

***DYNAMIC AFFORDANCE OF GENERATIVE
KNOWLEDGE CONSTRUCTION IN BUSINESS
SCHOOL E-LEARNING PROVISION***

Theme: The Social Processes of OL and KM

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Abstract

Universities have experienced many pressures recently and one response has been to consider utilising e-learning. In lecturers' training, the knowledge gained is not necessarily used to change teaching practice for the better nor is the new knowledge gained subsequently diffused across the faculty. Knowledge construction processes are therefore important during and after e-learning training courses to enable both continuous reflection on improving participants' practice and also to enable institutional transformative educational practices. A case study approach is taken to consider what antecedent conditions might need to exist to enable generative knowledge construction across a faculty to be feasible in practice.

Introduction

The UK university sector has experienced many pressures recently, including an increase in student demand for lifelong learning. One response has been to consider the use of *e-learning* defined here as a set of learning activities that can be undertaken by individuals, groups and knowledge communities, drawing upon information and interactive learning materials provided via accessible electronic communications media to enable the application, construction and diffusion of knowledge in the learning process (Tansley and Hussey, 2001). In spite of an increase in the availability, functionality and adaptability of computing and information technologies (C&IT) generally, there has been slow diffusion of e-learning provision in higher education. One reason for this could be that lecturers' skills and knowledge in the use of C&IT are often limited. Training courses attempt to address limitation but knowledge gained is not necessarily used to change teaching practice for the better nor is the new knowledge gained subsequently diffused across the faculty, and so not acting as a trigger for both positive changes to teaching practice or for promoting organisation-wide change. We argue that one important institutional aim should be to focus on *knowledge construction* during and after training courses to enable both lecturers' continuous reflection on improving their practice and, if it exists, to enable institutional transformative educational practices.

In this paper we explore the heuristic potential of taking a knowledge construction approach to embedding e-learning provision within a business school faculty by considering the notions of mechanistic pooling (Knights and Willmott 1997) and generative (Cook and Brown 1999) knowledge construction (Newell et al. 2003). We then examine a particular internal staff development course in e-learning in a UK business school in order to consider the ways in which knowledge was constructed and its subsequent impact on participants' activities. Finally, we consider what antecedent conditions might need to exist to enable generative knowledge construction to be feasible in practice.

The university sector and e learning

In response to the changing external demands of a variety of stakeholders (Kerr 1963; Green 2000; Lars and van Baalen 2002), many university faculties are developing entrepreneurial approaches to learning and teaching, despite resource constraints, including the use of e-learning. There are three distinct applications of e-learning: automating, blending and transforming. In automating, the focus is on the development of web pages for content delivery of materials previously delivered in face-to-face lectures. The objective here is individual learning, but featuring minimal tutor interaction and little collaboration with other learners. Blending is much more learner-centered, uses a supported online learning approach, involves an activity-focus, using small group learning, and encourages significant interaction with other learners. Finally, transforming is group-centred, and focuses on organisational learning. Here e-learning is used to support multi-way interactions among learners and may even involve learners acting as tutors. In other words, the three approaches differ in the extent to which they support interaction between the student and others – both other students and tutors. Overall, Reynolds suggests that 'the most significant issues for trainers are the teaching methods embedded in the training, since these link directly to learning outcomes' (Reynolds 2002). The crucial point here is that e-learning initiatives, instituted in a particular context, can be used to automate, blend or transform teaching provision. It can be argued that transforming is the most strategically useful choice, given external pressures such as increased

competition from a range of other providers, demands from students and changes in the focus of public funding for innovative teaching practices.

