Appropriate assessment for resource based learning in networked environments

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APPROPRIATE ASSESSMENT FOR RESOURCE BASED LEARNING IN NETWORKED ENVIRONMENTS

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ABSTRACT

Recent advances in the use of information and communications technologies in Higher Education have led to an explosion of interest in networked learning, which offers the potential for more open ended and flexible study in an ODL context. A new generation of resource based courses in networked environments combines access to a wide variety of resources in electronic form, with the construction and negotiation of meaning through online collaborative interaction. This study set out to establish what assessment strategies might be appropriate to support student learning in this context.

A case study of one Open University undergraduate course was undertaken over a three year period, with three cohorts of students, and the findings were compared with a short study of a second postgraduate course. The research explored perspectives on resource based learning in networked environments and highlighted aspects of assessment which appeared to support learning effectively. These findings led to the refining of assessment in later course presentations, demonstrating a successful interplay between evaluation and teaching practice.

The study has confirmed that the assessment strategy must be aligned with the exercise of self-directed learning, whilst developing information handling and online collaborative skills, and allowing scope for open-ness and flexibility in content. The extent to which these criteria for design are important will depend on the stage of development of the students, and the aims, and degree of open-ness of the course. The experience here shows that it is important to identify and differentiate between

appropriate skills required for a course, and those which the course will seek to

develop, so that the assessment can reflect these aims.

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CHAPTER 1. INTRODUCTION

Although resource based learning has been used in Higher Education for a number of years, it is of great topical interest because of the role which information and communication technologies (ICTs) can play in providing more flexible and open-ended learning environments in the context of Open and Distance Learning (ODL) courses. This Chapter discusses the growing emphasis on models of learning which develop self-direction, and the confusion in definitions and terminologies which has ensued. It then describes the ways in which ICTs and developments in online learning are influencing the pedagogy of resource based learning and facilitating the creation of an electronic community of networked learners.

In spite of the growing interest in this area, very little is known about student perspectives on resource based learning in networked environments, and the kind of support, through assessment, which might be appropriate to their needs, and this is the focus of this thesis.

Moves to greater independence in learning

Traditionally the aims of higher education have been implemented by a combination of lectures, tutorials and private study, and assessed by coursework and examinations. However, there have been moves to reconsider these methods of teaching and learning, in response to pressures from greater student numbers, combined with an increased demand for higher education and life-long learning from

mature students with a wide variety of backgrounds. There has also been concern that traditional methods of university instruction are not producing graduates which are appropriately creative and flexible, and able to work collaboratively with colleagues (Tynjälä, 1998; Boyer, 1998). Preliminary results from a research project on "Innovations in teaching and learning in Higher Education" (Hannan, English & Silver, 1999) comments on staff motivation for introducing new methods of teaching and learning, and suggests that traditional methods were producing students who were too "passive". The Dearing Report (1997), reflects these concerns:

"We recommend that with immediate effect, all institutions of higher education give high priority to developing and implementing learning and teaching strategies which focus on the promotion of students' learning."

(Dearing, 1997, Chapter 8)

A combination of these factors has focused attention on open, student-centred learning, where students take greater responsibility for their own learning, through course texts, access to a library, and educational technology, supported in some cases by tutorials or lectures. This is characterised by a shift from knowledge delivered by the teacher, to the acquisition of knowledge and negotiation of meaning by the student.

The change in emphasis is in line with constructivist theories of learning which maintain that knowledge construction is an evolving process in which individuals attempt to make sense of new information by relating it to familiar contexts and existing conceptions. Importance is placed on understanding, rather than on

memorising and reproducing facts, on the contribution of social interaction and collaboration to problem solving and to a construction of an effective interpretation of the knowledge base (see for example Lebow, 1993; Jonassen, Mayes and McAleese, 1993; Simons, 1993; Grabinger and Dunlap, 1995).

Constructivist philosophy accommodates a wide variety of learning and teaching models associated with a move away from teacher centred learning. They are known variously as open, flexible, resource based, research based, enquiry based, problem based, project based, discovery, independent, learner-managed, self-directed or student-centred learning. Unfortunately, there is considerable overlap in the interpretation and usage of the terminology, whose appropriate use has prompted much debate.

> "Each of these terms has a distinct history, starting at some point in the last
> 30 years. They have all been coined to describe particular aspects of
> educational practice, but have become increasingly confused. This is
> because, as is usual with specialist terms, as their usage becomes more
> common they draw to them nuances and shards of meaning which were not
> necessarily intended when first used. It is also confused because many of
> these terms describe aspects of practice which overlap in intention or
> philosophy...None of these terms is therefore unproblematic."
>
> (B.Jackson, isl mailbase discussion 12/3/99)

It is probably true to say that a spectrum of models offer various levels of independence in learning, in fact Tait & Knight refer to "members of a family of concepts" (Tait & Knight, 1996, p 29).

Definitions of resource based learning

The focus of this study is resource based learning, and in line with Jackson's comments, the term has attracted controversy in recent years. Some definitions of resource based learning are very broad based and some educationalists understand the term to mean any type of learning model not directly associated with the delivery of knowledge by a teacher, in class. For example, Gibbs et al (1994), who surveyed best practice in course design for "resource based" study in a range of Higher Education establishments, described the following types of resource based learning:

- enhancements to conventional courses, which may include a reader of significant articles, or perhaps a course guide which prepares the student for labs, seminars etc.

- lecture substitutes, for a variety of reasons, whether to offset problems with accommodation or to encourage independent learning. Material may vary from typed lecture notes to properly structured packages.

- distance learning on campus; using the OU model, with self-contained 'tutorials in print'.

- hybrids, that is, systems which emphasise class contact and learning resources in varying degrees, often involving forms of teaching technology.

- self-pacing; alternatives to the lecture programme which allow the student to progress at his or her own pace, using existing textbooks and other published material as sources.

- substitutes for specific learning activities, for example, computer simulations of experiments.

- support for learning activities, for example study guides, field guides.

The following comments further illustrate the confusion, and nuances of meaning which have become attached to the term:

"Resource based learning occurs when individuals or small groups of people learn from things such as self-instructional materials, textbooks and apparatus or exhibits of various kinds. Open and distance learning may use any of these, and are thus, by definition forms of resource based learning. Not all resource based learning systems are suitable for distance learning, though, because many of them require the presence of a tutor to carry out such tasks as organising small groups doing oral work or practical demonstrations, providing remedial tuition, supervising stage tests, etc. The resources for such learning systems are often kept in one location such as a library or resource centre and the learners come to that location to use the material"

(Hodgson, 1993, p108)

"In resource based learning, students use resources to broaden their learning base. They may access all the same kinds of resources referred to in our resource based teaching example, including the teacher and the textbook. But

the students are the centre of the learning environment. The focus is on what the students are doing with those resources to facilitate their learning."

(Haycock, 1991, p16)

"For the purposes of this guide, rbl is taken to mean the use by students of print and electronic based learning resources (but primarily the former) in- and out-of-class as part of learning exercises and packages devised by lecturers in HE."

(Healy, 1998, p7)

"According to the Polytechnics & Colleges Funding Council, [rbl is] using resources other than the teachers, for example books, study packs, CAL etc"

(M. Wilson, isl mailbase list, 11/3/98)

Two further definitions arise from a survey of the impact of resource based learning on library staff in 318 Universities and Higher Education Colleges carried out by Jackson and Parker (http://ilm.unn.ac.uk/impel/rblrbg.htm, 5/10/99)[1] as part of the IMPEL2 project. When asked for their understanding of the term "resource based learning", from a choice of two definitions A or B, about half of the respondents believed that definition A reflected their institutional practice, and the other half chose definition B:

A: "student learning from his own direct confrontations with a variety of resources, rather than relying on conventional expositions by the teacher"

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[1] Since the availability of these World Wide Web sites is unreliable, a date is given at which each site was checked and found to be accessible.

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B: "student learning from a variety of resources either at the direction of the tutor or by the student's own choice."

(Jackson & Parker, 1996, http://ilm.unn.ac.uk/impel/rblrbg.htm, 5/10/99)

It is difficult to attribute any meaningful conclusion to this comparison, and perhaps respondents also had difficulties in distinguishing between them. However, both these definitions reflect a general consensus that resource based learning is about student centred learning, in the sense that it relies on the use of resources by students, rather than by teachers for the benefit of students. It is also common to equate this student centred approach with open and distance learning (ODL), a model of teaching and learning in use in many campus based universities, as well as distance universities such as the UK Open University (OU).

Developments in open and distance learning

Open and distance learning such as that provided at the Open University does indeed provide students with an increase in flexibility and choice in study routines, when compared with conventional lecture based university courses. The courses comprise self-instructional materials, combined with television programmes, and increasingly the use of computer based learning materials, supplemented with tutorial support. At the same time, most of the learning material is still "pre-packaged", in the sense that the student is still expected to "receive" knowledge from the teacher, by studying the material supplied.

Historically some courses at the OU have afforded students greater latitude in their use of resources, and therefore a greater degree of independence. This latitude has commonly been associated with courses which have a project as a part, or a whole of the course assessment. Henry (1994) lists the following defining criteria for project courses:

> "*The student*:
>
> - usually selects the project topic
>
> - locates their own source material
>
> - presents an end product (usually a report, often for assessment)
>
> - conducts an independent piece of work (although there are also group projects);
>
> *The project*:
>
> - lasts over an extended period;
>
> *The teacher*:
>
> - assumes the role of adviser."
>
> (Henry, 1994, p12)

Where additional resources are required, students are given packs of offprints, or are expected to make use of a research library. However with increasing use of the Internet for various aspects of course delivery, many of these courses now direct students to make use of information resources in electronic form, as well as linking staff and students for e-mail and computer conferencing.

In parallel with these developments, technology has made a very significant impact on the feasibility of using the resource based approach in an ODL context, and has inspired new interest in the potential it offers. Indeed, Taylor & Laurillard (1995) have coined a new definition, which comes from a paper on resource based learning written specifically for the Open University course THD204: IT and Society, which is the subject of this research.

"Open access, self-directed learning from a large information source".

(Taylor & Laurillard, 1995, p 237)

There are two elements to this definition: *self-directed learning*, and secondly the way in which this self-directed learning is to be achieved, through *open access to a large information source*. Looking back at Henry's (1994) earlier definition of project courses, it is clear that it contributes much to Taylor and Laurillard's (1995) definition of resource based learning, both in terms of the self-directed nature of learning, and also in the use of a variety of resources. In fact there has been a convergence of the two models, with a new generation of courses using ICTs to supply information, and often making use of project work for assessment.

Comparing Taylor and Laurillard's (1995) definition with previous definitions of resource based learning it is clear that the distinction lies in a greater freedom and latitude of study afforded to students, made possible by the use of distance technologies. These technologies have opened up new potential, including easier access to more diverse information sources; the ability to present information in a

variety of different media; and the scope for new ways to access and combine information.

Networked learning

There are indications however that technology is not only facilitating a more widespread adoption of the resource based approach, but is in itself a significant force in driving pedagogy in higher education. In parallel with developments in technology supported resource based learning, the increasing use of electronic networking has meant that distance students need no longer work in isolation, but can join an electronic "community of learners", offering the potential for collaborative learning. This can act as a natural adjunct to the resource based approach, as Collis (1998) describes:

"...students not only have a wider choice of resources and modalities of study materials from which to choose...but also come to share in the responsibility of identifying appropriate additional resources for the course and even contributing to the learning resources in a course."

(Collis, 1998 p 377)

Indeed, because communication technologies allow access to resources as well as to peers, there has been a recent tendency to associate the use of electronic resources with networked learning, although this might not necessarily imply a resource based approach. So for example Collis's (1996) definition of telelearning includes:

"Making connections

Among persons and resources

Through communication technologies

For learning-related purposes."

<div align="right">(Collis, 1996, p 9)</div>

In a similar vein, a recent research project at Lancaster University on student experiences of networked learning in Higher Education (http://www.lancs.ac.uk/users/edres/research/csalt/networklearn/, 18/1/00) defines networked learning as:

"learning in which C&IT is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources."

(http://www.lancs.ac.uk/users/edres/research/csalt/networklearn/, 18/1/00)

In fact, Lauzon (1999) argues that communication technologies have radically changed the roles of student and teacher. He suggests that the "communicative dimension" of new technologies effectively undermines the authority of the educator and has led to multiple subjectivities, and multiple forms of authority. The educator becomes a part of a learning community and the learner can now interact with the text they read, editing it and making it meaningful to their particular situation.

Networking and resource based learning have been adopted to varying degrees in online courses, and Mason (1998) describes three models which categorise the present 'state of play', illustrating the gradual evolution of these courses towards greater freedom and latitude of study:

"**Content and support model.**

This model..relies on the separation between course content (which is probably delivered in print, or possibly now as a course package on the Web) and tutorial support (which in its simplest form is delivered by e-mail or alternatively by computer conferencing). The model supports the notion of relatively unchanging content materials..the online component represents no more than about 20% of the students' study time in this model....

Wrap around model

..consist of tailor made materials (study guide, activities and discussion) wrapped around existing materials (textbooks, CD-ROM resources or tutorials.)...the online interactions occupy about half of the students' time, while the predetermined content occupies the other half. This model tends to favour a resource-based approach to learning, giving more freedom and responsibility to the students to interpret the course for themselves.....

Integrated model

..The course consists of collaborative activities, learning resources and joint assignments. The heart of the course takes place online through discussion, accessing and processing information and carrying out tasks. The course contents are fluid and dynamic as they are largely determined by the

individual and group activity. In a sense, the integrated model dissolves the distinction between content and support....."

(Mason, 1998, p 5-6)

Here the traditional ODL course (with online enhancements) is described as the "content and support" model, and the resource based approach is associated to varying degrees with the "wrap around" and "integrated" models of online courses. The models underline the fact that the terms "online" and "resource based" are not synonymous, but rather that the resource based approach can be employed in an online context. Interestingly, the models also illustrate an evolution towards a greater dependence on collaborative interaction, made possible by networking.

Learning environments for resource based learning

With the growing interest in resource based courses and networked environments, and the potential they offer for a more open and flexible approach to study, there has been interest in the characteristics of environments which might support this approach.

Recent work by Britain and Liber (1999) describes Virtual Learning Environments (VLEs), which are defined as systems which support resource based, collaborative learning. They describe a prototypical VLE, based on a Web client/server approach, which combines synchronous and asynchronous collaboration tools, together with access to electronic resources. They envisage the potential of these environments as

providing flexibility, and a student centred approach in the face of increasing student numbers and diversity.

> "Most of the benefits of VLEs lie in their potential to support styles of learning that are especially time-intensive for university teachers using traditional methods, but which have always formed a core part of a university education. We are referring in particular to:
>> collaborative learning
>>
>> discussion-led learning
>>
>> student-centred learning
>>
>> resource-based learning"

<div align="right">(Britain & Liber, 1999, p30)</div>

Britain and Liber's (1999) vision of VLEs accords with Mason's (1998) model of the integrated online course and it underlines the significance of the resource based approach in networked environments. In line with comments by Collis (1998) they describe the potential of these environments for supporting student centred learning.

> "….support a resource based, student centred teaching approach, amplifying the teacher's variety and attenuating the variety in the learner group to make the teaching approach viable, but without treating all learners as if they were all the same. ….. Students should be able to contribute their own resources and materials to the group. The responsibility for the shaping of the learning content shifts from the tutor to the students."

<div align="right">(Britain & Liber, 1999, p29)</div>

Of course, while an integrated environment offers opportunities for student centred study through access to a variety of multimedia resources, combined with online interaction, the environment does not in itself guarantee a model of resource based learning, indeed such environments are also used for delivering lecture notes, or other custom written course material.

A Theoretical Model: Rich Environments for Active Learning

Of great interest to an understanding of resource based learning is a theoretical framework for constructivist environments which has been developed by Grabinger and Dunlap (1995). Their model is called Rich Environments for Active Learning (REALs) and accords with similar lists from fellow constructivists Lebow (1993); Jonassen, Mayes and McAleese (1993); and Simons (1993). This model is not tied to a particular technology, and the term 'environment' is used here to refer to any combination of learning methods which achieve constructivist objectives. So while it is applicable to IT supported environments, it could equally well be applied to print based methods. The elements of this model are inter-related, and not mutually exclusive, and include:

1. *Student responsibility and initiative*, in other words a student centred approach in which students develop life-long learning skills and learn to reflect on their learning processes.

2. *Generative learning activities* in which students are required to engage in tasks which encourage the development of higher cognitive skills, perhaps in searching for information or in solving problems.

3. *Authentic learning contexts* means that learning experiences should be of relevance to the student, anchored in real world problems, rather than simply abstract descriptions.

4. *Co-operative support*. Individual learning can be reinforced by collaboration with peers, which can offer alternative perspectives and clarify misconceptions.

5. *Authentic assessment*, which must support and test the learning objectives, particularly with respect to the skills students are expected to acquire. The emphasis is upon promoting the learning process and finding out about qualitative changes, rather than measuring the amount of information students have acquired.

The framework places emphasis on the development of lifelong learning by encouraging students to take more responsibility for their learning and to learn how to learn, and develop metacognition, rather than simply absorbing information. It is suggested that this can be achieved by using generative learning activities, in other words, the construction of knowledge by using the information learnt to produce a product. So in the context of resource based learning this might involve the construction of knowledge using a variety of information resources in preparation for written assignment work.

Co-operative support through collaboration with peers has increasingly become associated with resource based learning, partly because the technology made it

feasible, but also because it can help with the negotiation of meaning, as described in the last section.

The framework also predicts the significance of authentic, realistic learning contexts and authentic assessment. The authors suggest that conventional content oriented assessment which measures the quantity of student knowledge is simply inappropriate for REALS. Authentic assessment should measure students' appreciation of the organisation and connectedness of the knowledge base, and their use of skills relevant to the learning context. The relevance of these predictions is discussed later in the thesis.

Whilst all REALS are not necessarily associated with resource based learning, the literature does contain examples of REALS which fit the description of resource based learning which follows below, although they may not specifically refer to it (see for example Bostock, 1998; Alexander, 1999; Muir, Nazarian and Gilmer, 1999) and these examples will be referred to later in the thesis.

Summarising the evolution of resource based learning

Increasing student numbers and a greater diversity in type of undergraduate has led to an impetus to increase the flexibility of approach and concentrate on more student centred learning, with a move away from conventional lectures and seminars. Resource based learning has been in use in Higher Education for many years, in a variety of guises, but developments in ICTs mean that the approach can now be used

in ODL courses, offering students a wide variety of resources in electronic form. Courses using this approach provide a new context for learning, and offer even greater freedom and flexibility in study than was previously possible through the traditional model of ODL course at the Open University. Combining the resource based approach with online collaboration has led to a new generation of courses which allow students to construct and negotiate meaning through a synergic relationship between access to extensive electronic information sources and online collaborative interactions.

For the purposes of this research the resource based approach in networked environments is characterised as follows.

Resource based learning in networked environments

- Self-directed learning
- In an ODL context
- Achieved by open access to a large electronic information source
- Integrated with online collaborative learning.

Examples of resource based courses in networked environments

An increasing number of educational projects are experimenting with resource based learning in networked environments, using a variety of approaches and technologies. Inevitably the characteristics listed above represent a "snapshot" of a new and rapidly developing field, where the application of technology to the provision of resource based and collaborative activities is still under active experimentation. The degree to

which these characteristics have been adopted and developed in different courses varies widely.

At the Open University, a number of courses have employed resource based environments to varying degrees, two of which are described in this research project (see Chapters 3 and 7). The undergraduate course "IT and Society" could be described as partially resource based, and probably belongs to Mason's (1998) "wrap-around" model of online course, in that students are supplied with some course texts and a Reader, in addition to a CD-ROM personal library of academic articles and multimedia, access to the Internet, and computer conferencing. It is compared with the postgraduate course "Applications of IT in Open and Distance Education", which is delivered completely online, is fully resource based and dependent on online collaborative interaction between students and tutors. It therefore follows Mason's (1998) "integrated" online model.

Other examples include a fourth level[2] undergraduate course, A427: "Charles Booth and social investigation in 19th century Britain" where CD-ROM is used to provide a personal library of original documents, including transcribed manuscripts and maps, for historical research, and the course is supported by computer conferencing (Blake et al, 1998). The course provides a good example of the convergence of project courses and resource based courses, since it is one of a number of Humanities project courses which traditionally have had to rely upon conventional print sources.

The Internet is widely in use as a means of accessing private pages of especially

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[2] The entry requirement is a relevant degree, or relevant study at level 3 (equivalent to final year honours degree).

prepared course material and also as a general resource for students. Such courses could be considered as partly resource based, since students have the option to access extensive additional resources, although some of the teaching material will be written specifically for them. Some are delivered completely online, whilst others have an online component.

One project which illustrates this approach is the Clyde Virtual University, (Whittington & Sclater, 1998) (http://www.cvu.strath.ac.uk/campus.html, 5/2/99), one of the many new teaching and learning projects associated with the broadband MANS (Metropolitan Area Network) initiative in Scotland (http://www.use-of-mans.ac.uk, 5/2/99). This experimental on-line university has a "Lecture theatre" giving access to a variety of on-line courseware modules, an "Assessment Engine", delivering computer aided assessment, a "Library", with links to Internet based multimedia learning materials and a "Virtual café" for subject based online discussion groups.

Other courses have adopted a problem based approach, in which students learn by seeking solutions to common problems, inevitably using a wide variety of resources. Because the courses are student centred and students are given access to a large resource base, they could also be termed resource based. Problem based learning has been in use in the medical sphere for many years (see for example Newble & Clarke, 1986), and is also now in use for technology based courses, for instance at the University of Glasgow Medical School, where broadband networks are used to provide access to distributed resources for problem based courses (http://www.gla.ac.uk/Acad/MedEdUnit/, 5/2/99).

The problem based approach is also finding application in other disciplines. In the Netherlands the University of Twente runs a distance learning course called "Applications of Information Technology" for groups of Dutch and Finnish students who work collaboratively in a problem based approach, (http://wwtios.cs.utwente.nl/~vdveen/project5.htm, 5/2/99) and extensive use of other sources on the Web is made to support project work (Collis, 1997).

Introduction to the study

The question arises as to how such resource based courses should be assessed? There is no doubt that assessment has a major role in influencing and enhancing teaching and learning (see for example Miller & Parlett, 1974; Ramsden, 1979; Lockwood, 1990). It follows that assessment must be an integral part of course design and must drive student learning appropriately, which means that it must be aligned with the aims and objectives of the course (Gibbs, 1995; Knight, 1995). Assessment forms an integral part of a constructivist approach to learning, by providing an opportunity for students to engage in generative learning activities, and to integrate their new learning with existing learning and experience (Grabinger & Dunlap, 1995). For distance learners, assessment is particularly significant, since assignments represent the only time when learning activities can be practised, and are the crucial points at which individual correspondence tuition and feedback are focused. In addition to course content, assessment can be valuable for the practice of, and reflection on, particular skills (Gibbs, 1995).

It may be that this new generation of courses demands radical approaches to assessment. Perhaps these courses should be assessed online? Whether new or radical approaches are appropriate must depend on the aims and objectives, and underlying process of this version of resource based learning. If it is a well tried model of learning which is simply delivered in a new way, then maybe the lessons for assessment have already been learnt? Clearly it is important to establish what is involved in this new version of resource based learning, before considering the implications for assessment.

The following research question was used as a focus for investigation in this study:

What is an appropriate assessment strategy for resource based learning in a networked environment?

The research question has been broken down into a number of related strands, described below.

1. In order to establish what is appropriate in terms of assessment for a resource based course in a networked environment, it is important to discover what learning processes the assessment needs to reflect and support. The first research strand is therefore concerned with influences on the success of resource based study from a student perspective, the skills needed and those already possessed.

What factors influence successful resource based study in networked

environments?

What skills are required by networked resource based learners?

Chapter 2 reviews the published work in order to describe the process of networked resource based learning and the skills needed for effective networked resource based study. It then reviews developments in innovative assessment and considers the implications for an assessment strategy. A framework of assessment for resource based learning in networked environments is developed, in order to suggest relevant criteria for assessment design and possible assessment strategies.

