

Using ICTs to Promote the Effective Use of Student, Tutor and Information Resources in Professional Development at a Distance

Celia Graebner and Derrick Armstrong

*Department of Educational Studies, University of Sheffield UK,
388 Glossop Road, Sheffield S0 4JA
C.Graebner@sheffield.ac.uk, D.J.Armstrong@sheffield.ac.uk*

Abstract

As mature adult learners, professional development students have much relevant experience and knowledge to offer each other. A problem for small states, as also for specialized study programmes, is assembling in one place a student group of sufficient size to benefit from this exchange. Established forms of distance learning can overcome the problem of dispersed locations, but make it more difficult for students to draw on the collective resource their peers represent, particularly during periods of independent study. This paper presents a case that, providing they are carefully integrated, communication technologies can enhance and deepen the learning experiences of remote students, in addition to reducing the problem of social isolation. As well as learning from each other, students can gain better access to scarce subject expertise and source materials. To make the case, the paper draws on experiences documented in the research literature, and on one author's professional practice. At the same time, it emphasizes the importance of preliminary needs analysis and a well-constructed learning design for effective use of the new technologies, and offers some guidance from the practitioner research literature.

Introduction: Continuing Professional Development in a Worldwide Knowledge Economy

In an emerging global knowledge economy, continuing professional development is widely acknowledged to have a key role in leading the development of a learning society. The analysis of Gibbons et al. (1994) indicates that continuing professional development may even be a determining influence on levels of economic development when

lifelong study, as well as training and re-training, are possible and taken for granted by large fractions of the population. This readiness to learn greatly increases the capacity of a labour force to respond to rapid technological change and is at least as important as the innovations that support it, or the competitive markets that drive it. (Gibbons et al., 1994)

Moreover, since learning in the knowledge society can no longer be narrowly equated with the transfer of specific established content, the very nature of professional education is shifting:

Modern mass higher education teaches people not to become too closely devoted to one occupation or a single set of skills. It prepares them for the likelihood that both will change often and that they must travel fast. To travel fast one must travel light, in skills as well as attitudes. The only skill that does not become obsolete is the skill of learning new skills. (Gibbons et al., 1994)

In this analysis, the learning trajectories of professionals will become increasingly contextualized and individual.

At the same time, the challenge of globalization to the maintenance of local values and identity in education is increasing. We are regularly reminded that no country can afford to disregard education for participation in the knowledge economy:

The knowledge economy offers exponential returns on investment in education. Investment in education will now have to be geared towards the knowledge economy. This concerns all developing countries, whatever their performance over the past decade in the field of basic education.

If we lose the connecting links between basic education for all and the high-powered knowledge economy, we risk opening up a vast chasm separating poor and rich countries (Koichiro Matsuura, Director General of UNESCO, reported in the *Financial Times*, April 27, 2000).

A paradoxical consequence is that, despite the potential for information and communication technologies (ICTs) to provide “opportunities to build local knowledge structures, which can in turn be shared with a larger audience in the context of our global society” (Learning Without Frontiers, 1998), existing educational systems straining to meet greater demand may be driven to accepting ready-made technology-based

solutions. And past experience with technology-based solutions in education has not been encouraging:

Educators believe that the failures of many past educational technology applications have been due to the fact that they were ill-adapted to the culture of the learners, insufficiently interactive, too expensive or tried to replace rather than reinforce the role of the teacher. (Learning Without Frontiers, 1998)

How, then, can the new knowledge media themselves contribute to the sustainable development of education professionals in a knowledge society? By way of background to the issues raised by the development of ICT-mediated continuing professional development in the Caribbean regional context, the body of this paper briefly reviews aspects of education in which ICTs can have an impact on the availability and design of distance learning provision. It focuses principally on andragogical issues in the context of current practitioner research (including that of the first author). In conclusion, it brings forward for discussion the authors’ joint work towards a professional development environment that could address some of the concerns raised above.

Our particular concern has been with the development of appropriate support for both tutors and students participating in our professional development courses for teachers in the Caribbean. The distance learning courses that we have been running for over ten years have been based on a combination of text-based distance learning materials and face-to-face study school and local tutorial support. However, with the expansion of our Caribbean programme, the small island states context has meant that our traditional styles of working have become increasingly problematic. Our interest in that respect has focused not simply on tutor-to-student contact but

also on the use of ICTs in developing improved models of tutor support, coordination and staff development, linking university staff in Sheffield and the Caribbean.