A number of constraints can be said to exist to transforming. These include the lack of faculty e-learning strategy (integrated with corporate strategies and combining both technical and pedagogic features), a lack of clarity about what constitutes e-learning and little knowledge of how to utilise it in teaching practice. It is this last aspect that is being addressed in this paper.

theoretical argument

Lecturers' practice involves a myriad of duties requiring particular knowledge and competencies: designing courses, administering them, teaching students, assessing and giving feedback. Knowing how to act within a domain of action is learning to make competent use of the categories and distinctions that constitute that domain (Wenger and Snyder, 2000). This means that lecturers are constantly engaged in developing both the knowledge of their own discipline and the requirements of knowing how to interact with students to communicate this knowledge. When they are encouraged (or required) to consider using e-learning technologies they are essentially being asked to change their own pedagogic practice. Yet it is likely that few have either the knowledge, or ways of knowing how to do this. It therefore follows that attempts to incorporate e-learning faculty-wide are therefore likely to be ignored or resisted, as individuals will not only not be ready to gain and utilise new knowledge to reflect on changes to their own practices, but they are then unlikely to be able or want to share underdeveloped skills and knowledge in using e learning with others. This is why the considered design of appropriate staff development courses is so vital. To examine what these considerations need to be, we develop Knights and Willmott's (1997) notion of *mechanistic pooling*.

Mechanistic pooling or generative knowledge construction?

Mechanistic pooling (Knights and Willmott 1997; Newell et al. 2003) in the staff development context occurs when each person works independently on a set of clearly defined learning tasks or processes whilst on a course. Following the course, the new knowledge gained is utilised to change teaching practice for the better, either for the individual or as part of any faculty-wide transformational change. So e-learning technologies, if used at all, will only be used simply to deliver the same teaching content using a medium more related to automating than blending or of a transforming. Given our position that e-learning training courses can usefully be seen as mechanisms that can support transformational change in teaching provision, we argue that what should be focused upon when designing such training courses and subsequent activities is what we term *generative knowledge construction*. This essentially involves the social construction of knowledge in action, both during, and certainly after, a teaching and learning on line (TALO) course, in which participants from diverse backgrounds (Grant 1996; Hitt et al. 1999) are encouraged to engage in joint knowledge production through the combination and exchange of knowledge (Nahapiet and Ghoshal 1998) about current teaching practices, so that new and novel ways of doing things using e-learning technologies are identified that could not have been predetermined by individuals (Cook and Brown 1999). Generative knowledge construction involves a process in which organisational members negotiate, achieve and refine a shared understanding through interaction, sense-making and collective learning (Ayas and Zeniuk, 2001, Boland and Tenkasi, 1995) and this provides the basis for creativity. Such creative, generative knowledge construction is much more likely to lead to the kinds of radical IT-led change that many

universities are looking for but are currently not succeeding in achieving (<http://jobs.guardian.co.uk/rise/story/0> 2003).

What is required to enable generative knowledge construction?

'Dynamic affordance' is a term used to describe 'what becomes possible when knowledge is used as a tool in the context of situated activity' (Cook and Brown, 1999, p392). The term means the material, design or situational affordances that emerge as part of the (dynamic) interaction with the world (Cook and Brown, 1991, p389). So the design of an e-learning staff development programme 'dynamically affords' the acquisition of the knowledge needed to help participants learn how to decide what e-learning technologies, if any, to use in their programmes. However, careful consideration needs to be given to the dynamic affordances that are put into place to ensure generative knowledge construction takes place after such knowledge has been gained.

In this paper we are exploring how knowledge gained in an e-learning staff development programme for lecturers might be not only be utilised in one particular activity and one time, but developed so that knowledge gained can then be applied into other situated activities. We do this by taking a social constructionist perspective, where lecturers are presented as relationally constructing both technological and pedagogical knowledge and therefore learning how to subsequently incorporate e-learning technologies into both their daily teaching practices and their organisation-wide activities. These processes involve complex social interactions and an 'interplay of time, objectives, given institutional frameworks, individual preferences and choice processes' (Büchel 2001). Through this organisational learning can occur, which is also about ensuring learning accumulates over time within an organisation (Swan and Newell 1994).

