Knowledge management for new times with new technologies to promote new learning: a futures approach to self- managed learning

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Historically, the term knowledge management has been related to the field of business where industry has grappled with the need to manage knowledge at various levels in ways that enable access, transfer and growth. The reconceptualisation of knowledge as a commodity has resulted in a global environment where knowledge economies market the intellectual capital of their workforce. Governments recognise the potential of such markets and in the political arena, the process of developing and managing consumable knowledge is supported in government policy and initiatives designed to promote knowledge production. More recently, educational institutions have come into play as a training ground for preparing a workforce equipped in ways of thinking that will generate innovation and creative solutions. A major factor in this commodification of knowledge is the role technology has played in providing instant access to and dissemination of information. Further, information communication technologies (ICTs) are viewed as tools for creating knowledge as individuals, communities and organisations connect, interact, explore and problem solve together. Consequently, education systems have promoted ICTs as an answer to facilitating learning that is creative and complex and produces new knowledge that is innovative, transformative and transferable. Research reported in this paper examines ways ICTs have been applied across a range of learning contexts to support a self-improving community of learners as they collaboratively manage their own knowledge development.

Key words: Technology, Information communication technology, Knowledge management, on line learning, virtual learning communities

Introduction

Knowledge management has emerged as a key factor in contributing to the success of business corporations where efficiencies in managing information systems and organisational knowledge may impact on financial outcomes. Its impact is evident in the proliferation of companies whose core business is knowledge management and the number of internet sites that target the market as illustrated in a 'Google' internet search resulting in 42,100,000 finds of the term (retrieved 28 March, 2005). Blackler (1995) described this phenomenon as a new era in the role knowledge plays in wealth creation, where knowledge is being applied to knowledge itself to increase productivity.

Many corporations and institutions are coming to terms with the concept that knowledge is a commodity that needs to be managed, and more importantly, the management should be a process that is enabling for all members of the community.

Blackler (1995) defined knowledge that is embedded in cultural systems and related to the process of achieving shared understanding as *encultured knowledge*. Encultured knowledge is socially constructed, negotiated and language oriented. Johnston (1998) summarised Blackler's knowledge categorisation as epistemologically-sourced and believed such classifications are "becoming quite sophisticated, and hold considerable promise in supporting the development of improved models of knowledge strategy and management within organisations" (p.14). A focus of this paper is the development of encultured knowledge as a factor in advancing learning.

Background

The context for the research reported in this paper is Queensland Australia where initiatives at the Federal and State level have resulted in the foregrounding of knowledge management as a way forward in reforming workplace practices to capitalise on developing new ways of thinking and new ways of doing. Within this context, the education sector is a site of reform where technology is viewed as a vehicle for managing change and supporting new approaches to learning.

The new millennium was a critical event for many governments and corporations to review

their role in meeting the social, economic, cultural and intellectual needs of an expanding world moving into a new century. In Australia a review of the changing nature and forms of knowledge funded by Department of Employment, Education, Training and Youth Affairs linked the economic competitiveness of a nation, together with its ability to meet social and cultural objectives with the strength of its knowledge infrastructure and the strength of the connections between its various components (Johnston, 1998:20). The publication of a discussion paper *New Knowledge, New Opportunities* (Kemp. 1999a) argued "Australia's capacity to generate new knowledge is fundamental to the strength and health of our society. It must underpin our economic growth and our capacity to effectively solve social problems" (p. 63).

Queensland adopted a 'Smart State' response to federal policy targeting reform in the education sector through use of information communication technologies (ICTs) as one strategy to prepare students for present and future technologically oriented worlds and workplaces (See Education Queensland, Queensland State Education - 2010, 1999; Queensland the Smart State – Education and Training Reforms for the Future, 2002).

Tertiary teaching, learning and technology

The impact of the education reform agenda in tertiary institutions was noted by Gibbons, Limoges, Nowotony, Schwartzman, Scott, and Trow (1994:86) who reported "universities are no longer the remote source and wellspring of invention and creativity but are part of the problem-solving, problem identification and strategic brokering that characterise knowledge industries".

