

Strand 1: Networked Learning For Professional Development

Paper 8:

Communication and collaboration on-line: New course models at the Open University

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Summary

- This paper will describe the background and theoretical approach informing the design of a new course at the Open University, T171 Going Digital, now under development. It will pay particular attention to techniques for creating an effective on-line educational community. The course is the latest in a series of experimental courses, research prototypes and production courses which the author and his colleagues have developed over the past decade which have introduced collaborative and activity-based learning techniques to distance learning.

Why collaborative learning?

- The historical models of learning in higher education and distance learning are largely individualistic activities, at least in their formal structure. The conventional university model is for students to attend lectures, read textbooks and as a result produce essays and take examinations. Of course, the Oxbridge seminar model is an important exception to this and, in practice, students often study together informally.

At the Open University, and other distance learning organisations, the focus is on producing written materials, or broadcast or distributed audio-visual materials which form the basis of the students' learning experience. Students are expected to digest these materials and confirm their mastery of them through written assignments and examinations. However, the Open University also runs face-to-face tutorials and Summer Schools which allow for some collaboration in practice, and students often form informal 'self-help' groups when they can.

In recent years, collaborative models of education have been taken much more seriously, and have come to be seen as having important pedagogical advantages.^{1,2} It is even seen as worthy of mention in a British government briefing document on the University for Industry, where it is seen as having the additional advantage of reducing staff input.³

The educational basis for collaborative learning is rooted in constructivist models of the way people think and learn.

"From the constructivist perspective, concepts are not inherent in things but have to be individually built up by reflective abstraction."⁴

Learning is not a matter of passively accreting concepts, but of constructing a conceptual edifice in which what is learned is integrated and linked to one's entire life experience. Understanding is not the same as remembering. For 'deep learning',

where what is learned can be applied to new contexts and generalised, we are concerned with the higher levels of Bloom's cognitive hierarchy⁵.

In practical terms, this means that students have to manipulate concepts they are learning, turn them inside out, look at their connections to other concepts. The job of the educator or instructional designer then is not simply to create materials in which concepts are clearly explained, but to create learning situations in which students find themselves actively engaging with the concepts they are learning. A particularly powerful situation is one in which one discusses what one has learnt with peers.

"In order to describe verbally what we are perceiving, doing, or thinking, we have to distinguish and characterise the items and relations we are using. This often focuses attention on features of our construction that had remained unnoticed, and it is not at all uncommon that one of these features, when put into words, leads us to realise that some conclusion we had drawn from the situation is not tenable."⁶

and

"Putting students into groups...compels them to explain their thoughts to one another and this has several advantages: on the one hand, verbalisation requires reflection (upon one's own thoughts as well as upon what the others are saying) and, on the other, students tend to listen more openly and with more interest to their fellow students than to the teacher."⁷

This approach to learning has led to the twin pillars in the instructional design of the course to be described below:

- Activity-based learning: in which activities are devised which require reflection and interaction with sets of concepts obtained through a set of learning resources.
- Collaborative learning: a sub-set of the above which includes group discussion and the presentation and clarification of concepts.

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One final theoretical point needs to be made: to obtain the benefits of collaborative learning it is not sufficient to put people into groups. Groups do not automatically work well. People may get offended by comments made to them, or feel let down if some members are perceived as not pulling their weight. It is necessary to foster a group ethos, including skills of working together, and of giving and receiving comments and criticisms. Furthermore, our understanding is that learning is most effective in a social situation where learners feel appreciated, supported and accepted with all their strengths and weaknesses.⁸ We have thus been concerned to develop on-line educational communities which foster these principles.

Some earlier projects

1993 - XT001 Renewable Energy Technology: fully collaborative learning on-line

This research project, sponsored by the UK Department of Employment, produced an experimental multi-media course taken simultaneously by students in the UK, Finland and Australia^{9,10,11}. Students received a CD-ROM containing a variety of resources. This course was designed, from the ground up, to use collaborative learning techniques on-line. There were three activities, one based on joint document creation, one based on exploring a virtual world, and a role playing exercise. It used what was then a new generation of computer conference system, FirstClass, to link students. This was also the introduction of FirstClass to the Open University.