Research methodology

The main research method chosen here was action research which 'involves opportunistic planned interventions in real time situations and a study of those interventions as they occur, which in turn informs those interventions' (Coglan, 2001, p49). Tansley was part of the course design team of a teaching and learning on line (TALO) internally run course in a UK business school. She also acted as a participant observer whilst a member of the tutoring team who conducted the teaching process, recorded comments from two focus groups at the end of the course and conducted a one hour interview with 'John' (see the case study). Sacks was a course member and subsequently undertook telephone interviews following the course. The design of the course encouraged participants to reflect by posting a paragraph to the Web Board at various stages of the course. So feedback was gathered on an individual and group basis by different modes.

Case study – The Business School (TBS)

TBS and E-learning staff development

The UK Business School in this study is the largest and most complex of the University's faculties in terms of student numbers and course provision, with a portfolio of over 50 courses, over 2700 undergraduate students and some 1700 students on postgraduate and professional courses. A number of UK and overseas franchise operations are also supported. There are four departments, (Strategic Management and Marketing, HRM, Accounting & Finance and Business Information Systems), populated with staff of different disciplines, lecturing interests, work portfolios,

employment contracts and network contacts. Senior management encourage staff to have a flexible orientation to work. Here, autonomy is key, relationships between management and lecturing staff neither dominate nor subordinate, but autonomous individuals and groups exist and pressure of time spent on teaching and other duties does prevent much working socialisation. A number of formal and informal interest groups exist in the school but there is no great a tendency for information to be passed between groups.

Several lecturers managed some impressive incorporation of C&IT into their teaching, despite there being limited technological provision and time release from teaching in the early days. For other School staff, C&IT experience, if any at all, was limited to activities such as the use of Microsoft PowerPoint software to create slides. A minority were resistant to using C&IT in their teaching, suggesting it could lead to the simplification/deskilling of the lecturer role, a less than exciting experience for the student and the maximisation of managerial control over the lecturer labour process. A large and effective technician team provided an excellent hardware and software support service to all groups. Training in basic C&IT skills on particular packages is provided by the central university IT training team. However, staff in TBS also provided training in specific areas of interest, such as specialist business software. In July 2000 a major staff development initiative was launched for teaching and learning on line (TALO). The design team consisted of lecturers and, equally importantly, the e-learning coordinator and technologists.

The idea was that lecturers would become students themselves by learning on-line about e-learning curriculum design processes. The TALO course offered the promise not only of lecturers working across organisational and disciplinary boundaries, but also provided the opportunity of developing core competencies in the design and delivery of on-line university courses tailored to current and specific needs in both undergraduate and postgraduate provision. Built into the course was the requirement that participants must join with a particular e-learning project in mind and, following the application of their learning from the course, commit to reflect upon subsequent learning outcomes and promise to share the knowledge gained with colleagues via any medium (staff development workshop, journal article etc.) It was envisaged that what could also emerge from this course, if managed appropriately by a small, committed 'teaching' team, was the creation of a number of cross-boundary, cross-disciplinary 'communities of practice' (Wenger and Snyder, 2000) which reflected overall organisational interests and projects.

The content of the TALO course

The ten course members (with representation from each of the 4 departments, a mix of full and part-time staff TBS's information officer from the library information service) were required to join TALO with a particular e-learning project in mind and spend at least 3 hours per week for ten weeks studying on and off line. Delivery methods included web pages, a WebBoard discussion area and some use of desk-top video-conferencing web cams for discussion. Structured activities included training in specific software, analysis and group discussion of hyperlinked academic journal articles and critical analysis of 'proofs of concept' (i.e. examples of web technologies used in teaching practice) as well as more dynamically interactive exercises such as synchronous chat room discussions with local 'in-house' experts who had experience as on-line Open University tutors. Provision of an area on the web board for participants to reflect on their feelings of being both an on-line learner and an e-moderator was cited as being particularly useful. By the end of week six, before the individual project development work started, reflections included:

I came to the course with an open mind and willingness to learn. I have enjoyed the course and got a lot out of it. It has made me start to get into things and think about how I might introduce on-line learning It all still seems quite daunting but I think I can make a start now which I could not have done before.....

I am comforted by the fact that the technology is relatively easy to grasp and this in itself is not likely to be a big barrier... On line learning and teaching is an exciting possibility and will become more usable as technology continues to improve. At the moment learning at a distance needs other mechanisms as well to support it... One of the best things I found about TALO is the opportunity to reflect.

