Chapter 7

E-Learning and the Transformation of Education for a Knowledge Economy

Betty Collis

Introduction

Major changes are occurring in society in the ways in which we work and interact with each other. Collectively we are experiencing a change to a *knowledge economy*. I will focus on several of the main characteristics of functioning productively in a knowledge economy and give some examples of how these characteristics can relate to transformations in educational processes in the corporate setting, for ongoing professional education, and in higher education. However, for a transformation to take place many changes must occur in the institutions, regulating bodies, and world views of those involved.

Functioning Productively in a Knowledge Economy

The term "knowledge economy" is an evolving phrase without a precise definition. A search of the Internet on 5 February 2005 identified nearly a million hits, many of which are portals with multiple links. The knowledge economy is related to changes in society worldwide, particularly globalization, information/knowledge intensity, and networking and connectivity.[1]

Characteristics of a knowledge economy include: the increased mobility of services, information, and workforce; the need to derive local value from information often in creative ways that go beyond expected performance; the need to work in multidisciplinary and distributed teams; the need to use information technology (IT) for knowledge management, sharing, and creation; the need to update and change ones skills throughout one's lifetime; and the need to "act autonomously and reflectively, joining and functioning in socially heterogeneous groups" (The World Bank Group, 2003, p. 17). "These attributes produce a new type of marketplace and society, one that is rooted in ubiquitous elec-

---

[1] As an example see http://www.skyrme.com/insights/21gke.htm

tronic networks" (Kelly, 1998, p. 2). A concise summary of the skills needed to function productively in a knowledge economy is given by the Ministry of Economic Development in New Zealand:

"Know-why and know-who matters more than know-what

There are different kinds of knowledge that can usefully be distinguished. *Know-what*, or knowledge about facts, is nowadays diminishing in relevance. Know-why is knowledge about the natural world, society, and the human mind. *Know-who* refers to the world of social relations and is knowledge of who knows what and who can do what. Knowing key people is sometimes more important to innovation than knowing scientific principles. *Know-where* and *know-when* are becoming increasingly important in a flexible and dynamic economy."[2]

Personal knowledge management skills as well as a knowledge management infrastructure for the organization or professional body supporting knowledge workers are critical to the learning needed for a knowledge economy.[3] The National Health Service in the UK for example identifies personal knowledge management skills for those in the healthcare professions as including: skills in asking the right questions; searching skills including in defining and identifying the sources of evidence it is appropriate to search for when faced with a particular decision; storing information for effective reuse; and being able to critically appraise the evidence that is obtained.[4]

All of these relate to new approaches to learning in which technology is a constant tool, and from these to a transformed model of education.

Given this societal context, the need for schools, higher education, professional development, and corporate learning to change is obvious. The World Bank (2003) contrasts traditional learning with learning for a knowledge economy as moving away from the teacher and textbook as sources of knowledge towards the teacher as a guide for finding and interpreting real-world information; away from learning being delivered to learners who receive it toward learning by doing and participating as close to the real world as possible; from assessment being based on responding to questions with pre-determined right and wrong answers

---

[2] http://www.med.govt.nz/pbt/infotech/knowledge_economy/knowledge_economy-04.html

[3] See for example, the portal of resources at http://www.sveiby.com/library.html

[4] See http://www.nelh.nhs.uk/ebdm/knowledge_individuals.asp

to assessment being based on competence development as documented by a variety of forms of performance including those that require integrating one's work with the work of others. Developments in higher and professional education as well as corporate learning are gradually occurring that reflect these shifts. Information and communication technologies are necessary tools, but only when used in ways appropriate to the ways people will work and learn in a knowledge economy.

Much of what is currently called e-learning, where a computer system selects learning objects for knowledge transfer, is in fact counterproductive to the development of competencies for a knowledge economy. The following examples show interpretations of e-learning that, in contrast, relate to the competencies needed for functioning productively in a knowledge economy.