The author was concerned particularly with student perspectives as a result of her work as an Open University tutor on the course THD204: "IT and Society", which is networked and resource based. Tutors are in a unique position in the Open University, since they represent the human link between the University and its students, and they have a valuable opportunity to see life "at the coal face". It was therefore decided that it would be useful and relevant to study both tutor and student perspectives on this course.

Resource based learning is a fundamental feature of the course, and the process and practice of this approach is supported through advice in course texts, and structuring of the CD-ROM database. Chapter 3 describes a desk study of the course texts, which was undertaken in order to explore the various approaches used by the Course Team.

Since very little is known about this form of learning, a qualitative case study approach was adopted, so that a detailed understanding of this new field could be acquired. The design of the study and the choice of methodology is discussed in Chapter 4. Data on student and tutor perspectives on resource based study and its assessment were gathered over three years, with three cohorts of students, from 1996 to 1998.

The pilot study which was carried out in 1996 and is described in Chapter 5, established the common problems and successes of resource based study in networked environments. These findings were underpinned by subsequent work carried out in 1997 and 1998.

2. It was then relevant to consider to what extent the necessary skills might be practised and supported through assessment, and under what conditions. From this came a more general question as to whether assessment could be used in this context as a strategic tool for influencing course pedagogy on open and distance courses.

> *What skills should be assessed for a resource based course in a networked*
>
> *environment?*
>
> *Which aspects of assessment support this version of resource based learning*
>
> *effectively?*
>
> *Can assessment be a teaching/learning opportunity in this context?*

The answers to these questions were drawn from a study of student and tutor perspectives on assessment, which was carried out over a two year period, from 1997-1998, as described in Chapter 6.

Since the findings in Chapter 6 are drawn from a case study of a single course, it was decided to compare the results with those from a second course. A short study of student perspectives on a second Open University resource based course for postgraduates (H802: "Applications of IT in Open and Distance Education") was conducted in 1998, and the findings are reported and discussed in Chapter 7.

3. The findings from both courses on the extent to which assessment might reflect the open-ness of resource based learning in networked environments, whilst supporting the development of skills were used to judge the applicability of the framework of assessment design.

What is an appropriate framework for the assessment design of resource based learning in networked environments?

Finally, Chapter 8 concludes the thesis, discusses the extent to which the findings provide some answers to the research question, and suggests future directions for research.

CHAPTER 2. APPROACHES TO THE ASSESSMENT OF RESOURCE BASED LEARNING IN NETWORKED ENVIRONMENTS

Chapter 1 introduced the ideas behind the evolution of resource based learning, and underlined the potential of ICTs to support the active construction of knowledge and understanding through access to resources and collaborative interaction. It was argued that assessment strategy must reflect course pedagogy, whatever that might be. It is therefore important to establish here what the literature can contribute on the pedagogy of resource based learning in networked environments, before considering what might be an appropriate assessment strategy.

This review is in two parts. The first part discusses the process of resource based learning in networked environments, and the factors which may influence the success of a resource based learner. The second part reviews developments in innovative and online assessment and discusses the extent to which these strategies might provide appropriate support for the resource based learner. The review crosses several disciplines and draws on literature from educational technology, learning theory, information science, instructional systems design and educational psychology.

The process of resource based learning in networked environments

Resource based learning in networked environments, as defined in Chapter 1, involves self-directed learning in an ODL context achieved by accessing extensive

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electronic information resources, and integrated with online collaborative learning. The success of resource based learners probably depends on the acquisition of the relevant skills and may be influenced by a variety of factors, discussed here as the learning context. Some of these factors are particular to resource based learning in networked environments, while many are common to other models of distance learning. This part of the review is therefore divided into four sections.

- Self-directed learning
- Learning by open access to a large electronic information source
- Online collaborative learning
- The learning context

The review gives particular emphasis to the literature on learning by open access to a large electronic information source because it is of central relevance to this thesis. The extensive literature on the other three areas is referred to briefly.

Self-directed learning

Chapter 1 described resource based learning as part of a family of constructivist models of learning which share a common objective of self-directed learning, although they vary in the routes used to achieve it. These routes may make use of technology or adopt more conventional delivery media.

The common objectives of these courses are described in a variety of ways. Some authors refer to active, rather than passive learners (see for example Boyer, 1998;

Hannafin, Hill & Land, 1997), who are ready to take responsibility and initiative (Lebow, 1993; Bostock, 1998). They must be able to cope with multiple perspectives (Jonassen, 1991; Hannafin, Hill & Land, 1997), and for this they need cognitive skills such as critical and analytical abilities, and metacognitive skills (Jonassen, Mayes & MacAlesse, 1993; Grabinger & Dunlap, 1998), together with the confidence to make choices and to manage their own learning. The picture is again of overlap and confusion in interpretation and definition, but it seems that self direction in learning requires a combination of cognitive, metacognitive and affective skills. For the purposes of this study self-directed learning is characterised as the exercise of:

- Active, rather than passive learning

- Responsibility and autonomy

- Self judgement and a reflective approach

- Metacognitive development

Encouraging students to develop any independence and self direction in learning is an objective which, under traditional university models of teaching and learning, may be a lengthy and gradual process. This is borne out by a classic longitudinal study by Perry (1970) on the development of critical thinking in students. He interviewed students at various stages during their college career and coded their comments according to a developmental scheme, which described nine "positions", or models of attitude, from dualism, where students saw the world in unqualified "right/wrong" terms, to relativism, or an appreciation of diversity in points of view. The gradual development of relativism took a number of years. A longitudinal study of women

students by Belenky et al (1986) partially confirmed Perry's developmental scheme, although they also identified a number of additional categories, and established that some learners may engage in these stages of development in a non-linear fashion.

A similar time scale is described by Morgan & Beatie (1997), who conducted a longitudinal study of Open University students from the start of their studies until graduation, six years later. They describe increases in three inter-related areas: confidence, competence and control, and in common with Perry's (1970) observations, found that these areas develop gradually:

Stage	Control of Learning	Confidence	Competence
Fresher	Control by the system and institution	To enrol	Learning the system
Novice	Control by the system and institution	To attempt to study	Learning about oneself in the system
Intermediate	Control by the system and institution	To question	Learning to see a course as a whole
Expert	Control by self within a course	To question	Learning to engage with the content personally
Graduate	Control and autonomy in content and method of learning	To go it alone	Learning to use skills and knowledge in new contexts

Stages of development (Morgan & Beatie, 1997, p 234)

The endpoint, described as graduate status, reflects the kind of learner which a resource based course seeks to develop, and raises the question as to whether such courses should be introduced at the end of the student's undergraduate career, or perhaps at some point where they have developed sufficient self direction to survive.

Jonassen, Mayes & MacAleese (1991) hold the view that more open-ended courses are more appropriate for the more advanced learners, when students have already acquired a basic level of subject knowledge and skill. On the other hand, Boyer (1998), who is an advocate of inquiry based learning in American universities, recommends that undergraduate courses should be developed in such a way that students develop gradually as researchers, throughout their undergraduate careers. Indeed, problem based learning is often introduced at foundation level, using increasingly complex problems as the students proceed through their university careers (Newble & Clarke, 1986; Margetson, 1996; Driessen, 1999). Obviously whatever the stage that these courses are introduced, students need appropriate support in order to develop as resource based learners. In order to design courses appropriately it is necessary to identify both the skills which are a pre-requisite for resource based learning, and those which the course may seek to develop.

Learning by open access to a large electronic information source

If students are expected to learn by open access to a large information source, then they have to be able and confident enough to choose what they should read, and to critically assess their choice of readings. Arguably, the greater the scale and diversity of the resources, the more important it is to develop the critical skill to cope with them.

There will also be particular skills in searching and retrieval which they need to acquire. Proficiency in information searching and retrieval is an area which has long

been the concern of academic libraries, and an extensive body of research covers the use of bibliographic databases. In recent years there has been a move towards "end user" searching, in which the responsibility for searching is shifted to the student, rather than working through a librarian as intermediary. Various initiatives have concentrated on the need to teach students how to develop the skills necessary for efficient use of the bibliographic databases (see for example Creanor and Durndell, 1994; Ottewill & Hudson, 1997).

With the growth in the World Wide Web there has been increasing interest in the way in which it can be used as a source of information for learning. There are problems with the scale and diversity of the information available, coupled with a general lack of bibliographic control, and concerns with a lack of authenticity and reliability. Romiszowski (1997) describes the situation:

> "A ...reason for caution is the limited capacity of the end-users to find their way through an "exploding universe" of information in an effective and efficient manner. ...The undisputed technical advantages of making information more easily and more democratically available are to some extent undermined by human skill limitations on effectively using such an information network."
>
> (Romiszowski, 1997, p 32)

In response to these concerns, various initiatives have been put in place to provide guidance and direction, including the new Resource Discovery Network, which will offer subject based information gateways to quality tested Web resources for

research, learning and teaching (http://www.rdn.ac.uk/aboutrdn.htm, 25/8/99).

There are in fact a variety of new opportunities and problems in teaching students to use resources on the World Wide Web. For example, hypertext environments may offer students the potential to study in a more self-directed, open ended way (see for example Marchionini, 1988; Pink, 1999) and allow students to construct individual connections between different narratives.

Some authors have described how these environments can be used to not only help learners acquire and construct knowledge, (see for example Carver et al, 1992; Cognition and Technology Group at Vanderbilt, 1992) but also to give them an overview of the semantic structure of a knowledge domain (see for example Jonassen & Wang, 1993). Electronic concept mapping has been recommended as a way of supporting users in reflective hypertext exploration (see for example Kashihara et al, 1999) and for defining information need by providing a "knowledge arena" for expressing, and exteriorising the inter-relationships between concepts (McAleese, in press).

The work reviewed here focuses on the process of information literacy as an essential part of effective resource based learning. The term information literacy has been in use particularly in the US and Australia in connection with lifelong learning (see for example Hancock, 1993; Candy, Crebert & Leary, 1994; Parsons & Haberle, 1998; American Association of College and Research Libraries, 1999).

"Information literacy forms the basis for lifelong learning. It is common to all

disciplines, to all learning environments, and to all levels of education. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning."

<div align="right">(Association of College and Research Libraries, 1999)</div>

The characteristics of information literacy include recognising the need for information, being able to identify and locate it, gaining access to it, then evaluating it, organising it and using it effectively. In addition, students need to learn how to negotiate the appropriate electronic environments. In line with these characteristics, Taylor & Laurillard (1995) have proposed a list of information handling skills for resource based learning.

- *"operation* - run the physical system (for example, what buttons to press, how to switch things on, protocols for what gets loaded first, how to log on, interactions between peripherals, what runs under what system)

- *navigation* - run the software (for example, how applications run, how different packages interface with one another; how to respond to the system when it asks questions, how to keep track of places visited, and how to get back; how to retrace steps; how to jump from one place to another; how/where to make notes;)

- *investigation* - do the appropriate question framing/search/find (for example, how to ask a sensible question in the context; identify suitable goals; recognise what kind of information is actually relevant versus what is interesting, but irrelevant; interpret information to spot concordance, dissonance, variation; analyse information to recognise potential answers)

- *reflection* - satisfactorily integrate the information thus found into project work or

final write-up (for example, go back to original task; evaluate whether enough

information has been gathered; analyse and evaluate the material; integrate and

compose)."

<p style="text-align: right">(Taylor & Laurillard, 1995, p 240-241)</p>

This list integrates the cognitive skills involved in project based learning

(investigation and reflection), together with the practical skills needed to negotiate an

electronic environment effectively (operation, navigation), so it is a useful working

framework to adopt for this review.

- *Operation and Navigation*

Perhaps the most obvious step in teaching students to undertake resource based

learning in networked environments is that of ensuring that they are familiar with the

tools. They need to be able to operate the equipment, and to be competent with the

software environment. Many of these skills can readily be taught using computer

based training, or using experiential learning environments, in which the relevant IT

skills are embedded in the subject teaching (see for example Grattan, Brown &

Horgan, 1998; Alexander, 1999). The extent to which a lack of these skills

constitutes a hurdle to learning probably changes from year to year, as succeeding

cohorts of students generally become more computer literate.

The use of hypertext environments, whilst offering many opportunities and

challenges, also brings problems for searchers, which may include disorientation

(being "lost in hyperspace") and distraction, because of the wealth of information

available (Marchionini, 1988). The characteristics of hypermedia users have been described by a variety of colourful names, including feature explorers, cyber cartographers, resource junkies, video hoppers, apathetic hypertext users or disenchanted volunteers (Lawless & Kulikowich, 1996; Barab, Bowdish & Lawless, 1997), illustrating the variability in enthusiasm, ability or motivation.

Similar variations are described by MacGregor (1999), who found that some students were highly dependent on pre-structured lists, whilst others were able to construct their own navigation routes in more individual and purposeful ways. In a study of ten American high school pupils, he rated students for their prior knowledge of the discipline; self efficacy, or self confidence; and 'need for cognition', which the author related to academic competence, social maturity and independent, persistent, self motivated behaviour.

His subjects were required to search a hypertext system, and then to create a concept map of their understanding of the topic. Navigation performance was influenced by the three cognitive characteristics described above. Students either structured their navigation in purposeful ways individualised to their personal requirements, or alternatively followed the existing structure of the system. Those students who were more purposeful in their navigation also subsequently demonstrated a greater level of understanding of the topic, as expressed by the coherence of their mental representations in the concept maps. So in summary, subject knowledge, self confidence and need for cognition were all important factors in influencing successful and meaningful navigation.

Meaningful navigation may also be influenced by the lack of narrative structure in hypertext environments, in fact it can be argued that far from helping users construct knowledge, hypertext tends to undermine comprehension, because it fragments information (Laurillard, 1993). The problems may be exacerbated when the information is represented as multimedia, rather than straight text. For example, in project MENO (Multimedia, Education & Narrative Organisation), Plowman (1996) made observations of 200 children working on interactive multimedia programs. She found that use of the medium led to fragmented study, because of the transitions between sections of video to stills or text, machine interaction or group discussion. Comprehension was also undermined by complex navigational procedures, or the need to insert text. Similar observations have been made by Laurillard (1998), Pink (1999) and Klinger (1999).

It may be that structured tasks, and particularly assessment, could play a useful role in giving meaning and purpose when pursuing links and constructing narratives. Without necessarily defining the content to be covered, the learner can be given a direction to follow and the reason for pursuing it. An attempt to make the narrative in a multimedia program more explicit by building in a series of exercises and goals in this way is described by Laurillard (1998). The work was carried out on the OU second level course A295: "Homer: Poetry and Society", using a multimedia database linking sections of poems to commentaries, video sequences and pictures of various artefacts. The students were required to undertake some investigation of their own before they were given access to comments or model answers. The exercises and goals appear to have supported the students as more active learners, although there were still problems with lack of narrative structure.

- *Investigation and Reflection*

Learning by open access to a large information source demands a change in attitude in students who have previously been accustomed to receiving knowledge either from a lecturer, or by reading pre-packaged course texts. It requires the ability to select and synthesise ideas from a range of resources, and the ability to focus on themes, rather than a prescribed set of content. It is to be expected that the researching skills familiar to project courses would also be required for resource based learning in networked environments, and Henry (1994) lists a number of other skills required in, and also fostered by projects, including self-direction; inventiveness; problem solving abilities; integrative skill, decision-making skills and interpersonal communication skills.

The need for investigative and reflective skills has sometimes been overlooked in the technology-driven growth in resource based learning, and Laurillard (1995) describes the problems which may be faced by resource based learners:

" that being a user-controlled medium the learner expects to have control and yet a learner does not know enough to be given full control. The role of research using a multimedia database is wonderful for the expert scholar, but not for the learner....they cannot be expected to set appropriate goals or plot a reasonable path: they will under-specify the problem, be distracted by irrelevancies, be unsure how to evaluate the information they find, over generalise from instances, remain unaware of incompleteness, fail to recognise inconsistencies.......Most learners are not ready to be researchers."

These observations underline the fact that proficiency with the medium does not necessarily mean that students will have the critical and analytical abilities to undertake resource based study. However, there is no reason why the task should not be scaled down, so that they can practise their skills in an incremental way, and starting at an earlier stage in their academic career. It is important to identify what factors influence success in investigation and reflection, so that students can be assisted to develop their skills.

An initial phase in investigation is deciding on the question to be pursued, and Marchionini (1995) divides this into two parts: recognising and accepting an information problem, followed by defining and understanding the problem. Students need to recognise the gaps in their knowledge, in order to establish what they need to find out, and McAleese (in press) stresses the importance of information need, (in other words, "knowing what you need to know, or find out") as a skill which is an important reflective precursor to information searching and retrieval. Although he introduces information need as a skill which is transferable, and therefore applicable across disciplines, this raises the question as to how significant a subject knowledge of the discipline might also be, in providing the framework for further exploration and research. Margetson (1996) suggests that, in the context of problem based learning, there is a difference between the knowledge required to understand a problem and that ultimately needed to solve it, but he does not dispute that the learner must have some subject knowledge if he is to begin the process.

There are probably a variety of factors influencing the success of searching and making sense of information in hypertext environments. Hill & Hannafin (1997) have studied the strategies used by learners when searching the World Wide Web for particular topics and have drawn out the following from a substantial review of the literature:

- Metacognitive knowledge (in other words, ability to reflect on learning needs)
- Perceived orientation (ability to get one's bearings in an environment)
- Perceived self-efficacy (self confidence)
- System knowledge (prior experience with a particular information system)
- Prior subject knowledge

Hill & Hannafin (op cit) undertook a qualitative study of fifteen students, and a detailed analysis of a subset of four of these students. They established participants' perceptions of their subject, metacognitive and system abilities, and their perceived efficacy (levels of self confidence). The students were then asked to perform a search, which was recorded by think aloud protocols and search trails. It appeared that students with high perceived levels of metacognition were better able to reflect on their searching and refine their searches. Extensive prior subject knowledge augmented, and was influenced by metacognitive ability, whilst respondents with limited subject knowledge engaged in more primitive search strategies. The more successful students were able to recognise related terms and use them effectively. They were also better at integrating information and judging its relevance and veracity. Not surprisingly, disorientation seriously impeded searching. These findings should be treated with caution, since they only refer to four students.

Moreover, it seems likely that there was an interplay between these various factors, and since all the factors were self-reported, they must all reflect the degree of confidence of the individual subject. However, the findings do resonate with similar observations from Marchionini (1995); Chambers (1999); Hess (1999) and MacGregor's (1999) work on the mix of factors influencing successful hypertext navigation. This study has implications for factors which may be important for the successful information handling, and it underlines the significance of effective operation and navigation. It also shows that it is clearly not enough to teach students searching techniques, and then to assume that they will be competent investigators.

Hill (1999) has described a conceptual framework for information seeking in Open Ended Information Systems such as the World Wide Web. The framework provides a useful summary of the stages and phases involved in investigation and reflection, and the expectation is that searchers will go through the complete process in an iterative fashion, until sufficient relevant information is acquired.

Stage	Phase	Questions
Navigation	I. Purposeful thinking	• What am I looking for? • Where do I begin?
Navigation	II. Acting	• I am ready to initiate the search
Navigation	III. System responding	
Process	IV Evaluation Functional Optimal	• What does this mean? • Is this what I want? • What do I do now? • What do I have? • What else do I need?
Process	V. Transformation & integration	• Will this information work in a specific context? • Does what I have link with other information?
Process	VI. Resolution	• Is what I have sufficient? • Am I ready to end the search?

Stage, Phase, Question matrix. In: Hill, 1999, p 18

Given that Hill and Hannafin (1997) stress the importance of system knowledge in successful investigation, it might have been appropriate to include two more questions in their list, as part of the navigation process:

"How shall I seek information," (in other words what search tools to use?)

"What should I do if that doesn't work?"

Hill (1999) describes the types of difficulties encountered by naïve and knowledgeable users, in terms of the factors described in Hill & Hannafin (1997). Naïve users are unable to articulate what they know, and what they do not know. Because of limited system, subject and metacognitive knowledge, they have difficulty in interpreting the system, and tend to react to it, rather than searching in a purposeful way. They move through the navigation stage, but do not manage to negotiate the process stage, when they might integrate and transform their knowledge. Knowledgeable users on the other hand are more proactive and are able to question the information they retrieve, in terms of its relevance and validity. Macgregor's (1999) work shows that approaches to navigation may also vary widely. These categories again underline the significance of subject knowledge and metacognitive ability in influencing the success of information searching.

Online collaborative learning

The extent to which students on resource based courses in networked environments need online collaborative skills depends on the degree of integration of online conferencing with the resource based approach. So, at one extreme, students may be

expected to use the conferencing system as a general backup to resource based study, or at the other extreme, they may be required to work collaboratively with their peers throughout the course. The extensive literature on online collaborative learning is not covered in this review, (but see for example Harasim, 1990; Schrage, 1990; Kaye, 1992; McConnell, 1994) and the aim here is simply to outline the main factors influencing success.

As with searching and using information systems, a knowledge of the tools and the software environment inevitably speeds up effective participation in online conferences. In the early years of computer conferencing, this constituted a major hurdle to online participation because the interface was so user unfriendly (Mason, 1989). However, in recent years, personal experience in tutoring suggests that this has become less significant with increasingly intuitive interfaces and a greater general knowledge of email with successive cohorts of students.

Beyond this basic familiarity, students need to learn how to interact online with their peers, and the extent to which their interaction contributes to learning will vary with their competency. Indeed Salmon (2000) suggests that there may be a number of stages involved in online learning, which include access and motivation, socialisation, information exchange, knowledge construction and development. At the most basic level some authors (see for example Warren & Rada, 1998; Wilson & Whitelock, 1998; Kear & Heap, 1999) described later in this review, show how assessment plays an important part in encouraging online participation. The effectiveness of online conferencing as a medium through which resource based learners construct and negotiate meaning can depend very much on the model of

teaching and learning adopted by the course. For example, recent work by Lea (2000) describes how students can assume different roles and identities, depending on the conferences in which they choose to participate, because the conferences themselves embody different relationships of power and authority between students and tutors.

If students are required to produce collaborative work, they also need to develop team working and negotiation skills, group decision making and task management. These factors are common to those influencing face to face collaborative work, (see for example Schrage, 1990; Kaye, 1992; McConnell, 1992).

The Learning Context

The review so far has illustrated the interplay of a variety of factors in the effectiveness of resource based learners, and these include prior subject knowledge, levels of metacognition, educational stage of development and self confidence. Clearly success depends not only on the acquisition of particular skills, but also on the learning context, and there is some debate in the literature as to their relative importance.

For example, Bruce (1998) adopts a relational, rather than skills-based model of information literacy, which suggests that there are a variety of ways in which learners come to understand and experience the concept. Her study of lecturers' and librarians' conceptions of information literacy placed different emphases on the

relative importance to learners of information technology use and information use. It is doubtful whether an accurate picture of learners' conceptions can be established by asking experienced information users, however, Bruce argues that teaching information literacy should stress the growth of learners in coming to understand the concept in different ways, rather than focusing on the acquisition of particular skills. Whilst acknowledging the controversies surrounding skills and context, they do not form a central part of the argument here.

Previous work shows that a variety of factors influence the success of the self-directed learner and it may be that some of these factors are also relevant to this version of resource based learning. The literature in this area is very extensive, and so this part of the review simply concentrates on examples of some of the major factors.

An important model for understanding the influences of social and cultural contexts on student learning is "academic literacy", or the practices involved in reading and writing academic texts. The concept of academic literacy places great importance on the significance of these contexts, and particularly on the student's familiarity with the language of a discipline, and the academic genre. This helps to define their ability in reading, and success in writing assignments, and their understanding of assignment feedback (Lea, 1998; Lea & Street, 1998). The concept does not exclude the influence of transferable skills as discussed earlier in this review, but places less importance on them in the development of learning.

The academic literacy perspective underlines the potential difficulties for resource

based learners required to learn in a new, and more self-directed way, by accessing a large electronic information source. They need to be able to define their requirements for information in discipline-related terms, in order to be able to assess the extent to which new knowledge can fit with the knowledge they already have. So in other words, they must be competent in communicating within the academic genre. This underlines the significance of subject knowledge in information literacy and really challenges the concept of 'information need' as a stand alone, transferable skill.