So far I have enjoyed TALO Although I have some experience in on line teaching, much of my thought and focus has been around learning materials, rather than structure and pedagogy. ... TALO has taken up quite a time commitment, and the deadlines and tasks are a bit onerous (or maybe just the challenge we need to get things done.)I have ideas to take things forward, but question why I want to do them. Is it for my benefit or the students' benefit, as at the minute my development thoughts are all on full time courses.

The final requirement was that the last three weeks were to be spent on individual projects considering the feasibility of utilising elearning in teaching practice. At this point the participants worked alone, with the support of the e-learning co-ordinator rather than in-group activities. At this stage participants began to re-focus on their daily teaching tasks and none produced project plans or developed their projects after the course. Several had had 'grand plans' which did not manifest themselves in action. One ('John') had planned to embed e-learning technologies into two modules in a part time business studies degree course but did not do so. Here is his story.

John's story

John had always been interested in technology, both as a self-organising tool (he has used a Psion hand-held organiser for years 'I wouldn't be without it') and he has become increasingly interested in using it in teaching. He joined TALO to increase his knowledge. He was particularly interested

in using web-based technologies as a replacement for part-time business study degree students attending lectures and seminars on site. So, he learned when and what he needed to learn.

More than a year after doing the TALO course, John had not undertaken his original plan to embed e-learning into two modules on his teaching programme because *along with the majority at the moment I'm stepping around opportunities to carry on doing what we're doing because pressure is to maintain that*. From TALO he had decided that e-learning technology can be 'over-hyped' and is not always robust enough, which can impact on student accessibility. This made him reject for the time being the use of e-learning in his course. Two years after the TALO course, John took over the management of a postgraduate management studies course that was being re-designed. He joined near the end of the re-design process so there was little room for him to develop innovative teaching methods nor embed e-learning. He was also concerned that he could not introduce major e learning initiatives at that stage of the course because of timing and cost, *there's... a stage of development problem, isn't there? In that for us to use some of the equipment then the development and training time billed as individuals is quite expensive*. He was also concerned that colleagues might resist the introduction of e learning, *there are a number of our colleagues who would not... buy into computers simply because it meant them going through a learning process, learning new skills*. With regard to his own learning from TALO, John said he gained *an awareness.. of how technology potentially can come together, but I also think what's important was an awareness of its current limitations, and I don't mean it in a negative way because it enables you to construct positive opportunity. So, in other words, rather than reach too far and fail, then it creates an environment wherein you can decide how technology can be used usefully, at its current level of development*. He also commented that *I don't think anything on TALO was wasted because it sits there in the back of my mind, whether you're designing new things or redesigning stuff that you've already got, you're still looking for the potential to use elements of that*.

TALO course members' reflections

At a focus group and in face-to-face or telephone interviews, eight participants shared their reflections about the course. They found that experiencing being an on-line student and being encouraged to reflect on pedagogy and read journal articles in this area was valuable and enjoyable at the time they were doing the course. They had gained a clear idea of what was involved in e-learning and what was and was not technically and pedagogically possible. Because it had been very difficult for staff to find time to participate in a course of this nature for a period of 10 weeks but for the first 6 weeks (which consisted of group activities) most staff were very actively involved, it was suggested that the course team be less ambitious about course content. The final three weeks where participants had to produce their project report was the least popular element of the course and they actually suggested that the course duration should be reduced to 6 weeks and that the project element be dropped. Senior management endorsed the value of the course by providing support for future TALO course development but none of these managers have professed an interest in joining the course, even though most do teach themselves.

Following the course, specific e-learning technologies (web pages, chat sessions, video conferencing, etc.) were either not being used by the participants who had not previously tried them or were not being used in a new way. They had a vague idea that they might use them in new programmes but this tended not to happen. There were several reasons for this. Following the end of the first course the e-learning co-ordinator accepted a job offer at one of the UK's top university's, based on his experience of TALO and other developments. A second member of the

four-person TALO team also left the school for a promotion opportunity in another faculty. Both these changes seriously impacted on the post-course support for TALO members (although the faculty did have strong technician support, with one full time web developer being available). In addition, several course members changed their responsibilities, so the project intentions they had joined the course with were no longer feasible as they spent the next year getting to grips with their new roles and their focus on e-learning was not to the fore.

