KEEPING AN ANCHOR WATCH: INDUSTRY PARTNERSHIPS A BASIS FOR LEARNING

Catherine McLoughlin
Australian Catholic University, AUSTRALIA
c.mcloughlin@signadou.acu.edu.au

Joe Luca
School of Communications and Multimedia
Edith Cowan University, AUSTRALIA
j.luca@ecu.edu.au

Abstract

During the 1990's Australia has heard the call for graduates equipped with generic skills as a key theme in the development appropriate curriculum and pedagogy. In tertiary contexts, skills and knowledge are often decontextualised and transferable, and work-related skills are not accorded sufficient emphasis in teaching and assessment. The present study is an example of industry involvement on tertiary learning and assessment enhances the student experience and contextualises the curriculum. The context of the study is a project management unit at tertiary level that utilising online learning and self-directed learning pedagogies. The design of the environment is presented within a framework for professional knowledge development and the tasks and forms of engagement that occurred in this empirical study are described. Critical success factors for engagement with industry are discussed.

Keywords

Online delivery, industry partnership, management skills, assessment, peer-learning

Introduction

Recent research on higher education and adult learning recognises that much learning does and should take place in the workplace, and the importance of establishing workplaces as centres of learning is emphasised (Billet, 1996). Many Australian universities now offer workplace units of study for credit. Workplace learning often includes a variety of learning tasks, including opportunities that develop specific skills, transferable skills and personal development (Candy, Crebert & O'Leary, 1994). In the search for learning opportunities a range of partnerships can be created to support student learning. In this paper, particular emphasis is placed on partnerships which will involve educational institutions in developing curricula, learning tasks and forms of assessment that have direct input from practitioners in the field. While universities have a particular role to play in responding to the need for high-level skills because of their independent degree awarding powers, they may not succeed unless they can facilitate the development of innovative programs. The recent Commonwealth Department of Education, Science and Training document *Education at the Crossroads* (2002) emphasises the need for universities to engage with their communities and with industry.

The interest in providing learning opportunities at work has also become more popular among employers with the growing emphasis of the learning organisation (Pedler et al., 1991), promoted through the changing economic climate of the 1990's. The idea is not just that additional learning opportunities will be provided for employees, but that a continuing process of learning will be at the heart of achieving organisational success, and enabling the organisation to achieve its goals. These aspirations are associated with the notion of the

learning society and lifelong learning, and have encouraged change within higher education in a number of ways. Firstly there is greater pressure on the universities to work more closely with employers in contributing to the processes of economic change and development. Secondly, universities are expected to be increasingly flexible in their modes of delivery in meeting the lifelong learning agenda. Thirdly, the role of an increasingly wide range of organisations and agencies in meeting learning needs has been emphasised. This creates a challenge to the role of universities at this important time of change, and the recognition, on their part, of the need for adaptation and change if they are to avoid being marginalised with respect to some of these key areas of development.

Links with industry

Higher education is changing rapidly and many employers and students view the curriculum as prescriptive, narrowly-focused, dated and assessed against irrelevant criteria. Apart from the crisis of confidence in the higher education curriculum, there has been criticism of traditional teaching practices, in particular for their passive, surface approaches to learning whereby students seek to meet the demands of decontextualised and irrelevant assessment systems (Bennett, Dunne & Carre, 2000). The fast pace of change has redefined the kinds of skill need in professional, commercial and professional life, with an emphasis in intellectual and personal transferable skills. Increasingly, there is a shift of thinking about the role of universities and their contribution to the creation of a skilled and educated workforce (Barnett, 1994). In the UK, trends towards new outcomes for graduates have been emphasised in the Dearing report (Dearing report, 1997:1):

> *We see historic boundaries between vocational and academic education breaking down, with increasingly active partnerships between higher education institutions and the worlds of industry, commerce and public service.*

In response to employer expectations and demands, many universities in Australia are now deliberately focussing of the development of generic skills, core competencies or graduate attributes. The key skills included in the mission statements of most universities tend to include higher-level aims relating to critical thinking, inquiry and a capacity for lifelong learning. Generic skills described in the literature for university graduates include:

- skills needed to become a successful and self-sufficient learner. For example, information literacy, metacognitive skills (eg. Candy & Crebert, 1991);
- intellectual and imaginative powers, understanding and judgement, problem solving skills, critical thinking skills and an ability to see relationships (eg. Ramsden, 1992);
- personal and interpersonal skills needed for communication, cooperative and collaborative teamwork, and leadership (eg. Assiter, 1995);
- Skills required for successful work practices including time management, task management leadership and self-evaluation (eg. Collis, 1998; Nicholls, 2000).