A stark reminder of the varying backgrounds of students who may be confronted by the demands of resource based learning materials comes from work undertaken by Macdonald-Ross and Scott (1996) on students' reading skills and the readability of Open University foundation courses. Reading skills tests of 2000 students entering five foundation courses indicated that 95% of respondents showed some degree of inadequacy in understanding a passage of typical academic prose. They found that Technology students scored lower than Arts or Social Science students, but it is not clear whether this was related to the difficulty of the prose in the test, or to other factors, such as a familiarity with the style used or with the nature of the task. A study of the readability of foundation courses demonstrated a wide variability, and prompted the comment:

> "This illustrates the tension between the university's wish to be open, and the consequent fact that many students' reading standard is closer to the Daily Mail than to our academic prose."

<div align="right">(Macdonald-Ross & Scott, 1996, p 2)</div>

Inevitably, those with the greatest literacy problems drop out at foundation stage, but it seems likely that literacy problems may be compounded where students are required to refer to original academic texts, as an alternative to traditional course texts. These findings have serious implications for the support and assessment of resource based courses which rely on academic texts, and they highlight a dilemma for Course Teams when looking for suitable resources.

There are indications that the demands of the academic department may also have a significant influence on the way in which students learn. Ramsden (1979) studied students from six departments in a British University and found that each department possessed a particular culture in terms of the teaching, course organisation, subject areas and assessment. Some departments encouraged a far more independent approach to learning than others, for example students in those Arts departments included in the study felt that individual study and the exercise of choice was of great importance, whereas the subject matter in the Sciences and Applied Sciences seemed to give rise to more formal teaching methods and less individual control for the student.

This work reflects earlier observations by Biggs (1970) who found that the general nature of the tasks undertaken by Arts students on campus based university courses was rather different to that undertaken by Science students. He suggested that tasks in the Arts were involved with managing a large amount of relatively unstructured material, whereas in the Sciences, students were required to build on existing knowledge in a logical way. Since both Ramsden (op cit) and Biggs (op cit) refer to

campus based universities, it is not known to what extent their observations might be applicable in an ODL context, although it has some resonances with the work on academic literacy. There is no doubt that in the context of Open University students, where students may study courses across a variety of disciplines, there will be considerable variation in their experience and expectations. It may be that students from some disciplines are better prepared for studying using a wide variety of resources than others.

Gender is another factor which may influence a student's approach to learning, and there has been much work particularly on the influence of gender on the use of educational technologies. Much of this is concerned with access to technologies (for recent reviews see for example Wood, 1998, 1999; Halligan, 1999) and is therefore not of relevance to this study, in which all course participants were required to have access to the relevant technology. There has also been some work on the influence of gender on the nature of computer conference interactions (see for example Herring, 1993; Yates, 1997; Barrett & Lally, 1999) which suggests that there are differences in the frequency, length and style of messages from both men and women, and that conferencing reflects the same gendered identities as face to face interaction. In other words, the environment seems to have little effect on gender inequalities.

Inevitably the approach which students adopt in their studies results from a combination of factors, and Taylor, Morgan, & Gibbs (1981) describe a model of learning orientations which integrates the mix of institutional and personal contexts of learning. Each orientation is influenced by intrinsic or extrinsic factors, and

students may exhibit a combination of several orientations which vary through their
university careers.

ORIENTATION	INTEREST	AIM	CONCERNS
VOCATIONAL	Intrinsic	Training	Relevance of course to career
	Extrinsic	Qualification	Recognition of worth of qualification
ACADEMIC	Intrinsic	Follow intellectual interest	Room to choose work, stimulating lectures
	Extrinsic	Educational advance	Grades, academic progress
PERSONAL	Intrinsic	Self improvement	Challenge, interesting material
	Extrinsic	Proof of capability	Feedback, passing course
SOCIAL	Intrinsic	Have a good time	Facilities for sport and social activities

Orientations and student concerns. In Taylor, Morgan & Gibbs, 1981 , p 4

One might expect that students adopting an intrinsic academic, or intrinsic personal
orientation would thrive in courses with a resource based approach to study, because
of the intellectual challenge and the opportunities afforded for individual study and
expression. Others (for example extrinsic vocational), perhaps motivated by the need
to get a qualification for their job progression and therefore less interested in the
subject matter of the course, might aim to follow the minimum requirements of the
assessment system, without benefiting greatly from the resource based approach.

The process of resource based learning in networked environments (summary)

1. In common with other models which aim to develop self-directed learning, this version of resource based learning aims to develop in students the confidence to assume responsibility and autonomy in learning, and the cognitive, metacognitive and affective skills needed to make choices and manage their own learning. At the same time, some research suggests that students may need a basic level of these skills before they can begin to study a resource based course.

2. The use of electronic, as opposed to print based resources, offers new opportunities, in terms of the extent and choice of resources available, and also in the possibilities for tailoring searches, and accessing or combining information to meet particular requirements. Because of the potential scale and diversity of the resource base, students will be confronted with more choice than would have been possible in a print based ODL environment for project courses.

3. The literature on information literacy and information handling skills suggests that a number of stages are involved in learning from a large electronic information source. These stages include operation, navigation, investigation and reflection, effectively integrating the researching skills needed for project work with those required for negotiating electronic environments.

4. It appears that there is inter-dependence between these information handling skills, for example success in investigation and reflection depends on effective

operation and navigation techniques. There may be little point in teaching these skills in isolation from each other, in other words searching techniques will be ineffective if students are unfamiliar with the environment.

5. Difficulties with the practical skills of navigation and comprehension in hypertext environments vary with the confidence and prior subject knowledge of the student and may be assisted by signposting to appropriate links and scaffolding in the form of activities or assessed tasks.

6. The more complex cognitive skills of investigation and reflection involve an iterative cycle of articulating information need, searching and retrieval, followed by evaluation and integration. It is probable that with a greatly increased size and diversity of resource base, in comparison with that available on print based project courses, it will be crucial to hone these cognitive skills, so that students are able to manage the resources effectively.

7. For effective online collaborative learning, students must become proficient in operating the relevant tools for computer conferencing, in online interactions with peers, and where collaborative tasks are involved, in team working, task management and negotiation.

8. A variety of factors may influence learners' effectiveness with this version of resource based study. The literature suggests that an ability in these areas may be linked to the level of prior subject knowledge which students are able to draw upon, and there may also be some connection with the academic genre with which they are

familiar. In addition, the educational stage of development of students and their

levels of metacognition are clearly important, as are affective skills such as self

confidence. Lastly the orientation to study may affect the acceptability of the

approach.

The process of resource based learning in networked environments and the skills

which are involved, together with factors influencing success are summarised below.

Self-directed learning	• Active, rather than passive learning • Responsibility and autonomy • Self judgement and a reflective approach • Metacognitive development

Learning by open access to a large electronic information source	• Extensive scale and diversity of resources
	• More choice for students
	• Potential for tailoring searches, combining information
	
	Information handling skills
	• operation
	• navigation
	    orientation
	    connected meaning from hypertext
	• investigation
	    information need
	    searching and retrieval
	    evaluation
	• reflection
	    integration with existing knowledge
	    synthesis from a range of resources

Online collaborative learning	*Online collaborative skills* • operation • online interaction • collaborative decision making, negotiation, task management
Learning context	• subject knowledge/academic genre • metacognition/stage in academic development • affective skills • orientation to study

Table 2-1. The process of resource based learning in networked environments

For course developers the challenge is to seek ways to support students appropriately

in their resource based learning, and in view of the central influence of assessment in

influencing learning, assessment strategy must be a crucial consideration.

Assessment for resource based learning in networked environments

It was argued in Chapter 1 that appropriate assessment must be an integral part of course design and aligned with course aims and objectives (Gibbs, 1995). The first part of this review has illustrated how resource based learning in networked environments is part of a family of models which aim to develop self-directed learning, although they are distinguished by the route used to achieve these aims. It follows that an appropriate strategy for this version of resource based learning must be in line with the general aims and objectives of self-directed learning, whilst providing the opportunity for the practice of particular skills.

This part of the review describes work on assessment appropriate to self-directed learning and the development of skills. The review is organised under five functional headings, which relate to groups of assessment strategy.

- learning logs and peer review

- assessment of skills

- feedback and model answers

- projects.

It then goes on to develop a framework of assessment design, based on the discussion on the process of this version of resource based learning, which was presented in the first part of this review.

In campus based universities there has been a general awareness of the need for diversifying current assessment practices, in order to reflect changing models of teaching and learning, and to support the development of certain skills and more reflective learning. The ASSHE (Assessment in Higher Education) project (Hounsell et al, 1996) lists a wide variety of assessment practices, including self and peer assessment, use of portfolios, learning contracts and personal reflective logs, and Hounsell (1998) describes a number of overall trends, notably a growth in collaborative and team based assignments, and a move towards greater student involvement in assessment.

Many of these innovations are of relevance to open and distance learning, although some are difficult to realise in a traditional print based context. However, the increased interactivity and the possibilities for collaboration introduced by ICTs have opened up new options for assessment. Some of these are roughly equivalent to face to face or print based versions, whilst others are innovative approaches offered by the interactive nature of the technology.

Technology has made a significant impact on assessment in a variety of areas. In some universities it is in use to automate assignment submission and grade retrieval. (see for example van Gorp and Boysen, 1997). It is also widely in use to deliver computer based assessment, often as an adjunct of computer based learning packages (see for example Chaloupka, Koppi & Clark 1998; Bull, 1998; Brown, Race & Bull, 1999) and a national Computer Assisted Assessment Centre (http://www.caacentre.ac.uk/, 6/2/99) has recently been set up at Luton University, to

identify and provide guidance on good practice. These computer based assessments often use multiple choice questions or their derivatives, and appear to have a place in progress and achievement testing, and as a diagnostic tool. However they probably have little, as yet, to contribute to the development or assessment of student understanding, or of higher cognitive skills (Herrington & Herrington, 1998), and therefore are unlikely to be of relevance to resource based learning in networked environments.

This account refers to the lessons learnt from assessment for self-directed learning in campus based universities, and relates this to developments in online versions of similar assessment strategies. It also explores the potential for innovative strategies offered by ICTs, and then discusses the extent to which the assessment strategies described may be appropriate for resource based learning in a networked environment.

Learning logs and Peer review

Grabinger and Dunlap's model of REALS (1995) refers to the central importance of developing student responsibility and initiative through metacognition, or reflection on learning processes, and learning logs have been found to be useful in this context (Moon, 1999a, Moon, 1999b). Thorpe (1995) describes a study of two Open University courses which employ them in order to integrate an experiential approach with course concepts. Her evaluation indicated that this was a profitable approach, particularly where the logs were part of the formal assessment process, and students reported a greater awareness of reflective learning. This type of reflective activity has also been translated into an online context, where it may gain the extra

dimensions of interaction and collaboration. For example Montgomerie and Harapnuik (1997) describe the use of electronic learning journals, where students were required to record email exchanges, newsgroup interactions and other records of experiences with various internet tools, and mount these logs as web pages, so that fellow students could benefit from their experiences.

Resource based learners need to be able to evaluate their work, in order to develop effectively as self-directed learners and various researchers have found that self or peer assessment have a useful role here, in promoting a greater interest in reflection the ability to self judge, and in focusing student attention on aims (Boud & Falchikov, 1989; Boud, 1995; Williams, 1992; Falchikov 1995). Apparently students find these approaches worthwhile and useful in pinpointing strengths and weaknesses. By comparing several versions to a solution the student learns to recognise weaknesses in his work, as well as in others, thus developing critical thinking.

The use of computer conferencing makes peer review feasible in an ODL context, where previously it had not been possible. An interesting experiment to improve writing and research skills appropriate for computer science is reported by Cunningham (1994). Students were required to write up their work in the style of a research paper, and post it to a computer conference. Over a period of three days, each student had to submit a review of one of their peer's papers. They were then required to incorporate the peer reviewer's suggestions into a further draft of their own paper. Cunningham reports:

"..as students reviewed each others' work, they were exposed to some very

good as well as some very poor writing. The students learned to determine

what made some presentations good and what factors rendered some papers

difficult to read. They became remarkably astute…in determining what

elements led to easy to read, coherent presentations."

(Cunningham, 1994, p 7)

These comments reinforce the value of understanding the academic genre, and are

particularly of relevance to learners who are new to the resource based approach, and

may need extra guidance in expressing themselves within an academic discipline.

This exercise had the added advantage that public posting of assignments contributed

markedly to the standard of work, in common with observations made by Bos,

Kikstra & Morgan (1996).

The value to students of benchmarking is reported by Davies and Berrow (1998),

who trialled the use of peer review of assignments in a networked environment, with

a class of 16 external computer science master's degree students. Students were

required to write, and upload a review of published work in a given subject area.

The reviews were also submitted for tutor marking. The students then had to select

one of the uploaded reviews, and write a critique of it. Their evaluation indicated

that students were positive about the peer review exercise because it helped them to

judge the normative standard of the group.

Of course, peer review is not exclusively applied to written work, and in a face to

face situation may also be appropriate in presentation and debate, particularly in the

interim stages of preparation of papers. In this sense, and in the context of ODL courses, computer conferencing can be used for peer review, by the posting of substantial messages for peer comment. Gibbs (1999) describes the use of the Virtual Learning Environment coMentor for a philosophy course, in which students were encouraged to post pieces of their writing to share with fellow students. Most students found that they benefited from the opportunity to see the content of other students' written work and alternative styles of presentation. Gibbs comments:

"Although there was not a lot of evidence of engagement by students in debates (many threads contained just one message for example), it is clear that by posting up work, students made available to their fellows a large body of relatively accessible work and some helpful hints (readings, explanations etc) which others found useful."

(Gibbs, 1999 p 226)

Networking opens up other possibilities for new formative approaches to assessment, and can be used for a more formalised iterative review of successive drafts of assignments (McConnell,1999). For the MEd in Networked Collaborative Learning at Sheffield, students are required to submit their assignments in electronic form for review by their peers, together with a set of criteria, which are compared with a set produced by the tutor, who represents the views for the course team. The preparation and peer review stages take place over several weeks, and form a series of steps:

- "negotiating (with peers and tutor) the focus of the assignment topic, from an initial tentative idea to a fully confirmed topic;

- asynchronous discussion of issues, problems and viewpoints surrounding the topic;

- sharing resources (for example research papers; web sites; ideas; experiences);

- submission of several drafts of the assignment, followed each time by:

  - collaborative self/peer/tutor participation in reviews of the drafts;

  - formal submission of the final 'polished' assignment paper."

(McConnell, 1999, p 238)

In line with the comments on self and peer assessment in traditional campus based contexts, McConnell stresses the importance of a form of assessment which opens up a process normally hidden to the students, and gives them more control over their learning. It also enhances learning by allowing learners to understand the potential of self judgement and self determination. In contrast to more conventional class situations, the use of networked learning means that learners have a record of the discussions leading to the development of their written work, and the students find this a valuable learning resource, for reflecting on their learning and developing metacognition. The network also allows them the possibility to reflect on the written work over a period of time, something which might have not been practical in a class based situation, and certainly not in an ODL context. This iterative process may be of particular relevance to resource based learning, because it gives the students more freedom and flexibility in controlling the topic and the criteria by which they are to be judged.

Some evidence suggests that students need effective facilitation in order to become competent when learning how to assess work for themselves (Boyd & Cowan,1985;

Orsmond et al, 1996). Gibbs (1995) argues that whilst lecturers traditionally fall back on familiarity with a discipline, or the characteristics of good essay structure, students may need new, or more explicit criteria to work from, if they are to mark effectively. It is likely that any mechanism which permits discussion, or negotiation of assessment criteria will therefore assist in developing self-directed learning.

It is now possible to realise this objective in an ODL context. An experiment in using computer mediated communication for debating assessment criteria in preparation for project work is reported by Kwok and Ma (1999) who used a web based group support system (GSS) with a second year course in Distributed Information Systems. The students were given a set of criteria which they were invited to discuss and modify. They were then asked to vote for the six most appropriate criteria, and to assign weights on their relative importance. Based on these negotiated criteria, the lecturer was able give students feedback on the progress of their written work, and students were also encouraged to give peer feedback to others in the group. It appears that the negotiation of marks led to a high degree of ownership of the assessment scheme, and better understanding of the requirements of the assessment. This again illustrates the potential for developing self direction in learners, by offering students the opportunity to participate more fully in judging their work.

The examples of peer review and iterative assignment development described here offer great potential in supporting self-directed and reflective learning, but their implementation is difficult on large population courses, for example at the OU, where they have to fit within assessment regulations (Mason, 1999).

Assessment of skills

Resource based learners need to acquire a number of skills in relation to handling the electronic resources and participating in online debate. In fact, all online activity assumes a certain basic level of competence in using the online environment for collaborative learning, and the literature illustrates the fact that students are more likely to acquire these skills if they are given the opportunity, through the assessment, of practising them.

For example, Fox (1999) describes a case study of a course at Curtin University, Australia, where students were introduced to computer conferencing and expected to "find irresistible the opportunity to enrich their learning in this innovative 'high tech' manner." Contrary to their expectations, the majority of students did not find this opportunity irresistible and in a subsequent year online activity was made an assessable activity, both in terms of number of messages input and quality of dialogue. The result was a dramatic increase in levels of participation.

Similar observations have been made by a number of authors (see for example Warren & Rada,1998; Wilson & Whitelock, 1998; Thorpe, 1998; Rada,1998; Kear & Heap, 1999). As a result of their experiences Warren & Rada (op cit) recommend that to ensure participation in computer mediated communication, course designers should consider the following:

- deadlines for submissions;
- criteria for grading cmc [computer mediated communication] participation, in

other words length of submissions, frequency and nature of content;

- automated archiving and scoring procedures providing comparative information on individual participation.

Clearly, assessment has to be a vital part of practising and participation in computer mediated communication, but at the same time perhaps there needs to be a balance between ensuring that students participate, and encouraging a strategic approach to assessment. Of course, for resource based learners online interactive skills are not the only skills needed to be effective, and this experience underlines the fact that the relevant skills need to be identified, in terms of which skills will form a part of the course objectives, and which are assumed to be a necessary prerequisite to studying the course.

Fiedeldey (1999) describes the integration of various skills into online collaborative assessment for a Web based course in research psychology at the University of Pretoria. The assessment is designed to develop and support the following abilities, of relevance to the resource based approach in a networked environment, where it includes collaborative working:

- ability to share work

- interpersonal negotiation skills;

- ability to integrate/synthesise own work with that of others.

Each student produces an individual assignment on one aspect of a given topic, which is marked by the course presenter. They are then required to collaborate in

integrating individual assignment work into one substantive group report. In the course of this collaboration the students have to expose their work, including the course presenter's comments, to peer review. They also have to delegate tasks to different group members, and to negotiate editing of the various submissions. In this way the practice of skills is achieved by embedding tasks in the assessment, and by giving students the opportunity to reflect on their efforts through feedback from staff and students.

An alternative approach to skills learning through assessment has been introduced into a business administration course at the Dutch Open University. A pilot of the course ran for the first time in 1998 and is web based, with links to relevant resources and newsgroups for communication. The assessment strategy was designed as a way of teaching researching skills by presenting methodology and statistics "just in time" (Schlusmans; van den Boom & de Man, 1999). The principle of "just in time" learning is based on the acquisition of knowledge or skills as they are needed, rather than "in case", and uses the fact that students will be motivated by the assessment to learn new skills, or engage with a particular area of content. In this case, they were learning how to develop and critique a research proposal, in incremental steps, through the assignments. These assignments were published on the website, and subjected to peer review, and finally self evaluation. The assessment design was not without its drawbacks. After the first year the course team found that they had grossly over-estimated the study load, and the requirements for tutorial support imposed by 15 assignments and the quantity of resources, and had to revise the assessment strategy by combining several assignments into one portfolio for marking. However, the principle of "just in time" learning and of developing

assessment which builds the development of skills in an incremental way is one which could be applicable in a resource based context.

Feedback and Model answers

In order to be able to formulate their information needs and to investigate a subject by searching the literature, resource based learners need to learn to communicate effectively within a discipline. Within an ODL framework, they do this partly through tutorials or online interaction, but more especially through writing assignments. To maximise the value of correspondence tuition students need informative feedback from the tutor, and this provides the motivation to persist with study (Thorpe, 1998). It appears that students' reactions to feedback vary considerably with their particular needs and circumstances. A study of 22 Open University geology students' views on feedback (Roberts 1996) indicated that their needs might vary depending on their level of confidence with a subject, or their previous knowledge or motivation. The elements of feedback they were most concerned to receive included an encouraging response from the tutor; comments indicating where work was incorrect; and the provision of correct or model answers.

Communication technologies provide the potential for enhancing feedback to distance students. For example, Thorpe (1998) describes the potential for tutors to provide feedback to a whole tutorial group using a computer conference, and the possibilities of using word processing to produce legible comments to all students, or to copy the same comments to several students.

Students commonly experience difficulties in interpreting feedback from tutors

(Weedon, in press; Wood, pers comm 25/11/99) and it is known that effective

communication within a discipline is embedded within a particular academic genre.

The work on academic literacy (Lea, 1998; Lea & Street, 1998) underlines the need

to assist students in writing effectively in any academic subject. Lea (1998)

describes a longitudinal study of changes in students' study patterns as they progress

through their Open University study, from foundation[1] courses to subsequent

courses. In the initial stages of this study, 25 students from Social Science and

Technology foundation courses were interviewed at the end of their course and

subsequently in the next post-foundation[2] course. Students at foundation level

described the difficulties which they experienced in approaching the reading and

writing of academic texts: it represented an unfamiliar literacy practice, for which

reading and writing in other contexts provided little relevant preparation, so they

found the requirements of written assignments difficult to interpret. Further work by

Lea and Street (1998) made similar observations of students in campus based

universities and found that students were again experiencing great difficulty in

writing appropriately in new disciplines, and that advice intended to direct them was

not necessarily interpreted appropriately.

Indeed Mowl and Pain (1995) and Sambell & Johnson (in press) suggest that

students benefit from concrete examples of essay writing within a discipline in order

to understand the specific academic genre. As Rowntree (http//:www-

iet.open.ac.uk/pp/D.G.F.Rowntree/Assessment.html,11/9/99) suggests:

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[1] Foundation, or level 1 courses are equivalent to first year study at other UK universities.

[2] Post-foundation or level 2 courses are equivalent to second or third year study at other UK universities.

"Any worthwhile assessment strategy needs to include provision for helping

students understand just what we are looking for in their work. This goes

beyond showing lists of objectives or learning outcomes to students, or even

sharing with them our marking criteria. We may need to discuss with them,

and on more than one occasion, not just the content or intended outcomes of

the course but also the nature of the 'discourse' in our discipline - what the

discipline's practitioners regard as appropriate subject matter, the form of

argument that is expected, the kind of evidence that is acceptable, the criteria

for truth or elegance, the language and style of presentation. It may not be

enough to hope that students will absorb the subtler aspects of the discourse

by some kind of osmosis."

(Rowntree, http//:www-iet.open.ac.uk/pp/D.G.F.Rowntree/Assessment.html,11/9/99)

Model answers, illustrating for example the standard form for an essay within a

particular discipline, can help students to understand the requirements of their written

work, where abstract advice fails to communicate effectively. In a networked

environment conferencing can be used to distribute work, or to electronically archive

work likely to be of future use, so that students can benefit from seeing examples of

effective writing, or well structured assignments. (Barrett & Paradis, 1988; Mason,

1995). Broadband technology on the Mantchi project has facilitated the use of

"tertiary courseware", meaning past questions, student solutions and tutor feedback

as a reinforcement for student learning (Draper,

http://www.psy.gla.ac.uk/~steve/mant/altj.html, 19/3/99).

Projects

Projects are probably the most well tried and tested method of promoting self-directed, reflective learning. They provide the opportunity for students to identify their own learning needs and follow a topic of choice, rather than being assessed on set content, and in addition they enable the student to practise a wide variety of skills, in particular the information handling skills essential to resource based learning in networked environments. In a major study of 20 ODL project courses Henry (1994) found that teaching staff had used projects for a number of reasons, including the fostering of responsibility and autonomy, the teaching of cognitive skills and to provide professional practice.

Application of knowledge	Learn to apply knowledge
	Understand a discipline better
Preparation for work	Necessary technical training
	Provide professional practice
Teaching cognitive skills	Teaching higher cognitive skills
	Avoid spoonfeeding
Assessment	Sorts sheep from goats
	Necessary standard
Motivation	Motivating
	More effective
Relevance	Offers autonomy
	Fosters responsibility

Reasons for offering project work (Henry, 1994, p 46)

Henry comments:

"..responsibility placed on students in the design of a project, location of material, analysis and organisation, and the necessary use of initiative and problem-solving skills are a better test of ability than ordinary course work."

