The use of flexible learning resources for geographically distributed rural students

Dr. Frank W. Rennie[1]

Abstract

The focus of this paper is to describe and explain the evolution of teaching resources and tuition on the Rural Development Studies undergraduate degree programme at the UHI Millennium Institute. This degree was selected for development in a flexible style of delivery due to the curriculum contents and its delivery to a very scattered student population over a wide rural area. The degree has a multi-disciplinary approach with a variety of tuition styles, assessment mechanisms, and student support that have been tutored in both face-to-face and remote delivery, and this illustrates well the changing nature of Information and Communications Technologies (ICT) in student-tutor interaction.

Increasing emphasis is on the simplicity of the application of new technologies to facilitate interactivity between students and tutors but, most importantly, on improving the optimum mixture of the different teaching media used. The emphasis is on consistency and quality in distributed learning to encourage the sustainable delivery of formal education in rural and remote areas where it is not normally readily available. Current course research is investigating the sense of online community identity exhibited by groups of students on different levels, different study modules, and using different blends of resources for tutor-student-student communication.

Introduction

The suggestion has been made on numerous occasions since 1653 that there should be a university for, and located in, the Highlands and Islands of Scotland. This suggestion most recently gained momentum in 1996 with the concept of a university that is not simply sited in one central place, but attempts to distribute the role of a university throughout the entire region (Rennie, 2000). This resulted in the formation of a project to collegiate network of fifteen institutions, colleges of Further Education and various research establishments from Shetland in the north, to Perth in the south, an area of 39,058 Km2 (the size of Belgium) but with only 455,490 inhabitants (the second-lowest population density in Europe.). In 2001 the project became the UHI Millennium Institute, (UHI) a single Higher Education Institution, as a stepping stone to the creation of a new, distributed university for the region. A central plank in this plan is the use of ICT for the delivery of teaching and research tuition, as well as for networked administrative tasks. Colleges have adopted subject specialities that they lead on behalf of the network (teaching college to college, and college to local learning centre) though course teams may be drawn from staff situated across the network. Subjects taught range from vocational training, through degree courses, to post graduate research. The adoption of online courses, local learning centres, and networked library resources (MacKay, 2001) is regarded as a strategic target of the UHI in order to ensure consistent quality over a wide geographical area, as well as for economies of scale in rural and remote locations.

---
[1] Lews Castle College, UHI Millennium Institute, Stornoway Isle of Lewis

The definitions of online courses vary to cover "nearly any course which makes even a passing use of the Internet, as well as to those where every aspect of the course is only accessible electronically" (Mason, 1998). There is, however, general agreement that the use of ICT is fundamentally changing both the student-tutor interaction, and the teaching and learning process itself (Wheeler, 2001; McAlister et al, 2001). The central focus of this paper is the evolution of a particular academic programme, the Rural Development Studies degree, from conventional face-to-face teaching to online supported "blended learning" that uses communication of tuition as appropriate to the student.

Through professional involvement, the Course Committee were aware of ongoing work on the use of the Internet in the facilitation of education in rural areas (Bryden & Fuller, 1987; Bryden et al 1996). The rural development studies degree was initially selected for experimentation in the delivery of different online course materials for a number of reasons. It was the first UHI network degree programme, and therefore innovation was unencumbered by pre-existing structures and methods. The subject matter is not necessarily closely associated with information technology, but does have a direct relationship between the scattered end-users (students) and the subject topic (rural areas) which can be seen to contribute to sustainable rural development in practice.

A key aspect of the course evolution is the growth from a localised (on-campus) student population to a distributed learning network with individual students in areas remote from the campus that is providing the tuition. In the case of the UHI these students are generally scattered over a wide geographical area, and at a considerable distance from conventional centres of Higher Education. This drives the need to provide a system of consistent, cost-effective tuition and support for students in keeping with the UHI mission for the region. The Course Committee have experimented with delivery methods with each new student cohort from 1993 to 2002 by the introduction of different learning resources. The student response to these changes has been monitored by questionnaires for modules and courses, interviews with student class representatives, and student performance records. Recent research work has begun to investigate opportunities for increasing student interactivity with the online resources through the adoption of wireless broadband technology in the region.

This degree programme was specifically selected for experimentation because of four initial reasons relating to a combination of curriculum contents and the geographical application of the topic to a scattered student population.

1.   Modular structure

The standard format of the course is one of eight modules in each of three levels, corresponding with the award of Certificate of Higher Education, Diploma of HE, and BA degree. The modules are each valued at a notional 150 hours of study time, including tutorials, guided study, preparation for assessments, and some of the recommended reading time. This system gives the potential of a great deal of flexibility in the construction of the undergraduate programme, allowing modules to be shared between different degree teams, completed for different levels of awards, or undertaken as stand alone modules of study for individual interest or continuous personal development. The modular format also allows the developer of curriculum resources to experiment within a relatively small, self-contained area of study, which can be used to roll out good practice to other curriculum areas on an incremental basis (Laurillard, 1993).