Bennet, Dunne & Carre (1999) offer a concise model to conceptualise key skills in the higher education sector by suggesting a framework comprising four broad managerial skills. (See Table 1.) The authors argue that the important key skills are fundamentally those associated with being able to manage self, others, information and tasks. They propose that such a model can be applied “to any discipline, to any course and to the workplace and indeed to any other context” (p.77).

Management of Self	Management of Information
• Manage time effectively • Set objectives, priorities and standards • Take responsibility for own learning • Listen actively with purpose • Use a range of academic skills • Develop and adapt learning strategies • Show intellectual flexibility • Use learning in new or different situations • Plan/work towards long-term goals • Purposefully reflect on own learning • Clarify with criticism constructively • Cope with stress	• Use appropriate sources of information • Use appropriate technologies • Use appropriate media • Handle large amounts of information • Use appropriate language and form • Interpret a variety of information forms • Present information competently • Respond to different purposes/contexts and audiences • Use information critically • Use information in innovative and creative ways
Management of Others	**Management of Task**
• Carry out agreed tasks • Respect the views and values of others • Work productively in a cooperative context • Adapt to the needs of the group • Defend/justify views and actions • Delegate and stand back • Negotiate • Offer constructive criticism • Learn in a collaborative context • Assist/support others in learning	• Identify key features • Conceptualise ideas • Set and maintain priorities • Identify strategic options • Plan/implement a course of action • Organise sub-tasks • Use and develop appropriate strategies • Assess outcomes

Table 1: Generic management competencies

Underlying the current debate about generic competencies and preparation of graduates for the workplace, there is a common concern with the development of cognitive competencies such as problem solving, critical thinking, information literacy and management of information. Given these demands, it is incumbent upon tertiary educators to develop powerful environments which encompass generic skills and lifelong competencies. But, ask Candy & Crebert (1991), "Can the learning that takes place in the cloistered atmosphere of a tertiary institution be realistically transferred into other, more rough and tumble learning contexts"? In this case study we present an example of an environment that fosters transferable skills and competencies (as depicted in Table 1) through the integration of three elements:

- strategic use of Web-based environments, whereby independent learning is fostered;
- partnerships with industry that help create purpose and meaning in learning activities leading to development of self and team management skills;
- peer partnerships, in which learners participate in an online environment where collaboration was encouraged and built into assessment design.

Current research linking technology with professional learning

There is currently a great deal of research being conduced into using technology-based environments to support professional development and lifelong learning (Race, 1998). Web-based instruction may be used to support experiential learning so that the process of learning is integrated with real world experiences. Such contexts enable students to engage with situated perspectives, experience real problems and develop problem-solving strategies. Learning on task enables learners to develop "know how" or procedural knowledge, which is essential in the professions and is characteristic of the cognitive flexibility of lifelong professional learning (Eraut, 1994; Taylor, 1997). For Kolb (1984), the actual experiences people go through become the starting points for learning. Emotion and reflection are also an integral part of the cycle of learning, and reflective processes are intrinsic to learning from experience. In an experiential learning cycle, the learner passes though each of four stages: concrete experience, reflective observation, abstract conceptualisation, and active

experimentation. The cycle begins again with the implementation of new ideas (Figure 1). It is possible to relate the experiential learning cycle to technology applications and technology supported tasks as follows:

- Task engagement: Engaging in a computer supported task or problem through a computer–based simulation or visualization using multimedia (eg., Cox & Brna, 1995);
- Observation and reflection: Analysing the output of the task, or the problem solving approach through discussion, email or conferencing activity (Bonk & Cummings, 1998);
- Formation of an abstract concepts: Building a theory or mental model of task or problem by using software or through engagement with new ideas via communications networks (Collis, 1998);
- Active experimentation: Applying the new knowledge to a novel task or problem, posting a solution to a bulletin board, testing new ideas and perspectives in virtual learning groups (McAteer et al. 1997; McLoughlin, 2002; English & Yazdani, 1999; Klemm & Snell, 1996).