ICTs in the Organization of Distance Learning

From the organizational perspective, there are evident advantages of deploying ICTs in continuing professional development at a distance. For provider institutions targeting specialized and scattered groups, communication technologies facilitate gathering a critical mass of learners, and monitoring the progress of distributed learner populations. For course organizers, information in digital formats offers just-in-time resources, rapid transfer and ready accessibility of learning and research resources. For students and tutors at any individual location, ICT-based delivery increases the range of opportunities for acquiring new skills and for professional updating, and can also create a base for professional networking and peer support.

The organizational advantages shown in Table 1 may not represent unequivocal benefits in every professional development situation. A clear example is the focus on efficiencies of scale, which tends to compromise local relevance. This is more than a trivial problem, since authenticity of task requires remaining rooted in one's own professional culture rather than becoming detached from it, while learning to research effectively requires access to a range of resources likely to be available only beyond the immediate situation.

A developing "hidden costs of education" research literature suggests further that, whatever the benefits of innovations at the organizational level, these may be offset by less evident resource costs to individual tutors and students. A recent survey of the costs of networked learning in the UK (Bacsich et al., 1999) identified unattributed staff time, and time and resource demands on students (including acquisition of hardware, printing of learning materials) as significant elements. Thus,

TABLE 1: Overview of Organizational Uses of ICTs

ICTS IN DISTRIBUTED COURSES – ORGANIZATIONAL FUNCTIONS
<p>Administrative procedures and information Course publicity, online enquiry, registration forms Administrative information and common questions (FAQ) Course requirements and institutional regulations publicized</p>
<p>Student assessment and supervision Records of assignments received, and grades Student progression and intermissions, and supervision arrangements</p>
<p>Delivery of (some) learning resources Generic professional resources online Online searching resources and databases Official data and policy documents Pre-prints research reports and conference proceedings E-journals</p>

there may be divergence, or even tension, between institutional, staff and student interests in the deployment of ICTs. By way of example, the e-mail list model, a course support mechanism with very low entry costs, building on well-established working practices and software environments, does over the longer term tend to foster a centre-periphery pattern of communication which can overload tutor time (see Moonen, 1997) – and also carries the risk of encouraging dependence rather than self-direction among students.

Communication, Dialogue and Learning

When we come to consider the impact of the new technologies on quality of learning, questions proliferate. A recent meta-analysis by Hara and Kling (1999) confirms a current of thinking among online learning practitioners that there is a gap between the appreciation of the course delivery potential represented by ICTs, and the understanding of what makes for effective transferable learning and positive experiences for staff and students. For the andragogical approach, which sees students as a major resource for each other's learning development, this is a crucial issue. Social learning has been poorly served by traditional distance learning methods:

The constraint imposed on contingent dialogue between tutors and students and amongst students themselves in distance learning inevitably imposes limitations on social constructivist activities. (Armstrong, 1996)

From this perspective, the key advantage of ICTs is their potential for increasing the opportunities for mutual exchange, or for interaction through simulated co-presence. Indeed this is often a major objective in bringing a professional development course online.

However, our own empirical research on student experiences, paralleling that of others, leads to the

conclusion that realizing the apparent andragogical opportunities, particularly in the area of overcoming the tutor-centred model of teaching and learning, and enhancing learning dialogue among students, is not straightforward. Nor should we be surprised if professional development students online sometimes show less of the mature learner characteristic of self-directedness than might have been anticipated from their knowledge, experience, and general learning skills. Given that the autonomy of adult learners is context-dependent (see Boud, 1982), computer-supported group communication is in itself a sufficiently new context to pose challenges additional to those of new domain knowledge.

Emerging in parallel with the “hidden costs” literature referred to above is an “effectiveness of learning” literature from researchers who have been involved in pedagogical experiments with ICTs, or close to them in evaluation of outcomes, a literature that asks questions about existing examples or about best deployment of communication resources in support of learning from online dialogue (*inter alia*, Lee, Dineen and McKendree, 1997; McKendree et al., 1997; Mason, 1998; Wegerif, 1998).

For small professional development groups, what are the barriers to participative online learning? The case analysed by Hara and Kling (1999) implicated three quite different sources of difficulty: pragmatically, technical problems; in relation to the learning design, ambiguity or uncertainty; and in interaction, the need for swifter and more detailed feedback. While all of these are significant, the first writer's own investigations in the recorded online interactions of adult learners suggest that none of these sources of difficulty can be entirely isolated from issues around expectation and prior experience – with even the overtly technical sometimes representing a displacement of other kinds of concern.