2.   Inter-disciplinarity

The nature of the subject requires students to grapple with a wide range of topics, concepts, and methods from both the physical and the social sciences. This interdisciplinary approach offers a very rich source of educational resources to enliven the learning process, but also poses difficulties for the tutors as the opportunities vary widely with the subject and level of each study module. An obvious example is that it is difficult to tutor the practical aspects of laboratory or fieldwork at a distance, and that this becomes more difficult as students progress to higher levels of study, although some work is being attempted to create resources for virtual field study. Conversely, subjects that place a greater reliance on discussion and/or text-based study may offer liberating opportunities for students to access restricted materials or engage in debate with a very selective (possibly global) group of enthusiasts, and pilot sessions with (remote) guest tutors have been included on several occasions.

3.   Learning methods and study tools

The variety of topics within the degree, and the fact that they were starting with a relatively new degree programme, enabled the Course Committee to begin to experiment with different pedagogic approaches. In particular the Course Committee were keen to enable the students to develop strong links between the theory and the practice of rural development by fostering reflection on pragmatic issues relevant to their own region and individual experience. This was encouraged by a need to spread the availability of the course to potential students in other regions, distant from the main campus, yet to maintain a consistency in the educational resources and tutorial support for students, regardless of their geographical location or method of study.

4.   Assessment instruments

In view of the multi-disciplinary approach, it was to be expected that the Course Committee should look to develop a variety of assessment mechanisms. These have been used in both face-to-face and remote delivery, and range from conventional essays, reports, and time-limited exams, to the inclusion of oral presentations, team projects, seen-exams, and journal records of fieldwork or work placements. This variety in the types of formal assessment has been regarded as a strong point of the degree by tutors, employers, and external examiners, but it is as well to realise that not all types of assessment are equally applicable across all subjects, levels, and the problems of distance and/or time dislocation (Morgan & O'Reilly, 1999).

Pedagogic Evolution of Tuition and Support

The degree programme began to enrol in 1992, initially in a conventional face-to-face system of lectures and tutorials. Levels 1 and 2 incorporated the FE awards of Higher National Certificate (HNC) and Diploma (HND), so were based entirely upon continuous assessment (no final exams). With progression to Level 3, (degree) some exams were introduced for the first time, as well as other appropriate assessments such as extended essays, personal projects, and collaborative work. This seemed sufficient for the early cohorts, but as the course picked up momentum student feedback and performance made it obvious that some resources were

required to assist students to navigate through the course, and to make the links between diverse facts and concepts. This led to the production of paper-based study packs giving students both new texts, and some orientation to existing texts, web sites and other resources.

These paper-based resources were not intended to function as stand alone courseware, in the manner of the type of courseware used by the UK Open University, but rather to complement and supplement other forms of course resources. It quickly became evident that some students were choosing to use these texts rather than attending lectures, and as a supplement to their attendance at tutorials. Module satisfaction questionnaires indicated that this was particularly true for students with a distance to travel to the main campus, and those with childcare or other family responsibilities – i.e. those students for whom time allocation was a major concern (cf. Mason, 2001).

As the concept of the University of the Highlands and Islands Project took a firmer shape, the course began to attract enquiries from students at locations other than the main campus in Stornoway. Students began to be located at the main campus sites of other Academic Partners in the UHI network, but within a year the catchment was extended to include a small number of the 60+ Local Learning Centres operated throughout the Highlands and Islands. It is not the purpose of this paper to examine the contribution of these Local Learning Centres, but other work (Bryden et al., 1993; Broumley & Weedon, 2001) and ongoing work (Mason & Rennie 2003; Broumley et al 2003) has tried to document this.

In parallel with these developments, many students were quick to capitalise on the liberating aspects of e-mail support. All UHI degree students are issued with an e-mail address during their induction week, and many students also have private addresses that they use to communicate with tutors. No restriction has been placed on which Internet Service Provider students use. The main uses of e-mail are students asking specific questions for guidance, but increasingly staff and students are becoming comfortable with the submission of assessments and formal tutorial support by e-mail.