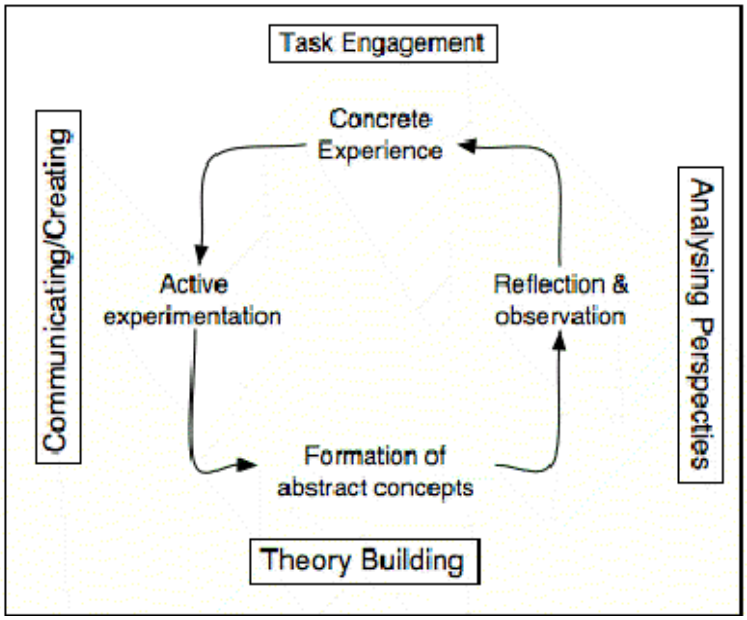

Figure 1: Kolb's experiential learning cycle within a technology supported environment

In the experiential learning cycle, technology acts as a scaffold at each stage of the process, and the entire cycle is learner centered. Figure 1 shows how the experiential learning cycle of Kolb (1984) can be matched to technology supported learning activities that foster cognitive, social and metacognitive competence leading to the management competencies described in Table 1. Other significant developments that link generic competencies with the use of information and communications technologies are Computer Supported Collaborative Learning (CSCL) environments, in which the technology architecture supports groupwork and cooperation, thereby fostering teamwork and communicative skills (McConnell, 2000).

Context of the study

At Edith Cowan University, final year multimedia students are required to complete IMM3330/4330 "Industry Project Development". The aim of the unit is to consolidate core multimedia skills learnt in other units, while at the same making industry contacts and developing a portfolio item to assist with job applications. Students are provided with industry projects made available through the Faculty, or they can negotiate a project of their own, as long as it fulfils the course requirements, that it is team-based, commercial in nature and not trivial. As part of the unit requirements, students are required to perform a needs analysis,

provide a design specification, develop the web site, evaluate it, implement it and produce the required documentation (legal, procedures, metrics, templates and standards).

The unit runs over a fifteen-week semester, with three hours allocated per week for tutorials and lectures. There are no formal face-to-face classes, the unit is largely run online from a Listserv, which provides a rich arena for advice, comments and feedback as there is about one hundred participants subscribed on the List, including industry representatives and ex-students. An additional website provides students with resources, models of previous projects and examples of industry tasks. The Listserv allows students to post questions and ideas and to receive responses from industry experts to guide them in creating suitable web designs and multimedia products. This apprentice-novice partnership was intentionally organised so that participants would be able to receive scaffolding from an industry partner. The constructivist rationale used in structuring the project work and the Listserv activities was that students should benefit from the experiences of peers, industry representatives and academic tutors in an environment that promotes collaboration, negotiation and the exchange of ideas.

Integrated assessment

As part of assessment requirements, students are responsible for making contact with the client and discussing the scope and legal aspects of the development of a multimedia product or website (educational software, IP, etc). In addition, project teams have to work together on creating a product the have to report on progress to other teams, compare project plans and reflect on learning processes, assessment processes and team dynamics. All of these processes and activities are assessable, in order to enure that learning students value processes. To create a motivating environment, assessment acknowledges individual contributions to the listserv (eg, seeking feedback and advice) as well as team progress reports, which includes students posting design ideas and prototypes to a shared workspace and requesting feedback from others. Students are given templates to use in preparing these reports as well as rules or “netiquette” they were required to use when posting information to the Listserv.

Encouraging students to initially use the Listerv by monitoring postings is necessary, and where appropriate, moderators respond and encourage conversational dynamics.

The tutors’ involvement on the Listserv tends to be non-interventionist so that they act more as facilitators by focusing discussion, rather than as the “fonts of all wisdom”. Figure 2 outlines the model used for promoting discussion on the Listserv. Issues are generated from team progress reports or from individual queries about technical, content, procedural, client, communication, team/peer issues sent to the list serv. Tutors, industry experts and ex–students then respond. Also, students have the opportunity to post other open questions, comments and reflective statements.