Despite a long-standing acceptance of the liberating effects of computer-mediated communications on reticent individuals (Harasim, 1993; McConnell, 1994) some recent empirical work has suggested there may be critical thresholds for confident and effective engagement which some online course members may never attain (Wegerif, 1998; Salmon 1998), and there is some support for this from the students reported in Graebner and Levy (1999). A sense of social connectedness appears to be a contributing factor (Graebner and Levy, 1999) - or perhaps even a prerequisite (Weggerif, 1998) - for learning through participation in a discursive environment. Detailed comparison of working groups further suggests that communicative patterns may be significantly group-contextual and that their development through trial and error is liable to absorb considerable time and energy (Graebner, in preparation).

Issues of structuring the learning experience have also emerged: too many channels in the software environment may inhibit learning (Mason, 1998); while structured induction into discussion activities is vital (Salmon, 1997, 2000), even after the initial steep learning curve the management of uncertainty and isolation in the online environment remains a problem for a substantial proportion of students (Graebner and Levy, 1999), and so scaffolding devices have a continuing role.

Most seriously, the findings of the Vicarious Learner project (see Lee et al., 1997; McKendree et al., 1997) have suggested that the genuinely dialectic learning exchange central to the social constructivist model is not common from online interaction, though their experiments also suggest that such skills can be acquired, and that modelling in the course context through structured exercises and examples contributes to their acquisition (McKendree et al., 1997)

An underlying theme of the findings from this last project is that learning cannot be equated with articulating meanings online. The students investigated in Graebner and Levy (1999) were keenly aware that their recorded contributions to discussion online were a very partial representation of the learning they experienced on the course: "we all apply our own understanding elsewhere . . . What goes on in the [discussion areas] is only a fraction of the learning that has taken place on the course (contribution to a reflective online discussion, student P).

Individual reflective learning could easily remain invisible, and can be undervalued: "Silence is seen as non-participation when in fact it could simply be that someone is trying to think about what is happening and perhaps trying to make connections with either their practice or the debate or indeed the readings" (contribution to a reflective online discussion, student Q).

This produces a fundamental problem for assessing learning from the online evidence alone - for example, in grading students for their online participation. But at the same time it points towards ways of working with students to engage with the changing purposes and needs they bring to the online situation, or acknowledging that online discussion may be the occasion, rather than the site, of a developing understanding, and setting the scope of online activity accordingly. Through activities such as scheduled reflective discussions or personal journal keeping, or by addressing needs arising from the offline professional situation through mutual support groups or information exchanges, the resources of the online environment can be deployed to build bridges with students' wider experiences of learning. (For a useful general review of some styles of learning tasks which online discussion can support effectively, see Berge, 1999.)

While course-related induction and ongoing support are crucial to effective development of online discussion (cf especially Salmon 1998), we would stress that the support of an integrated course design is also indispensable; and that alternative forms of discursive software environments should to be taken into account, and related to the broader learning aims for the course. (The second point is developed further below.) Overall, Salmon's five-phase schema of motivation, socialization, information exchange, knowledge construction and development (Salmon, 2000) can offer a strong generic framework for courses introducing adult learners to a discursive online environment, although its application to different learning situations remains to be investigated. Our own experience has suggested that learners participate differentially in structured online activities, with individuals favouring those modes to which they relate most readily - which are likely to be influenced by factors such as domain experience or personal background (Graebner, in preparation).

Empowering Learners through Appropriate Online Structures

A major technology choice in designing an online learning event is between synchronous (real time) and asynchronous (time-independent) modes of interaction. The students studied in Graebner and Levy (1999) perceived the two modes as offering quite distinct kinds of learning experience, and the contrast forms a useful illustration of alternative software environments (see Table 2).

Finding a Sustainable Basis for Distributed Professional Development

In this section we present for discussion a pedagogically rather than technologically determined model for ICT-based professional development, which the authors have designed

in the context of the University of Sheffield Caribbean programme, initially for the delivery of an MEd in Networked Teaching and Learning, which is currently under development. This is seen as a pilot for future delivery of courses in the university's Caribbean programme.