During the late 1990s, the UHI began to use videoconference technology, for tuition, faculty meetings, and other management operations such as student counselling (Ross, 2000). Since 1998 tutors have been involved in the facilitation of tutorials via videoconference links to selected learning locations in the UHI network. These videoconference sessions are timetabled like normal face-to-face classes and run on a variety of systems from ISDN 2 to ISDN 6, with a corresponding increase in the quality of the video image. This gives students the benefits of live-time video tutorials, particularly to reinforce inter-activity between tutor and student, though the cost of the hardware means that it is effectively restricted to certain Local Learning Centres and main campus locations. There are added complications in the use and maintenance of the videoconference network, particularly at remote sites where IT technical support may be very limited, and this can be a disincentive for students to fully participate. Overall, experience has shown that to be able to videoconference is better than not being able to take part in a meeting held at a distance, but it requires a different meeting etiquette, and is not a panacea for the problems of distance tuition.

As students (and staff) began to draw more heavily on web-based resources, there was a gradual transition from paper-based learning resources to the creation of linked resources on

the World Wide Web. This path of development is fairly typical of this sector, (Ryan et al, 2000; Miller & Padgett, 1998; Care & Scanlan, 2001) from simple course and guidance notes hosted on a campus server through the introduction of greater interactivity for the learner, to the provision of individual study modules within a password-protected Virtual Learning Environment (VLE)(in this case BlackBoard[tm] was introduced in 2000 – see Fig. 1). The advantages of the VLE are in the provision of a continuously available, consistently structured site that offers familiarity for the learner. Easily identifiable signposts indicate learning resources labelled "Course Information" "Course Documents" "Discussion Board" etc. and are consistent for modules across the programme of study. The VLE can host documents (with internal and external links), graphics, photographs (still and moving - including full webcasts) as well as discussion 'threads' for computer conferencing, and a space for course announcements. All course modules are now hosted on a UHI Blackboard environment.

Insert figure 1 about here

Over the last three years, as demand has grown, increasing pressure has been placed on the (expanded) videoconference facilities with correspondingly greater stress being placed upon equipment and staff. This is a common theme in online course development, which records that the problems associated with course management (as distinct from tuition) are consistently underestimated and under resourced (McAlister et al, 2001; Care & Scanlan, 2001). In particular, attempting to deliver a traditional 'lecture' to students who are in the same room while simultaneously linking with students at remote sites, has proven problematic.

This has led to three major shifts in emphasis, firstly a concentration upon tutorials rather than lectures; secondly a greater emphasis on the development of web-based resources for students; and thirdly the addition of telephone tuition (individual and audio conference) as a key form of contact with students. Telephone tuition is easy to organise, relatively inexpensive (particularly as most homes, offices, and learning centres already have the necessary hardware) and very effective in small groups. It does not have the advantages of asynchronous access like e-mail and web-based resources, but student feedback indicates that is ideal for use in combination with other formats as it is a technology that is familiar to most users.

Most recently, staff have been experimenting in the use of the Microsoft NetMeeting application as a means of adding to the richness of student support. This format combines real time audio, video, and text chat, with the powerful advantages of being able not only to display documents, graphics, web images etc. to the remote students, but also to provide interactivity by sharing documents, desktop functions and applications between remote sites. The technology costs and complexity is modest as the basic requirements are a computer, Internet access, and web-camera but successful operation requires some extra cost and some training.

Experiences with Technology

Technical Problems

Not infrequently we focus on the negative aspects of technology that frustrate and irritate us, and there is no doubt that a strong reliance upon educational technology produces its fair share of irritations. Although a complete breakdown of systems is rare for any length of time, students (and staff) are quick to complain when any break down does occur. Difficulties in accessing the Internet, either through software problems, physical breakage, or slow response times may be minor problems in the scale of things, but when users are accustomed to the familiarity of the medium these can seem major barriers. Staff have needed to recognise these difficulties in scheduling course work and the design of courseware, e.g. attaching graphics or large files as options, rather than forcing students to download large volumes of data over poor lines. Even minor irritations in the perceived quality of learning can contribute to the deterioration in the motivation and learning effectiveness of the student (O'Malley & McCraw, 1999; McAlister et al, 2001).

The technical complexity of the systems may also prove to be a barrier to learning, particularly when users are anxious about the medium. Even when users become comfortable with routine operational tasks, such as starting or closing a videoconference system, internal monitoring has shown that users often seem conscious that they are utilising only a small part of the capacity of the system, and even experienced users rarely claim complete confidence in using the whole system. In situations where technical support is minimal or absent, there can be considerable extra stress placed upon users, and even on the main campus, and there is a visibly high dependence on the availability of ICT technical support for tutorial staff.

