

Higher Education Research and Development Society of Australasia, Inc

Quality Conversations

Proceedings of the

25th HERDSA Annual Conference

7-10 July 2002

Perth, Western Australia

Juwah, C. & Northcote, M. (2002) Devising strategies for enhancing quality staff development in embedding ICT in teaching and learning, in *Quality Conversations, Proceedings of the 25th HERDSA Annual Conference, Perth, Western Australia, 7-10 July 2002: pp 384.*

Published 2002 by the
Higher Education Research and Development Society of Australasia, Inc
PO Box 27, Milperra, NSW 2214, Australia
www.herdsa.org.au

ISSN: 0155-6223
ISBN: 0 90 8557 51 5

This research paper was reviewed using a double blind peer review process that meets DEEWR requirements. Two reviewers were appointed on the basis of their independence, expertise and experience and received the full paper devoid of the authors' names and institutions in order to ensure objectivity and anonymity. Where substantial differences existed between the two reviewers, a third reviewer was appointed. Papers were evaluated on the basis of originality, quality of academic merit, relevance to the conference theme and the standard of writing/presentation. Following review, this full paper was presented at the international conference.

Copyright@ 2002 HERDSA and the authors. Apart from any fair dealing for the purposes of research or private study, criticism or review, as permitted under the Copyright, Design and Patent Act, 2005, this publication may only be reproduced, stored or transmitted, in any for or by any means, with the prior permission in writing of the publishers, or in the case of reprographic reproduction in accordance with the terms and licenses issued by the copyright Licensing Agency. Enquiries concerning reproduction outside those terms should be sent to the publishers at the address above.

Devising strategies for enhancing quality staff development in embedding ICT in teaching and learning

Charles Juwah
The Robert Gordon University, Aberdeen, UK.
c.juwah@rgu.ac.uk

Maria Northcote
Edith Cowan University, Perth, Australia
m.northcote@ecu.edu.au

***Abstract**: Information and Communications Technologies (ICT) have huge potential and can add value to the quality of university teaching and learning. However, to fully exploit the potential of these innovative technologies, it is imperative that teaching staff are well informed about how to embed ICT in the curriculum in a way that is underpinned by sound pedagogy. Professional development programmes can enable staff to acquire appropriate skills to effectively facilitate technology-supported learning.The teaching staff from The Robert Gordon University and Edith Cowan University, are facing similar staff development challenges. Both universities provide online and distance education courses to their local and remotely located students. Staff involved in designing and teaching these courses require knowledge about and skills related to the appropriate use of ICT within teaching and learning contexts. Both universities face dual challenges: how to construct staff development programmes which develop their teachers' ICT knowledge and skills; and how to include full time, part time and remotely located staff in such programmes. The authors of this paper are involved in assisting staff within their universities to develop ICT skills and have adopted a collaborative approach to designing a staff development programme in this area. This strategic alliancing between two institutions with similar profiles, staff needs and ICT experiences is proposed as a viable technique for implementing effective staff development in ICT.This paper reports on the initial stage of an ongoing collaborative project which aims to devise strategies to enable staff to use and embed ICT in their teaching.*

***Keywords**: ICT, staff development strategies, online learning*

Introduction

The rapid and continually evolving nature of Information and Communications Technologies (ICT) has brought about changes in the way education and training is being accessed and delivered (Bates, 2000). The new learning technologies, including computers, application softwares, the internet, virtual learning environments (VLEs), satellites and videoconferencing, can most certainly deliver potential benefits. For example, such technology can enhance the facilitation of learning by offering a range of learning activities which incorporate various styles and modes of course delivery. Also, this technology has the capacity to transform

educational and training systems to become more learner-focussed by incorporating increased levels of choice and customisation.