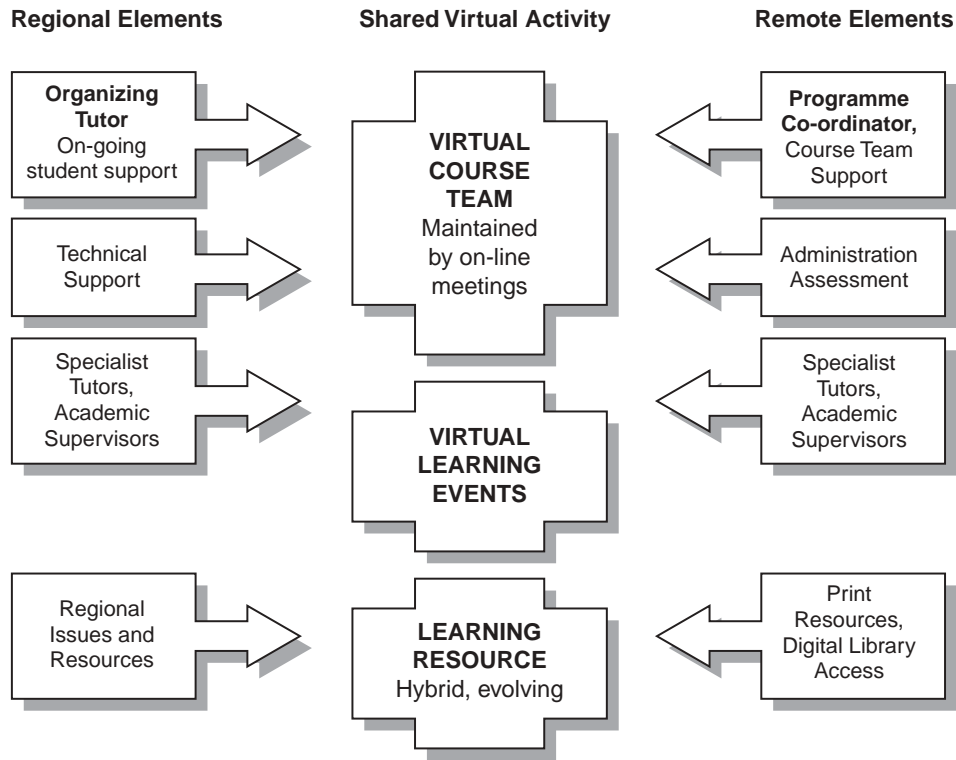
In developing a prototype for regionally based but distributed learning, we have brought together both the andragogical and the organizational considerations reviewed in the first section of this paper. Rather than offering just a delivery model with a localized element of input, it is important that this model creates opportunities for further and informal learning, in that it supports regional professional networking and that it uses the framework of a research-oriented master's programme to build some negotiation of curricular inputs and support, particularly around the use of authentic tasks from the students' own professional environments. In the interests of fostering social learning, the number of students sharing activities remains small - not more than twenty. (In principle, scaling up could be achieved by multiplying working groups.)

A provisional mapping of activities onto appropriate communication technologies is given below for the first year of the planned modular Master's course in Networked Teaching and Learning. We have adopted a three-phase model, rather than Salmon's five, on the grounds that in practice there is likely to be some overlap between learning phases. Channels of interaction are built up in a scaffolded sequence, exploiting the different strengths of synchronous and asynchronous modes.

**TABLE 2 • Students' Experience of Asynchronous and Synchronous Environments
– Perceived Strengths and Weaknesses**

	ASYNCHRONOUS DISCUSSION ENVIRONMENT	SYNCHRONOUS DISCUSSION ENVIRONMENT
Flexibility of time	Fits around other obligations, but can be marginalized by them. Time spent is open-ended.	Requires a fixed commitment of time, but at predictable intervals.
Pacing of interactions	Information overload can occur when the pace of discussion accelerates between log-ons.	Rapid pace; difficult for those who like to take time to articulate their views.
Management of information in discussion	Supports considered responses and collaborative writing. Threaded discussion provides a growing record to reflect back on. Bifurcating structure of discussion threads means that decision-making not well-supported. Supports diversity – with areas for multiple ongoing discussion topics	Not conducive to in depth discussion. Separate unthreaded transcripts from each meeting. Review and organization can be effective if the event is planned and structured. Maintaining topic structure depends on time-keeping and chairing.
Social environment	Provides channel for ongoing social support. Isolation – waiting for others to respond. Concerns about others' perceptions, and sometimes self-censorship.	Sense of presence creates “buzz”, or synergy. Helpful to engagement.

FIGURE 1:
Shared Roles and Responsibilities in a Professional Development Course:
The Sheffield Caribbean Master's in Education Model



As the programmes develop, the patterns of interaction are expected to evolve.