The first TALO course had been a 'pilot' designed to be largely delivered on-line which encouraged staff to experience being an on-line student, reflect on pedagogy associated with on-line learning and start thinking about personal projects. Other TALO courses for TBS followed, and the current course has been funded by the Centre for Academic Practice and designed as a university-wide initiative to include two staff members from each faculty and using the university virtual learning portal (VLP) as the technology platform. A new e learning technologist was appointed and she energised the consideration of elearning in TBS. Consideration is now being given to devising a faculty elearning strategy more focused on pedagogy rather than the technological orientation previously taken.

Case study analysis

Participants joined this TALO to experience being a student on line and how to suitably utilise C&IT in their teaching. Knowledge that arises as individuals engage in their regular routines and improvise (Orlikowski, 1996) in response to particular situations that are encountered is known as *heuristic knowledge* (Collins 1992). So participants drew upon their current heuristic knowledge, accessed and integrated their dispersed and ambiguous collective understandings of what constitutes e-learning and how they could use it in their work. But none subsequently developed a potential e-learning project, giving time pressures as an 'excuse'. So knowledge can 'perish', as 'John' found, particularly mentioning the short life of a formal e-learning project group of interested parties he had joined and a change in job role where he was not able in the short term to give any consideration to major structural changes in his new course. But the design of the course could also have been a cause, because it was individually focused rather than continuing the encouragement to share knowledge gained with each other. Furthermore, there was no course content encouraging reflection on the future of e-learning across the School and the part they could play in this. If C&IT was used at all after the course, it was simply to deliver the same teaching content. We can conceptualise this by saying a mechanistic pooling of knowledge rather than generative knowledge construction occurred. Mechanistic pooling of knowledge is unlikely to result either in improvements in other courses or encourage transformational change in teaching delivery as it only slightly changes current teaching practices and this on a piecemeal basis.

It is because of such structural conditions that transformational change in the guise of generative knowledge construction is restricted, where communication and exchange within a group or team might evoke novel associations, connections and hunches such that new meanings and insights are generated in situ and afterwards, to the benefit of organisational learning.

Conclusions

Generative knowledge construction is a social process requiring organisational members to negotiate, achieve and refine a shared understanding through interaction, sense-making and

collective learning (Boland and Tenkasi 1995; Ayas and Zeniuk 2001) thus providing a basis for creativity. Such creative, generative knowledge construction is much more likely to lead to the kinds of radical IT-led pedagogic and programme changes that many business schools might find themselves having to embrace. As the case study illustrated, once participants leave a training course, there can be a tendency only for ‘mechanistic pooling’ (Knights & Wilmott, 1997) to occur. Whilst this need not necessarily be a negative outcome (in the case, following the course some participants made an informed choice not to use e-learning technologies so their teaching practices were not changed), there are dangers.

If knowledge is not passed on, even that which promotes a passive or negative stance to the use of e-learning technologies, then there can be no generative knowledge construction. For if such a ‘transformation of knowledge’ (Carlile 2002) does not happen, there will be a danger that knowledge gained on such courses is neither used to change current teaching practice for the better nor shared in a way that enhances *organisational knowledge*, i.e. ‘the set of collective understandings embedded in a firm, which enable it to put its resources to particular uses’ (Tsoukas and Vladimirou 2001). We argue here that because e-learning technologies offer the potential for beneficial transformation of student programmes across a business school, then generative knowledge construction rather than mechanistic pooling should be the strategic goal. But how might those responsible for embedding e-learning into teaching practice usefully construe generative knowledge construction?