Activity 1: Renewable Energy Technology in Europe

Here, students worked in groups to construct a joint document, in multimedia form. Each student contributed a chapter describing one renewable technology in a European country for which that technology is appropriate.

Activity 2: Integrated Energy in Ecotopia

A group of students explored a 'virtual world', the imaginary island of Ecotopia. They acted as 'research assistants' in a firm of energy consultants

jointly developing an energy policy for Ecotopia. We developed a spreadsheet model of the Ecotopian national energy system and a set of documents giving background information on Ecotopia and the policy positions of various Ecotopian governmental departments and other organisations. Each of these 'policy documents' included a few difficult questions which students had to answer.

Activity 3: Wind Farm for Ambridge

This is an exercise in which students take on various roles in a simulated public planning enquiry into the siting of a wind farm in the fictional village of Ambridge. Students were given a set of role briefs and background documents relevant to wind farms and planning enquiries.

For each of the three activities, students had to alternate between periods in which they did private work using the resources provided and periods in which they participated in discussions with other students using the communication facilities provided. The private work included: finding relevant information in the libraries on the CD-ROM, performing experiments with the model, writing up the results of these searches and experiments. The discussions included commenting on the results of other students and responding to points made in the public enquiry.

We made considerable efforts to create an on-line atmosphere conducive to collaboration, including such devices as 'electronic faces' (see figure 1), and 'empathy templates' to help students avoid misunderstandings.¹²

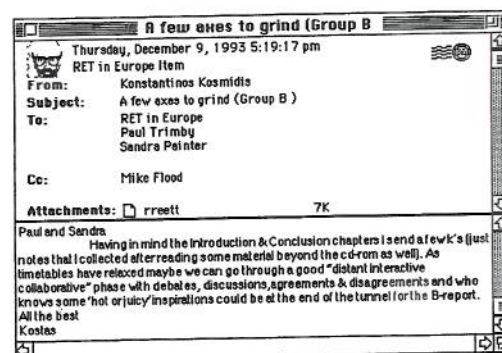


Figure 1 - The FirstClass interface as used in XT001

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1996 - T102 Living with Technology - A large-scale on-line academic community

Following upon the successful use of the FirstClass conference system in the experimental course XT001, it was incorporated into the Technology Faculty's first year course, T101 Living with Technology, which has 3-4,000 students per year. This was a modification to a conventional Open University course, so the learning methodology was not inherently collaborative. However, we were able to include some collaborative elements, and more importantly, to develop methods of creating a supportive, smoothly functioning academic community on-line.

The inclusion of computer conferencing enabled us to provide a wide range of on-line activities for students, including a library of current documents to keep the course up-to-date, guest seminars with outside experts, formal and informal discussions on various topics and themes in the course. The T102 on-line environment is shown in Figure 2. In parallel to the course-related conference structure, we set up a large on-line social area, with student-run conferences on many subjects (by student request).

To introduce computer conferencing on this scale required substantial effort to ensure it went smoothly. We developed a 'Communications Guide' which gave students structured exercises in using computer communications and, especially, on 'Netiquette', or how to work as part of an on-line support group. This included several 'Practical Communications Principles' which were developments from the XT001 Empathy Templates. In outline, these are:

PCP 1: Thank, acknowledge and support people freely

PCP 2: Acknowledge before differing

PCP 3: Speak from your own perspective (or at least some specified perspective)

The introductory exercises made use of a Practice Conference, in which there was a set of read-only messages from a set of 'virtual' students. These messages illustrated both good and bad on-line style, including the beginnings of a 'flame war'. Our students were given an assessed exercise in

which they had to analyse these messages in terms of the Practical Communications Principles and other principles in the Netiquette section of the Communications Guide. This was meant to give them a good basis for their own discussions throughout the course.