Examples from Professional and Higher Education

Corporate: In corporate settings, the benefits of informal learning including with knowledge management tools and resources are well known, but corporate training still tends to operate via traditional models reflecting a knowledge transfer orientation. Much of what is called e-learning in the corporate sector involves providing knowledge transfer through the computer so that the employee does not have to "attend" a classroom session itself oriented around knowledge transfer from the expert to the learners. Such an approach to learning, while speeding up and personalizing the knowledge transfer process, will not lead to the sort of transformation that is called for in a knowledge economy. Instead at Shell International Exploration and Production (Shell EP) an approach to e-learning in which participants in courses make use of the skills and tools of knowledge management and learn from each other related to their actual workplace problems and experiences has emerged in over 70 courses since 2002 (Margaryan, Collis, & Cooke, 2004). Because participants in the courses represent many different backgrounds and experiences, these differences are built upon to improve the process of learning from each other. For example, one course brings together experienced well engineers and geologists who must work on multidisciplinary teams in the workplace in order to identify new sources of oil. While each of the participants needs to update himself in his own discipline, he also needs to work productively with his non-discipline colleagues. Thus the course is organized around a model of participants contributing resources and

sharing experiences via company knowledge management systems and a common course Web environment during the first portion of the course while still remaining in their workplaces, and then when coming together for a one-week face to face session still using the Web environment to support their working in multidisciplinary teams. While in the classroom component they deepen their own discipline knowledge by learning from the contributions made by the others in their discipline to the Web environment. But they also take responsibility for helping their non-discipline teammates to be able to adequately understand and explain different perspectives to the workplace problems. Assessment is based on how efficiently and effectively this knowledge sharing, building and coaching takes place.

The sorts of e-learning involved in Shell EP do not emphasize the use of e-modules oriented around knowledge transfer, although these are available to support the knowledge-building processes. Instead Web technology is used to support the knowledge sharing, knowledge building, and coaching activities of the participants, as well as to integrate the organization and assessment of these activities in an efficient and manageable way accessible to everyone in the course from their own workplaces.

Professional development: The ongoing professional development of practitioners outside of a particular corporate setting is predominately a matter of life-long learning where there may or may not be professional accrediting bodies or societies to steer the learning process. Here the role of *communities of practice* for learning becomes essential. Etienne Wenger describes a community of practice as being "formed by people who engage in a process of collective learning in a shared domain of human endeavour…" where "members engage in joint activities and discussions, help each other, and share information. They build relationships that enable them to learn from each other" (http://www.ewenger.com/theory/index.htm). Thus communities of practice are important to ongoing professional development.

In a review of best practices in 2000 for professional development (Bowskill, Forster, Lally, &McConnell, 2000), the importance of the use of electronic networks for on-going professional development was highlighted. Key strategies include:

- The use of guests or experts from within the communities, for example as guest lecturers interacting with others via the use of online tools. The interactions may be in preparation for a

face-to-face event or may be in response to specific requests for help or support;

- The use of shared archives, such as those from online discussions, from workshops, from knowledge management systems, or from other forms of contributions from the members of the community of practice;

- Mentoring and coaching, supported by online resources and tools.

Figure7.1 E-learning in terms of content and communication with communities of practice representing the intersection of the richest forms of each