Recent research studies report on how students are attracted by and become engaged in the new technologies due to their interactive nature combined with their capability to incorporate a diverse range of media (Giouvanakis, Samaras and Tarabanis, 2001; Jonassen, 2001). To take advantage of the potential of ICT, it is imperative that university teaching staff are provided with assistance to develop the necessary repertoire of skills required to use the new technologies, whether they be online (using internet technology) or offline (using static computerised technology). Fox (1999) and Herron (1998) urge university teaching staff to consider the adoption of online technologies to deliver courses and support student learning. However, such an extensive use of the new technologies requires succinct, tailored staff development initiatives.

Supporting staff in the acquisition of ICT skills is challenging and this challenge intensifies when staff are located in dispersed locations, such as the rural, highland and islands areas of Scotland or the rural and remote regions of Western Australia. Considering the similar requirements of staff at Edith Cowan University (ECU) and The Robert Gordon University (RGU), the primary aim of this study is to enable staff to develop their ICT skills for the purpose of integrating such skills into their online teaching. Providing effective training and development in online learning, is compounded by the complexity of current learning theories and various approaches in delivering ICT staff development. A way forward is to provide a holistic, dynamic training and development that that will enable staff to be better able to facilitate and enhance students' learning experience.

Based on the above considerations, this research study aims to address the following questions:
(i) What strategies are best adopted for providing quality, effective and efficient staff development to meet the needs of teaching staff in using ICT in teaching and supporting learning?
(ii) What mode of delivery will be a viable model or approach in providing effective, staff development in ICT that meets the needs of staff?
(iii) How best to target and include part time and remotely located staff in training and development activities, to ensure increased participation and inclusiveness?

Background to the project

Gaining a competitive edge in the global education market has focussed institutions into seeking more effective ways of delivering services to their clients and retaining a good market share. Online or internet based education has been one of the strategies adopted by a significant proportion of educational institutions on a worldwide basis. The adoption of such a strategy at RGU has necessitated the recent introduction of a Virtual Campus for the delivery of its e-based courses, particularly in the niche areas of Off-shore and Gas Engineering, Nursing and Midwifery, Information and Publishing Studies and Business Administration. Similarly, the staff at Kurongkurl Katitjin, the School of Indigenous Studies, at ECU are in the process of extending the proportion of their courses offered online. These initiatives therefore, have created a need for the up-skilling of staff at both universities in the

area of ICT. Specifically, staff require knowledge and facilitation skills to enable them to embed ICT into their curricula and to use ICT to deliver and support online learning.

The occupational and professional nature of the niche courses being offered at RGU requires teaching staff to be both experienced academics and to have current industrial and/or professional practice. These requirements inevitably account for significant numbers of dispersed, part time lecturers. Such staff make valuable contributions to the work of the university but, because of their work patterns, these staff do not always benefit as they ought to from the traditional, face to face, staff development activities delivered during working day hours. This phenomenon was confirmed by results of a recent UK research study, *In from the cold*, conducted by the NATFHE Union and other collaborating institutions (Allen, 2001, p. 8). These results were also reflected in a needs analysis of the Scottish staff development community under the Scottish Higher Education Funding Council (SHEFC) funded NetCulture, C&IT Project (2001) which reported: (i) a lack of appropriate skills and staff development support; (ii) a lack of understanding of the pedagogy underpinning and in-appropriate embedding of C&IT in the curriculum and, (iv) a sectoral need for appropriate training and development resources.

The teaching staff at the School of Indigenous Australian Studies at ECU have recently faced many similar challenges as those encountered by staff at RGU in Scotland. ECU, in Australia, is similar in profile to RGU, in that it has a dispersed staff population who provide education and training to the geographical, dispersed community of Western Australia. Teaching staff at Kurongkurl Katitjin, a School within ECU, have become increasingly involved in the development and delivery of many online units of study. However, like those at RGU, many of these staff are disadvantaged when it comes to accessing traditionally delivered staff development programs. The major metropolitan campus of ECU is based in Perth, the capital city of Western Australia. However, the School of Indigenous Studies also has regional centres and campuses in rural and remote areas of the state and staff at these locations also require specific training in ICT skill development.