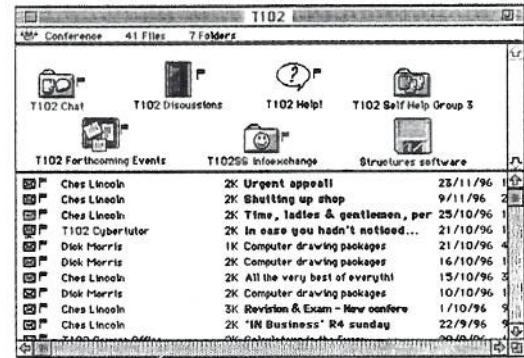


Figure 2 - The T102 on-line environment

As this one course alone had 300 part-time associate lecturers working with the students, we also developed extensive training for staff in how best to use the new media now at their disposal. There is a conference for staff to share ideas and exercises which have worked well.

The use of FirstClass conferencing in T102 led directly to its use by many other courses in the Technology Faculty and other faculties, mostly using variations of the materials developed for both students and staff training. In 1998 there will be roughly 30,000 students using this system. With its extensive possibilities for communication between students and staff, this has been one of the largest changes made to the learning methodology of the Open University since its original set of courses.

A new model for on-line education at the Open University

A team which includes many of the key people who developed the two projects described above are currently developing a new first year undergraduate course for the Technology Faculty which will be an inherently on-line course. It will use a Web site and a CD-ROM as its principle delivery media, with extensive use of on-line discussion groups.

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The course is labelled T171 and has the working title 'Going Digital'¹³. It will be made up of three 10 CATS point modules:

1 Learning in Cyberspace

2 The Story of the Personal Computer

3 The Internet: Where it came from, how it works

The idea behind T171 is to produce a course which introduces beginners to the wired world and explains how it came about. As a level 1 course, it also serves to introduce students to Open University study, and so the first module puts a heavy emphasis on basic study skills as well as introductions to the use of a computer and to computer communication.

Overall, Going Digital is seen as an extensible suite of modules introducing computers, communications and information technologies for the general public, with T171 as the initial set of modules. Our intention is to produce modules which can be purchased either as standalone packs or as part of a 30 point course. When purchased as a pack, a module will not include assessment and will not offer Open University undergraduate credit.

The design principles are meant to make effective use of current, computer-based media and to reduce the long lead times required for conventional Open University courses. The key principles are:

- The learning approach will be largely activity-based, including some collaborative activities, such as group authoring of Web pages, and Web searches for alternative views on material in the modules.
 - There will be no face-to-face tutorials. Instead there will be a range of on-line discussion groups, varying from small project groups, through to course-wide discussions on course themes or difficult areas, all with tutor support.
 - Minimal print. The modules will be presented in HTML, for access with a Web browser on a password-protected Web site. The Web site will be regularly updated to keep the course current.
- Two of the modules will use current books as set texts, supplemented by the on-line material.
 - A CD-ROM will be provided which includes all necessary software. It will also include a 'snapshot' of the Web site to permit off-line working, but the Web site will contain the most up-to-date version of the materials.
 - Each module will have its own assessment, and there will be no final examination. Students will complete an electronic 'portfolio' for each module, to be submitted on-line.

Use of media

Perhaps the most obvious innovation in T171 is its use of media. Instead of text as our primary medium, we are using browser-based delivery of material in HTML format, either on the Web or on the course CD-ROM. Printed text is not being ignored though: we are using set books for two of the modules.