None of these options are cost-free. The design process is expensive (Care & Scanlan, 2001) and in many cases the real costs are hidden. This should be balanced against the 'opportunity cost' that would accrue by not attempting to extend students numbers, abilities, and geographical coverage by retaining only a 'conventional' course delivery (Bacsich et al, 1999; Oliver, 2000). This is a key political consideration in the Highlands and Islands region. In terms of the various models of online courses, different modules on the Rural Development Studies degree correspond to different examples of the typology by Mason (1998) listed as, a) content + support model; b) wrap around model; c) integrated model. The course as a whole would correspond to the integrated model.

These three types (and hybrids) will have different cost implications, and should be driven by the nature of the subject material, the objectives of the module, and the ability level(s) of the participant students.

People Problems

The most common people-problem is inexperience in the use of ICT. Training in the use of the VLE is now an integral element of student induction, with a greater recognition of the varying levels of student abilities at entrance (Perrin & Mayhew, 2000) reflected in the induction procedure. Students are assisted at the start of the year in the preparation of a personal learning plan that acknowledges their prior abilities, and this directs the students to areas where they can improve and extend their ICT skills.

With increasing practice and competence we can reduce the effects of technofear, (Bryden and Fuller, 1987 p29) as technology evolves, the likelihood is that there will always be a 'lag-time' during which the skills of users fail to meet their aspirations. The important point is that the emphasis should be upon equipping the users (staff and students) to utilise the scope of the VLE to their own best advantage. Some users will wish to proceed into greater depth but this will not be necessary for all. The learning process itself, as well as the contents, becomes student led.

Perhaps the most difficult aspect of the VLE is that of maintaining personal contact between tutor and student. This varies between levels of study, between individual students, and between stages in the educational development of an individual student. While never a complete substitute for direct personal contact, the appropriate design of the VLE does offer particular advantages for students who are distant in time or place from the working space of the tutor. There is a recognition that "electronic learning brings education to the living room where everyone in the family can participate, rather than keeping it in the classroom where only students and their peers take part." (Perrin & Mayhew, 2000). The issue of the quality of support given to the student by personal contact, whether online or offline, remains the key educational factor in the success or failure of online modules.

Student Benefits

A considerable amount of literature has been produced on the subject of resource-based Internet learning and Higher Education (Mason & Kaye, 1989; Ryan et al., 2000) and in particular with the student perspective of web-based courseware (Mason & Weller, 2000; Hara & Kling, 2000). The issues most central to discussions of online teaching have been summarised and discussed by Mason (1998) as:

- **collaborative working** for all curriculum areas.
- **rolling intake** versus cohort system of student groups
- **tutor workload** to maximise input and develop online facilitation skills
- **motivation of students** to ensure effective participation in class work
- developing **sustainable, cost-effective models** for online education

To this I would add, the accreditation of students, at all levels, with demonstrable, transferable skills that add value to the academic competence of the student. The Rural Development Studies course has attempted to provide benchmarks in transferable skills through the integration of Personal and Professional Capabilities (ppc's) into all levels of student assessments, and this is worthy of discussion elsewhere, (UHI, 2001).

Course Benefits

Course benefits vary according to the design of the resource base. As in the design of 'conventional' courses, it is critical that tutors and course designers should have a clear understanding of the aims of the course and the objectives of creating online resources (Mason, 1997; McAlister et al, 2001). There needs to be recognition that "developing a distance learning course is not simply applying an interactive technology to traditional course offerings. Rather, distance education should capture what teachers do in the classroom in a way that can be understood by students studying at a distance" (Care & Scanlan, 2001). The

creation of online course materials may or may not be initially very expensive, dependent on the level of interactivity, tutor support, and additional (wrap-around) resources. The factor to be aware of is the maximum value of the opportunity cost for the course. This means the full cost of not developing innovative educational study units that enable wider, asynchronous access, in which the factors of time and distance are minimised as difficulties. There are obvious benefits in terms of greater numbers of students, more resources, more extensive reputation, and professional satisfaction. This is true if "the underlying aim of such courses is learning how to learn; that is, facilitating knowledge management skills such as searching, selecting and synthesising information, discovering how and where to find answers and solutions, and understanding, transforming and presenting ideas. The Web provides both the cause and the means for doing this." (Mason 1998)

In these respects, the Rural Development Studies course has been found to compare well with the 'traditional' style of tuition when student satisfaction questionnaires for online and campus-based students are analysed. This has resulted in a very recent move to enrol all course students to the VLE, whether they are on the main campus or in more remote Local Learning Centres. The only difference between these students is in the method(s) by which they receive their main tutorial contacts, and consequently the differences in the quality of these contacts, as perceived by the students, is the subject of ongoing research by the course tutors.