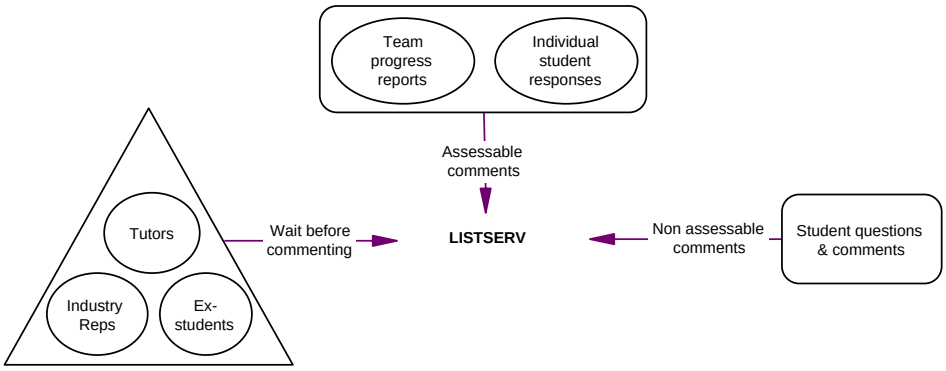

Figure 2. A model for online discussion based on peer partnerships

The benefits of workplace industry partners adds a number of strengths to the learning environment (1) authentic, goal-directed activities (2) access to guidance--both close assistance from experts and "distant" observing and corresponding with others and the physical environment; (3) everyday engagement in problem solving, which leads to self-awareness; and (4) intrinsic reinforcement as students receive direct feedback on their performance.

Project-based learning: Meeting client needs

As part of assessment requirements, students are responsible for making contact with the client and discussing the scope and legal aspects of the development (educational software, IP, etc). These have to be negotiated so that the client had their needs satisfied, while at the same time the students were involved in producing a web-site that conformed to the requirements of an academic unit. This often involves firstly understanding the client's needs and "educating" the client about web production, maintenance and costs. In this online unit, project based learning enables students to develop a relationship with a client, create solutions to a design problem and develop a project brief. In addition, project teams who work on creating have to report on progress to other teams, compare project plans and reflect on learning processes, assessment processes and team dynamics. Each of these management skills involves partnerships with industry clients as and results in the development of multimedia products (usually websites) as shown in table 2. The final web sites can be viewed at http://www-scam.ecu.edu.au/projects.

Team No	Project Description
1.	Oil and Gas Resource Web Site
2.	On-line course module for Westone
3.	Benchmark Furniture Online Catalogue
4.	Curriculum Council web site
5.	Medical web site for Edith Cowan University
6.	Cancer Foundation web site
7.	Race around Edith Cowan University
8.	Indigenous Art 1
9.	Indigenous Art 2
10.	SCAM Website
11.	Photomedia web site for Edith Cowan University
12.	Ecotourism web site
13.	Solo Travellers Club
14.	Wine Club
15.	Imac Touch Screen
16.	Scammers Association

Table 2: Industry Projects

The student learning process

The framework used in this course to promote the student-learning process is shown in Figure 5. It is focused on using learner-centered strategies, which encourage learner independence and peer support, which in turn promote the development of professional skills and process knowledge. These then directly contribute to deep and meaningful learning experiences. Also, as part of the authentic learning task, students have to share their knowledge with their industry partners, who in many cases were not fully informed about online design and the potential of technology.

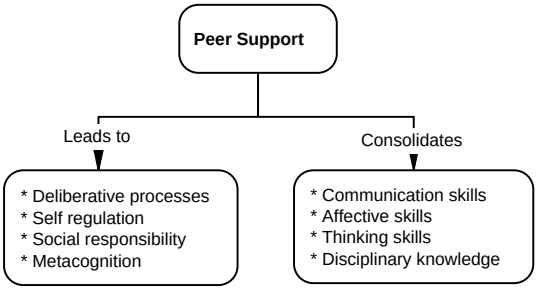

Figure 3: Overview of how peer learning supports process-based learning

This experience raises industry awareness about opportunities for business promotion using the web, while industry partners assist students by briefing them on market needs, business practice, commercial, legal and ethical constants. So, not only do the students gain experience by liasing with clients, but the clients also benefit by the reciprocal relationship and exchange of knowledge. In this way the learning transaction is based on the notion of a real-life partnership. The relevance of this to the student experience is that the adoption of learner-centered pedagogies increases learner interdependence and peer support that equips learners with professional skills and attributes as shown in Figure 3.