1. Orientation Period

- Online staff team development activities during student recruitment period
- Initial face-to-face study school - orientation to pedagogy, curriculum, and learning environment; group building and skill development

2. Acclimatization Phase: sharing of experiences and resources (first half of Module 1)

- Technical support - monitoring of students' online access
- Regional tutorials/progress meetings (synchronous online)

- Working groups - small-scale task reported back (asynchronous discussion)
- Real time review discussion - including remote tutor team

3. Development Phase: assignment of project work, discussion of key module topics (second half of Module 1, Modules 2 and 3)

- Regional tutorials/progress meetings in real time
- Virtual seminars - trans-regional/global (synchronous and asynchronous elements. Reading resources and transcript of the synchronous session available online.)
- Work-in-progress discussions and tutor support with assignments (predominantly asynchronous)

- Review and module evaluation discussions – including a synchronous event

Year two, the independent research phase of the master's degree, begins with a face-to-face orientation to educational research, and a period of planning and resource-sharing preceding the dissertation project itself. Dissertation themes are developed from individuals' professional practice issues. In developing support arrangements for the dissertation, students will have increasing access to specialist tutors, either regional or remote; some joint supervision, probably incorporating real-time meetings, is envisaged. They will also have some freedom over organizing peer support around common themes in projects and research development needs.

In Conclusion: Ongoing Research Questions

We view the further development of this model, through the pilot of a new Master's in Education in Networked Teaching and Learning, as opening up a number of significant action research issues in transnational continuing professional development. Prominent among them are:

Devising effective methods for building, extending and maintaining a virtual course team across national educational cultures.

Developing participative evaluation procedures using the online environment.

Establishing the possibilities for developing some economies of scale in course delivery, while maintaining sensitivity to context, and developing partnerships in the management of teaching and learning.

These are all topics on which we would welcome discussion with colleagues, in the context of the

Conference on Distance Education in Small States, and in the longer term.

Bibliography

Armstrong, F. (1996). "Teaching and Learning at a Distance: Redefining the Role of the Teacher," in *Going the Distance: Teaching, Learning and Researching in Distance Education*, edited by N. Hedge. University of Sheffield Department of Education Papers in Education. Sheffield: University of Sheffield.

Bacsich, P., Ash, C., Boniwell, K., Kaplan, L., Mardell, J., and Caven-Atack, A. (1999). *The Costs of Networked Learning - Final Report*. Sheffield: Sheffield Hallam University.

Berge, Z. (1999). "Online Teaching: Purpose and Methods," *Electronic Journal of Communication* 9, no. 1. http://www.cios.org/getfile/Berge_v9n199

Boud, D. (1981). *Developing Student Autonomy in Learning*.

Duffy T. M. and Jonassen D. H. (eds.). (1992). *Constructivism and the Technology of Instruction: A Conversation*, pp. 137-148. Hillsdale, NJ: Lawrence Erlbaum.

Gibbons, M., Limoges, C., Nowotny, H., Schwarzman, S., Scott, P., and Trow, M. (1994). *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*. London: Sage.

Graebner, C. "Beyond Bonding: From Community of Discourse to Diversity of Practice in Online Working Groups" (in preparation).

Graebner, C. and Levy, P. (1999). "Managing Flexibility: Issues in Supporting On-Line

Professional Development Courses,” in *Proceedings of the 1999 ICDE World Conference*, Vienna.

Hara, N. and Kling, R. (1999). “Students’ Frustrations with a Web-based Distance Education Course: A Taboo Topic in the Discourse.” Centre for Social Informatics Working Paper, September 1999, preprint, available at http://www.slis.indiana.edu/CSI/wp99_01.html

Learning Without Frontiers. (1998). UNESCO Learning Without Frontiers Programme <http://www.unestoc.org/education/lwf>

Lee J., Dineen, F., and McKendree, J. (1997). “Supporting Student Discussions: It Isn’t Just Talk.” HCRC Available from the Vicarious Learner Project Site at <http://www.hcrc.ed.ac.uk/gal/vicar/index.html>

Mason, R. (1998). “Models of Online Courses,” *ALN Magazine* 2, no. 2 (October).

McConnell, D. (1994). *Implementing Computer Supported Cooperative Learning*. London: Kogan Page.

McKendree, J., Stenning, K., Mayes, T., Lee, J., and Cox, R. (1997). “Why Observing a Dialogue may Benefit Learning: The Vicarious Learner,” in *Proceedings of PEG’97 Conference*, Bulgaria.

Moonen, J. (1997). “The Efficiency of Telelearning,” *Journal of Asynchronous Learning Networks* 1, no. 2. http://www.aln.org/alnweb/journal/vol1_issue2/moonen.htm

Salmon, G. (1998). “Student Induction and Study Preparation Online.” Paper presented to the Telematics in Education Conference, Finland (September). Online version at: <http://oubs.open.ac.uk/gilly>

Salmon, G. (2000). *E-Moderating - the Key to Teaching and Learning On-line*. London: Kogan Page (in press).

Wegerif, R. (1998). “The Social Dimension of Asynchronous Learning Networks,” *Journal of Asynchronous Learning Networks* 2, no. 1. http://www.aln.org/alnweb/journal/vol2_issue1/wegerif.htm