(Henry, 1994, p 51)

Projects continue to be a well used assessment strategy for open and distance learning courses, but their effectiveness can be enhanced using communication technologies. Collis (1998) describes the potential for introducing collaboration, and enhancing feedback loops and peer assessment in the planning and execution of project work. Many of the assessment devices which have been discussed in this review are integrated in this model of collaborative project work, indeed much of the literature already referred to is also concerned with project work (Fiedeldy, 1999; Kwok & Ma, 1999; McConnell, 1999).

Although there is plenty of experience and expertise on the use of projects as an assessment strategy, the online collaborative element may introduce particular challenges for students and course developers. Various researchers (Thorpe, 1996; Kear & Heap, 1999; Schlusmans, van den Boom & de Man, 1999) have observed that it imposes strains on the pace of study, in comparison with individual paper based assignments, because of the need to rely on fellow students.

There are other problems in implementing collaborative project work and Collis, Andernach & van Diepen (1997) describe various ways of addressing them for two web based courses at the University of Twente. Maintaining a balance between equal participation of all members of the group is encouraged by assigning each student a well-defined set of responsibilities, and equipping them with the skills to carry out their assigned tasks, in a set time-scale. The problems of maintaining "group memory" are addressed by using a group environment in which student work can be filed and annotated, and linked to further materials in the Web environment. In order to motivate students to communicate with each other, for example when

peer reviewing, the course uses highly structured forms, so that students are clear

what is required of them and how much input is required, although this seems to

militate against a philosophy of open-ness and flexibility. Problems with group

rapport between distance students have been alleviated to an extent by using real

time chat (IRC) and video-conferencing.

Despite the difficulties, the opportunity offered by project work for self-directed

learning, combined with the use and negotiation of knowledge from online peer

interactions and a more open approach to assessment means that this strategy must be

of particular relevance to resource based courses in networked environments.

A Framework for Assessment Design

The first part of this review defines the process of resource based learning in terms of

its aims and objectives, and the skills which are involved. This is now used to

develop a framework of assessment design, based on the lessons learnt from previous

work on assessment.

Although the integration of resource based learning and the collaborative approach in

networked environments is new to distance learning, the objective is the

development of self-directed learning, so there is much to be learnt from assessment

strategies used to develop, and judge the development of, self-directed learners in

other contexts.

At the same time, this version of resource based learning also has a particular profile of skills which learners must acquire if they do not already possess them, and the use of electronic resources may well impose greater open-ness and flexibility in study than is familiar even to print based project courses.

In summary, the assessment strategy must accommodate the following:

Common to models developing self-directed learning

Aligned with the exercise of:

- Active, rather than passive learning

- Responsibility and autonomy

- Self judgement and a reflective approach

- Metacognitive skills

Particular to resource based learning in networked environments

Allowing and encouraging scope for:

- Increased open-ness and flexibility in content

Developing:

- Information handling and online collaborative skills

These criteria are now used as a basis for discussing the applicability of the assessment strategies reviewed here.

1. Aligned with self-directed learning

In common with other self-directed models, resource based learners need to develop

the confidence to manage their own learning responsibly and to make choices in what they should study. Most undergraduates are unused to taking control of their learning, and need practice in self management, and decision making. Previous work (Henry, 1994; Schlusmans, van den Boom, & de Man, 1999) has shown that strategies which give them incremental support can help them develop this control, and sustain motivation. Projects have been widely used in this context, as have learning logs (Thorpe, 1995; Montgomerie & Harapnuik, 1997) and participation in the negotiation of criteria (Kwok & Ma, 1999, McConnell, 1999).

Learners no longer work in isolation, but in collaboration with their peers, and traditional values associated with the authority of teaching texts may be challenged. It is vital to support this transition to greater independence by assisting students to judge their own work and to develop a critical approach to their reading. The development of self judgement and a reflective approach has been supported by a variety of assessment strategies in campus based universities. They include the use of learning logs, model answers, and peer review (Moon, 1999b; Mowl & Pain, 1995; Boud & Falchikov, 1989), and these innovations have also been trialled in an ODL context using communication technologies (Thorpe, 1995; Montgomerie & Harapnuik, 1997; Barrett & Paradis, 1988; Mason, 1995). Communication technologies offer the scope for more interactive feedback, which may include an iterative review process of assignments in preparation (McConnell, 1999), but the practicalities of this implementation on a large scale for a large student population have not been explored.

2. Developing information handling and online collaborative skills

The process of resource based learning in networked environments requires a complex profile of interdependent skills, some of which are unique to this model and some of which are common to project based learning. These skills include information handling and collaborative skills, and if a course is well designed assessment must provide opportunities for generative learning activities in which students may practise, and reflect on their skills development, and receive formative feedback on their progress.

It is clear that a specification of skills must form an integral part of assessment design and must be covered by the assessment criteria. Assessment is vital in providing the motivation and opportunity to develop and reflect on skills, particularly for distance students, who have no opportunity to do this in a conventional classroom setting.

Online interactive, collaborative and negotiating skills can be practised through the use of computer conferencing in collaborative exchanges and group work, within the framework of assessment (Warren & Rada, 1998; Fox, 1999; Fiedeldy, 1999). They are also practised in collaborative project work, although the literature suggests that collaborative activities may require careful planning in order to ensure effective participation by all learners (Collis, Andernach & van Diepen, 1997). Similarly, project work has been used for the practice of investigative and integrative skills (Henry, 1994), but of course in this version of resource based learning students also need to practise operation and navigation skills.

The concept of incremental approaches to skills development, where students acquire

expertise "just in time", by undertaking progressively more complex activities associated with the assessment, also offers the potential for supporting skills development in this version of resource based learning, although previous experience suggests that course overloading can be a problem (Schlusmans, van den Boom & de Man, 1999).

3. Allowing scope for open-ness and flexibility in content

The resource based approach in networked environments offers students greater open-ness than in traditional ODL courses. Indeed if Course Teams rely on electronic resources on the Internet, there will be far more flexibility and freedom than is afforded students on conventional print based project courses. They must learn to take responsibility for this new-found freedom, and may need to practise this freedom and autonomy in a controlled and incremental way. The latitude afforded to students also underlines the importance of developing a critical and reflective approach, so that they are able to cope with the greater diversity of reading matter.

This must have implications for the assessment, because with access to a rich variety of resources and a greater latitude in what students may study, course developers are no longer able to give precise definitions as what content will have been covered. The work reviewed here describes the potential of projects as a way of accommodating this flexibility by providing for individual choice (Henry, 1994; Fiedeldy, 1999; McConnell, 1999). Open-ness may also have implications for the development of assessment criteria. It is no longer relevant to assess according to highly definitive, content-based criteria, whether the assessment is a project or not, although more general theme-based criteria may still be relevant. The use of

iterative reviewing during assignment development introduces the concept of

negotiation of content (McConnell, 1999). And of course, if the assignment content

is negotiable then perhaps the criteria should be as well, and this option is now also

feasible for distance courses using communication technologies (Kwok & Ma, 1999).

Criteria for Assessment Design	Assessment Strategies reviewed in this study
Aligned with objectives of self-directed learning (active, rather than passive learning; responsibility and autonomy; self judgement and a reflective approach; metacognitive development)	Projects Learning logs Negotiable criteria Interactive feedback Iterative reviewing Peer review Model answers
Developing Information handling and online collaborative skills	*Assessment supporting specific skills development, such as:* Computer conferencing Collaborative project work Incremental approaches, activity based assessment
Allowing scope for Open-ness and flexibility in content	Projects Theme-based criteria Negotiable criteria Interactive feedback Iterative reviewing, negotiable content

Table 2-2. Resource based learning in networked environments. A Framework for Assessment Design.

Tailoring this framework to the requirements of a particular resource based course

may be a matter of degree, for example, recognising the degree of open-ness and

flexibility offered by the course, and the corresponding affordance needed in the

assessment, or perhaps the level of critical analysis required of students in order to be

effective. Similarly, the extent to which assessment should provide opportunities for

the practice of particular skills must depend on an estimate of the skills base already

possessed by students taking the course, and the degree to which skills acquisition forms a part of course objectives.

The research undertaken in this project, and described in Chapters 5, 6 and 7, considers to what extent this framework is applicable for two resource based courses in networked environments.

CHAPTER 3. THE TEACHING AND ASSESSMENT OF RESOURCE BASED LEARNING IN THE COURSE THD204: IT AND SOCIETY

The Open University course THD204 "Information Technology and Society" was presented for the first time in 1995. In response to the need for flexibility to reflect rapid changes in technology, and the potential offered by technology to provide an extensive, structured resource to distance students, it was decided to adopt a resource based approach, and to exploit existing published material. It was the first accredited Open University course to use CD-ROM as a major course component (Heap et al, 1995). The approach contrasts with more traditional Open University course texts, which often contain comprehensive reviews accompanied by lengthy bibliographies. Resource based learning in networked environments could certainly be attractive to other course developers, because according to a summary produced for other course teams (Heap, 1997), a third the traditional Open University staff resource were needed to produce the course, and a quarter the teaching texts normally budgeted for, although copyright costs were very significant. The course provides an innovative environment for resource based learning in the context of distance learning, by giving students access to a personal library of articles on CD-ROM and guidance to sites on the Web, in addition to more traditional printed course materials. The process and practice of resource based learning receives overt emphasis in course materials.

This Chapter describes a desk study of all THD204 course texts and supporting documents, which was carried out in order to assess the various approaches to the

teaching of resource based learning. The conclusions were discussed with various members of the Course Team, and are presented here.

Aims and objectives

The THD204 Course Guide (Open University, 1997a) lists a number of aims related to coverage of course content, the most important being:

> "To identify and discuss some of the major social and technological issues surrounding the application and implementation of IT systems, and relate these to your own experience of such systems."
>
> (THD204 Course Guide, Open University, 1997a, p 3)

In addition to its content-related aims, the course also specifically addresses a number of process-related aims. A strand of advice to students which appears in the Course Guide and regularly recurs throughout the course texts refers to the development of the skills of critical judgement.

> "To provide you with some historical and comparative perspectives....enabling you to make better informed judgements..to examine critically some of the often implicit assumptions..."
>
> (THD204 Course Guide, Open University, 1997a, p 3)

An early planning document for the course (Open University, 1996a) also describes

the need to develop information handling skills:

> "The concept of a 'personal resource library' is crucial to the development of
> the course's pedagogic strategy and places special emphasis on the need to
> teach the higher order skills of browsing, reviewing and selecting extracts
> from a variety of information sources."
>
> (THD 204: IT & Society. A summary of course content and strategy, Open
> University, 1996a, p 3)

Finally, and in order that students benefit from this new learning environment, the
course aims to provide a framework for the learning and exercising of practical skills
in relation to computer conferencing, and navigating the CD-ROM.

> "...provide hands-on experience of some IT systems through the use of a
> home computer and modem, using software applications such as document
> processing, databases and electronic communications and where appropriate
> relate this to the issues discussed in the course."
>
> (THD204 Course Guide, Open University, 1997a, p 3)

The Resources

The course is divided into five blocks, each having a block text, including a number
of chapters on different themes, and written by different authors, plus a series of
Study Guides, indicating a study route through the materials for each block, and two

associated texts: a Reader and Set Book.[1]

In addition to these hard copy resources, the students have access to a CD-ROM containing a library of around 300 articles, as well as 350 Mb of video clips, CBT and animations (Jones, Kear & Reilly, 1998). The library is divided into sections of recommended reading for each block. Access is possible in a variety of ways:

- a straightforward list of titles;

- an electronic concept map, providing entry through hotlinked subject headings;

- an 'Index' for searching by block and course themes;

- a 'Search' facility which permits free text searching.

The figures in Appendix 1 illustrate routes into the database and it was anticipated that the variety of entry points would provide scope for various study styles.

The resource based structure of the course provides students with a core article, accompanied by related papers and other resources on CD-ROM. For each article on CD-ROM, a member of the Course Team was responsible for preparing the following:

- a bibliographic reference and abstract;

- a reference to particular paragraphs in the article which discussed any of the main course themes and block themes;

- glossary entries;

- hypertext links to parts of related documents, figures or annotations.

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[1] The OU normally divides correspondence texts into blocks of work on particular subject areas. Some courses also require the purchase of additional texts.

The core articles are maintained on CD-ROM, as well as being in the Reader, which makes it possible for students to read through articles initially in hard copy, and then perhaps to follow through hypertext links to annotations and related material on subsequent reading. Any part of the electronic resource can be cut and pasted into the student's own documents, and they also have the facility to insert bookmarks or annotations into relevant sections of articles.

Given that the organisation of the CD-ROM database is new to all students, they have to be taught how to find relevant information. Advice on navigation and operation of the CD-ROM, and on searching and retrieving material is covered by two computer based tutorials included with the CD-ROM.

Students are networked for e-mail and conferencing with staff and fellow students. They are also introduced to sources on the Internet, in particular a Home Page for the course, which provides links to additional reading, and updating material. The course is supported by five TV programmes, which are broadcast during the course.

Perspectives on the Support of Resource Based Learning

Resource based learning is not only a new way of study for students, it is also the subject of part of the course, in this way encouraging students to reflect on their learning development. In planning the course, the Course Team recognised that the resource based approach would be difficult or unfamiliar for most students and so its

introduction was a progressive process, from block three onwards. In explaining

resource based learning to students, the various course writers highlighted different

facets, and their perspectives have led to a variety of strategies for encouraging

students to make effective use of the resources.

Some course writers emphasised the acquisition of critical abilities, in association

with resource based learning. Aspects such as learning to scan articles, or being

exposed to a variety of viewpoints, and learning how to assess them were frequently

referred to. Although these skills are often discussed in association with Open

University study generally (for example various Chapters in the Good Study Guide,

Northedge 1990), students probably have a greater opportunity to practise them when

using a resource based approach.

"Learning how to pick out the essential elements of what an author has to say

and making connections between ideas from a range of sources, and finally,

exposing yourself to different perspectives on the same issue, are all

important elements of resource based learning."

(THD204 Block 3, Open University, 1996b, p 40)

Other course writers introduced researching exercises as a way of practising resource

based learning. Students were given a topic or question as part of an activity in the

course text, and required to find relevant material from the resource base. In some

exercises the students were assisted further with advice on analysing the question, the

mechanics of skimming through articles, marking relevant parts and making notes on

salient points.

Another recurring theme used by course writers was that resource based study afforded a greater measure of independence, more choice in reading matter, and greater control over learning.

> "..you will have the choice..to spend more time on areas which interest you most"

> (THD204 Block 3, Open University, 1996b, p 56)

Some course authors encouraged students to exercise this freedom, by offering a choice of study routes according to interest, or time available. Whilst in some cases articles were simply marked as "essential", or "optional", in other parts of the course students were given guidance in the form of short abstracts or summaries of CD-ROM articles in the block text. An electronic alternative to this strategy offered hypertext links between a core article and related texts.

Assessment strategy of THD204

The course is assessed by a combination of assignments (50%) and a final, closed book exam (50%). The assessment strategy is an evolving one, in response to regular on-line feedback from tutors and students, and particularly to research and evaluation work which has been carried out by this project. The situation described here reflects the assessment strategy in 1996 and 1997, before the innovations and refinements piloted by this study were put in place. Four of the assignments covered

the topics presented in the respective course blocks and took the general framework:

1. Define a technology (150-200 words)

2. Elaborate on associated technological issues (400-600 words)

3. Consider the social impact and implications (1200-1500 words)

(THD204 Assignment Book, Open University, 1996c, p 3)

The Course Team had a number of objectives for these assignments, which emerge from a reading of their advice to students. These were very much in line with the overall objectives of the course and were essentially concerned with the development of higher cognitive skills, such as critical thinking, and the integration of the social and technical strands of the course. In common with other Open University courses, it is clear that the team saw the assignments as a way of helping the student to focus on the most important aspects of their reading, and in integrating the knowledge they acquired:

"...you will find that the TMA [assignment] questions associated with any block will help you focus on what issues and discussions are vital to an 'understanding' of the course material"

(THD204 Block 1 Study Guide, Open University, 1997c, p 6)

"The point then is to grasp the central issues and principles and to be able to use examples and relevant terms as appropriate in (for example) the tutor-marked assignment...or the written examination."

(THD204 Block 1 Study Guide, Open University, 1997c, p 5)

"TMA01 associated with the block is intended to start you thinking more critically about what you are reading and to develop strategies for coping with the different natures of Technological and Social Science explanations."

(THD204 Block 1 Study Guide, Open University, 1997c, p 4)

"You should aim to integrate your knowledge, and show, by way of the TMAs and examination, that you understand the interconnection between the various components."

(THD204 Course Guide, Open University, 1997a, p 6)

Some assignments also offered practice in using the new learning environment. For example, the first on-line assignment (see Appendix 2, TMA04) was designed to encourage students to participate in computer conferencing; to give them their first experience of the medium for collaborative work; and as a support for reading and researching. Students were required to contribute to an on-line debate on a given topic; to submit transcripts of some of their contributions, in order to demonstrate their interactions with fellow students, and finally to summarise the whole debate. They were judged on two counts:

-"the extent to which you use the evidence presented in the course material to develop your arguments;
-the way in which you build on and criticise the ideas and inputs of your fellow contributors to carry the discussion forward."

(THD204 Assignment Book 2, Open University, 1997d, p 5)

The final assignment, in which students participated in a computer supported collaborative project, was double-weighted and non-substitutable. This means that was compulsory and worth double the normal assignment score. Students were required to produce an informed critique of a fictional, and exaggerated article describing a new IT application. Part of the resulting report was an individual effort, but the summary and conclusion were the result of co-operative endeavour. The project was intended as a synoptic device, to draw together and encourage an understanding of course issues; as a way of getting students to practise the skills of critical analysis and information handling; and as a way of teaching and practising collaborative skills. The advice to students reflected these considerations:

"provide an opportunity for you to integrate the social and technological strands and combine them with the intellectual and practical skills you have practised as you progressed through the course."

(THD204 Block 5 Study Guide, Open University, 1997e, p 12)

"By undertaking this project you will hone existing skills, or develop new ones, such as negotiation and compromise, interpersonal communication, assessing each other's work, and collaborative writing."

(THD204 Block 5 Study Guide, Open University, 1997e, p 12)

Whilst the assignments were designed to support students in various aspects of content, and the development of some skills, the exam was conceived as a mechanism for testing the students' grasp of course content. In view of the experimental nature of much of the course and many of the assignments, and in a

climate of institutional conservatism, it was considered inappropriate to do any more experimentation (pers comm, CT, 6/3/98). However, it is probably true to say that early Course Team ideas on the exam were more content-oriented than in subsequent years.

The exam questions (see Appendix 2) were designed to reflect an integration of the two main disciplines of the course and they followed the general structure used in the continuous assessments. The questions could be on any part of the course, and the intention of the course team was to accommodate for a range of approaches by wording them in a fairly open-ended way. From 1996 onwards the third part of each question, dealing with social issues, was marked on a demonstration of cognitive skills, such as statement of argument and use of evidence. This was designed to allow students latitude in the sources used for their answer and to reward the ability to use course principles and construct a reasoned argument. The first two parts of the questions, dealing with descriptions of technology, continued to be marked for the inclusion of specific content.

The students had a period of six weeks for revision after the end of the taught course, and were given guidance in the form of a specimen exam paper, which contained model answers to a number of questions, together with advice on approaches to the exam:

> "The course is about social and technological issues, differing perspectives and controversy, so you must reflect these in your answers."
>
> (THD204 Specimen Exam Paper, Open University, 1997f, p 5)

"...the course includes a large quantity of material and you have been encouraged to use this as a resource to support your understanding of the course themes."

"Concentrate on a few articles and get to know them well."

(THD204 Specimen Exam Paper, Open University, 1997f, p 6)

In line with current practice at the Open University, the exam is marked by external markers, who are normally course tutors. Markers do not receive scripts from their own students, and the scripts are anonymous. Before marking begins, they attend a co-ordination meeting in which they consider a representative sample of scripts and agree on marking standards and modifications to the marking schemes.

Conclusions

In the absence of any previous experience in the support of students in their first experience of resource based study, the Course Team went to considerable lengths to assist students, both in the advice and exercises given in course texts and in the structuring of the CD-ROM database. Of course, it is difficult to enforce the practice of particular skills in an ODL course, unless exercises are embedded in the assessment, and this was not recognised by the Course Team at the time. Indeed, historically there had been no explicit identification of skills outcomes for particular courses and their consequent inclusion as part of the assessment, although this is now part of current practice.

What emerges from this desk study is that the course had no consistent style, in that various members of the Course Team interpreted the process aims of the course in a variety of ways. This may not necessarily have been a drawback, since it might be anticipated that some methods would be more successful than others, or might suit the study styles of some students more than others.

As for assessment strategy, in common with other Open University courses, this particular course used assignments to support independent learning by focusing on the important aspects in each block and by providing an opportunity for the development of some higher cognitive skills. In addition, two innovative assignments were designed to support students in the development of skills associated with use of the various technologies. The design of these assessments, and their evaluation predate much of the work on innovative online assessment which is described in the review.

The exam remained traditional and content-oriented, however it was recognised that students might experience difficulties in their revision, having used a resource based approach for their study. Course Team advice attempted to channel students into concentrating on the main principles and themes.

The story of course development does not end here, however. With the close cooperation of the Course Chair, the results from this study were used to modify iteratively the assessment strategy of the course, so that it supported student learning more effectively.

CHAPTER 4. RESEARCH METHODS

In view of the fact that very little is known about the study and assessment of

resource based learning in networked environments, it was decided to undertake a

case study for this research, in which qualitative data would be used to construct a

detailed picture of student perspectives. The underlying paradigm to case studies is a

"naturalistic" philosophy (Lincoln and Guba, 1985) which is concerned with the

study of a phenomenon in its natural setting, without separating the phenomenon

from the context. Lincoln & Guba (op cit) argue that this paradigm is appropriate for

any field of enquiry in the vanguard of current thinking:

"if one is interested in inquiry that is ongoing at the forefront of disciplines,

the naturalistic paradigm is the paradigm of choice."

(Lincoln & Guba, 1985 p 50)

Simons (1996) suggests that pressure from funding bodies for quantifiable results has

tended to obscure the significance of case study research, which may frequently yield

inconclusive outcomes, however she believes that case studies are still important for

policy makers as a way of offering a better understanding and a "veracity of

experience".

This study has adopted a qualitative approach known as phenomenography, based on

this naturalistic philosophy. Phenomenography is an approach which has as its aim

the description of experiences, or ways of perceiving the world. The distinguishing

feature of the approach is the outcome, which is a series of categories describing

conceptions of a particular phenomenon (Marton, 1981). These categories will be generalisable between situations, although individuals might "move" between categories, depending on the circumstances. The approach has been highly significant in the field of student learning, because these changes from one category to another have a strong developmental component, and occur in the course of learning, and Entwistle (1997) argues that the approach provides an empathetic understanding of student learning, as opposed to an objective observation from outside. Marton (1981) believes that it is particularly appropriate for studies of student learning because learning involves the integration of content with the learner's existing conceptions:

> "If we think instead of the content of learning in terms of what is in the students' minds rather than of what is in the textbook, it clearly seems preferable that the content of learning should be described from a second-order (or experiential) perspective."

> (Marton, 1981, p182)

The approach has been widely in use for studies of the process of learning in higher education and for developing programmes to support learning more appropriately (see for example Laurillard, 1979; Morgan, Taylor & Gibbs, 1982; Hounsell, 1984; Belenky et al, 1986; Entwistle & Entwistle, 1991). It has also been used in the evaluation of learning technologies (Mason, 1989), and currently for a study of student learning experiences in networked environments (http://www.lancs.ac.uk/users/edres/research/csalt/networklearn/, 18/1/00).

However, phenomenography, and its implementation, is not without controversy, and Richardson (1999) argues that the term has been rather misused. The problem has arisen because of a lack of detailed description as to how data collection and analysis should be carried out, and he suggests that the analytical procedures attributed by many researchers to phenomenography are closely related to grounded theory.