Consequently, Australian universities have invested a substantial percentage of their budget as they have strategically reformed administration systems, program and course delivery and communication technologies using interactive software platforms that integrate the management of knowledge and facilitate learning opportunities.

In education faculties, where teacher preparation traditionally has been based on the use of text-based resources and a transmission model of learning, a new approach to teaching and learning has emerged. The technologising of tertiary teaching is now standard practice across all programs in Australian universities, where web-based learning sytems (WBL), initially reserved for distanced education or international students have been adopted as an integral part of course delivery. Blackboard, WebCT TopClass and CourseInfo are systems currently used in Australia (Housego & Freeman, 2000).

Education faculties have attempted to address new ways of learning by adopting more constructivist approaches to teaching, however the integration of ICTs in supporting this approach is inconsistent and uncertain. Academics have been given minimal support in ways new technologies may work for them in their effort to deliver quality learning experiences to their students. Furthermore, research reporting the effects of technology on student learning in a tertiary context identified conflicting outcomes (DEETYA, 1998) and there is a need for evidence identifying what works, what doesn't and why (Fletcher, 2002). Importantly, systematic evaluation of information communication technologies is an infrequent practice when practitioners incorporate ICTs into their curriculum (Oliver, 2000). Vitale and Johnston (1997) raised concerns about the indiscriminate use of technology without more systematic evaluation to determine technology driven outcomes.

The Griffith experience
In Queensland, Griffith University currently is undergoing a period of review and has initiated a range of policies designed to enhance the learning experiences of students. An outcome of the Griffith Project (2002) is the Strategic Plan 2003-2007, which highlights the qualities of a Griffith Graduate as someone who "will be known for their expertise and ability to apply their multi-disciplinary knowledge and skills in innovative ways to novel problems". The need to develop graduates as life-long learners is also an essential attribute for students if they are to manage their own learning in new times where the only constant is change. [See Teaching and Learning at Griffith, available www.griffith.edu.au]. One strategy aimed in achieving this is the application of technology in course delivery:

Our investment in flexible learning ensures the broadest possible array of program offerings on each site and contributes to a more

comprehensive learning experience for students. The University will continue to review its flexible learning approaches to ensure the most productive use of technology for student-centred learning. (Griffith University Strategic Plan, 2003:6)

Griffith uses Blackboard as the interface for implementing such a strategy and this has been a learning experience for all academic staff that has resulted in varying degrees of success for both staff and students. In 2001, I was convenor of a new course to be developed and delivered using Blackboard, and was responsible for managing the site with minimal understanding of its features and potential as a learning tool. There was no professional development provided and while academics worked with educational web designers in developing course web material, my own experience was limited and provided little understanding about the impact design, content and technology might have in facilitating or impeding learning.

Consequently, this lack of understanding provided the impetus for research and the integration of technology in course delivery became a focus of study reported in this paper. Its genesis was the result of a pilot study conducted in 2001 where links between assessment processes and learning outcomes were examined in the new third year English curriculum course. Quantitative results suggested there was a relationship between learning and two assessment items. However the addition of a forum for discussing the assessment items emerged as a site for further research, as students appeared to move from procedural postings based on discussions on how to reference and how many words to higher-level inquiry dialogue. Research reported here is based on data collected over a period of three years from 2002.

Method
This paper is a synthesis of research undertaken during this period of reform where formative and summative evaluation methods have been systematically applied in an attempt to measure the effectiveness of ICTs in advancing learning within and across undergraduate courses. The site of the study was in an education faculty where a new course had been introduced to the primary education degree program in 2001. Research methods involved a case study design applying an embedded design using several units of analysis (Yin 2003). The case was an English

education curriculum course. Each unit within the case focused on the use of technology as a tool for learning over a three-semester period, from 2002 to 2004. Sub units were selected from Blackboard components and based on their potential to influence learning outcomes. They were categorised as design, content, noticeboard, forum and resource folder were five components. Lectures were included as a sixth area for evaluation as Griffith had upgraded lecture theatres with sophisticated technology for the delivery of content.

Action research methods (Zuber-Skerritt, 2002) underpinned the design and were applied within and across units to systematically evaluate, review and respond to data. Thus action research methods provided a systematic and rigorous evaluative role where the learning process, interactions and documented outcomes were analysed across each unit in an effort to understand if and how the technological medium used in course delivery facilitated self-managed learning.