As the influx of ICT into universities across the world continues, various approaches to staff development have emerged. In the recent past, staff development in IT in teaching and learning has not been a major priority at RGU. However, the situation is now changing. The staff at ECU, in recent years, have begun to implement approaches to enable faculty staff to develop skills in using ICT. However, many universities find that development in e-education and distance learning has remained a domain for the individual enthusiasts. To ensure that staff are capable of supporting quality, effective, online education that suits the purpose and meets the learning needs of its clients, a structured staff development strategy is required rather than leaving the development of ICT skills to chance.

Considering the characteristics and requirements of the teaching staff in both institutions, a clear need has emerged for these staff to receive specific assistance to increase their ICT skills in their teaching practices in online course development. Since course development often involves the design of learning resources which incorporate multimedia components, staff require time to become familiar with procedures relating to the development of digital resources such as online graphics, video clips, text files and other online-appropriate media. The experience from ECU suggests that a vision underpinned by a coherent staff development strategy including “buy-in” from faculty is pivotal in ensuring successful implementation of

ICT skills development for supporting online learning for faculty (Northcote, 2001). Such recommendations would appear to also suit the situation at RGU.

Theoretical framework and evidence based practice

Prior to the advent of virtual learning environments (VLEs) as we currently know them, support of distance education, the fore-runner of e-learning, was conducted exclusively by mail, telephone, fax or, more recently, email. Today, the delivery of e-education is internet-based, often incorporating various platforms of VLEs. Understanding the pedagogy of any teaching approach is critical in the delivery of quality learning opportunities to students. It is therefore important that staff who teach and support online learning are fully aware of the pedagogy of online education. Constructivism, the pedagogy cited as the foundation of much online education, considers learning to be a process which involves the construction of knowledge by learners through social interaction or discourse (Jonassen, 1994; Van Glasserfeld, 1998, Vygotsky, 1978). Such constructivist learning principles are also advocated as appropriate for the design of web-based staff development programs (Salter & Hansen, 2000). The use of this pedagogical approach (MacFarlane, 1997) requires a paradigm shift in which the learner's role changes from the traditional passive to an active learning mode. Ensuring this paradigm shift from the transmissive to the social constructivist approach to teaching involves personal, social and professional change for staff and one that requires support (Fetherston, 2001). This level of support is planned to be provided in this jointly-designed staff development program, the first phase of which is the focus of this paper, by planning opportunities for staff to develop their ICT skills at varying rates within collaborative contexts.

Jonassen (1994, p. 35) summarised the principles that illustrate how constructivism can be facilitated by sound instructional design. He recommends the provision of multiple representations of reality. The natural complexity of the real world should also be represented. Knowledge construction, not reproduction should be focussed upon. Tasks should be authentically contextualised rather than being abstract and real world, case-based learning environments should be provided instead of pre-determined instructional sequences. Reflective practice should be fostered and knowledge construction that is either context or content dependent should be enabled. Lastly, Jonassen recommends that learning can be supported through the collaborative construction of knowledge through social negotiation. The active, constructivist approach to teaching helps underpin deeper and quality learning (Boud 2002). These instructional design principles were used to guide the development of our staff development program which aims to develop the ICT skills of teaching staff.
Quality learning is that which is authentic, meets learners' needs, enhances engagement and deep learning, develops long lasting knowledge, enables the interpretation of meaning, metacognition and ownership of learning in the form of lifelong (autonomous) learning (Boud, 2002; Fetherston, 2001). In developing quality learning, learners develop good learning behaviours such as risk taking, observation, analysis and evaluation. Furthermore, quality learning can be indicated by learners who are able to create new knowledge and meaning when presented with unfamiliar situations and information. Quality facilitation propagates quality learning which in turn meets the needs of various stakeholders in education. This is clearly demonstrated in the Figure 1 - Quality Spiral below.