Advantages of "blended learning"

There are many benefits of a "technologically enhanced learning environment" to increase the pedagogical effectiveness in the tuition of course contents at a distance (Miller & Padgett, 1998). There are at least seven clearly identifiable advantages to this sort of "blended learning" format of educational experience:

1) **Support is not dependent on a single medium** – reliance upon any single form of subject 'delivery' is liable to be susceptible to system breakdown, whether human or technological. A mixed format spreads the risks and benefits of synchronous and asynchronous support between a wide range of 'high' and 'low' technologies and provides a backup.

2) **The format gives time and distance flexibility** – which is a particular attraction for students who are part-time, have family and/or work obligations, are based in locations remote from the tutor, and/or are spread across a wide (global?) geographical area.

3) **A consistency of learning resources** - is provided for all students, regardless of whether they are located on the main campus, have easy access to a university library on site, or are working in some degree of isolation from a campus.

4) **The mixed format is subject and student sensitive** – with no requirement to operate according to a blueprint. It allows an opportunity to customise student support, to a limited extent, by using tuition styles and technologies with which the students is most comfortable.

5) **This enables the tutorial resources to be used in an appropriate context** – for example, adjusting the use of the tuition medium used to the lowest level of complexity. There may be no need to use slow resolution, expensive video-conference technology if the same result can be achieved with web-based resources backed by a telephone tutorial.

6) **The mixed format develops extra skills in students** – both 'standard' written or verbal communications skills, together with competence in a variety of ICT applications of differing complexity. In this course the diversity of skills is extended due to the multi-disciplinary nature, necessitating familiarity with widely different concepts, contexts, and methodologies of investigation.

7) **More power is invested in the students** – through the ability to select their own style and pace of working, as well as, in some cases, both the context/application of the study module, and increasingly the choice of module preferred by the student from a pool of modules at the appropriate academic level.

Furthermore, the mixed format increases opportunities for "using non-linear strategies for problem-solving, representation, and the storage and retrieval of information." (Wheeler, 2001).

Current Course Developments

The Course Committee have sought to capitalise on the advantages of this "blended learning" by pursuing and/or strengthening a number of aspects of the course, particularly with the transition from Mode 1 to Mode 2 learning (Fig. 2 and Hills, 1999). This means a greater emphasis upon collaborative teaching and learning, a problem-based focus for research and investigation, and the precedence of the context of the acquired knowledge over the volume of content. This transition is being applied not just in course design and development, but also in tuition support, student activities, and formal assessments. Emphasis has been placed on the recognition of transferable skills within each course module. These Personal and Professional Capabilities (PPC) identify a range of life skills for different levels of study, that can indicate to a prospective employer the non-academic skills and abilities of the student.

Insert figure 2 about here

Following the trends for the widening of student access to Higher Education, and the growing numbers of adult learners seeking to return to formal study (O'Malley & McCraw, 1999) the course is now attracting a greater number of part-time students. In response to these demands the course is now being offered to people in full-time employment as well as in 'stand-alone' learning units for Continuous Professional Development.

These demographic changes to the student profile, together with the geographical extension of the student population through access provision at the 60+ Local Learning Centres in the north of Scotland, have encouraged the Course Committee to re-think how course resources

can best be distributed to students. Consideration is being given to Compact Disks for offline use, giving students access to a 'static' VLE, together with a compilation of hypertext links, relevant literature, web-casts, and graphical illustrations. This will reduce online ICT costs, while providing a controlled and integrated environment of support resources and allowing 'live' hypertext links to online resources when, and if, students choose. Links have also been made with the resources of an electronic Hybrid Library, and the Public Library Service to hold and distribute texts throughout the region, and it is hoped to extend this service (Mackay, 2001).

Implications for Sustainable Rural Development

The Rural Development Studies course was selected for the development of blended learning, in part, due to the direct relationship between the scattered end-users (students) and the subject topic (rural areas). An issue in some staff research has been the contribution which online learning can make towards the support of sustainable development of communities in rural areas. This work is ongoing, but a number of immediate benefits have been identified, particularly in the reduced travel costs and travel time – for students who participate in the course. The ability to engage with Higher Education within a relatively short distance from the home location has meant participation by students who could not afford the financial cost or time cost to travel to (and probably reside in) the major centres of population where Higher Education Institutes are situated. This has opened up access to individuals and geographical regions previously largely excluded from participation in the knowledge economy of Higher Education.

As a consequence, the financial cost saved on commuting and student lodgings is potentially released for spending in the local economy, contributing to a local economic multiplier. By being enabled to live in their home area, students are also available for local employment, and this retention and attraction of skilled citizens is an important aspect of demographic development in many rural areas.