Grounded theory is a well established form of qualitative research in the social sciences, and describes detailed procedures for collecting and analysing data. It is described by Glaser & Strauss (1967) as a method of *fostering the generation of theory,* by an iterative process which involves continual sampling and analysis of qualitative data from a variety of sources. The methodology as described by Pidgeon (1996) is not restricted to a particular form of data gathering, and sources of data may include research interviews, participant observation or archival material. It is based on two processes: constant comparison, and theoretical sampling. Constant comparison involves a process of continually sifting and comparing elements, and exploring similarities and differences, in order to develop codes, or categories which describe the facets of a potentially significant concept. Theoretical sampling involves active sampling of new cases as the analysis proceeds, in order to pursue the potential variation, and to deepen the understanding of the researcher. This may include negative case analysis, where the researcher explores cases which do not appear to fit the emerging concepts. In other words, the researcher will move between data collection and data analysis in an iterative way, and early analyses can be used to prompt future data collection.

There are certainly similarities between grounded theory and phenomenography. For example, the process of constant comparison and the generation of categories to describe the characteristics of the data in grounded theory accords with Marton's (1981) description of the outcomes of phenomenography, and is also described in the context of phenomenographic analysis by Entwistle & Marton (1994). It would be fair to say that phenomenography has strong links with other well established and "respectable" forms of qualitative research. However, it is distinguished by its aims to produce descriptions of individuals' conceptions of reality, and this defines the nature of the categories.

Design of study

The research reported here was carried out from 1996 to 1998 and spanned three presentation years of the course THD204: "IT and Society". There were four parts to the project.

1. Pilot study: student perspectives on resource based learning

The pilot study was undertaken as a way of gathering empirical data and developing an understanding of the most important issues to pursue in subsequent investigation. The study focused on the ways in which students interacted with the new learning environment, and their attitudes to resource based learning.

2. Perspectives on assessment

As a result of the findings of the pilot survey, it was decided to concentrate on

evaluating student and tutor perspectives on assessment, in order to establish which aspects of assessment seemed to be effective in supporting learning, and under what circumstances. Whilst most of the data was collected from students, the tutor perspective was also valuable. Not only did it provide insights into marking and other aspects of tutorial support, but since tutors are provisionally employed for the life of the course, which is typically six to eight years, it also conveyed a sense of evolution in terms of student progress.

3. Refinements in assessment strategy

With the co-operation and supportiveness of the Course Chair over three years it was possible to use the feedback from the first two stages of the project to refine various aspects of the assessment structure. The refining process had the following elements:

a. Using computer conferencing to deliver model answers, marking schemes and electronic peer review, thereby increasing formative feedback on assignments. Introduced and evaluated 1997 & 1998.

b. The introduction of a new assignment to support the development of information handling skills at an early stage in the course. Introduced and evaluated 1998.

c. Alteration of the first computer conferencing assignment to encourage earlier development of on-line collaborative skills. Introduced and evaluated 1998.

d. Using computer conferences to provide additional formative support in revision, in the form of advice from the Course Chair and scripts from past students. Introduced and evaluated 1998.

4. Perspectives on the study and assessment of a second resource based course

In order to establish the extent to which the findings from this research might be generalised to other situations, a shorter study was made in 1998 of a second Open University course (H802: "Applications of IT in Open and Distance Education"), which is for postgraduates and uses a resource based environment.

Data collection and analysis

Since the aim of this research was to collect open-ended exploratory data on people's experiences of resource based learning and its assessment, it was necessary to contact as many people as possible, who might represent a wide range of perspectives. It was also going to be important to be ready for the emergence of unforeseen issues, and not to have too many preconceptions about the importance of anticipated issues. To satisfy the need for trustworthiness in data, a range of methods was therefore employed, with a wide range of respondents, at different stages in the course. The following account describes these methods and considers their strengths and limitations.

Computer conferences

Computer conferences have been widely used as a source of qualitative data by a

number of researchers (e.g. Mason, 1989). They have the advantage of providing an easily accessible record of contributions, which can be printed out or alternatively searched to find keywords or comments by particular contributors. However, past experience (Mason, op cit) has shown that in an educational context, computer conferences rarely contain messages from the whole student population, unless their participation is a required part of the course.

For this study, computer conferences were used as a way of collecting feedback from students as they progressed through the course and encountered various assignments. Some of these conferences were set up specifically by the researcher for the purpose of gathering data. They were supplemented by data from other conferences which were established as a normal part of the course. In two of these conferences the researcher piloted various ways of improving the formative aspects of assignments, and the details are described in Appendix 5. These "assessment" conferences were particularly well received by students, and the fact that they were given extra help with the interpretation of assignments meant that they were willing participants and ready to supply informative comment. The researcher provided summaries of the views expressed in the conferences, and these summaries were posted for comment, thus providing a form of respondent validation. In addition, a summary of findings from the first assessment conference was posted in the second year's conference, for comment by students.

The sample of students who participated in the conferences set up by the researcher was inevitably biased because it relied on seeking out volunteers who were ready to give feedback. It seems likely that the participants were students who found

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conferencing to be a particularly useful adjunct to their studies, and they may have been more articulate in their views than the student population as a whole. Furthermore, the titles of some conferences ("Assessment", "Exam") may have attracted a high proportion of students with a strategic approach.

It became apparent that the computer conferences were providing a rich source of "ad hoc" and unprompted feedback on issues which students felt were of topical interest. This was particularly valuable for an exploratory study of this nature, in which the important questions to ask were not necessarily known at the outset of the investigation. However, the conferences were also a difficult and unpredictable way to extract information on specific questions, because students did not feel that they had to answer the questions, as they might in an interview, or indeed to respond at all, unless the questions were of immediate interest or relevance. It also seems likely that messages from some students may have influenced the input from others. It was clearly important to supplement this source of data with more traditional methods such as interviews.

Interviews

Flexibly structured interviews were employed throughout the period of research, and formed the backbone of a series of evaluations which, together with the conference data, built up a picture of student and tutor perspectives.

The interviews were conducted along the lines of a guided discussion, using main headings. The interviewer was also free to interact and explore issues with the students, in order to further define questions, or check the interpretation of remarks

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by paraphrasing the responses made by respondents. Questions were posed in a neutral manner, whilst being receptive and positively encouraging to any responses made by the respondent, so that the interview was as close to a "normal" conversation as could be arranged. The interview schedules were used as general guides for the interviews, and were modified as interesting or unexpected material emerged, or alternatively as existing questions failed to yield fruitful or relevant data.

The aim in deciding how many students to sample was to obtain as full a picture as possible of the variations in perspectives from students, in line with the principles of theoretical sampling (Glaser & Strauss, 1967). As Lincoln and Guba (1985) suggest:

"The object of the game is not to focus on the similarities that can be developed into generalisations, but to details of the many specifics that give the context its unique flavour."

(Lincoln & Guba, 1985 p 201)

With this aim in mind, interviewees were sought for each evaluation until the researcher reached a point at which further interviews yielded little new information, within the context of the terms of reference. In practical terms, this implied contacting respondents until the interviewer knew the range of possible answers to her questions. Inevitably the samples were somewhat biased, because of the need to respect students' wishes by selecting from those who had agreed to be contacted.

Initial interviews for the pilot project were carried out face-to-face, in students' homes, in the place where they studied at the computer. The data yielded not only

information on what the subjects had to say, but also on how they behaved, and provided some insight into the range of constraints under which they were studying. These interviews were taped and transcribed. Recording was found to be helpful, because the interviewer was not losing eye contact with the respondent or signalling the relative importance of remarks made by the respondent by making notes at the time.

Subsequent interviews were carried out by telephone. The telephone was used for interviews because of the geographical location of the researcher, but it also had the advantage of allowing easy contact with students in all parts of Europe. The interviews proved to be highly successful in that the responses were generally full and informative and clearly caused minimal disruption to the subjects, indeed many respondents were willing to be interviewed at the time initial contact was made. It seems likely that as distance students many of them welcomed what is often an infrequent opportunity to communicate their course experiences verbally.

The data collection for telephone interviews was based on "active listening", a technique described by Kvale (1996), which involves writing down the main aspects of the interview immediately after the session, assisted by notes taken during the session. Certainly the method has its drawbacks in the sense that the researcher could forget important details, or selectively enhance others. However, the onus is on the researcher to listen carefully, and the researcher's immediate memory will probably retain aspects such as the social atmosphere during the interviews, which to an extent would be lost in a recording. Kvale (op cit) suggests that this technique of active listening may ideally work as a selective filter:

"retaining those very meanings that are essential for the topic and purpose of

the study."

(Kvale, 1996 p 161)

Audio-conferencing

Data was also collected using audio-conferencing with groups of students, where it

was felt that this might yield a useful perspective on collaborative work. Whilst some

authors have reported that group interaction: "often leads to spontaneous and

emotional statements about the topic..reduces the interviewer's control of the

interview situation.." (Kvale, op cit), the author's experience of group interviewing

by audio-conferencing was not a success for a number of reasons. It was difficult to

organise a group of students who were willing to participate and were also available

at one time, and eventually only two small group conferences proved possible.

Whilst the interviews provided an insight into group interactions, there was a

tendency for any consensus to be a reflection of the opinions of the more influential

members of the group, whilst any divisive aspects between group members was

glossed over. In common with the computer conferences, it was evidently important

to cross check any observations against the data collected from other sources.

E-mail questions

Given the open-ended nature of the investigation, respondents frequently introduced

an issue which had previously not been discussed. They also raised interesting points

which required further clarification. In order to provide a reflective channel for

respondents after interviews, supplementary questions were sent by e-mail, as a

follow-up. These questions served as a check on remarks made during the interview, or to bring out new points. This was a very fruitful way of getting feedback, since respondents had had time to reflect on the scope of the interview, and were able and often very willing to comment on specific points in more depth. The messages provided an accurate and generally coherent record of responses, and the method is recommended for networked courses, as an extremely successful way of getting in-depth data.

E-mail questions were also used in some cases as a precursor to telephone interviewing, and proved particularly helpful for interviewing students for whom English was a second language.

Searching the database: observations and self-recorded tapes
In the pilot study, students were asked to perform a search task at the computer, whilst the researcher observed their methods of approach. The aim of this exercise was to supplement informal observations made during the face to face interviews, and as a check on interview responses.

Those respondents who were interviewed by telephone were posted a tape, on which they described their actions as they attempted the search. This "think aloud" procedure is used in protocol analysis (Ericsson & Simon, 1993) as a way of exteriorising student thought processes. Ericsson & Simon (op cit) report that thinking aloud has no significant effect on the quality of performance, although it may increase the time required to reach a solution. In this study the self-recorded responses were most informative, and in all cases more detailed than the searches

observed in the face-to-face interviews. The respondents seemed to feel less pressured, and certainly spent more time on their searches (20-25 mins) than was allowed during the face-to-face interviews. One drawback to this method was that the quality of some recordings was poor, some respondents being unable to find a suitable tape recorder. However, overall it proved to be a useful exercise: students sometimes navigated the resources in ways they had not described during the interview, and generally it provided a dramatic demonstration of their ability in this area, which would probably not have been conveyed in an interview.

Analysis of interviews and conferences

Inductive data analysis of both interviews and conference transcripts started during participation in the conferences and interviews, in the sense that common themes emerged. Points requiring clarification were followed up by e-mail. Notes were made of each telephone interview by the researcher, within 24 hours, and before memories had faded. By repeated reading of the conference and interview notes, together with the follow-up e-mail messages, it was possible to identify a number of common trends in student behaviour and attitudes, based on the principles of constant comparison (Glaser & Strauss, 1967). The method was used by Entwistle and Marton (1994) for a phenomenographic study:

> "rigorous qualitative analysis of interview data depends on the iterative reading and re-reading of transcripts to establish similarities and differences in responses. This...leads to the gradual emergence, reassessment, and confirmation of a series of concepts and categories which describe the most salient aspects of the data."

The findings described in Chapters 5, 6 and 7 highlight the commonalities, being the aspects referred to by most students, and they are illustrated by verbatim extracts from conference transcripts or e-mail messages.

Quantitative data

Whilst most of the data collected in this study is qualitative in nature, and the aim is to describe and interpret a picture, reference is made to quantitative data from other sources, as a way of underpinning the findings of this study, and where possible triangulating results. Thus the University Courses Survey 1996 (IET Courses Survey Project Team, 1997) is referred to, with respect to student attitudes to assignments and various course components. The THD Annual Electronic Course Survey, carried out by the THD204 Course Team, (Heap, pers comm 29/9/97) is also an important source of data, particularly of relevance in validating the information collected in the pilot project. This questionnaire is distributed to students on CD-ROM, and returned as e-mail attachments in the period prior to the final assignment. The results are available for three years, from 1996-1998 and contain quantitative data, and related comments. Since they are only accessible on a private Web page, the relevant figures for 1997 have been reproduced in Appendix 4.

Ethics

This research received the approval of the Student Research Project Panel, and the identities of the students involved in the interviews were entered into the IET (Institute of Educational Technology) student research database, to prevent over-sampling. At the outset of the assessment conferences, in both 1997 and 1998, students were informed as to the scope and aims of the research, and only those who volunteered were included in the closed conference. During conferencing, the researcher was an active participant, and contributed to the debate, so the students were not given the sense of being "spied upon". Finally, at the reporting stage, student identities were stripped from messages, so the extracts were strictly anonymous.

Validity, reliability and generalisability

In order to ensure the trustworthiness of the results obtained, Lincoln and Guba (1985) suggest that a number of criteria be met, including triangulation, persistent observation and prolonged engagement, and Pigeon (1996) suggests that they should be viewed as "guidance for good scholarship". This study meets their criteria in a number of ways. Data were collected from a range of sources, using a range of methods, so that it was possible to triangulate and cross check observations. The methods included interviews, both face-to-face and over the telephone, self recorded tapes, observation, on-line conferences and electronic mail. The interviews and conferences were carried out at various stages throughout the course, and with three

cohorts of students over three years, thus satisfying the requirement for persistent observation and prolonged engagement. Finally, the researcher had for some years worked as a tutor on the course, and in this way had had extensive opportunities to "learn the culture" of the course, and to be involved in prolonged engagement.

Validity

Entwistle & Entwistle (1991) comment on the criteria needed to establish validity:

> "..the validity of the concepts and categories established depends partly on logical analysis, partly on the match with previous research findings and partly on the extent to which the categories provide an accurate description of recognisable reality...The careful procedure in establishing the categories, the iterative process of refinement and above all the links established with previous findings, together establish the credibility of the findings."
>
> (Entwistle & Entwistle, 1991, p 211)

Using these guidelines it is argued that this study demonstrates validity in that the findings on assessment for resource based learning in networked environments bear out previous work described in the review in Chapter 2. As for the concept of recognisable reality, this rests partly with the experience of the researcher, who has considerable first hand experience of tutoring students on the course, and marking exams, and partly on the recognition of reality by the reader. The credibility of the findings is also strengthened by comparisons and triangulation between data from a variety of sources, including data from course tutors, together with respondent validation both from students in the assessment conferences, and from e-mail follow-

ups.

Reliability

This refers to the ability to replicate results, however in the context of qualitative research, Mason (1989) has argued that it is a consideration of the investigator's position which is of more relevance. Whilst a first hand knowledge of the practical constraints has been an advantage in understanding the ways in which students operate, it probably also meant that the researcher started the study with some preconceived notions. In the case of this research, the investigator started from a position of assuming that the exam at the end of a resource based course must necessarily be not only inappropriate, but also unwelcome to students. As a result of the interviews with students and tutors, and also from reading the work previously undertaken by other researchers, this view has been considerably modified.

Generalisability

This refers to the extent to which the findings of this study could be useful in other situations, and it is a common criticism of case studies that whilst being rich and descriptive they cannot easily be generalised. Kvale (1996) argues that there are several forms of generalisability: *naturalistic*, which relies on personal experience, and leads to expectations, rather than formal predictions; *statistical*, which is based on subjects selected at random, and relies on inferential statistics; or *analytical*, which is based on the similarities and differences between the two situations, and is arrived at by an analysis of the supporting evidence, in order to decide how many of the attributes the two situations have in common. This last definition is probably of most relevance to this study, and has been used in a comparison of the two courses

described in Chapters 6 and 7. Generalisation may yield some indication not only of *what is*, but also of *what might be*, so when used with data describing a case study at the leading edge, it can be used to envisage possible future directions.

There are probably two areas of this study where it is important to establish the extent of generalisability. The first is whether the students who are described here are representative of other students on the same course. The students who were interviewed for the main data (55 in 1997; 48 in 1998; see table 6-2, Chapter 6) were selected to represent the extent of extremeness of views, but the data was supported and triangulated from conference transcripts, which involved the participation of approximately 400 students in 1997 and 500 in 1998, approximately 50% of the student population in each year. The results are also borne out by the results from the initial pilot project (see Chapter 5), when interviews were carried out with all the students from one tutorial group, regardless of their initial willingness to participate, and they therefore represented a spectrum of abilities and motivations.

A comparison of the demographic data from these pilot interviews with the electronic survey data shows a similar profile of student characteristics. Table 4-1 illustrates the demographic characteristics of the 108 students, or approximately 10% of the student population replying to the Annual Electronic course survey in 1997 (Heap, pers comm, 29/9/7) and compares them with those collected from the 21 pilot study interviews. The results are not strictly comparable because under the descriptions of employment, the categories were self reported for the Annual Electronic course survey (Heap, op cit), whereas those for the pilot survey were chosen by the researcher on the basis of a description of occupation from the

respondents. Similarly, ages were self reported in the case of the electronic course

survey, and in the case of the pilot study the information was derived partly from

observation and partly from information volunteered by respondents.

	Electronic Course Survey (108 respondents)	Pilot study (21 respondents)
Gender	M 66% F 34%	M 14 (66%) F 7 (34%)
Faculty	Technology 51% Maths/comp 19% Social sciences 13% Other 4% No single faculty 13%	Technology 13 (62%) Maths 4 (19%) Social sciences 1 (5%) Science 2 (10%) Arts 1 (4%)
Occupation	 Seeking employment 6% Professional 41% Technical 26% Skilled trade 5% Homemaker 7% Other 15%	(20 respondents) Seeking employment 1(5%) Professional 6 (30%) Technical 12 (60%) Skilled trade Homemaker 1 (5%) Other
Age	 25-34 26% 35-44 46% 45-54 23% 55-64 4% Over 65 1%	(14 respondents) 20-29 3 (20%) 30-39 5 (37%) 40-50 6 (43%)

Table 4-1. Demographic characteristics of students from THD Electronic Course Survey and

pilot study from present research

The second area for generalisability is the question of whether the findings can be

extended to other resource based courses in networked environments. The findings

are limited to one institution (the OU), but the assumptions made in the framework of

assessment design are common to two courses within the OU. The variation in the

extent to which findings from the two courses support the framework suggests areas

where there may be variation in other courses. With the growth of web based

courses in Higher Education the findings may find wider applicability.

CHAPTER 5. STUDENT ATTITUDES TO RESOURCE BASED LEARNING IN A NETWORKED ENVIRONMENT

At the outset of this research project, very little was known about student perspectives on resource based learning in networked environments, and the influences on the success of this approach. Since this information is essential for the provision and planning of an appropriate assessment strategy, it was decided to run a pilot study in 1996, in which detailed information would be gathered on the practicalities of, and student attitudes towards this version of resource based learning. A report of this pilot study is given in this Chapter, as well as in Macdonald & Mason (1997, 1998), and Macdonald, Mason & Heap (1998a, 1998b).

METHOD

An interview survey of THD204 students was carried out with 21 students from two tutorial groups. They included all the students from the author's own group, and in addition six students associated with a tutorial group in Glasgow. The interview schedule, together with some background information on the students is given in Appendix 3.

The acknowledged bias in sampling was the fact that the researcher was a tutor to many of the students interviewed, and therefore students might have been influenced by particular aspects of tutorial support or were rather more tactful about the role of tutor support in their studies than they might otherwise have been. However, it was the researcher's experience that the students in her group represented a wide range of

backgrounds, ability and motivations, and by no means all were initially enthusiastic to participate. The researcher also had the advantage of possessing a wealth of background information on the students, which proved valuable in the light of the fact that the study was exploratory, and probably contributed to a sympathetic understanding of the reasons why students behaved as they did.

Most interviews were conducted after students had finished the last assignment of the course, and before they started revision for the examination. It was felt that at this point they would have maximised their experience of resource based learning in a networked environment, and the way in which it fitted into the course. In particular they would still have a reasonably clear memory of how they studied block five, which together with the project assignment was the most resource based part of the course.

Eight interviews were conducted face-to-face in the home of respondents, the remaining 13 interviews being conducted by telephone. The first three interviews were conducted in a more exploratory way, in order to establish the areas likely to be most productive in terms of interesting data. General areas covered in the interviews were study methods using the CD-ROM, researching information on the CD-ROM, use of other resources on the Internet, and overall attitudes to this version of resource based learning. In addition, the face-to-face interviews provided an opportunity for the researcher to gather invaluable data by observation of the practicalities of study at home using a resource based approach.

In order to learn to what extent students had become competent in information

handling skills with respect to the CD-ROM database, they were given a topic to research, and the students were observed as they researched the topic. Of those interviewed by telephone, seven interviewees were sent audio tapes on which to record the same researching exercise, and a total of five returned their tapes. This provided data on the search strategies adopted, the commands attempted and a general impression of the level of confidence exhibited by the students.

The interview transcripts and observations were subject to repeated reading, which led to the identification of a number of common trends, described below. These trends are illustrated with verbatim extracts from student comments, identified by a number referring to individual students. The letter P refers to the evaluation (pilot).

The findings from this study are compared with results from the 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97) taken from 108 responses, or approximately 10% of the total THD204 student population. The relevant figures are included in Appendix 4.

Reference is also made to the 1996 University Courses Survey (IET Courses Survey Project Team, 1997). In 1996, 300 students from THD204 were sampled and a total of 193 responded, which represented 20% of the total THD204 student population.

FINDINGS

Attitudes to resource based learning in a networked environment

This version of resource based learning was a new way of studying for all the students interviewed, and opinion was more or less equally divided between those students who found the resource based approach helpful (10) overall, and those who did not (11). Some students found that the greater independence, the flexibility in study routes and choice of reading appealed to them:

> P3 "I enjoyed this approach and liked the independence."
>
> P11 "I'm happy enough with a choice of readings and study routes.. if a route is more beneficial to me, I will follow it."
>
> P 20 "Yes, I much prefer the freedom to do a bit of detective work. It also improved my study skills."

Many students found that studying with a choice of media helped to make the course interesting and stimulating. They described the advantages of maintaining interest levels by switching from course texts to CD-ROM or conferencing.

> P6 "This is my fourth year and is the best course for keeping interest high. Very stimulating. It helps having different media and different access techniques. I liked the choice and the variation, not being bogged in one book."

This observation is in agreement with recent work showing that students generally

appreciate studying with a variety of media (Bowers & Lewis, 1999; Jones et al,1999).

Other students found that resource based learning in a networked environment encouraged them to study in a more reflective way. A particularly perceptive student explained how the use of electronic media could play a unique role in constructing alternative interpretations, and this is very much in line with current thinking on the potential for learning from electronic information sources (Lauzon, 1999).

> P10 "Electronic forms of information are very exciting: there is the potential for unique interpretation, and for constructing an individual knowledge base. Electronic storage and retrieval makes it all so much more efficient, and it allows you to be more flexible in your arguments: if one argument doesn't stand up, you can easily search for materials to support another."

Some students found the open-ness and choice associated with this version of resource based learning to be both tiresome and time consuming.

> P8 "Such a lot of information is thrown at you. There is too much choice and it's rather distracting. The boundaries are not defined. I would prefer more direction."
>
> P16 "There was far too much reading. But I feel I'm a bit lazy - already too busy, and only doing the course to finish my degree course off."

It appeared that the acceptability of the resource based approach depended partly on

the particular motivations of individual students. For example, students who were studying for interest, or who had a more academic motivation, found the structure of the course helpful. On the other hand, students who were motivated by the need to "polish off a degree" did not. This is reminiscent of Taylor, Morgan & Gibbs' (1981) work on personal orientations to study, which suggests that students who have certain learning orientations at a particular point in their academic career may be more likely than others to relish choice in their study and therefore to engage readily with resource based objectives.