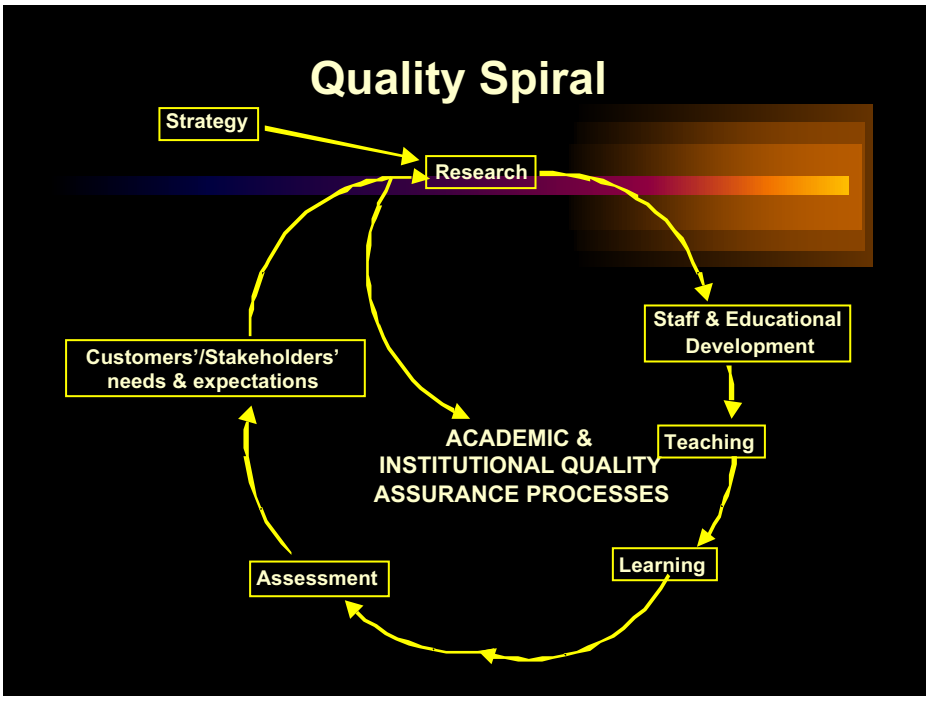

Figure 1: Quality Spiral of Educational Provision

In recent times, equality of opportunity and inclusiveness have become by-words of many organisations and higher education institutions. This is in keeping with the UK government's policies and legislation for equality for all. Indigenous Education programs in Australia have adopted similar terminology in many of their policy documents. The foregoing notwithstanding, the results of the NAFTHE research project - "In from the Cold? Part time teaching, professional development and the Institute for Learning and Teaching" paints a totally different picture of reality. The project's key findings were:

- Key finding 14: Induction for part time lecturers and postgraduate tutors was minimal and most part time lecturer's and postgraduate tutors' initial experience of teaching was unsupported and without training.
- Key finding 16: Where institutional programmes for teaching and learning have now been developed - and are open to part time lecturers - there are financial and time constraints for part timers in taking these up. Postgraduate tutors were the most likely to have engaged in institutional programmes - which they found very useful.
- Key finding 17: Both postgraduate tutors and part time lecturers expressed the desire for support and development at the departmental and subject level. However, many part-time lecturers have limited time available, given other commitments, and departmental and development activities need to be carefully scheduled and paid for.

(NAFTHE Report, 2001, p.8)

The key report findings mentioned above are relevant to many universities which employ sessional, part time or contract teaching staff including RGU and ECU. With these findings in mind, this project attempts to address the issue of inclusiveness for part time lecturing staff.

Methodology

The research methodology adopted for this study is a longitudinal survey comprising a postal survey questionnaire and semi structured, face to face interviews with staff and peer

observation of teaching online using agreed criteria of the staff currently undertaking the Online Tutoring Skills Course (See below). At RGU a postal survey questionnaire in ICT skills to audit and determine the training needs of all staff in one of the thirteen Schools was undertaken. Following the needs analysis, an Online Tutoring Skills Course was devised and currently being delivered to a cohort of staff at RGU. (See next section for the outcomes of the course.) At the School of Kurongkurl Katitjin, ECU, the staff's needs in ICT have also been assessed (Page & Northcote, 2000). From a series of face-to-face interviews and online questionnaires, the staff's needs were found to be similar to RGU's staff in that they were mainly concerned with how to manage online courses from administrative as well as management, teaching and pedagogical perspectives. Staff at Kurongkurl Katitjin have experienced a small number of face-to-face workshops on online learning courses provided by staff within the School and from the university's central professional development provider.