The growth of e-learning offers opportunities for realising the rhetoric of 'lifelong learning' in rural areas, where economies of scale almost inevitably place restrictions on the delivery of education by 'traditional' means. The accumulation of additional intellectual and economic skills are therefore able to be used to build up the social capital of the region, (Blanchard & Horan, 1998; Dhesi, 2000) rather than be a causal factor in the out-migration by the rural population in search of academic qualifications. In addition to this, a substantial body of literature now exists on the creation of educational online communities, both for specialist and social purposes (Stephenson, 2001), and documenting the new social networks and enhanced social diversity which might be found through online communities, (Rheingold, 2000; 2002). This social enhancement alone may be a significant contributory factor in rural areas, where low population density may make the establishment of face-to-face clubs etc. for specialist functions difficult. Digital inclusion therefore offers some of the gregariousness of the city, with the life-style advantages of the countryside

Finally, initial feedback indicates the most significant benefit of online access to learning in remote areas may be in the perception by the rural communities of an improved quality of life through access to a wider range of services, facilities, and educational or economic structures (Blanchard & Horan, 1998). In annual course reviews and student satisfaction surveys, students consistently cite the benefits of online resources and network support in the

reduction of the disadvantages of physical communications across the region. The feeling of 'connectedness' to individuals and resources within their own local community may in itself be a motivation and/or entrepreneurial factor that can in part compensate for the economic disadvantages of living physically remote from centralised (urban) markets and facilities (Anderson, 2000). There is growing evidence from regional studies that this may be significant in the relocation of centralised administration facilities to areas currently peripheral to main business centres. These relocations may be geographically distributed around the country to take advantage of local infrastructure, differential urban/rural costs, and quality of life concerns for staff, and this process has started with both UHI and Highlands and Islands Enterprise (HIE) relocating some of their centralised network functions to more 'peripheral' parts of their region of operation.

Lessons for Remote Delivery

The experience of this degree programme suggests a number of key points to consider in the delivery of higher education programmes to communities of geographically distributed learners. The shift to predominantly web-based learning resources builds on the best aspects of the Internet, namely asynchronous access, interactivity, a large resource base of learning materials, and non-linearity of the learning experience. It also helps to provide quality consistency of learning resources and flexibility in the provision of tuition and support. These factors are assisted by the modular degree structure (small chunks of learning objects linked carefully) that is well suited for inter-disciplinary programmes with an assortment of assessment instruments.

It has become apparent that delivery styles are not as critical as student support mechanisms, and that the adoption of several different methods of staff-student contact are preferable to placing all trust in a single medium of technology. A 'wrap around' module structure inclusive of web-resources, a text book, and a range of (high and low) communication technologies is a robust delivery platform. The development of these aspects of online learning emphasises the need to adopt the Mode 2 shift from lectures towards tutorials, problem solving in context, and group learning in flexible networks. This course has been strengthened by the inclusion of ICT training for all students at induction, and by the incorporation of credit for non-academic transferable skills.

References

Anderson, A. R. (2000). Paradox in the periphery: An entrepreneurial reconstruction? *Entrepreneurship and Regional Development*, *12*(2), 91-110.

Bacsich, P., Ash, C., Boniwell, K., & Kaplan, L. (1999). *The Costs of Networked Learning*.(Two volumes) (Sheffield Hallam University). URL: http://www.shu.ac.uk/cnl (Accessed October 10, 2001)

Blanchard, A. & Horan, T. (1998). Virtual communities and social capital, *Social Science Review*, 16 (3), 293-307.

Broumley, L., & Weedon, E. (2001) *Evaluation of the LINC Project - Learning in Networked Communities*, UHI. URL: http://www.uhi.ac.uk/adapt-linc/web_pages/eval/internal.htm (Accessed October 16, 2001)

Broumley, L. Weedon, E. & MacLean, C. (2003). *e-dialogues: developing academic capabilities. ?* Proc. eLearn International 2003 World Conference on Global Directions in eLearning, Edinburgh Scotland 9-12th February 2003.

Bryden, J. M. & Fuller, A. M. (1987). *New technology and rural development*. Report of a seminar held in Scotland, 5-9 October 1986. Enstone: The Arkleton Trust.

Bryden, J., Johnstone, M., Rennie, F. W., & Black, S. **(**1993). *Final year report on the evaluation of the Community Teleservice Centres in the Highlands and Islands*. The Arkleton Trust report to Highlands and Islands Enterprise. ISBN 0-90-6724-41-4

Bryden, J., Fuller, T., & Rennie, F. (1996). *Implications of the Information Highway for Rural Development and Education*. Report of the Arkleton Trust Seminar, Douneside, Aberdeenshire, Scotland, February 1995. Enstone: The Arkleton Trust. ISBN: 0-906724-43-0

Care, W. D., & Scanlan, J. M. (2001). Planning and managing the development of courses for distance delivery: Results from a qualitative study, *Online Journal of Distance Learning Administration*, 4(2), URL: http://www.westga.edu/~distance/ojdla/summer42/care42.html (Accessed November 08, 2001)

Dhesi, A. S. (2000). Social capital and community development, *Community Development Journal*, *35*(3), 199-214.