Results reported here are based on a longitudinal tracking of one course over a three-year period with a total enrolment of over 600 students. Data were collected using interviews, surveys, observation and on-line interactions of students as they participated in the course over a semester. These data informed the action research process of "review, reflection, rethinking and reinterpretation of taken-for-granted knowledge" (National Staff Development Committee, 1995, p.2) that contributed to an evolving understanding of the impact technology had on student learning and ways to improve outcomes. This iterative process of analysis enabled changes to made to the way the technology was managed

Results

Results collated in the 2002 case unit indicated positive responses to the six sub units with content featuring as the most positive aspect for students and the forum as the least positive (See table 1). Student interactions in forum discussions were limited and results showed over 60% of the group were lurkers who read postings but remained non-participatory in the dialogue. However, generally lurkers monitored the discussion and valued the information provided. As one student observed, "*I found answers to all*

my questions on the forum so I didn't need to say anything – it was all up there."

A second area for consideration was the sub unit resource folder where student responses indicated this was a feature that needed to be reviewed in terms of its contribution to learning.

A third area for review was the role lectures played in supporting student learning. These areas reflected my own inexperience in delivery course content in a technological medium and instigated a review of my taken for granted knowledge about my role as a teacher in a technologically advanced web based learning environment. Action research processes guided me in the reflection process where I analysed student responses and my own observations of their use of this feature.

Managing change through action
These results informed my thinking about the management of knowledge in this course. It was apparent that a view of knowledge acquisition through learning about content was evident in students' evaluations and this was confirmed in interview data where students linked learning to assessment that was grounded in declarative knowledge. I critically reflected on my own theories of learning, reviewed the literature on WBL and used the 2002 results to guide actions for 2003 that would incorporate Blackler's (1995) view of encultured knowledge as socially constructed, negotiated and language oriented.

While the course structure remained the same, course delivery was recast in terms of knowledge management principles, where structures were redesigned to facilitate self-managed learning. The guiding principle was supporting encultured learning that was epistemologically- sourced in a range of learning contexts around the WBL environment. These contexts directed students from face–to-face interactions to a place for online access of resource material to a space where forum discussion was dialogic in enhancing socially-constructed understandings. Students negotiated areas for research, constructed their knowledge collaboratively through on-line discussion, led tutorial sessions and participated in on line conversations about new understandings that were applied to new ways of doing. Lectures were transformed from delivery of content to exploring stimulus materials that required students to make sense of the issues raised through tutorial conversations

and forum discussions. All learning contexts related to each other in explicit ways, directing students across learning pathways that were complementary and integrative.

The resource folder became a repository for material that was linked to discussion in the forum or stimulus material in the lectures. Content was learner-centered and determined by careful monitoring of conversations in the forum.

Lectures were placed in the resources folder and notices on the Noticeboard would alert students to complementary information posed on the forum. Forum interactions were closely monitored with input from course convenor designed to stimulate discussion and raise issues rather than provide answers.

Results of these changes were reflected in 2003 data where there were significant positive changes across all sub units.

Table 1: Comparative evaluation of website over three years: How effective were the following in developing your learning in this course?

	2002	2003	2004
Design	93.5	95	95
Content	94	97	95
Noticeboard	90	97	95
Forum	78	88	78
Resource folder	88	100	100
Lectures	84	93	95

Students began to manage their own learning as they raised questions, responded to each other's queries and shared resource material. Unresolved issues became opportunities for continued conversations in tutorial discussions or were addressed in the lecture where possible solutions were identified, stimulating further inquiry by the students. Students determined the focus of discussion and developed new threads in the forum. For example Jade's posting initiated discussion about professional practice experiences facilitating the development school-based encultured knowledge:

I thought it might be beneficial to have a discussion on how our pracs are going...I know that I enjoy talking about what's going on and the like. So if anyone's interested make a posting and we can discuss that good, bad and ugly of our prac experiences!!