The staff development strategies provided so far to the staff at each university are intended to be consolidated and further trialled this year.

Findings from the project so far at RGU and ECU

Findings from the needs analysis at RGU revealed that no staff in the School had the experience or the relevant skills needed to support online learning. Additionally, none of the staff had experienced online learning as a learner and only one respondent had the experience of writing courses for web delivery. Below fifteen percent of the respondents have an appropriate repertoire of IT skills. However, staff were desperate and needed to be able to facilitate effective learning online within a lead in period of twelve weeks, at the start of the next semester.

Reasons adduced by staff for the lack of relevant IT skills included: lack of time to attend staff development activities as a result of other work commitments or inappropriate scheduling of courses; previous bad experience in IT training; fear of technology; and distance was also a major barrier to accessing staff development activities for part time lecturers who were not based at university sites. These findings were similar to those reported by the NetCulture Project (2001) Needs analysis of the staff development community of the Scottish higher education institutions.

Reflecting on the above findings and in meeting the immediate needs of staff, the Online Tutoring Skills project Course was then devised at RGU. The intended outcomes are that participants were able to: (i) familiarise themselves with the facilities within a virtual learning environment and use the same to support online learning; (ii) appraise the pedagogy underpinning online teaching; (iii) design fit-for-purpose online course(s); (iv) embed ICT in the curriculum and to use innovative technology in teaching and supporting learning; (v) develop effective facilitator roles of moderating, reviewing, summarising, assess and giving feedback on individual and group performance and (vi) reflect on own personal and professional practice and development.

As part of grounding the course in best practice, it was fundamental that staff were trained online, in the same medium through which they will deliver their own teaching to make learning more authentic. Surprisingly, almost all of the participants preferred a mixed/blended mode (some face-to-face and online) approach. However, they reported that the asynchronous mode offered the space and time to research and produce more quality-focussed posts than in

a face-to-face or synchronous mode, as they had more time to reflect on their learning. Some quotes from participants regarding aspects of the course in contributing to their development and in enhancing their teaching include:

> "I have more appreciation of motivational problems and general participant reluctance to take part. Seeing it from the other side (as a learner) allows a good perspective, and expert coaching provides insight into how it should be done."
>
> "The course is certainly helping me to think about the issues and how I could use the technology."
>
> "The thought process of turning traditional format work into online based work has been interesting and enjoyable."
>
> "In future, I will take a more theoretical approach to designing activities."

At the School of Kurongkurl Katitjin, staff development activities have been provided by staff from both within the School and across the university. An online survey of staff within the School (Northcote, 2000) found that academic teaching staff were concerned about how online courses would be designed, delivered and evaluated. They requested information about how to construct online courses which suited the content of their courses but also indicated a concern about the lengthy processes involved in developing digital resources. Other issues raised from this group of staff included how to create online learning activities that were culturally appropriate, managing the online courses from a managerial perspective and how to provide teaching staff with instruction and time to develop ICT skills.

From this survey, a number of specifically designed instructional booklets were created which provided assistance for teaching staff on how to manage and teach an online unit. Similar booklets were created for students who were enrolled in online units at the School. Additionally, a small number of workshops for staff and students were provided for staff at metropolitan and rural locations on how to use the online teaching materials that had been developed at the school. The Professional Development Centre (PDC) within the university has also provided staff with instructional workshops on how to create online units of study using commercially available courseware software. Also, a proportion of the staff at the School have enrolled and completed an online course on the topic of online learning, also provided by staff development officers at the PDC. The School is now at the stage of further increasing their online unit development program and, as such, an increased number of teaching staff will become involved in both creating and delivering online courses. Since these staff have a range of ICT skills, the School will benefit from a structured, coherent staff development program in this area.