Source: Collis & Moonen, 2005.
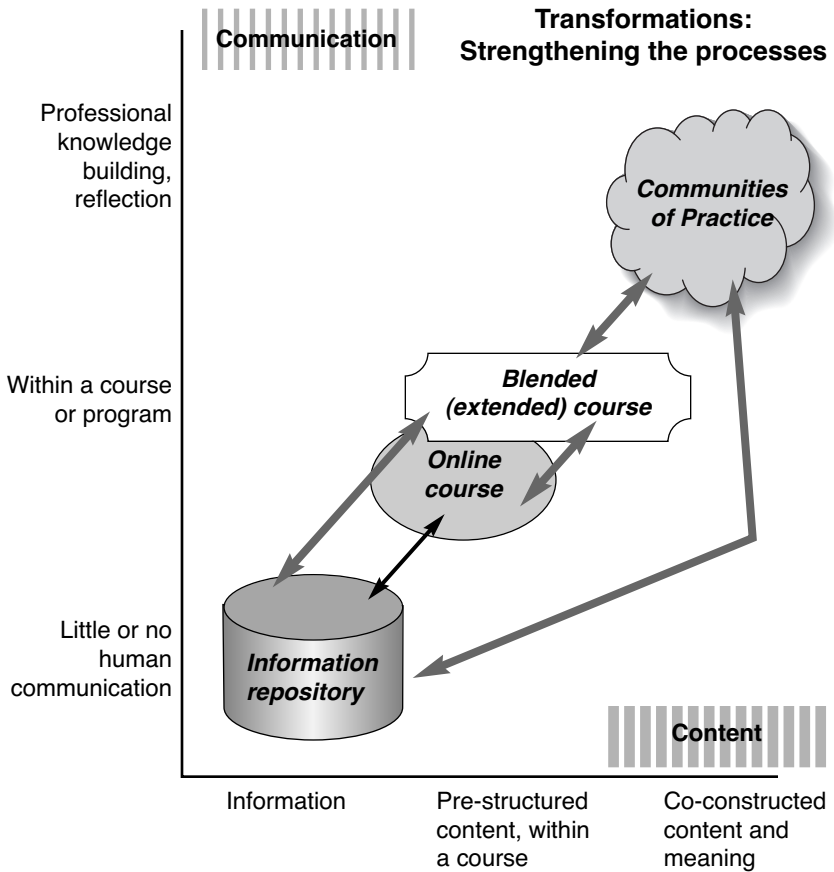
For all of these, network tools provide access to the community over time, distance, and depth. Such communities can also contribute to the learning of others not (yet) active in the community, for example through making their archives available via the Web or an intranet, or by engaging young professionals still in training into some of the dialogues and dynamics of the community. Figure 1 shows how such interlinkages can involve communities of practitioners with practitioners in training and their instructors.

E-learning is here seen in terms of two dimensions: Content and communication. Communities of practice use communication for knowledge sharing and co-construction as the richest form of e-learning.

Higher education: Electronic portfolios are increasingly being used as reflection and assessment tools in higher education5. There are many definitions for a portfolio from before the time of electronic portfolios, such as "a purposeful collection of student work that exhibits the students' efforts, progress and achievement in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection" (Paulson, Paulson, & Meyer, 1991, p.60). An electronic portfolio uses electronic technologies, allowing the portfolio developer to collect and organise portfolio artifacts in many types (audio, video, graphics, text) in a way that is scalable and accessible over time, distance, and modality. An electronic portfolio provides a comprehensive storage medium for the results of individual assessments, accommodating a potential variety in the instruments themselves as well as providing assessment opportunities at different time frames and for different performance indicators, in particular indicators dealing with less-tangible results. There can be a number of different levels of use of electronic portfolios, such: (a) a collection of artifacts, (b) collection of artifacts with reflective statements, (c) the previous with self-assessment, (d) a course-centered portfolio, (e) a program-centered portfolio, (f) a standards-centered portfolio, and (g) a learner-centered portfolio. At the University of Twente in the Master of Science program for Technology in Education and Training, the use of electronic portfolios goes beyond the benefits for the individual student. Students set up their portfolios not only to provide evidence of their own individual growth relating to the competencies of the program, but also develop a portion of the portfolio as a learning resource

for students who will enter the program in subsequent years, helping them to understand what the competencies mean in practice.

For uses of the electronic portfolio that involve accessing the resources in a scalable and convenient way, network tools are needed, thus electronic portfolio use becomes a form of e-learning.

Affordances and Barriers

These examples illustrate how the social and technical developments of the knowledge economy can be applied to different learning settings, within formal courses and programs and for informal professional development. Network technology, particularly including groupware tools and tools for self-expression, provide key affordances. However, there are many potential barriers. For example, for the use of electronic portfolios to make an impact in education, standards and procedures for integrating these as assessed processes and products within courses and accreditation procedures are needed and must be applied in a consistent way for marking and grading. These processes will be new for both instructors and students alike, and can lead to uncertainty, excessive time demands, and disputes relating to grading decisions. From the institutional perspective issues relating to the cost of the electronic tools, the management and monitoring of the network systems involved, and security are issues that must be handled.