Hara, N. & Kling, R. (2000). *Students' distress with a Web-based distance education course: An ethnographic study of participants experience*. Center for Social Informatics Working Paper. URL: http://www.slis.indiana.edu/CSI/wp00-01.html (Accessed September 10, 2001)

Hills, G. (1999) The University of the Future. pp 213-32 in Thorne, M. (Ed.), 1999, *Foresight: Universities in the Future*. Dept. of Trade and Industry, UK.

Laurillard, D. (1993). *Rethinking university teaching: a framework for the effective use of educational technology*. London: Routledge. ISBN 0-415-09289-2.

McAlister, M. K., Rivera, J. C., & Hallam, S. F. (2001). Twelve important questions to answer before you offer a web based curriculum, *Online Journal of Distance Learning Administration.* 4(2). URL: http://www.westga.edu/~distance/ojdla/summer42/mcalister42.html (Accessed November 08, 2001)

Mackay, M**.** (2001). Collaboration and liaison: the importance of developing working partnerships in the provision of networked hybrid services to lifelong learners in rural areas*, Library Management*, 22(8/9), 411-5.

Mason, R. (1997) *Advancing opportunities for enhancing learning*. URL: http://www.nw97.edu.au/public/papers/mason.html (Accessed September 10, 2001)

Mason, R. (1998). Models of Online Courses, *ALN Magazine 2*(2), October 1998. URL: http://www.aln.org/alnweb/magazine/vol2_issue2/Masonfinal.htm (Accessed September 02, 2001)

Mason, R. (2001). *Time is the New Distance: a Discussion*. Inaugural Lecture of Professor Robin Mason, The Open University, UK. URL: http://kmi.open.ac.uk/projects/stadium/live/berrill/robin_mason.html (Accessed September 12, 2001)

Mason, R. & Kaye, A. (Eds.) (1989). *Mindweave: Communication, Computers and Distance Education*. Oxford: Pergamon Press. ISBN 0-08-037755-6. URL: http://icdl2.open.ac.uk/mindweave/mindweave.html (Accessed October 16, 2001)

Mason, R. & Weller, M. (2000). Factors affecting students' satisfaction on a web course, *Australian Journal of Educational Technology*, *16*(2), 173-200. http://cleo.murdoch.edu.au/ajet/ajet16/mason.html (Accessed September 02, 2001)

Mason, R & Rennie, F. (2003). *Broadband: a solution for rural e-learning?* Proc. eLearn International 2003 World Conference on Global Directions in eLearning, Edinburgh Scotland 9-12th February 2003.

Miller, M. D. & Padgett, T. C. (1998). Redesigning the Learning Environment for Distance Education: An Integrative Model of Technologically Supported Learning Environments,

Online journal of Distance Learning Administration 1(1) URL: http://www.westga.edu/~distance/miller11.html (Accessed November 11, 2001)

Morgan, C. & O'Reilly, M. (1999). *Assessing Open and Distance Learners*. London: Kogan Page. ISBN 0-7494-2878-3.

Oliver, M**.** (2000). An introduction to the evaluation of Learning Technology, *Educational Technology and Society* 3(4). ISSN 1436-4522). URL: http://ifets.gmd.de/periodical/vol_4_2000/intro.html (Accessed November 13, 2001).

O'Malley, J., & McCraw, H. **(**1999). Students perceptions of distance learning, online learning and the traditional classroom, *Online Journal of Distance Learning Administration*, 2(4). URL: http://www.westga.edu/~distance/omalley24.html (Accessed November 08. 2001)

Perrin, K. M., & Mayhew, D. (2000). The reality of designing and implementing an Internet-based course. *Online Journal of Distance Learning Administration*, *3*(4). URL: http://www.westga.edu/~distance/ojdla/winter34/mayhew34.html (Accessed November 08. 2001)

Rennie, F. W. (2000). The importance of the University of the Highlands and Islands Project in Regional Development in NW Scotland. pp 99-108. In Allansson, J. G. and Edvardsson, I. R. (Eds.) *Community Viability, Rapid Change and Socio-Ecological Futures.* The University of Akureyri and The Stefansson Arctic Institute. ISBN 9979-834-26-9.

Rheingold, H. (2000) *The Virtual Community*. (Revised Edition). (MIT Press). ISBN 0-262-68121-8. (2nd Edition, 1998 at URL: http://www.rheingold.com/vc/book (Accessed March, 05, 2002).