Similar results have been found from the RGU's staff experiences of their staff development activities to date. In the Online tutoring Skills course, there is clear evidence of peer-learning and networking (formal and informal) in facilitating staff knowledge and skills base. This assertion regarding the value of networking and peer-tutoring as a learning strategy is supported by the findings of Howard, McGee, Schwartz and Purcell (2000) in their report of a specifically designed course which aimed to enable teachers to become familiar with appropriate technology and improve their ability to use computers. By using constructivist models of instruction which specifically made use of cooperation and communication amongst

its participants, teachers' skills levels and teaching beliefs were both influenced. Kandlbinder's (2001, p. 377) observation about the power of the internet for collaboration between academic staff echoes this recognition of the benefits of online learning by stating that "the real opportunities for online technologies are in creating collaborative work environments with an institutional focus. This offers tangible benefits in academic staff development without major reorganisation by providing access to academic staff in remote locations".

Inclusiveness of part time lecturers

It is recognised that personal networks enable individuals to function effectively and efficiently in any organisation. In addressing the issue of non-inclusiveness with regard to part time lecturers not being rigorously involved in staff development activities, a new forum for part time lecturers has been created. It is intended that this forum will provide information and influence networks for staff within each university and between the two universities. A virtual conferencing and meeting point has been created for the group to enable them keep contact and network with each other, as well as to deliberate and discuss issues on teaching, learning and assessment. It is envisaged that once the part time staff "buy-in" to the online medium for contact and discussions, this will form a natural extension into accessing training and development online.

Proposals for further studies or investigation

This project attempts to devise strategies for enhancing quality staff development in embedding ICT in teaching and learning, with particular emphasis in the support of online learning. In so doing, it has identified: (i) a mixed mode (blended) approach of online learning with some form of face-to-face support, in meeting the just-in-time ICT training needs of staff. (ii) strategic alliancing as a principal strategy to adopt because of the benefits that can be gained at both RGU and ECU from synergies in various areas. A modified version of a course to support Online Teaching has been earmarked as the first course to be jointly developed by and delivered to staff at both universities. An adaptation from management science, strategic alliancing is the mutual but not exclusive cooperation between partners for the purposes of deriving benefit from existing synergies; building capacity (for example, facilitate training and development and accreditation of staff/personnel); ensuring commitment to competitive advantage, sustainable development and collaboration; and networking (Cotton, 2000; Jones, 2000; Porter, 1980). Both universities will benefit by sharing knowledge and expertise; a reduction in the learning curve; enhancing cost effective in reducing duplication of effort and resources, and leveraging opportunities for networking. In addition, strategic alliancing offers opportunities for benchmarking the quality of courses and effectiveness of delivery, as well as providing flexible, accessible and portable training. (iii) use of the part time lecturers forum in increasing participation in professional development activities.

In view of the above, therefore, the project's next stage aims to: (1) conduct parallel research studies into the effectiveness of online education in meeting staff training needs by utilising a comparison of staff development experiences at two universities in different parts of the world; and (2) evaluate the contribution of the part time lecturers forum in enhancing inclusiveness.

In conclusion, it must be stated clearly that identifying strategies for enhancing quality staff development and training is only but a part of the whole picture. For strategies to be effective,

there must be clear commitment and support from senior management in terms of providing the necessary vision, leadership and resources (Cotton, 2000; Jones, 2000; Porter, 1980). Secondly, staff must have a "buy-in" into the strategy. Lack of commitment and support from either will reduce the effectiveness of this staff development strategy.

References

Allen, L (2001). *In from the cold? Part time teaching, professional development and the ILT.* A Union Learning Fund Project led by NATFHE. London: The University & College Lecturer's Union.

Boud, D. (2002) How can university assessment practices provide what is required for lifelong learning? Towards sustainable assessment. Seminar presented at the launch of the Centre for Research into Higher Education at the University of Glasgow, Scotland, 21 January.