Well I'll go first then hey??? My first day was great...i have a wonderful supervising teacher who is only 3rd year out and really understands what we are going through. She had so much organised for me...timetables, unit plans...just everything you need!! My class on the other hand are a different story…… (Jade: Thu Dec 11 2003 3:37 pm Read 79 times)

Participation in forum discussion remained active when the course delivery was completed and all students were undertaking field studies in schools. There had developed a sense of community in the discussions where collaborative inquiry developed encultured learning that was self-managed by the students. The reciprocity of interactions through the forum talk resulted in knowledge building that was process oriented rather than content based. Students sought to understand and through their shared understandings, test out work related practices with each other. The monitoring of talk by the convenor remained important in alerting students to alternative materials and information and scaffolding and encouraging new ways of thinking.

The 2003 data supported the actions taken in response to the 2002 analysis. The action research methods had focused the course delivery in ways that connected theoretical orientations for the course with learning approaches that transformed learning practice. Cumulative experience for teaching staff enabled members to refine their own practice in an attempt 'to practice what we preach" (Fletcher & Bryer, 2000).

In response to the 2003 results, minor refinements were made to the course for the 2004 semester and results appear to have stabilised and remain very positive. However, due to personal circumstances, I was limited in my ability to monitor and participate in forum discussions. This is reflected in a return to the 2002 evaluation of the forum and signifies the importance of responsive monitoring as a strategy in supporting students as they construct encultured knowledge.

Across the three years, summative data were collected to establish student perceptions of the effectiveness of the course in preparing them to be teachers of English. Results in table 2 mirror the trend reported in table 1 with a positive change from 2002 to 2004.

Table 2: Summative evaluation of course in preparing students for work.

	2002	2003	2004
How effective was this course in contributing to your preparation as a teacher of English?	81%	97%	95%
How effective was this course in developing your understanding of teaching English	85%	86%	90%

Implications
If universities are to be the training ground for an innovative creative thinking workforce, learning systems need to adopt a futures orientation in educating for life, and there needs to be a shift from content knowledge to an emphasis on process that supports self-managed learning approaches. Information communication technologies offer learning opportunities that promote ways of knowing that are collaborative, negotiated and socially constructed. However the role of formative and summative evaluation is critical if the potential of WBL environments are to maximised.

Results reported in this study synthesise findings that have been developed over three years. An outcome of this is a knowledge management strategy for new times with new technologies that will promote new learning. This strategy is based on the following recursive actions that are the result of an action research process designed to react to data through critical reflection and review. It is a not a linear step-by-step strategy but a recursive, self-informing process that is dynamic and evolving.

A strategy for knowledge management
Explicate and Reconcile beliefs and practice. The alignment of theorised beliefs about learning and what constitutes knowledge is a critical factor in determining changes in practice.

Evaluate practice in terms of learning outcomes. Changed practice does not necessarily mean improved learning. Formative and summative evaluation provides indicators of success or areas to be addressed.

Responsive monitoring for managing change. Responsive monitoring is action oriented and is a just-in-time strategy that may prevent or alleviate developing problems.

Adaptive practice. Practices need to be flexible and adaptable in new times to capture learning opportunities that emerge in the evaluation and monitoring process.

Manage the space: Face-to face or place in space. Emerging technologies offer a range of mediums for encultured learning that need to be managed in ways that reconcile beliefs and practices. The strategy is to manage a space where shared understandings can be clarified and challenged in ways that create new knowledge. The space should be enabling for participants to negotiate learning as an inquiry into process that will result in a product- knowledge.

 Critically reflect. Knowledge management is a process that should result in a measurable product. Critical reflection on the how and why of learning guides actions so practices are refined in ways that facilitate a process designed to produce an outcome.

For me the outcome in applying this strategy to my work as an educator is an ongoing effort to reconcile my beliefs with the practices I adapt to manage the development of encultured for my students.

Conclusion
New times demand new ways of learning that will promote new ways of doing. Knowledge management has emerged as a key factor in supporting innovation in learning with technology viewed as a medium to promote shared understandings through collaboration and negotiation. However, the critical factor that determines success in this venture is strategic self-management where an alignment between beliefs and practices that is responsive to evaluation and critical reflection should produce measurable outcomes.

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