More generally, for the instructor or trainer and the learners, new roles and processes must be accepted and managed and for universities, training centres, and accreditation bodies new flexibilities must be introduced. The skills and insights for participating in a variety of knowledge communities over time and distance need to be stressed and assessed as much as (if not more) than the acquisition of knowledge. Fundamentally this may lead to a clash among cultures in an organization. The organisational cultures of the e-learning contexts can be seen as worlds where different values and attitudes can be applied (Boltanski & Thevénot, 1991). The organisation culture is a key variable in the motivation for why a transformation might take place. Boltanski and Thevénot (1991) describe six different cultures within organisational contexts. Table 7.1 shows the characteristics of these different worlds in terms of features which are relevant for the transformation of an educational organization from traditional to knowledge economy orientations.

Table 7.1   Relevant characteristics of the worlds (Strijker, 2004, adapted from Boltanski & Thevénot, 1991)

	Verbs	Value Features
The Industrial World	To organise, to control, to formalise, to standardise	Efficiency, performance
The Domestic World	To behave; to respect traditional roles	Responsibility, convention, hierarchy; rules
The Civic World entities	To debate, to gather, to inform	The group, collective action, collective
The World of Opinion	To convince, to persuade	Reputation, credibility
The Merchant World	To buy, to sell, to negotiate, to deal, to rival, to accumulate	Business; competition, rivalry
The World of Inspiration	To create, to discover, to research	Singularity, innovation, originality

An organization that reflects the Domestic World, as is the case with many higher education institutions, will not be transformed with a model of e-learning that also reflects this world. Instead, the examples relating to the knowledge economy that have been mentioned here are closer to the World of Inspiration. A mismatch of cultures can prevent the realization of e-learning initiatives (Strijker, 2004).

The knowledge sharing communities in large organizations, supported by knowledge management tools and processes and effective coaching and mentoring in the workplace, are the closest current match to the requirements for productive participation in the knowledge economy. In such corporate settings, the need to adapt to the changing business environment is a strong motivator for change and for new models of organizational learning. However, such models of learning oriented around knowledge sharing, management, and co-creation are infrequently seen in higher education. For a transformation of education to occur national policy and accreditation processes and institutional assessment and degree requirements will need to better reflect the societal transformation that is already emerging. And network technologies must be used for "know why," "know who," "know when," and "know where" much more than "know what" in the primary processes of education.

References

Boltanski, L., & Thevénot, L. (1991). *De La justification*, *Les economies de la grandeur*. NRF Essais, Gallimard.

Bowskill, N., Foster, J., Lally, V., & McConnell, D. (2000). Networked professional development: issues for recipients and providers. In Asensio, M., Foster, J., Hodgson, V. & McConnell, D. (Eds.)

Networked Learning 2000: Innovative approaches to lifelong learning and higher education through the internet (pp. 49-56). University of Lancaster, UK. Available via the Internet at

http://www.shef.ac.uk/education/research/RTPLandMc.shtml

Collis, B., & Moonen, J. (2001). *Flexible learning in a digital world: Experiences and expectations*. London: Kogan Page.

Collis, B., & Moonen, J. (2005). Standards and assessment of e-learning. In P. Resta (Ed.). *Teacher development and e-learning* (in press). Paris: UNESCO

Kelly, K. (1998). *New rules for the new economy: 10 radical strategies for a connected world*. New York: Penguin.

Margaryan, A., Collis, B., & Cooke, A. (2004). Activity-based blended learning. *Human Resource Development International*, 7(2), 265-274.

Ministry of Economic Development of New Zealand (2005). *What is the knowledge economy?* Available via the Internet at http://www.med.govt.nz/pbt/infotech/knowledge_economy/knowledge_economy-04.html

Paulson, L., Paulson, P., & Meyer, C. (1991). What makes a portfolio a portfolio?. *Educational Leadership*, 48(5), 60-63.

Strijker, A. (2004). *Reuse of learning objects in context: Human and technical perspectives*. PhD dissertation, Faculty of Behavioural Sciences, University of Twente, The Netherlands. Available via

the Internet at http://130.89.154.170/proefschrift/

The World Bank Group, (2003). *Lifelong learning in the global knowledge economy*. Available via the Internet at http://www1.worldbank.org/education/lifelong_learning/lifelong_learning_GKE.asp