We see the use of browser-based material as having a number of advantages over print:

- 1 We can integrate in a single environment, study guides, learning material, discussions, assessment, administration and a range of student support tools such as a diary, notebook, address book.
- 2 Colour is free in a browser, but very costly in text. Audio and video are now possible, but not as easy as text.
- 3 We can choose the presentational style. Some parts will be basically linear text, but with hypertext links to other parts, while some parts will be in the form of an audio-visual lecture. Authors have the choice of mixing in short lectures (basically slide shows with accompanying speech) where they think this is most appropriate.
- 4 Hypertext devices are powerful and will be used where appropriate, although we have no intention of trying to re-invent programmed learning. For example, we will be using:

glossary terms with hyperlinks to the glossary making it immediately accessible

hyperlinks to further explanations of concepts which only some students are likely to find problematical

embedded links to on-line discussion groups

hyperlinks to other parts of a module which provide background or more depth on a subject

- 5 The material becomes open-ended. We will be including links to external materials on the Web, where relevant, and will be asking the students to search the Web for more such material.
- 6 We can include a search engine on the Web site as a powerful indexing mechanism.
- 7 Browsers come with a good set of navigation devices built in, including retrace facilities, and structurable bookmarks/favourites.

As Open University staff, we are used to creating written material, and our main creative tool for many years has been the word processor. We are now finding that the latest generation of Web authoring tools¹⁴ are as easy to use as word processors. The basic HTML styles of headings and lists make structuring material easy, and HTML tables are a new formatting tool. Creating a hyperlinked set of documents is easier than using footnotes.

Of course, to get a professionally styled Web page requires additional design input, just as does going from a word processed document to a printed book. OU design staff are part of the overall team on T171.

CD-ROMs have been used for a number of years in education, but authoring and producing them has always been difficult. Usually, some significant skills in programming are required. The effort required to produce a fully multi-media style CD-ROM is nearer to that required for a film than for a book. Thus multi-media educational CD-ROMs generally require very large student numbers, well beyond even the large numbers on Open University courses, to justify their development costs. Some Open University courses are using multi-media CD-ROMs with the hope that there will be a large external market for them. Others are

using simpler, low-cost CD-ROMs, basically as a large disk full of a library of documents. Our strategy on T171 is somewhere in between these two.

We will be using a CD-ROM as a way of distributing the course software and also as an off-line copy of the course Web site. This will enable students to do a considerable portion of their work off-line, which will improve performance and reduce their telephone costs. It also preserves valuable network bandwidth. The multi-media facilities we can provide will thus be limited to those available through a browser, but those are quite considerable at present. Good navigation facilities are built into the browser, but we will also be adding a navigation bar to the Web site. Our plans call for very little additional effort on the CD-ROM beyond what is required for the Web site. The cost of duplication and distribution for a CD-ROM is very much lower than that of the same information presented in print. Moreover, with our strategy of a CD-ROM which is mostly a snapshot of a Web site, production time should be extremely short.

Learning approach

The learning approach will be a mixture of individual work and collaborative work. For example, students will be asked to read sections of the course set books and then answer questions in a short quiz on that section, and there may also be a computer conference linked to that subject to provide help and backup discussion.

For each module students will be expected to complete a 'portfolio' of items to be assessed. The portfolio will include a number of small items and one major item and is the heart of the activity-led approach. The small items will include such things as spreadsheet calculations where suitable, a structure diagram summarising some material to be read, the results of a search on the Web. The large items will be an essay to be presented in the form of a Web page. For this, the students will have the option of working individually or as part of a group. We think it is important that students working in groups do so as a matter of positive choice. One person working in a group against their will is likely to sabotage the group, perhaps without meaning to do so.

Creating the on-line community

As explained in the first section, to maximise the benefits of working collaboratively, we think it is necessary to actively foster a sense of community and practical skills of team work. This is a principal task of the first module. We will be using a similar approach to T102, with advice on 'Netiquette' to be applied in a Practice Conference on sets of 'good and bad' messages from virtual students. This will be extended by asking students to find examples of flame wars in Internet Newsgroups as practical examples of how a group can degenerate when good communication principles are ignored.

In addition, there will be a first group project in module 1 in which students read and summarise one of a small set of articles on team work and collaborative learning. After reading one article and presenting its summary to the group, they will be expected to read a second article and comment on another student's summary of it. In this self-reflexive activity, students will need to practise skills of careful commenting with support to ensure that people feel that they have gained by the exercise rather than feeling put down or diminished.