Two of the most commonly reported problems in the study of this course have been a lack of time and a sense of information overload. Students have described themselves as "drowning in a sea of information", and have reported difficulties in coping with this. Their perceptions were that the approach was time consuming:

> P21 "I prefer all the information in block units, so I know enough to pass the course. I have time limitations. Choice is a good thing for people who have time to follow up the leads."
>
> P10 "...the worry is getting what you need in the time you have.."

This sense of overloading is reported elsewhere. The 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97) found that whilst a majority of students were favourable to resource based learning, they thought it had contributed to an increase in study time (Appendix 4, figures 1 & 2). Figures from the 1996 University Courses Survey show students estimated they had spent about 12.6 hours per week on the course, and 45.6% of them felt that this was about as they had expected. This time

estimate is at the upper end of the spectrum for Technology courses, but about the same as the Technology foundation course.

There are some indications that levels of student interest and motivation may influence perceptions of workload. Chambers (1992) found that where students had personally engaged with their work it felt less onerous and time consuming, so it may be that student perceptions of workload in relation to resource based learning are affected by the nature of the tasks and the degree of their personal involvement. There may also be other factors at work. Lawless (2000) asked students on various Open University mathematics courses to record the time taken to undertake activities, and found that students who were undertaking a course involving computer based activities took more time on their activities than those on other courses with activities which were not computer based. He attributes this to two factors: firstly, those who were taking longer appeared to be making a serious effort to engage with the activities, and secondly the computer based element simply took longer.

It seems likely that a combination of factors contribute to the difficulties for students who are new to resource based learning in networked environments, and the computer based element certainly plays a significant part in this. This research attempts to "unpick" the perceived problems of lack of time and information overload, by describing the adjustments required in study patterns, and the new skills which students need to acquire. It then goes on to consider the relationship between resource based learning in networked environments and assessment, which forms the subject of this thesis.

Study methods using electronic resources

In order to accommodate the requirements for a wide and diversified range of resources in a distance education course, extensive use has been made of electronic storage and retrieval, in addition to more conventional course materials. The use of resources in electronic form means that students are required to spend longer with a computer than they would in traditional courses. They use it to write assignments, to search for and read articles from the CD-ROM, to communicate with each other using computer conferencing and to explore the Internet. This has radical implications for part-time students, who have to fit their study time into and around other requirements of work and family. The interviews set out to gain an understanding of study patterns, to discover how students had adapted to cope with information in electronic form, and to highlight the reasons why they chose particular strategies. Appendix 3 contains thumbnail sketches of some of the students interviewed, together with some background on their work and study routines, in order to illustrate the ways in which they were integrating resource based study with other obligations.

Students were asked about their study habits at the computer: whether they read articles on screen, when and why they printed out material, and to what extent they used the electronic bookmarks and cut and paste facilities. As a way of setting these observations in context, they were also asked to describe how they preferred to study hard copy text.

It appeared that most (18) students both read on screen and printed out hard copy. A common practice was to skim through articles to establish relevance, and then print out part, or complete articles. There were a wide variety of reasons for doing this, including fatigue from screen-based study, and the familiarity of existing study habits with hard copy.

There were other reasons for printing out material, which were related to the constraints of part-time study. Students described the need to study away from their computer because of shift work; studying on public transport; in the car outside the scout hut; a predilection for reading in bed or in the bath; going on holiday; or the need to find a quiet space in the house away from the family. Some students were lucky enough to have a room at home where their computer was kept and they could study uninterrupted. Others were less fortunate and had a computer in the corner of the living room, or in the hall, where shared space with other members of the family imposed limitations on the times when the computer could be used.

> P15 "Reading from the CD-ROM means you have to be at your machine: I
> can't carry my CD-ROM through to the kitchen when I'm competing
> with children's TV."
>
> P18 "I'm working in time slots, but I may not be beside a pc [personal
> computer]. It doesn't really lend itself to someone like me who is burning the
> candle at both ends."

The difficulties encountered by students in integrating part time study with other

commitments are described by Kember (1999), and clearly the use of electronic

information sources reduces flexibility in study habits (Jones, Kear & Reilly, 1998).

When studying hard copy text, most (13) students liked to highlight or underline text

of significance, or write notes in the margin. This is not a habit which lends itself to

the study of material in electronic form, although clearly students were already

learning how to adapt study habits to an electronic environment, because the cut and

paste and book marking facility were widely in use.

The results of the 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97)

are in close agreement with these observations and Appendix 4 figures 3, 4 & 5

illustrate students' competence in operating the CD-ROM. With respect to printing

out, the majority of students printed out a varying proportion of articles, according to

circumstances (figure 6). The survey also highlights the fatigue and discomfort of

studying at a screen, and its limiting effect on the time and place for study (figures 7

& 8). In confirmation of the role which the CD-ROM library could play in

constructing interpretations, a majority found that copying extracts helped to group

ideas together (figure 9).

Skills development

In addition to adaptations in study routines, the use of electronic resources for

resource based study placed a requirement on students to learn and use a variety of

skills, and the Course Team had anticipated that the specific advice in the course

texts, together with the computer based tutorials would support the development of these skills (see Chapter 3). Much of the comment below refers to students' abilities with the CD-ROM, because the indexed library it contained formed an integral part of the course. The extent to which students used the Internet as a resource was more variable. The course provided introductory exercises to the various Internet resource tools, and an assignment on their applicability. Beyond this, Internet use was a matter for personal preference.

Operation and navigation skills

The previous section describes the ease with which students became familiar with the environment of the course CD-ROM, indeed by the end of the course, all the students were confident in the "nuts and bolts" of CD-ROM operation and navigation. This is probably not surprising given that CD-ROM technology was relatively familiar to two thirds (14) of the students interviewed: they had used it for games, home reference works like Encarta, and library searches. The 1996 University Courses Survey (IET Courses Survey Project Team, 1997) reports that even then 70% of students on the course had had previous experience of CD-ROM use.

Navigation skills similarly seem to have caused few problems, although the hypertext linking caused some disorientation and many students had difficulties in obtaining an initial conceptual overview of the database. This sense of disorientation is familiar to most users of the Web and is discussed in the review (see for example Marchionini, 1988), and it inevitably adds to the time needed to become proficient with this new medium.

In contrast with CD-ROM operation, Internet use was less familiar and most of the students (18) interviewed had not used it before the start of the course. Even by the end of the course only two thirds (14) of the students interviewed felt confident in using it as an information source, and one third did not. Of course this is a rapidly evolving area, and this survey reports the situation as it was in 1996. Some difficulties encountered were related to the cost of using the system, indeed over a third (9) of the students interviewed were accessing the Internet using trunk call rates. This situation was no longer the case by 1998, when students could access the network at local rates. In common with CD-ROM use, there were conceptual difficulties in navigating through hyperlinks, and inevitably this problem becomes more serious with the size or unfamiliarity of the resource.

Investigation skills

As a way of understanding the extent to which students had become competent in investigation using the CD-ROM database, students were asked to research a sample topic and then to describe in what circumstances they would use particular search facilities. The sample topic was:

> "How is IT being used to promote flexibility and open access to learning and training resources?"

Thirteen respondents completed the researching exercise and a full account of their efforts is given in Macdonald & Mason (1997). All the students interviewed were regular users of the free text 'Search' facility: it appeared to be a relatively familiar technique, although few exhibited much skill in their searching strategies. Indeed,

over half the students (9) demonstrated a lack of reflection on the subject of the search, and simply entered terms directly from the wording of the question. The choice of terms and the logic used to combine them seemed to be if not random, at least not a process involving prolonged thought. Their iterative search strategies following initial search results were similarly "ad hoc" in nature.

Concept maps were in regular use by half (10) the students, who found them useful to get an overall view of the subject, and occasionally when searching for articles on a specific subject.

The 'Index', offering access to the database by block or course themes, seemed to have caused confusion and uncertainty on the part of most (18) students. It is possible that some students may have experienced confusion because of an inconsistency in terminology, imposed by the software used. The course texts refer to 'themes', whereas these themes are found in a software menu labelled 'Index'. It is likely that students' inability to reflect on the subject of the query and reformulate it in terms of information need, or to reconceptualise it using the block or course themes was hampering their approach to searching using this route.

However, in spite of their lack of skill it is probably true to say that most students were able to survive in this situation, because the small size of the database meant that they were bound to turn up relevant material in the end, although a more proficient use of the software could have supported resource based study better. Had students acquired a greater skill in searching, it is possible that fewer might have experienced difficulties with information overload, additionally, a greater familiarity

with the use of block themes might have assisted with the problems in reading

selected parts of articles, described in the next section.

In contrast to the CD-ROM database, many students had experienced serious

difficulties in finding relevant information on the Internet, although their competence

was not investigated in detail in this study. Various well known problems were

encountered, including the time required to find relevant information, the quantity

and variable quality of the information found.

> P5 "During the course it all took too long, too many fruitless searches."
>
> P15 "It's not a very friendly interface. I don't like going from one place, to
>
> the next, to the next, then not finding what you want."
>
> P18 "It's important to have the right guidance to useful and relevant pages."

The Home Page gave background information on the course, and also Web addresses

containing supplementary reading for the various course units, and was potentially a

good way of supporting students by giving them guidance to the sites most likely to

be of relevance. Student opinion was divided on the usefulness of this resource and

only a third (8) of the students were regular users of the site. There had been some

disappointments with the site, because of unavailable URLs. Whilst the Home Page

itself was up to date, there could have been a variety of reasons for students' lack of

success in following links, and it is not possible to ascertain exactly what the

problem, or problems were.

It appears that there were difficulties in using the Internet as a resource, and they are

well recognised problems for all users. In the context of resource based study for an undergraduate course, the Internet provides a resource which is very much less structured and packaged than the CD-ROM library and considerably less efficient in terms of student time. The priority is to restrict the size of the resource which must be searched and to give guidance to useful and relevant sites. Whilst a course Home Page is potentially a useful approach, it does not appear to have been wholly successful in this case, possibly because not all the sources required were available via this route and also perhaps because students who were new Internet users may have been over-adventurous in their initial enthusiasm. Of course, as use of the Internet becomes more and more widespread there are likely to be fewer students encountering it for the first time on a post-foundation course, and so it may be that less support will be needed for the introductory stages.

Reflection skills

It appeared that even by the end of the course many students still did not possess the necessary skills to analyse and evaluate the information resource effectively. This impacted on their ability to refine their searching, and to integrate relevant parts of their reading into their written work. They were faced with more material than they could possibly have time to read, and experienced serious difficulties in being selective in their choice of article, and also in the reading of parts of articles.

Although some students clearly felt they had learnt to be selective in their reading, many admitted to reading complete articles, in case they missed vital information, and felt that more guidance on essential reading would have been appropriate.

Clearly Course Team expectations were over optimistic and the provision of course and block theme indexing intended to scaffold selective reading had not been as effective as anticipated.

P10 "To begin with, I was not selective enough, not good at getting the gist."

P20 "In the early stages I printed out whole articles, then I learnt to find relevant paragraphs and print them."

P7 "Have I learnt what I was supposed to learn? I feel uneasy... I like learning, but have I got side-tracked?"

P2 "I'd rather have material in one text. I'm not confident I've got everything relevant."

Student perceptions from the 1996 University Courses Survey were that the course was "very" relevant for learning to synthesise and put together ideas (44% of students) and to analyse data, descriptions and arguments (again 44%), although it is not possible to establish how competent they had become.

The 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97) also reports that by the end of the course students were aware of having developed various skills, although many also had particular difficulties with those parts of the course dealing with social issues (Appendix 4, figures 10,11,12). The problems experienced with choice and selective reading are underlined in this survey (figures 13,14).

Clearly students were experiencing difficulty in defining their information need, and in assessing the relevance of the information they had retrieved. This impacted on their ability to decide how much to read, or when to stop. These problems are analogous to those associated with academic literacy described by Lea & Street (1998) of students who were unable to write appropriately in new disciplines, or to interpret the advice given them. Students need to be able to define their requirements for information in discipline related terms, in order to be able to assess the relevance of new knowledge to their existing knowledge base. Hill and Hannafin's (1997) work confirms the significance of adequate subject knowledge for successful searching and suggests that a lack of metacognitive ability may also contribute to inadequate reflection and searching strategy. It seems likely that both these factors are also significant for resource based study in a networked environment.

For this particular course which is multidisciplinary, comprising strands from technology and social science, most students were required to read an unfamiliar style of writing, associated with one or other of these disciplines. Added to which, articles included in the electronic resources were written for an academic audience, as opposed to the course texts which are written specifically for students. This must be a consideration whenever students are referred to resources, on the Internet or elsewhere, which have been written for other readerships.

Other factors relating to the background of the students and the courses they had studied previously may have influenced success.

P8 "This was a totally different way of thinking, I found it very difficult, coming from an engineering background"

P12 "My own established habit with technical courses is to wade through set books. It is quite a different technique looking for conflicting arguments."

P3 "It was quite a different way of looking at things from the technology foundation course, where you were positively discouraged from looking at other sources"

There are some indications that this problem may have been more acute for students with Technology backgrounds, than those from the Humanities or Social Sciences, and there is evidence from earlier work that that some skills needed for researching and managing a variety of different sources are more likely to be acquired by students who have studied Humanities or Social Science courses. Work by Biggs (1970) and Ramsden (1979) reported in the review, supports this view.

Online collaborative skills

Students were given access to email and to a wide variety of national course conferences, which provided a forum for discussion on course topics, for socialising and a channel of communication between themselves and staff. In addition, students were divided into local groups of four to six for collaborative work associated with two of the assignments.

Half (10) of the students interviewed had used email or conferencing previous to the course, so basic operational skills were already familiar to them. As for their confidence and competence in online interaction skills, there were certain times

when it was an assessed requirement to participate in conferencing, and at these times all students said they were active in conferencing. Some students found that the small groups formed for these assignments were less threatening to participate in.

P11 "I was much happier with groups formed for the project: it was less threatening."

P16 "If I don't know people, I don't normally talk to them. It was the same with conferencing. I wasn't comfortable until near the end of the course."

Inevitably there was variation in the degree to which students participated in conferences beyond this. When asked whether they had contributed by inputting messages to conferences other than the small group (used for the assignments), roughly a third (8) had done so.

In confirmation of previous work, (Mason, 1989) students found conferencing beneficial in a variety of areas, including news, technical support, or in overcoming isolation. It was of particular relevance to this version of resource based learning because for some students it supported the interpretation or sometimes negotiation of knowledge:

P10 "Useful for constructing an understanding of the facts."

P20 "Conferencing was a lot more than chat. It was quite an eye opener to the way others handle their assignments. The interpretations were quite interesting."

P1 "Great for getting ideas and information from peers: generating ideas."

Attitudes to Assessment

In line with previous observations on the importance of assessment in driving the direction of student effort and motivation (see for example Miller & Parlett, 1974; Ramsden, 1979), this study showed that it was critical in determining the direction of student study. Furthermore in some cases it supported, and in others conflicted with the aims and objectives of the open, resource based approach.

> P16 "There is a lot of very interesting stuff on the CD-ROM: you can get stuck in and lose track of time. But what's important is the [assignment]: it's the 'be all and end all'."
>
> P10 "The assessment is more traditional than the study approach. You have to think what's going to be in the exam, although you are encouraged to strike out on your own."

Evidently assessment had an important role in providing practice in various skills needed for this version of resource based learning. When asked which part of the course they thought had taught them most about resource based learning, students were clear that the researching of material for the assignments and particularly the project was highly significant.

> P4 "It's when you do something practical, that you really learn how to do it."
>
> P17 "The project brought the whole thing to life."

Assessment was also the driving force in determining what was studied, and what was left out. Indeed, students adopted a highly strategic approach to block five course materials, which were designed to be studied in parallel with the project. It emerged that many students felt pressured by lack of time and the demands of the project and exam at this stage in the course, with the result that the project determined what was studied and in how much depth, and very few students had read material which was not related to this assignment.

Assessment plays a crucial role for students in an ODL context, and the strategic approach, which describes situations in which students are more assessment-directed (Ramsden, 1981) may be of particular relevance. In addition to the summative component, the opportunity for individual formative feedback on regular assignments from the tutor is often the only formative contact which the student receives, and substitutes for contact in lectures, tutorials or seminars. This may contribute to a greater awareness of assessment requirements. There is also a pacing function in the completion of regular assignments which may well be of particular importance to students working on their own. Morgan, Taylor & Gibbs (1982) suggest that the lack of time experienced by part-time students who have to meet the deadlines imposed by regular assignments may drive many students to adopt a strategic approach.

These observations underline the critical importance of assessment to students and the role which it plays in focusing attention on particular aspects of the course. In the light of the aims and objectives of this resource based course it was clear that it

would be necessary to re-consider the part which assessment might play in supporting course aims and objectives.

SUMMARY AND DISCUSSION

The findings of this pilot study are preliminary indications of trends in student attitudes to resource based learning in networked environments. The main points discussed here confirm previous work on information literacy and information handling skills described in the review, and underline the impact of electronic media on adaptations to study, and the various influences on student acceptance of the approach. The findings first alerted the Course Team to the need to reappraise the assessment strategy of this course and they act as a backdrop to the further work described in Chapter 6, when data from other students in 1997 and 1998 confirmed many of these observations. The findings are summarised in italics.

1. This version of resource based learning was new to all the students, and offered more freedom and flexibility in study routes and choice of reading than conventional ODL courses. Some students found the variety in delivery media contributed to their interest, while the electronic resources offered the facility to group ideas or support flexibility in arguments.

Clearly this version of resource based course has great potential in offering a stimulating learning environment. It appears that there are a variety of reasons for student acceptance of this approach, and these are related to high interest levels together with more choice and flexibility. Similar favourable comments of student experiences in exploratory learning environments are reported by Alexander (1999),

who has evaluated an online health course which was presented using an exploratory, constructivist learning environment. She describes the way in which the environment captured student interest and challenged them, contributing to high levels of motivation.

Whether the approach indeed develops self direction in learners is more difficult to establish from this pilot study, although some students reported greater confidence in some skills. Alexander (1999) claims that students did not learn as much content as they would in traditional teaching environments, but were equipped with a better conceptual framework of the subject and had developed knowledge construction skills, although she cites little evidence to support this.

2. The approach seemed to take more study time than conventional distance courses
Some of these factors are probably a reflection of the fact that students were studying in this new way for the first time. This is attributed to the need for adaptations to studying with electronic resources, together with the acquisition of a variety of new skills, and these observations are reflected in a recent evaluation of the resource based course A427 (Blake et al, 1998). It seems likely that students who subsequently followed courses with a similar open structure would have fewer difficulties. However, in spite of these considerations, it may be true to say that resource based learning in networked environments takes more study time, and probably needs more support in the process of study than traditional distance courses. Certainly Alexander (1999) reports that discovery learning required more time and work from students in comparison to a traditional lecture course.

3. The use of electronic resources required a variety of adaptations in study routines for part-time students.

The ways in which part-time study fits into students' lives, and the constraints imposed by technology on this course confirm observations of the same course undertaken by Thorpe (1996) and Lea (1996), and of the course A427 (Blake et al, op cit). The reality is that distance learning courses which are technology-dependent are likely to become more common, and part-time students probably need to adopt new routines, and print out material to permit greater flexibility.

4. The students had many new skills to learn before they could tackle course content effectively.

The effective use of the resource based environment appears to require the acquisition of a number of skills to negotiate the electronic resources, search effectively, and incorporate the results of searches into written work. In confirmation of the work reported in the review, information handling skills and online collaborative skills were important to the students in this study, and appear to constitute the basic "building blocks" of resource based learning in networked environments. Integral to the practice of these skills was a familiarity in studying with the electronic environment. Since many of these skills were new to students, this added to the time needed to study course content, and students would have benefited from a greater opportunity to practise their skills during the course.

5. Most students were reasonably competent in the skills of operation and navigation on the CD-ROM by the end of the course. They were less confident with their use of the Internet.

In spite of occasional problems with disorientation, the operation and navigation of the CD-ROM does not appear to have caused major problems with the students. This was probably because of the limited size of the database and student familiarity with CD-ROM operation. The Internet, which received less support in the course and inevitably presented more choice and considerably less course oriented structure, caused greater problems.

6. The skills of investigation and reflection caused continuing difficulties amongst the students, even at the end of the course, consequently many students reported problems with information overload.

Although students were reasonably competent in operating the search tools, a greater familiarity with them could have contributed to their investigative technique, in line with work by Hill & Hannafin (1997) demonstrating a measure of inter-dependence between system knowledge and investigative technique.

There were probably other influencing factors. The descriptions of students searching the CD-ROM database and the Internet reflect descriptions by Hill (1999) of naïve users. Naïve users are "reactive", in other words they respond to what is displayed on the screen, because they do not have strong subject, system and metacognitive knowledge. This affects their self confidence and their ability to articulate what they know and what they do not. She describes knowledgeable users, on the other hand as being more proactive in information seeking because of system, subject and metacognitive ability and able to question the information they find in terms of its validity and usefulness of content. Similar differences are reported by MacGregor (1999), who describes some students who were dependent on pre-structured lists,

whilst others were able to navigate in more individual and self-directed ways. This work underlines the complexity of investigative and reflective skills and their dependence on a variety of factors.

Inevitably, investigative skills become more important, the larger and more open the resource base, and so the potential offered by electronic resources on the Internet needs to be set against student skill in being able to critically evaluate it.

7. Student attitudes and acceptance of the approach varied with motivation, previous experience and qualifications.

Observations on the spectrum of student backgrounds and motivations bears out work on orientations to study (Taylor, Morgan & Gibbs, 1981), and suggests that this version of resource based learning may be more attractive, or intuitive for students who for one reason or other have adopted a more intrinsic academic orientation.

Some students will be better prepared for resource based study than others, by virtue of the type of study skills support offered in foundation courses, although students who start their study at post-foundation level may be particularly disadvantaged[1]. It looks as if students who have previously studied within certain disciplines have a grounding in skills more appropriate to resource based study than other students. Perhaps the ability to select the relevant from a range of resources, and from this to synthesise a coherent account is more familiar to students from say Arts and Humanities than Science and Technology?

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[1] Students are free to register for a course at any level, although it is recommended that they start their studies with a level 1 course.

If success in investigation and reflection depends on prior subject knowledge and levels of metacognition, then the stage at which students undertake resource based courses in networked environments will also be of significance.

9. Generalisability of the findings to other resource based courses in networked environments

Although the detailed description given here of students' information handling skills refers to the CD-ROM library, the observations can be used as a basis for general observations on this version of resource based approach. The question of generalisability of these findings is related to the extent to which they are independent of, or alternatively related to a specific environment. Obviously operation and navigation skills are environment related, but the fact that in this case students had few problems with operation, and experienced a degree of disorientation when navigating, bears out previous research on other hypertext environments described in the review.

The observations on investigation and reflection skills are only environment related in so far as it was important to have a familiarity with the tools in order to search effectively. The difficulties experienced by students in this study resonates with previous work referred to in the review, which underlines the significance of other factors such as a lack of prior subject knowledge or metacognitive skills, and these factors may also have been of significance in this study.

10. Assessment clearly had a significant role in influencing the direction of students' effort. At the same time, there were tensions between the resource based aims of the

course and that of the assessment.

In confirmation of previous observations (see for example Lockwood, 1990), students in this study were strongly influenced by the demands of both the continuous assessment and the exam. For example, the two online assignments were important in encouraging students to practise online interactive skills. Whilst some found the medium valuable for constructing and negotiating knowledge, many did not contribute beyond the necessary requirements of the assessment. In the early years of this course presentation, conflicts and tensions were identified between assessment, particularly the exam, and the resource based aims.

As a result of this pilot project, there has been an increased awareness of the significance of assessment on the part of the Course Team, and they decided to reappraise the assessment strategy of the course, for four reasons.

- Because of the lack of time reported by many students, and related to this, their observed lack of skill in the resource based approach, it was clear that they needed more practice and support in the process of study.

- Given the influential way in which assessment determines the direction of student effort, it was felt that the best way of supporting their learning more effectively would be through the assessment.

- Within the Open University system, assessment is the most easily modified element of a course, since it is changed every year, unlike other course material which may have a life of several years. It is thus a strategically effective way of

refining course pedagogy.