Rheingold, H. (2002). *Smart Mobs: The next social revolution*. Press. ISBN

Ross, C. (2000). *Video-counselling: A report of a pilot study in the University of the Highlands and Islands Project*. A UHI/SFEU Learning Environments and Technology Report. UHI/SFEU. ISBN 1-902393-09-0

Ryan, S., Scott, B., Freeman, H., & Patel, D. **(**2000). *The Virtual University: The internet and Resource-Based learning*. London: Kogan Page. ISBN 0-7494-2508-3.

Stephenson, J. (Ed.) (2001) *Teaching and Learning Online: Pedagogies for New Technologies*. London: Kogan Page. ISBN 0-7494-3511-9.

UHI (2001). *What are PPCs?*. URL: http://www.pdp.uhi.ac.uk/ppc.htm (Accessed December 07,2001)

Wheeler, S. **(**2001**)** Information and Communication Technologies and the Changing Role of the Teacher. Journal of Educational Media, *26*(1), pp 7-17. ISSN 1358-1651.
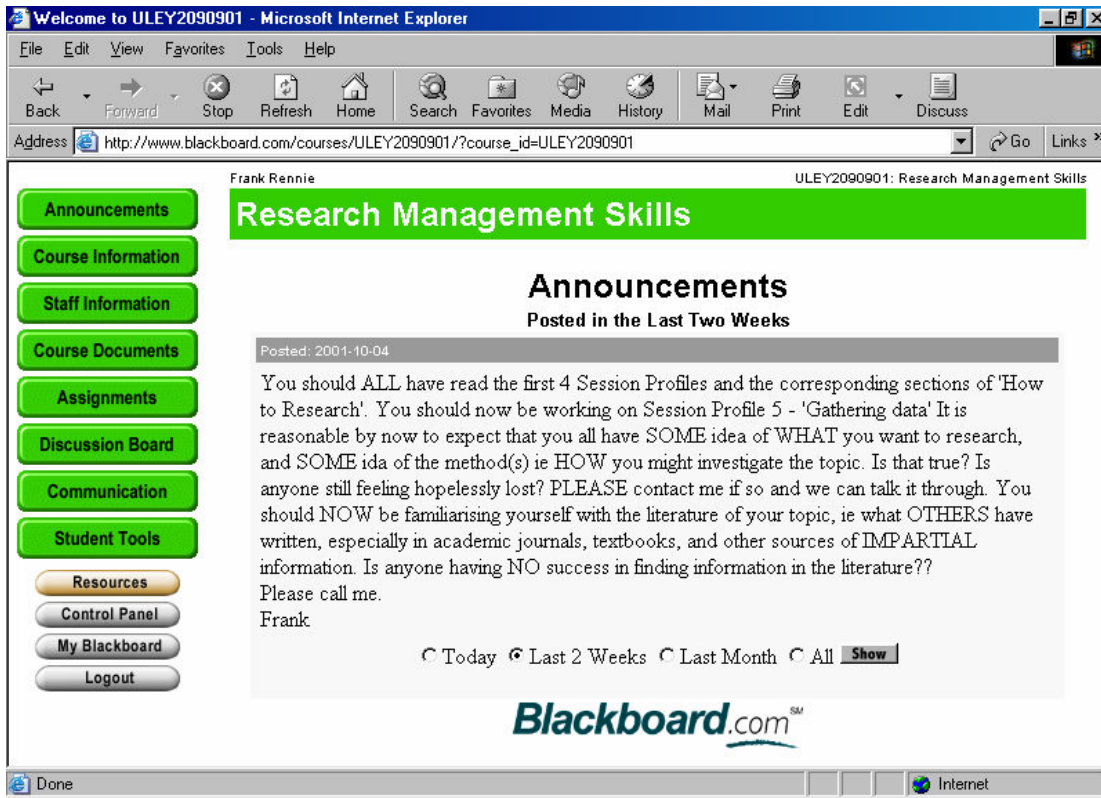
Fig.1 Example of course VLE

Mode 1	**Mode 2**
Communes of homogeneous subjects	Multidisciplinary teams, heterogeneous knowledge bases
Solitary scholar	Team work and active networks
Open publication, freedom of knowledge	The internet and intellectual property
Universal themes, falsification criteria	Mission led project, local problem solving final solutions
Objectivity and disinterestedness	Service of practical interests involving subject values
Fundamental blue skies research	Contextually defined applied research, collectivised problem solving
Life-long vocation	Professional teams, entrepreneurial insecurity

Fig. 2 - Transition from Mode 1 to Mode 2 (from Hills, 1999)