Peer partnerships and development of management skills

In the final evaluation of the course, both industry experts and students are asked to self-evaluate their own performance and to give examples of how they had demonstrated management skills. As the process had been team-based, this is undertaken in teams rather than individually. The partnership approach is therefore taken to its logical conclusion and used for evaluation purposes. Rather than seeing the group as a barrier to individual learning, the learning opportunities are enriched and augmented by the opportunities afforded to participants to talk about their achievements. Table 3 shows a summary made by students on the skills they developed during the course.

Management of Self in a team context	***Manage information to benefit the team***
• *Manage group time* • *Agree on objectives, priorities and standards* • *Take responsibility* • *Listen actively* • *Be patient and sensitive* • *Take on board other ideas* • *Be flexible & plan ahead* • *Be constructive* • *Cope with conflict*	• *Find up-to date information* • *Know how to interpret large amounts of information* • *Check that information is correct* • *Present information professionally* • *Respond to client needs* • *Test ideas first*
Management of Others in a team context	***Manage the task to ensure team success***
• *Listen to the views of others* • *Work cooperatively* • *Give feedback to others in the group* • *Lead by example* • *Negotiate and talk openly* • *Try to reach consensus* • *Give and take ideas*	• *Keep track of time* • *Don't overspend* • *Set deadlines and priorities* • *Identify options* • *Plan a course of action* • *Track changes* • *Assess the product*

Table 3: Self-evaluation comments by students

Analysis of critical success factors

In this industry linked project, learning outcomes and activities were integrated so that all stakeholders felt a sense of achievement and participation. It was important that clients felt part of the process, and this was

achieved by having an evening launch of the project completed by the students, with clients and industry representatives invited to view and comment on products. The success of the unit can be attributed to the following factors:

- A virtual community was formed through the use of a Listserv, which encouraged collective and collaborative learning rather than individualistic. The online social environments provided scope for group interaction, sharing and discussion and in depth exploration of issues.
- Participatory and negotiated content in which students had access to a website where they could add resources or choose the most relevant ones. Access to relevant knowledge resources was one of the "just in time "approach to planning, i.e. the choice of selecting resources is left to students who have to identify a learning need;
- The integration of collaboration and peer feedback as a 'learning event' to scaffold process knowledge and take learners closer to context of the workplace, where professionals are expected to have self-management skills, and be able to make judgements about their own and other's work
- The development of networked collaborative learning requires a focus on the processes of collaboration, and the well-being and development of the collaborative group (McConnell, 2000). In summary, this involves:

    - openness in the educational process
    - self-determination in learning
    - a real purpose in the cooperative learning process
    - a supportive learning environment
    - collaborative assessment of learning
    - assessment and evaluation of the ongoing learning process.

Conclusion

The study illustrates an effective student/industry partnership, which was integrated into the final year of tertiary multimedia course. Through authentic settings, students were engaged with real industry projects, clients and assessment tasks. This was complemented with a virtual environment in which students exchanged ideas and helped each other cope with these authentic tasks. The online environment, in combination with client negotiations, promoted the development of professional skills and process knowledge, which supported the process of professional knowledge building.

The notions of 'partnership', 'relevance', 'flexibility' and 'workplace skills' are now part of the discourse of higher education these in combination are having an effect on how curricula are designed and implemented. In this case study we have attempted to identify some of the key dimensions of change implied by moves towards industry partnerships, to note the nature of student roles and teaching roles, and to consider the implications of these changes for assessment and curriculum development. For higher education in particular the move to industry partnerships may represent a potential loss of control over the curriculum as the focus begins to shift from the transmission of disciplinary knowledge to the improvement of performance in the workplace, and preparation of graduates for careers. Perhaps the most significant effect suggested by this shift is the rise of different conceptions of learning and of knowledge production. In contrast to the value placed on propositional (and declarative) knowledge in traditional programs, workplace developments have embraced a variety of possibilities including 'competence' and the development of knowledge in the context of action. In the case study presented here, project-based learning in partnership with industry, brought about significant learning outcomes for participants, and scaffolded both process and product skills. The most significant indicator of success has been that our industry partners now want to continue the relationship, to contribute to development of the curriculum and to have our graduates join them as colleagues in the workplace.