Cotton, W. B. (2000). Transforming traditional training methods to meet the needs of a modern industry. Paper presented at the 2000 Offshore Technology Conference held in Houston, Texas, 1 - 4 May.

Fetherston, T. (2001). Pedagogical challenges for the World Wide Web. *Educational Technology Review*, Priemiere Online Edition, Volume 9, No. 1. Retrieved from the World Wide Web http://www.aace.org/pubs/etr/fetherston.cfm

Fox, R. (1999). What issues do we need to resolve to become competent users of online learning environments? In K. Martin, N. Stanley & N. Davison (Eds.), *Teaching in the disicplines/Learning in context* (pp. 124-128). Proceedings of the 8th Annual Teaching and Learning Forum, The University of Western Australia, February 1999. Perth, Western Australia: University of Western Australia. Retrieved from the World Wide Web http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf99/dj/fox/html

Giouvanakis, T., Samaras, H., & Tarabanis, K. (2001). Designing a pedagogically sound web based interface: The critical role of prior knowledge. In *Proceedings of ED MEDIA Conference*, Tampere, Finland.

Herron, T. L. (1998). Teaching with the Internet. *The Internet and Higher Education, 1*(3), 217-222.

Howard, B. C., McGee, S., Schwartz, M., & Purcell, S. (2000). The experience of constructivism: Transforming teacher epistemology. *Journal of Research on Computing in Education, 32*(4), 455-465.

Jonassen, D. (1994). Thinking technology. *Educational Technology, 34*(4), 34-37.

Jonassen, D. (2001). Keynote Speech, ED MEDIA Conference, Tampere, Finland.

Jones, P, H. (2000). Knowledge strategy: Aligning knowledge programs to business strategy. Retrieved 18 January 2002 from the World Wide Web http://www.poetics.org/redesign/ks-kmw2000.htm

Kandlbinder, P. (2001, July). Peeking under the covers: Understanding the foundations of online academic staff development. Paper presented at the HERDSA (Higher Education Research and Development Society of Australasia) Conference, University of Newcastle, NSW.

MacFarlane, A.G.W. (1997). *Information, Knowledge and Learning,* paper presented to the Learning Environments and Technology Working Group of the University of the Highlands and Islands project.

NetCulture Project (2001) NetCulture Needs Analysis Report. Retrieved from the World Wide Web http://netculture.scotcit.ac.uk/project/

Northcote, M. (2001). Successful online unit development through staff learning partnerships. Paper presented at HERDSA Conference, Newcastle, NSW. July.

Northcote, M. (2000). Online survey of staff views of online unit development. Survey conducted at Kurongkurl Katitjin, the School of Indigenous Australian Studies at Edith Cowan University, Perth, Australia.

Page, J., & Northcote, M. (2000, June 2000). *Online unit development: We need a plan*. Paper presented at the Learning IT Conference, Surfers Paradise, Queensland.

Porter, M.E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.

Reis, R. (2001). Just in Time Teaching. Retrieved from TOMORROW'S PROFESSOR(SM) LISTSERV. Retrieved September 2001 from the World Wide Web http://sll.stanford.edu/projects/tomprof/newtomprof/postings.html

von Glasersfeld, E. (1998). Why constructivism must be radical. In. Larochelle, M., Bednarz, N. & J. Garrison (Eds.). *Constructivism and education* (pp. 23-28). Cambridge: Cambridge University Press.

Vygotsky, L.S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press

Acknowledgements

The Author 1 wishes to acknowledge the financial contribution to the study by the UK Institute for Learning and Teaching in Higher Education (ILTHE) small project grants award scheme.

Copyright © 2002 Charles Juwah and Maria Northcote: The authors assign to HERDSA and educational non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to HERDSA to publish this document in full on the World Wide Web (prime sites and mirrors) on CD-ROM and in printed form within the HERDSA 2002 conference proceedings. Any other usage is prohibited without the express permission of the authors