Firstly, it needs to be understood that individuals develop both knowledge and ‘ways of knowing’ (Cook and Brown, 1999, p386). The potential for successful action of any person within an organisational context will depend not only on *what* knowledge is gained, but also of knowing *how* to put that knowledge into relational practice, that is, by understanding processes of ‘knowing in action’. Cook and Brown make a particular point of distinguishing tacit knowledge from ‘knowing’. By ‘knowing’ they mean something that is a ‘part of’ both individual and group action and which is ‘dynamic, concrete and relational’. They do not mean something that is ‘used in’ action or something ‘necessary to’ action, but rather ‘knowing’ is about relation: it is about interaction between the knower(s) and the world’ (op. cit. p389). This means that a ‘generative dance’ (Cook and Brown 1999) between knowledge generation and knowing in practice needs to occur.

Secondly, generative knowledge construction can enable the development of organisational knowledge. In the development of e-learning in a university faculty, simply gaining knowledge about the functionality of C&IT will not surface the benefits of such system tools. Rather, the benefits of elearning technologies emerge from participants engaging in ‘knowing in practice’ in planning and undertaking their teaching duties and engaging in social reflective processes (Ayas and Zeniuk 2001). Therefore, generative knowledge construction needs to be considered with regard not only to the structuring and content of the staff development course, but also to subsequent organisational activities. Let us consider some of these using the notion of ‘dynamic affordance’ (Cook and Brown, 1991).

‘Dynamic affordance’ of generative knowledge construction

There are a number of elements that might ‘dynamically afford’ generative knowledge construction processes. Dynamic affordances are ‘the material, design or situational affordances that emerge as part of the (dynamic) interaction with the world’ (Cook and Brown, 1991, p389). For example, it is important to have an e-learning strategy that takes

account of the development of generative knowledge construction in areas of teaching and learning as well as technology and links to related institutional strategies. The structuring of formal and informal groups can be helpful. Formal groups can progress organisational projects of individual interest, and informal groups, such as communities of practice (Wenger and Snyder 2000; Brown and Duguid 2002), where individuals share their knowledge and experience by developing their own intellectual interests and work projects via a knowledge community. Both types of group need the effort and commitment of all staff and a consideration by managers of how to develop the social capital that enables the launch and progress of such communities. Nahapiet and Ghoshal (1998) define social capital as “the sum of actual and potential resources within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through the network” (p.243). Such a unique network would broaden the reach of e-learning developments across the potential staff community.

Human resourcing strategies, policies and practices are also dynamic affordances, particularly staff development interventions. As well as the important provision of training courses on the basics of C&IT usage, cross-departmental (and even cross-faculty) courses to enable lecturers understand the challenges of designing and delivering teaching and learning on line are vital. Great benefit can be gained from multi-disciplinary membership (e.g. economists, accountants and information systems specialists), as long as these courses incorporate social learning activities that focus on individual projects not only through the development of knowledge about the tools, technologies and pedagogic aspects of e-learning but also engaging with issues informing future faculty and institutional practice. As we have seen, this can be difficult because of the ‘specialisation of knowledge in practice’ (Carlile 2002), where lecturers’ knowledge is taken to be localized, embedded and invested within a particular department in a faculty. So consideration also needs to be taken of creating ways in which knowledge may be jointly developed after the course, including building a learning community, since any learning depends on close co-ordination, collaboration and knowledge sharing across the participants as a group. Individuals may not have worked together as a unit before, so the development of the group into a ‘community of practice’ (Brown and Duguid, 1991), where individuals share their knowledge and experience, will require effort and commitment of both participants and tutors.

In order for transformational change to occur through embedding e-learning in the teaching process and generative knowledge construction to occur, those involved (students and tutors) need to dare to do things differently. This might mean looking at themselves with new eyes to understand the potential they have to develop new skills. In this reflective process they might also have to engage self-consciously in forming different perceptions of their identity and locate themselves differently. They also need to be prepared to stop accepting the status quo and develop a thirst for exploration in new ways of teaching. This means conceiving of a different future, possibly imagining new career directions and trajectories. For staff developers this means embedding reflection processes in the course design and for others following the course, to attempt to synthesize the contributions of different specialisms participating in the relational learning experience.

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