References

Assiter, A. (1995). *Transferable skills in higher education*. London: Kogan Page.

Barnett, R. (1994). *The limits of competence: knowledge, higher education and society*. Buckingham: Open University Press.
Bennett, N., Dunne, E., & Carre, C. (2000). *Skills development in higher education and training*. Buckingham: Society for Research into Higher Education and Open University Press.
Biggs, J. (1999). *Teaching for quality learning at university*. Oxford: Society for Research into Higher Education and Open University Press.
Billet, S. (1996). Towards a model of workplace learning: The learning curriculum. Studies in Continuing Education, 18(1), 43-58.
Bonk, C. J., & Cummings, J. A. (1998). A dozen recommendations for placing the student at the centre of Web-based learning. *Educational Media International, 35*(2), 82-89.
Candy, P., Crebert, G., & O'Leary, J. (1994). *Developing lifelong learners through undergraduate education*. Canberra: Australian Government Publishing Service.
Collis, B. (1998). WWW-based environments for collaborative group work. *Education and Information Technologies, 3*, 231-245.
Commonwealth Department of Education, Science and Training (2002). *Higher Education at the Crossroads: Ministerial Discussion Paper*. Canberra: Commonwealth of Australia
Cox, R., & Brna, P. (1995). Supporting the use of external representations in problem-solving: The need for flexible learning environments. *Journal of Artificial Intelligence in Education, 6*(2/3), 239-302.
Dearing Report. (1997). *Higher education in the learning society*. London: HMSO.
English, S., & Yazdani, M. (1999). Computer-supported cooperative learning in a virtual university. *Journal of Computer Assisted Learning, 15*(2), 2-13.
English, S., & Yazdani, M. (1999). Computer-supported cooperative learning in a virtual university. *Journal of Computer Assisted Learning, 15*(2), 2-13.
Erhaut, M. (1994). *Developing professional knowledge and competence*. London: The Falmer Press.
Gibbs, G. (1992). *Improving the quality of student learning*. Bristol: Technical and educational services.
Kitchen, D., & McDougall, D. (1998-99). Collaborative learning on the Internet. *Journal of Educational Technology Systems, 27*(3), 245-257.
Klemm, W. R., & Snell, J. R. (1996). Enriching computer-mediated group learning by coupling constructivism with collaborative learning. *Electronic Journal of Instructional Technology, 1*(2), http://www.usq.edu.au/electpub/e-jist/vol1no2/article1.htm.
Kolb, D. A. (1984). *Experiential learning*. Englewood Cliffs, N.J.: Prentice-Hall.
Lajoie, S. P., & Derry, S. J. (Eds.). (1993). *Computers as cognitive tools*. Hillsdale, New Jersey: Lawrence Erlbaum.
McAteer, E., Tolmie, A., Duffy, C., & Corbett, J. (1997). Computer-mediated communication as a learning resource. *Journal of Computer Assisted Learning, 13*(4), 219-227.
McLoughlin, C. (2002). Computer supported teamwork: an integrative approach to evaluating cooperative learning in an online environment. *Australian Journal of Educational Technology* 18(2): 227-254.
McConnell, D. (2000). *Implementing computer supported cooperative learning*. London: Kogan Page.
Nicholls, G. (2000). Professional development, teaching and lifelong learning: The implications for higher education. *International Journal of Lifelong Education, 19*(4), 370-377.
Oliver, R., & McLoughlin, C. (2001). Using networking tools to support online learning. In F. Lockwood (Ed.), *Innovation in open and distance learning: Successful development of online and EWeb-based learning* (pp. 160-171). London: Routledge.
Pedler, M. (1991). *The learning company: a strategy for sustainable development*. London: McGraw Hill.
Race, P. (1998). An education and training toolkit for the new millennium. *Innovations in Education and Training International, 35*(3), 262-271.
Ramsden, P. (1992). *Learning to teach in higher education*. London: Routledge.
Reeders, E. (2000). Scholarly practice in work-based learning: Fitting the glass slipper. *Higher Education, Research and Development, 19*(2), 205-221.
Schon, D. A. (1995). *The reflective practitioner: How the professionals think in action*. Aldershot: Ashgate Publishing.
Taylor, I. (1997). *Developing learning in professional education*. Buckingham: Society for Research into Higher Education and Open University Press.