The conference structure of the course will include a number of conferences which are open to all students. These will cover remedial topics, special interest discussions, and general forums. These conferences will have a potential audience of several thousand (the expected student numbers on the course), but in practice are likely to have a much smaller core of active participants. Each such conference will be supported by a small team of tutorial staff with expertise in that area.

Students will also be part of a much smaller tutorial group, supported by the tutors who will mark their assessable portfolio material. The smaller groups are important to enable students to get to know each other and form a social identity. The collaborative work groups will be formed out of these tutorial groups.

We will be seeking tutorial staff for T171 who have experience and enthusiasm for on-line learning. (There is a rapidly growing body of such people arising from our current courses.) We will also provide training and on-line support for the tutorial staff.

One final issue, related to a sense of on-line community is that of intellectual property rights. We will be asking students to create Web pages based upon information they find by searching on the Web. Inevitably, they will want to incorporate material from Web sites they find. Technically this is very easy, but legally, we have been advised that it is probably a violation of copyright. This advice reflects a mindset which regards people as in competition and hence unwilling to freely offer other people the fruits of their labour. We intend to finesse this problem by exploiting the generally co-operative ethos on the World Wide Web. We will be providing our students with e-mail templates to send to sites to which they wish to link, requesting permission to do so and offering acknowledgement and reciprocal agreements. By reducing the overheads of requesting permission to a minimum (not much more than copying and pasting a URL) we will be fostering the Web's co-operative ethos among our students.

Conclusion

- This paper has described a series of courses at the Open University in which activity-based and collaborative techniques have been used. Our motivation has been a desire to create improved learning based on a constructivist model of learning, rather than simply a desire to exploit new technology. The learning approaches we have used require the learner to actively engage with the material being learned, especially through presenting their own versions of what they have learned and discussing it with others.

The projects have paid particular attention to the need to create a sense of a supportive community. We have developed methods whereby students practice communication skills and analyse discussions to see where they are successful and where they fail.

The two projects described in this paper used the FirstClass conference system as the basis for collaboration and discussion. The new course we are currently developing uses the added richness of HTML as a presentation medium, with embedded FirstClass conferences for discussion.

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- 4 von Glasersfeld, E. (1995) *Radical Constructivism, A Way of Knowing and Learning*, Studies in Mathematics Education Series, no. 6, London, The Falmer Press, p.184.
- 5 Bloom, B.S., (1956) *Taxonomy of educational objectives: the classification of educational goals*, London, Longmans, p. 207.
- 6 von Glasersfeld (1995), op. cit., p. 188.
- 7 *ibid* p. 190.
- 8 see examples and discussions in Goleman, D (1996) *Emotional Intelligence*, Bloomsbury, 1996.
- 9 Alexander G. (1994) "Final Report to the Training, Enterprise and Education Directorate: Renewable Energy Technology: An Interactive Open-Learning Course with Technology-Based Support", Report No. 52, Centre for Electronic Education, Open University.
- 10 Alexander G, (1995) 'Enhancing Quality in Distance Learning through Collaborative and Resource-based Learning', One World Many Voices, 17th World Conference for Distance Education, Oslo, ICDE and Milton Keynes, The Open University.
- 11 Dorairaju G, Hamalainen M, Krol J, Mikhi J, Patynen E, Virtamo J, Finland and Alexander G, UK (1994) "Computer Support for Resource-based Collaborative Learning at a Distance: OU XT001 and the Finnish Experience", in *Hypermedia in Vaasa '94*, Matti Linna and Pentti Ruotsala, Eds., Vaasa Institute of Technology.
- 12 Zimmer, R.S. (1995) "The Empathy Templates: A way to support collaborative learning", Chapter in *Open and Distance Learning Today*, Ed. Fred Lockwood, London, Routledge, pp. 139-150.
- 13 The team have decided not to use 'Going Digital' as the actual title but no replacement has yet been agreed. Some of us are currently calling it 'Not Going Digital'!
- 14 such as Claris Home Page and Microsoft Front Page.