- The pilot project highlighted various problematic aspects of the assessment of this version of resource based learning. It was obviously necessary to help students to bridge the gap between this version of resource based learning and its assessment.

The research reported here, together with further research on assessment structures reported in Chapter 6, has fed into the planning of assessment in future course presentations.

CHAPTER 6. PERSPECTIVES ON ASSESSMENT FOR RESOURCE BASED LEARNING IN A NETWORKED ENVIRONMENT

Having acquired a valuable insight into student perspectives on resource based learning in networked environments from the pilot research in 1996, it was now appropriate to focus on assessment, with a view to establishing which aspects were effective in supporting the approach. This thesis sought to confirm or discount the observations made in the pilot study and to extend the findings described in the literature review.

Research in 1997 concentrated on tracking student and tutor perceptions to assessment as the course progressed. A trial to supplement the formative aspects of existing assignments was also undertaken. Since the whole project spanned three course presentation years it was possible to iteratively refine assessments, by incorporating the findings from initial evaluation work in 1996 and 1997 into assessment modifications in subsequent presentations of the course.

In 1998 data on student and tutor perceptions on assessment were again collected, and the research project also evaluated various refinements in the assessment strategy which it was anticipated might be more appropriate to support student learning. This Chapter describes the findings from research in 1997 and 1988, some of which is also reported in Macdonald, Mason & Heap (1998b & 1999) and Macdonald & Heap (1999).

METHODS

The various methods of data collection, together with details of all interview schedules and conference discussion points are included in Appendix 5 and summarised here in Table 6-1, and Figures 6-1 and 6-2.

Data from students were gathered from a number of computer conferences running in parallel with the course, supplemented with telephone interviews or e-mail questionnaires at significant points in the course, and in some cases by follow-up questions using e-mail. In addition, data reflecting the tutor perspective were gathered, again using computer conferences, supplemented with some interviews and e-mail questionnaires on specific points.

TABLE 6-1: METHODS OF DATA COLLECTION

1. 1996. Student attitudes to resource based learning

Date	Time	Purpose	Data collection	Samples	Comment suffix
Sept 96	After project (TMA06)	Pilot survey	Interviews: face to face/telephone Observations Self recorded tapes	21 students	P

2. 1997. Perspectives on Assessment

Date	Time	Purpose	Data collection	Samples	Comment suffix
Mar-Oct 1997	Throughout course	Tutor perspectives on assessment	Computer conference: (Tutors)	50 tutors	T(97)
Mar-Aug 1997	TMAs 01-04	Student perspectives on assessment/ model answers etc	Computer conference: (Assessment)	38 students	A
Sept 1997	End of Assessment Conference	Student perspectives on Assessment Conference	Telephone interviews	15 students	A
Sept 1997	After project (TMA06)	Student perspectives on project	Telephone interviews 2 Audio conferences	7 students 2 x 4 students E-mail follow-up	B
Oct 1997	After exam	Student perspectives on exam	2 computer conferences: (Revision)/(Post-Exam) Telephone interviews	400/200 students 25 students	C
		Tutor perspectives on exam marking	Telephone interviews Markers meeting (informal comment)	3 tutors	T(97)

TABLE 6-1: METHODS OF DATA COLLECTION

3. 1998. Evaluation of refinements in assessment strategy

Date	Time	Purpose	Data collection	Samples	Comment suffix
1998 Mar-Oct	Throughout course	Tutor perspectives on assessment	Computer conference: (Tutors)	50 tutors	T(98)
1998 Mar-Aug	TMAs 01-04	Student perspectives on assessment/model answers	Computer conference: (Assessment)	34 students	D
May 1998	After information handling assignment (TMA02)	Student perspectives on TMA02 + attitudes to exams	Telephone interviews E-mail questionnaire	20 students 5 students	E
Sept 1998	After project (TMA06)	Influence of collaboration in TMA04 on TMA06	E-mail questionnaire E-mail questionnaire Computer conference:	12 tutors 8 students 130 students (Project team collaboration)	T(98) F
Oct 1998	After exam	Perspectives on Revision/exam conferences	Telephone interviews + E-mail questionnaire Face to face interview	6 students 5 students	G Course Chair CC
		Perspectives on exam	Telephone interviews + E-mail follow-up Computer conference (Exam)	6 tutors 400 students	T(98) G
		Student profiles	Telephone interviews	4 students	

4. 1998. Assessment for resource based learning on a second ODL course H802

Date	Time	Purpose	Data collection	Samples	Comment suffix
Sep 1998	After project	Assessment evaluation	E-mail questionnaires + Telephone interviews	11 students	H

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Fig 6-1. Evaluation: Perspectives on Assessment, THD204

Fig 6-2. Evaluation: Refinements in Assessment THD204

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Assignments		1	2	3	4	5	6(Project)	Exam	

1998

50 (C)

34 (C)   130 (C)   400(C)

25(I)   12(I) 8(I)   11(I) 6(I)
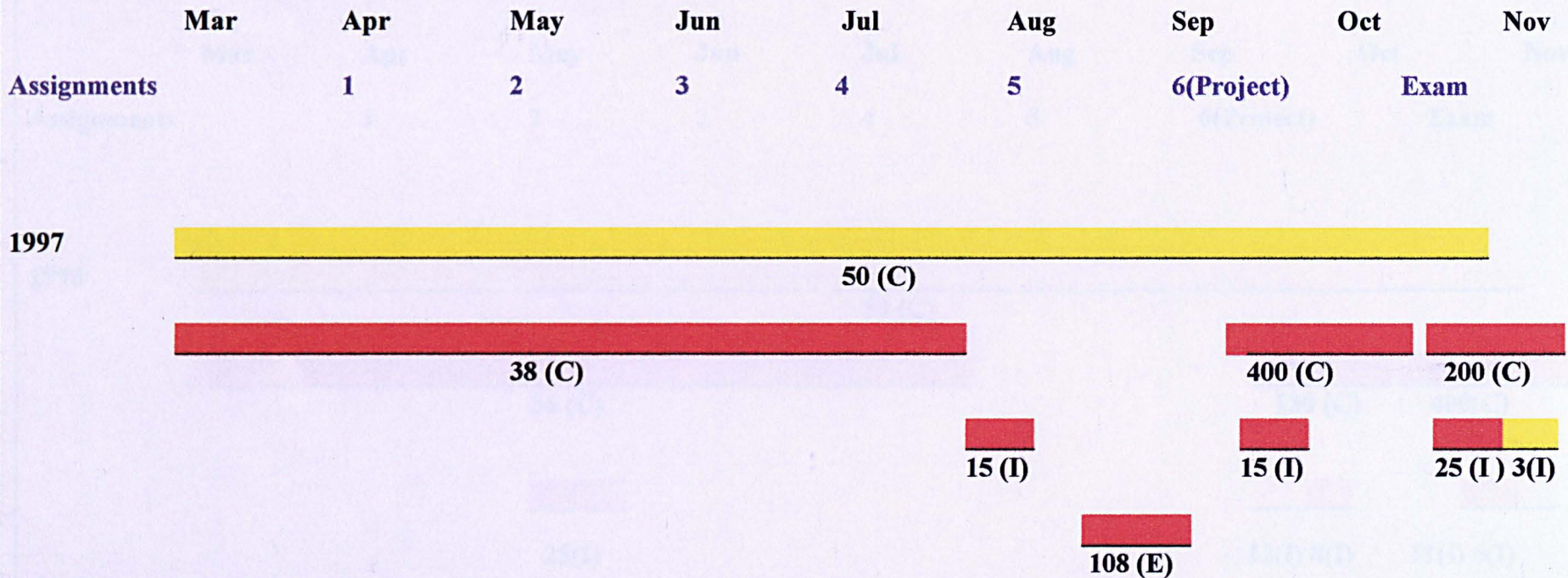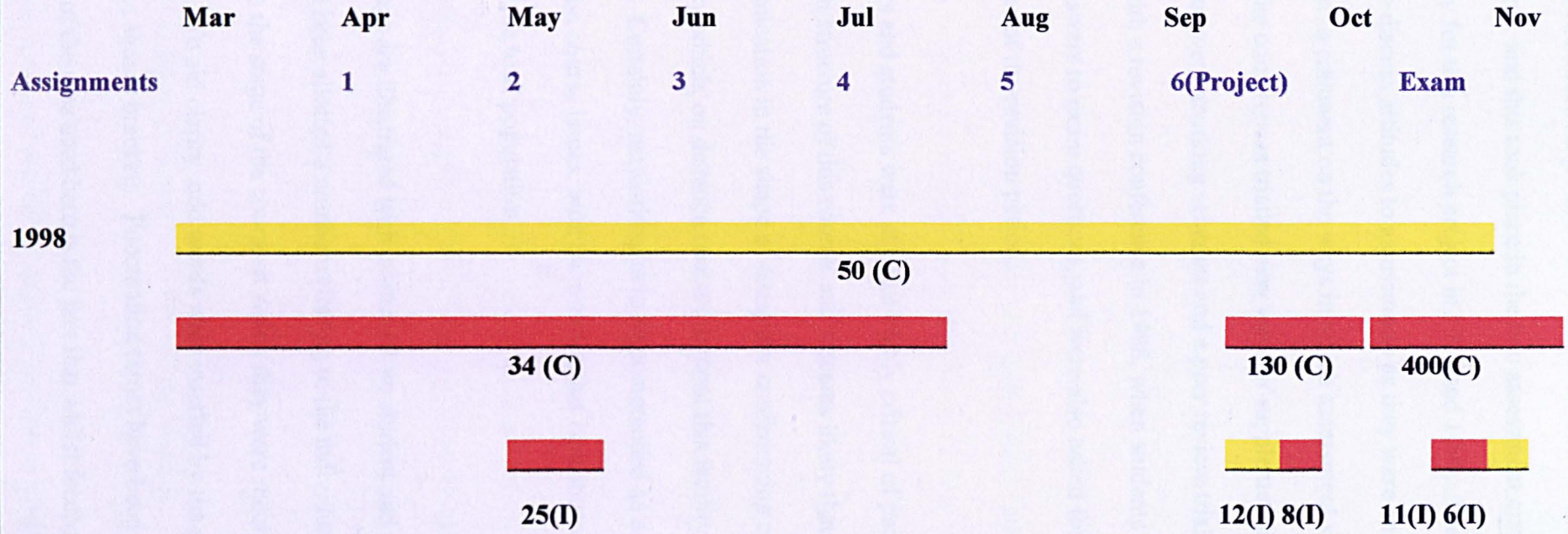
Qualitative evaluation 1998

Computer conferences (400)   ▇ Students

Telephone interviews (62)   ▇ Tutors
+ E-mail follow-up

The use of computer conferences made it possible to combine data collection with a teaching role, and this took place in the two assessment conferences set up specifically for this research project in 1997 and 1998. Their aim was to encourage students to discuss attitudes to assessments as they were encountered during the course, and to comment on the ways in which assessment supported learning. In addition, the conferences trialled new ways of supplementing feedback, in the form of model answers, marking schemes and a peer review trial. A similar model was adopted with a revision conference in 1998, when students were supplied with student answers to exam questions, and were also asked for feedback on their experiences of the revision period.

Both tutors and students were at times highly critical of particular aspects of the assessment structure of this course, and it seems likely that the presence of a channel of communication in the shape of computer conferencing could have given voice to a community which, on distance courses without this facility might have been writhing in silence. Certainly, networking is to be commended as a way of providing instant feedback on course issues, with the proviso that contributors may form a small sample of the total population.

The findings are illustrated with extracts from student and tutor comments, each of which has been allotted a number referring to the individual and a prefix relating the extracts to the stage of the course at which they were recorded: the key is given in Table 6-1. To aid clarity, odd words were inserted by the author and they are included in square brackets. Punctuation errors have been corrected. One of the strengths of the data used here is the fact that whilst feedback was sought on specific

stages in the assessment process, respondents regularly volunteered information on other stages, which helped to reinforce the messages emerging from each evaluation. This fact is illustrated by the extracts used in this account which were taken from a wide range of different evaluations. Tutor comments served to contextualise the feedback from students, whilst contributing depth and new perspectives to the overall picture. Since the researcher was also a tutor on the course, this helped to provide a sense of what could constitute a recognisable reality in the data collected.

As for the pilot study, the findings are compared with two sources of quantitative data: the 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97) and the University Courses Survey (IET Courses Survey Project Team, 1997).

FINDINGS

The findings are divided into four sections. A summary and discussion for each of the first three sections is to be found on the pages listed below.

Section 1: Assignments as a focus for course content

Essays and reports are a standard form of continuous assessment on Open University

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courses and formed a significant part of many assignments on this course. Students found them important as a way of summarising and reflecting on their reading. This observation is in common with observations from other ODL courses, (see for example Morgan, Taylor & Gibbs, 1982), but it seems likely that this function may assume greater importance, the greater the diversity of sources the student is required to draw upon, since the assignment effectively provides a focus for reading. Evidently the marking feedback received from tutors on this course was greatly valued, particularly in the early stages of the course.

C14 "You were having to look through a lot of information, when you prepared them. The [assignment] was almost like a précis....When reading [course texts] initially not much stays with you. You need the assignment to put information into a coherent form."

A14 "At least now I have a feel for what to expect when it comes to writing these essays and so I hope that the experience of this first [assignment] may hold me in better stead for the future!"

A13 "I have only had [the first assignment] returned so far, but found the comments supportive and constructive. This gave me confidence in my approach to the [assignments] and the boost I needed to carry on!"

B2 "The essays really concentrated your thoughts. You get more into issues."

The importance of tutor feedback on assignments is borne out by the 1997 THD Electronic Course Survey (Heap, pers comm, 29/9/97), see figure 16 Appendix 4. In addition, in the University Courses Survey (IET Courses Survey Project Team, 1997)

77% of students agreed, or strongly agreed that they had received supportive and constructive comments on this particular course, and 51% agreed that assignments were effective in consolidating the teaching of the course.

Discussion on the tutor conference (1997 and 1998) revealed tensions between the need to ensure consistency between tutors and difficulties of being over-prescriptive in terms of detail. This is often a problem with more traditionally structured courses, but it becomes more acute in this resource based context. Some tutors felt there were particular problems in dealing with course content because of the open-ended nature of the task:

> T1(97) "..this lack of control is a little unnerving at first. I have got used to it and by and large the students all use similar pathways through the materials..As tutors we have to try to guide their research without proscribing the path too well."
>
> T2(98) "I think students can approach an assignment with the aim of 'playing a game' and doing enough to get good marks, or they can approach from the standpoint of trying really to understand what the course is about.. and writing assignments to explore this. As a tutor I have limited time and I want to help people move into the second way of thinking if they are able and willing. I (sometimes) learn something new in following up what an adventurous student has done."
>
> T5 (98) "The challenge we ask students to face is to think about learning as something more than the heroic student in romantic isolation emerging at the end of a period of struggle with 'an answer'. We try as tutors to avoid being

the oracles to whom all others in our group/class or whatever look for clues as to what is 'the book answer'......So do we need something else, or more than mark guidelines?"

Of course, balancing the requirements for flexibility in marking is the need for consistency between markers. The fact that some students were aware of their particular tutor's interests, and were prepared to concentrate their efforts on tailoring assignments appropriately, underlines the importance of marking consistency, and for a moderator to check the marking at some point during a course, in order to ensure a "level playing field".

A17 "I feel that attending tutorials to 'suss out' your tutor is vital in this course (and other courses), as I suspect various tutors, being human, have different interpretations of what is required by this course..It pays dividends to get to know your tutors views, and play to them."

G11 "The decision whether to use a "Real-world" example of which one has up to date and accurate information, or whether to take an example from course material which may not reflect current concerns or capabilities. I realise that there are limitations to the marker's ability to check all new material cited, so I suppose that the latter option is always going to be the safest."

A9 "I found my tutor hard to please. Could you make a good enough essay to satisfy the tutor? Often when you get the [assignment] back you are not sure where you could have picked up extra marks."

A10 "For me the dilemma with the [assignment] is giving the tutor what they

are expecting, not what I feel the question is asking for. Somehow the two

are often quite different."

Additional formative feedback: marking schemes/model answers

Observations from the pilot project indicated that many students were experiencing

difficulties with new literacy practices associated with reading and writing in a new

discipline. The new resource based approach compounded these problems, because

of the variety of information resources available to them, and the variability in styles

used. These observations are borne out by feedback from students on the assessment

conference, many of whom had problems with assignment writing.

> A14 "I had not, and still have not got a clue on the sort of answer required.
>
> Total confusion over this one. 'Define the universe and give three
>
> examples.'"
>
> A17 "..not being well practised in discursive essays, I found it difficult to
>
> distil the relevant issues and apply them to a hypothetical IT manager."
>
> A 4 " I seemed to get lost in the middle. Mainly because of the wealth of
>
> material and wanting to use what I'd researched. To not have done would
>
> have seemed like wasting time. To have done may prove to have been a
>
> waste of time."

Various strategies were piloted on the assessment conference, with the aim of

encouraging students to be more reflective in their work, to assist with techniques of

essay or report writing, and to demonstrate how to use a variety of sources

effectively as evidence to illustrate an argument. One of these strategies was to

upload electronic versions of model answers and marking schemes, after the assignment cut-off dates.

To encourage	Assessment Design Feature
Self judgement Reflective approach to reading & writing Using evidence to illustrate an argument	Online model answers & marking schemes placed on assessment conference after assignment submission

This additional assistance was well received, particularly in the initial stages of the course when students were "finding their feet".

E11 "There is nothing like looking at answers for it to sink in: what level to pitch it. Having a chance to see the marking guides, the buzz words you need to include."

D26 "Seeing the marking scheme was the most valuable part of the exercise for me. This provides both guidelines for the future and an insight into the tutor's comments - it makes clear the game rules."

A13 "I certainly would appreciate a 'model' answer or outline of important points - if only to check the expected interpretation of the question. But I don't think tutors should expect [assignments] to conform exactly to a model answer - if a question is open to interpretation, then more than one answer is to be expected..perhaps marking guides are more useful to tutors."

C32 "I think model answers for the technical part of the [assignment] is a good idea, it is difficult to fit the amount of information needed into such a small word allowance. I have difficulties knowing how much detail to go into it, so it is useful to see a model answer to examine how it should be tackled."

A8 "I compared my own [assignment] to the model answers, but found this a very difficult exercise, probably because I am 'too close' to the piece of work. Thanks for the chance to do this, a very enlightening experience."

A14 "When I was starting I was going into it blind, and model answers were a help. 'Oh yea, I know where I'm going wrong.' Later in the course you can just get on and do it."

There is no doubt that students perceived great value in seeing a concrete example of an assignment, rather than attempting to digest abstract advice, and this is in line with other observations both in campus based universities (for example Mowl & Pain, 1995; Sambell & Johnson, in press) and in networked environments (Barrett & Paradis, 1988; Mason, 1995).

One unexpected consequence of the provision of marking schemes to the 1998 assessment conference was the criticism it provoked. Many students were concerned at the perceived discrepancy between the information provided to tutors in marking notes and that provided to students in the assignment book. There was some support for the inclusion of assessment criteria in the assignment notes sent to students, so that both students and tutors were working from the same baseline.

D28 "..the very 'open' questions seem to be so remote from the 'tight' answering criteria. It seems to me that [assessment criteria] would certainly be a great help to those of us who don't seem to be able to come to grips with *what you want us to know*."(author's italics)

D29 "The marking scheme frequently bears little or no relation to the

question and /or notes which often offer conflicting guidance."

Whilst there may have been some grounds for concern in the 1998 assessments, (these concerns were not expressed in the 1997 conference), and there may well have been a connection with a change of personnel in the Course Chair, it is probably also true to say that students were grappling with the new concept of open-ness in study routines.

As a result of this feedback, together with discussion on the tutor conference on the interpretation of questions and marking schemes, assessment criteria were included with assignments for the 1999 presentation.

Additional formative feedback: peer review

The electronic peer review trial was designed to be a formative adjunct to tutor marking, with the aim of increasing students' awareness of assessment requirements, and developing their self judgement. Volunteers from the assessment conference were invited to participate after they had submitted their scripts to the tutor.

To encourage:	Assessment Design Feature
Self judgement Reflective approach Alternative approaches to writing	Online peer assessment: • Students stripped id from script & forwarded script to researcher • Script redirected to second student • Marks and comments sent to researcher for redirection • Students marked own script

Those students who participated in the electronic peer review trial found it a valuable exercise in improving self judgement and seeing alternative approaches, in line with

observations by Falchikov (1995), and Cunningham (1994).

Many students found the exercise quite difficult to complete, indeed marking was a new skill in which they needed practice and guidance before they could become proficient. These difficulties have been reported elsewhere (see for example Boyd & Cowan, 1985; Orsmond et al, 1996; Sambell & McDowell, 1998). The task may also have been difficult because they were only asked to assess one script, which even an experienced tutor would not find easy to do fairly. Gibbs (1995) has argued that students probably need more specific guidance with marking criteria if they are to interpret them effectively. It seems that the exercise engendered new respect for tutors.

B7 "It was interesting to mark another persons work, not wanting to criticise too much, but still be strict in a fair way. It also gives insight into the way tutors think and mark scripts themselves."

A3 "The opportunity to see another essay shows how else it could be tackled. Peer assessment was very interesting. Helps you assess what the tutor is looking for. Makes you more critical of your own writing."

A16 "I found that keeping to the guide and marking a single script difficult as I have had no experience of marking student work. How high/low to set a standard? What if the marker does not entirely agree with all the comments on the guide and feels the student has put in other valid points that gain no marks? I suspect that marking many scripts a tutor would get a feel for what is good or bad."

D8 "I think marking yourself is additionally complex because you know what

you were *trying* to say."

A20 "No wonder that tutors sometimes take a long time getting them back. It was useful to see this from the 'other side of the fence.' In doing the exercises I have learnt how important it is to read the questions, and try and establish what is required."

The electronic network made possible a rapid turnaround of scripts, in addition to a guarantee of anonymity for those participating, but the trial did have drawbacks. Use of the researcher as the "exchanger" of scripts was cumbersome, and would have been time consuming for larger numbers of students. Further, it was difficult to encourage many students to participate, and if the exercise were to be used effectively, it would probably need to be included as part of a summative assignment.

Assignments as a focus for course content: summary and discussion

1. The essays and reports used as assignments in the early stages of the course were valuable to students in providing a focus for independent study.

In spite of the innovative nature of the course, this form of assignment, traditional to many Open University courses was found to be helpful to these students, indeed Tynjälä (1998) describes the value of assignments which, in line with constructivist pedagogy, encourage students to transform their knowledge, and apply it.

The students in this study appreciated rich tutor feedback, confirming work by Roberts (1996) on ODL courses and McDowell & Sambell (1999) for campus based courses.

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2. Students went through an "acclimatisation" to assessment writing in the initial stages of the course.

In line with observations made in the pilot project, students were grappling with reading and writing in a new discipline, and had problems in interpreting the requirements of the assignments. Similar problems with new literacy practices have been documented in campus based university courses (see for example Lea & Street 1998).

It looks as if some students were also striving to find a "formula" which met the requirements of their particular tutor, reflecting work by Miller and Parlett (1974) and Norton et al (1996) on cue seeking behaviour. Perhaps these cues were more important where studeants were unsure of the requirements of the course? Lockwood (1990) describes "TMA (Tutor Marked Assignment) dominated" students, who studied the course texts with the assignment firmly in mind, with the paramount aim of achieving a good grade, and this fits Taylor, Morgan & Gibbs' (1981) model of orientations to study and the influence of intrinsic and extrinsic motivation.

3. In general, the completion of assignments and rich feedback from tutors helped with these initial stages.

It was clearly important to maximise the support to students in the initial stages of the assessment process so that they were able to adapt quickly to course requirements. Students may need more assistance in attuning themselves to the genre, where they are expected to study from a variety of resources written in various styles.

4. The marking of assignments for a resource based course in a networked

environment offers new challenges to tutors, and networking can help, by providing

a forum for them to discuss their approach.

This version of resource based approach offers new challenges to tutors and Course

Teams, in terms of steering a course between the need to allow for latitude and

individuality in written work, whilst ensuring consistency between markers. The

flexibility of such approaches demands a rethink in terms of the content of the

assessment. How is it to be defined, so that students can be marked fairly and

consistently? Indeed Gipps (1994) suggests that logically the assessment of self-

directed learning is bound to lack objectivity :

> "should we still be so concerned with standardisation, with replicability and
>
> with generalisation?..the constructivist paradigm does not accept that reality
>
> is fixed and independent of the observer, rather reality is constructed by the
>
> observer and thus there are multiple constructions of reality. In this paradigm
>
> there is no such thing as a 'true score'."

