 9(3), 253-276, (ISSN 1055-8896)