> (Gipps, 1994, p 288)

This philosophy leaves much to the initiative of the tutor, and obviously needs to be

balanced against the requirements for fairness over a large student population. The

use of networking to discuss moderation and marking criteria can be of assistance to

tutors in ensuring a more level playing field. It may also help to guard against

Rowntree's (1977) "halo" effect, caused by markers who make an initial judgement

about a student and then stick to it regardless of subsequent, and sometimes

conflicting evidence on the value of the student's work.

Alternative strategies to address the need for flexibility in content may include the iterative development of assessment (McConnell, 1999), or criteria negotiation with students (Kwok & Ma, 1999).

5. Networking permits the electronic delivery of marking schemes, model answers, and electronic peer review, all of which have the potential to supplement formative feedback in these initial stages.

Building on experiences from campus-based universities, and some work in networked environments, this research has confirmed the usefulness of model answers and marking schemes as a promising way of enhancing feedback to distance learners. Model answers particularly need to be used with caution in the context of resource based courses, because of the danger of being over-prescriptive in terms of content. However, a model answer included in course materials at the start of the course might help students to focus on the type of answer required. The use of marking schemes as formative feedback also appears to have been valued and could be a useful adjunct to tutor feedback if used within tutor groups, where it is easier to establish when all students have submitted their work.

Other ways of assisting students with formative feedback include the use of networking for the submission of draft forms of an assignment for formative comment, prior to final submission (McConnell,1999). Assigning a low weighting to the first assignment of a course, so that it has a greater importance as a formative exercise, may also assist students in these initial stages, although the challenge for course developers for both these innovations is to seek ways to encourage students to

undertake work which is not fully assessed.

The use of networking opens up opportunities for electronic peer review as an exercise for distance students, and as a formative exercise it proved to be a successful way of encouraging self management and self judgement, of raising awareness of the requirements of assignments and of demonstrating alternative approaches to written work. Whilst the method of electronic exchange used in this experiment is not scaleable, a system of electronic exchange of scripts has been implemented effectively in other Open University courses, using Web-based bulletin boards (see for example Chapter 7).

Section 2: Assignments encouraging skills development

This section describes student and tutor perspectives on three assignments which support the development of various skills of relevance to resource based learning in a networked environment, while requiring the study of relevant course readings. The feedback from students and tutors has led to the refining of these assessments in an attempt to improve their effectiveness in supporting the resource based approach (Macdonald, Mason & Heap, 1999). The 1997 texts of these assignments, together with the modifications made in 1998 are included in Appendix 2.

1. Online collaborative project (TMA06)

To encourage:	Assessment Design Feature
Information handling skills Online collaborative skills	Online collaborative project: • As a group to provide a critique of a fictional article, based on course themes Individual marks for: • Body of report • Contribution to online discussion • Structure, coherence, use of evidence Collaborative marks for: • Summary and conclusion • Discussion of themes in group conference

Student feedback indicated that this was by far the most significant assignment in terms of supporting and developing the skills needed for this version of resource based learning because it put the approach into practice. The majority of students interviewed on its completion felt at home with the prospect of using a wide variety of sources to research a topic and at the same time found that it had helped to emphasise and contextualise the main course principles.

B11 "..certainly the resource based part of the project reinforced the skills encouraged throughout the course, if only in the sense that it required theme-oriented research across the CD-ROM articles."

A14 "The project was a very useful exercise as for me it helped to put the themes into context. This was because you needed to consider them in relation to a 'real' situation."

B20 "I do now feel a lot more 'at ease' with researching - especially with the CD-ROM...Taking into account the disadvantage of either having to print everything off or reading from the screen."

B10 "I quite enjoyed it. I relied mostly on the CD-ROM, what was supplied. I feel quite confident about finding material on the CD-ROM. There was a

lot of stuff. I went back time and again and some I didn't bother with. I don't know if I got better or not at sorting through a lot of material. It was a matter of narrowing down the search, and trying alternative strategies."

An evaluation of the project for the same course by Kear and Heap (1999) revealed that students rated as most important the ability to use evidence to support an argument, and electronic communication, followed by team skills such as negotiation, delegation and co-operation, peer group learning, critical skills, and the course related skills of integrating social and technological issues.

The computer supported collaboration, at its most successful, had the potential to provide a supportive environment for independent study and to encourage a critical approach to reading. Respondents found that the group work made them follow a schedule, and helped them to be more critical of their work. Some students reported high levels of mutual support:

> C14 "I felt really focused, we had a sense of responsibility and were mutually supportive, I was surprised at the level of feeling. Because we were 'chatting' to each other and balancing each others arguments ...you had to change your opinion a bit."
>
> C20 "Conferencing was new too. By tma06 it worked brilliantly. There was lots of information and exchanges of ideas."
>
> B14 "Collaboration was quite fruitful. People were very forthcoming. We met at a tutorial at the start and discussed main themes. We posted scripts on the conference: this was useful in a way and gives you an idea of what others

are thinking."

B13 "This is a superb way of working remotely. I wish our company did this. Having written comments rather than speaking them in a meeting you can't interpret the meeting differently. You have time to reflect before delivering a response... Success depends on people regularly logging on. If you are working to a deadline, things need to be moved along."

F5 "Generally, the group project and working with the group gave me a real insight into how IT can work for distance learning, conferences etc, which has been invaluable. It was also the most enjoyable part of the course.."

These findings are borne out by results from the 1997 THD Electronic Course Survey (Heap, pers comm, 29/9/97) which indicated that students enjoyed the opportunity of working collaboratively with other students and referred to the opportunity it afforded to acquire alternative perspectives, in addition to increasing confidence and motivation (figure 17).

However, comments from tutors and some students suggest that the extent of collaboration in project groups was probably fairly limited, and this reflects earlier comments on the difficulties which students experienced in coping with peer review:

T3(98) "The part of TMA06 that worked was the co-production of materials.[group summary and conclusion]..The least successful part was however constructive criticism of each other's work...they did little to help each other to prepare good quality contributions to the group work. Several students submitted their individual components to their conference, but

nobody gave any constructive response to any of this. The replies were generally along the lines of 'that all looks very good'. In fact most of them were poor."

F1 "There were times when I felt I was on an uphill task, trying to solicit comment from other members. I felt I could have done with a lot more criticism of my ideas."

B11 "On commenting of scripts, two of us sent out their scripts on the last evening. We were racing against time - it was very hurried."

Clearly without computer conferencing this collaboration would not have been possible at all for distance students and very few technical difficulties seem to have been encountered, most having been ironed out at an earlier stage in the course. In addition, the fact that the medium was asynchronous meant that it accommodated a range of study times. However, not all project groups were successful in their collaboration and disbenefits included non-participating group members, the lack of an enforceable schedule and the time consuming nature of asynchronous collaboration. This is line with observations elsewhere of the strong pacing and control element of online collaborative work (Thorpe,1996; Schlusmans et al, 1999).

B6 "Collaboration in any field is only as good as the willingness of all to collaborate, and their own sense of responsibility."

A14 "...this did put an extra strain on the members who were around at any one time, as they could not continue with confidence until everybody had contributed and agreed/disagreed with decisions."

F3 "To be honest, I think we have a kind of schizophrenia about collaborative

working: we like the sharing, the sense of pooling ideas and picking up ideas from others, but we are less sold on the idea of relying on others. The commitment required to work collaboratively is greater than as an individual, adding to the time demands which are already a problem for most OU students."

B6 "We had a good bunch, but human nature is such that some people get their inspiration at the last minute and I like to be ahead. How much could you rely on them? It was all left to the last minute. If we could have got an answer sooner, we could have learnt from each other."

B17 "Disadvantages? Guys like me! Being stuck with other people's timetables. There were differences in style and ways of working. This was something to get used to."

A number of factors influenced the success of the collaborative process. Firstly, a face-to-face meeting, audio conference, or on-line chat discussion early on in the project period was highly significant in reaching organisational decisions, including establishing a timetable, for a quick initial brainstorm, and also to establish a working relationship.

T4(98) "They have enjoyed the face-to-face meetings in the pub the best, and this is what makes it work well or not as the case may be."

F6 "The face-to-face sessions were a big help in that we were able to agree on the topics for discussion, introduction and conclusion etc, and also set timescales for completing work."

F1 "I think people were a lot more collaborative after they'd had a face-to-

face meeting, then they felt they knew each other to work together.."

Unfortunately for many groups this last suggestion was not feasible, because of geographical constraints, or other commitments. Secondly, successful groups had appointed a co-ordinator who took overall responsibility for promoting the discussion and in many cases who drafted the final collaborative product. Thirdly, useful lessons had been learnt in the first conferencing assignment which had given students practice in conferencing in a small group and had given them a foretaste of the collaborative project.

> C25 "Our project group had a key member who was retired and always responded to any messages we put in."
> F8 "Successful factors: people logging on regularly; ...a timetable for completion..delegation of tasks"
> B11 "We met twice, at the beginning and two weeks later. We would certainly have done worse if we hadn't met!"
> B4 "As a group we went through the training in the previous assignment [tma02]. We made mistakes, we got together, rethought our strategy and came to a conclusion quickly. There were difficulties, but it was quite a useful exercise."

In view of the difficulties faced by groups in coping with the management of group dynamics in an on-line context, the Course Team introduced changes in subsequent course presentations. An earlier conferencing assignment (TMA04) described below, was used to raise the profile of on-line group management with students.

2. Conferencing and on-line collaborative assignment (TMA04)

This first on-line assignment was designed to encourage students to participate in computer conferencing, to give them their first experience of the medium for collaborative work and to give them experience of its potential as a support for reading and researching.

To encourage:	Assessment Design Features
Development of online collaborative skills Development and discussion of meaning from course readings Investigation and reflection	Students required to discuss a course topic in small online group. Individual marks awarded for: • 3-5 messages contributed to group debate • summary of whole discussion

Whilst many students found the exercise difficult because of lack of time and the practice of new skills, some found that it supported their study in positive ways:

B11 "The conferencing itself was really stimulating, a positive experience, and the sources were actually very good, I thought. I tried to read almost everything on the CD-ROM which was relevant and although it was very heavy going, each time I went back to the conference I had developed my thinking further. More time seemed to be the key to getting it all together better."

F2 "I found this approach really useful. Our group did not discuss the block in general terms to any great extent. However it was a useful medium to pose questions or seek clarification. I would have welcomed such a system on previous courses."

A5 "It's different to other courses. They were tutor-oriented. This is a lot more student-oriented. And we are moving forwards as a group."

Comment on the tutor conference underlines the fact that not only do assignments provide study support for students, they are also important as a focus for tutorial support. It appeared that there was still a need for tutorial support in the mechanics of computer conferencing:

T5(98) "The dynamics of group collaboration over the last couple of years has changed as more students have had some experience of the concept of e-mail...I find there is still a need for considerable tutoring in terms of organisation, priorities and keeping to the point of the exercise."

T2(98) "..they are starting to practise some of the skills of working with Resource Based Learning. These are the skills that will be needed when let loose on the richer resources for TMA06..And it is the strategy of working with peers and building up a learning team that I am looking for."

Evidently whilst on-line conferencing can play an important part in the resource based approach in a networked environment, the skills of conferencing need to be learnt, and appropriately supported in assessment, before students can be expected to benefit. Indeed, assessment on this course was crucial in developing on-line debating skills, and this is in line with observations elsewhere (see for example Warren & Rada, 1998). The fact that the debate was being assessed had a positive effect on the quality of contributions, and many students commented on its value in comparison with the debates on optional course conferences.

D11 "The wider conference thing didn't really do the job in terms of really taking the subject forward and pulling out salient points. There was too much chat. At a local level [collaborative groups for TMA04 and 06] they were more useful, but *then we were being marked on it*." (author's italics)

F2 "With respect to conferencing/debating, in TMA04 we HAD to use the conference to discuss the various themes and issues. This was because it was an important and specific part of the assignment, we had to produce five quality messages and they were worth 50% of the marks. Some of us spent quite a bit of time producing our messages to ensure they were of the right quality."

In view of problems previously identified with group management during the project, the assignment was modified in 1998, to encourage students to learn from collaboration strategies using the resources in the CD-ROM library, and to reflect on their experiences with on-line collaboration. From this they were required to produce a strategy for collaborative working which might be of practical use for the forthcoming project.

To encourage:	Assessment Design Features
Development of online collaborative skills Development and discussion of meaning from course readings Investigation Reflection on the process of online collaboration	Students required to discuss a course topic in small online group, and then to reflect on the experience and produce a strategy for online collaboration. Individual marks for: • 5 messages contributed to group, each supported by another message to illustrate their ability to interact and build on other contributions; • a summary of whole discussion • a statement of group's proposed strategy for online collaboration, with a personal assessment of the strategy.

An evaluation of this refined assignment, after the project had been submitted, revealed that many students had found the initial conferencing assignment helpful, as a general preparation for the project, and a forum for discussing procedures and working practices. Whilst many of the problems envisaged did not materialise, and not all strategies proved appropriate, the exercise still appears to have been much appreciated by students.

F3 "We recognised from our earlier TMA04 exercise that we lost a lot of time in the initial overhead associated with organising the task allocation, voting mechanism etc, so we tackled this very early and got ahead."

F1 "I would say that the problems we envisaged in TMA04 did not occur, but it was good preparation, for it eliminated the fear of TMA06 being a daunting task."

F7 "Because of our work together on TMA04 we had the confidence to contribute, comment and constructively criticise. Knowing that the five of us were actively contributing and shaping our thoughts and developing ideas gave me and I think the others in the group a great deal of support. Above

all, I really enjoyed this aspect of the course because I felt I could contribute."

F2 "We thought that weak, non-contributing members would not be an issue - it was and was difficult to remedy. Hardware/software was seen as an issue, but none occurred. Resolution of disputes was also a worry. Again, no real problems here thanks to a good team effort and regular logging in by all participants. Finally, concern expressed in TMA04 was division of labour. Some wanted to swap tasks regularly, that was voted down in favour of having a task and seeing it through. That worked well and gave us good continuity throughout our work on TMA06."

Looking back at the two conferencing assignments, most tutors felt that the earlier assignment had had positive benefits for many groups in terms of practising on-line collaboration, reflecting on effective strategies, and also in strengthening working relationships. There were also other relevant factors, including the individual variation between students, their willingness or ability to meet face-to-face, and previous experience with managing group work.

T7(98) "It quickly became clear to me that the "dry run" of TMA04 helped them become very comfortable about the way that they wanted to interact for TMA06. I would also say that the part in the TMA04 about planning future conferencing... may have allowed them time to consider the errors they made as a conferencing team - errors which they dealt with for TMA06."

T2 (98) "All my groups took a bit of time to get going this year and there were some mixed results for TMA04. The lessons learnt then however clearly paid off as the group conferencing in TMA06 this year was not only

as good as the very best in previous years but unlike previous years I did not

have a poor group conference. I believe that 04 had a positive effect."

T5 (98) "It was certainly evident from the work and comments from my

groups that TMA04 helped them get started on TMA06 more quickly and

efficiently. They had a strategy from the start, and actually discussed their

strategy for TMA06 at the end of their discussions for TMA04, when they

realised that they could have done better."

3. Information handling assignment (TMA02)

Interviews and observations of students at their workstations in 1996 (see Chapter 5)

indicated that students lacked skill at searching the CD-ROM, and seemed unsure

about the use of various search methods. It was considered that a more proficient use

of the software could have supported resource based study better, and had students

acquired greater skill in searching, they might have experienced fewer problems with

information overload (Macdonald & Mason, 1998).

Consequently, it was decided to introduce an assignment in 1998 to encourage the

practice of these skills at an earlier stage in the course. Students were asked to

explore the various search methods available to them on the course CD-ROM, using

a given course theme, and to give an assessment of their use in future course work.

They were also required to identify and provide a précis of one article of relevance to

a given theme. This involved the practising of all the information handling skills,

because it required students to operate electronic search tools; navigate through

electronic resources; read appropriate sources selectively and get the gist of

important points in order to write a précis.

To encourage:	Assessment Design Features
Development of information handling skills: operation, navigation, investigation, reflection Precis writing	• Write a report comparing the use of three different CD-ROM search methods, describing outcomes, and offer an assessment of the various methods. • Write a précis of an article which is related in subject content to a given extract.

An evaluation of this assignment following its presentation revealed an insight into which of these skills had been new for the students and bears out observations made in 1996 (see Chapter 5). Interestingly, and this must reflect an ongoing trend, over half the students had previous experience of searching for resources on the Internet, and so felt that searching the CD-ROM was basically familiar, although it is not clear how sophisticated their previous searching had been. As a result of this basic familiarity with hypertext environments, together with the practice offered by the assignment, all the students interviewed were at least able to comment on the relative merits and successes of the various search methods, and had arrived at a strategy for tackling future searching tasks. This was a noticeable improvement on the students surveyed in 1996.

> E17 "I felt like writing to my tutor to say thank you for putting this
> [assignment] in. I'd only scratched the surface before. I really felt this was a
> useful exercise. Makes you get to grips with it. It was interesting to see you
> got different results for different methods."
>
> E10 "I had used the Internet but have never done anything like this before.
> I'm getting into it now. If it [the assignment] wasn't there I wouldn't have
> bothered. It was quite a good idea to put that in."

E23 "I think that I will probably use all of the search techniques because they are all useful in different contexts. I think though that the concept maps are particularly useful, with the block and course indexes coming a close second. The free text search is useful too when you are perhaps trying to get a different angle on something or someone else's point of view."

E22 "I think I would start with using the Index to look up articles associated with course/block themes being addressed in the assignments and use the 'doc info' [bibliographic details and abstract] option to look at the summaries. However, this method does bring up many options, so also a glimpse at the concept map - but this is frustrating as it gives authors and not title, so it is necessary to look at each one. So afraid I'm going to have to sit on the fence a bit for this one and say it would be a combination of methods."

E13 "A combination of the three will be the most useful. The concept map and index yield basically the same results. The only advantage of the concept map is the visual representation. Free text searching allows more freedom, and an individuality which you wouldn't pick up in other ways. You get a large number of hits, which can be less relevant. I hadn't done any electronic searching before - its all new. You need to skim read the results, so you sort them after the free text search. It made me think they've all got advantages."

As for their ability in investigation and reflection, a surprisingly high proportion of students interviewed (about half) had felt confident about writing a précis, either because of previous study, or because it was a skill they used in other situations.

E7 "I didn't find précis was a problem. Summarising is something the OU

has taught me in previous courses [A/D][1]. I still have to exert a great deal of self control, or I tend to read too much....I found to my surprise that I read the electronic form rather than the Reader, the type is larger, and [scrolling down] is lazier than turning a page.... I'm overwhelmed by the prospect of the resources on the CD-ROM. Another scale is involved. Researching topics for study is again something OU courses have cultivated."

E1 "I found the abstract very helpful. I started reading the whole thing on screen, tried looking at the contents, then printed out the whole thing. On this particular [assignment] I fell into a trap and printed out too much stuff. I had previously been criticised for plagiarism and found the exercise awkward. I find it very difficult to be selective in picking out what is really important. It's a case of adapting to computer based learning, and knowing how to adapt."

E18 "I'm not particularly good at skim reading, so it was really time consuming. I have read everything thoroughly, so it takes an awfully long time. I like to satisfy myself that I know it thoroughly."

E3 "At work I write technical reports, so I'm used to precis. I printed off the article and highlighted relevant bits before writing the precis....I can speed read, although I tend to be easily led onto a variety of different sources. I have that "mind set".

E11 "I didn't find précis writing too bad, although I hadn't done this before. I did AS283[2] in which we had to use secondary resource material. This helped a lot."

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[1] A/D denotes Arts or Social Science courses.
[2] AS indicates a course combining Arts and Sciences.

Finally, about half the students mentioned their need to adapt to new study patterns in reading from the screen, or printing out parts of articles, or perhaps in cutting and pasting sections of relevance. This assignment was valuable in presenting them with the first opportunity to practise these new routines.

> E13 " I read the article on screen, made notes in a Word Document then cut and paste bits across. I found it a very creative way of doing things. I like being able to make one para grow and another one to shrink. You can't just stick something in the middle if you are working with paper copy."
>
> E17 "It brings forward an old skill in a way. Some of the articles are really in-depth. I copy across bits, then write it in my own words. It has advantages over a book. You can do searches to jump to parts of articles, get to quotes etc."

All this suggests that a significant number of students were grappling with a variety of new skills at this stage in the course, and it illustrates how their competence was related to, and integral to new ways of studying with electronic resources. It would be naïve to assume that this assignment taught them all they needed to know, however these findings do underline the fact that many students have a steep learning curve to surmount in one direction or another when studying in this way. It also shows how significant the assignment was in encouraging them to experiment with, and reflect on new skills and new ways of working.

Assignments to encourage skills development: summary and discussion

1. Most students had to master a variety of new skills associated with resource based learning in a networked environment, at the same time as course content.

Previous work reported in the review and reinforced in the pilot project shows that the ability to work in an open-ended, independent way as required by courses such as this one is demanding of a variety of skills from students. This study has illustrated how new approaches to studying with an electronic environment formed an integral part of the acquisition of these skills. Clearly, the extent to which the students in this study had already acquired these skills depended partly on the courses they had taken previously and also on the experiences and training they had been through in other walks of life. These observations again confirm those made in the pilot study.

The influence of previous courses on students' levels of skills is worthy of note here, and the particular challenge for the Open University, where there are few specified lines of study towards a degree, is to ensure that skills associated with "learning how to learn" are encouraged in a systematic way.

These findings again indicate that some of the skills needed for this version of resource based learning are more readily acquired than others. For example all the students interviewed after the information handling assignment (TMA02) reported confidence with operation and navigation. Similarly, the skills of participation in online debate were effectively supported in the conferencing assignment (TMA04). On the other hand, other skills appear to be more complex: whilst the information handling assignment provided practice in investigation and reflection, student

confidence in selective reading and writing précis remained variable.

2. The experience here shows that it is possible to use assignments as a vehicle for encouraging students to adopt new patterns of learning, whilst covering course content. The assignments not only impact on student reflection, but influence them indirectly via tutorial support. In addition, the timing of assignments can be used to influence the stage in the course at which various skills can be practised.

In line with many observations on the effects of assessment on learning (see for example McDowell, 1995) it is clear from these experiences that assessment can effectively be used as a "stick and carrot" to encourage the development of various skills. The assignments described here illustrate how significant assessment can be in focusing the attention of both students and tutors on particular aspects of the course, not just in terms of content but also the process of learning. They demonstrate the potential for using assessment to influence the direction of student learning.

3. The collaborative project was effective in supporting the researching skills encouraged by the course, and conferencing formed an integral part of the resource based approach.

In line with Henry's work (1994) on projects, and other work on projects in online environments (Thorpe, 1996; Fiedeldy, 1999; McConnell, 1999; Alexander, 1999) the project in this case study was very effective in supporting self-directed learning, by giving students the opportunity to research information on a topic of their choice, in other words they were putting resource based learning into practice. The possibility of working collaboratively using computer conferencing was clearly

valued by many students, and supported a reflective approach to study. Similar observations have been made by Muire, Nazarian & Gilmer (1999) on a web based constructivist learning community devised by Florida State University, and by Jones et al (1999), on the Open University resource based course A427. In both cases, students found that belonging to an online learning community helped them to make sense of their readings, and to clarify their thoughts.

4. The success of the online collaborative project was hampered by students' lack of skill in the management of on-line collaboration. An earlier conferencing assignment was modified to encourage reflection on on-line group management, and this impacted on the outcome of collaboration in the project.

The problems encountered by students in the management of on-line collaboration have been described elsewhere. For example, a study at the University of Twente (Veen, van der & Collis, 1997; Collis, Andernach & van Diepen, 1997) of two on-line collaborative courses also revealed problems associated with online collaboration in the absence of face-to-face contact, and to address this they set tasks, deadlines and particular responsibilities for each member of the group. In the case of THD204, the use of an earlier assignment to encourage students to reflect on the problems of on-line collaboration was successful in raising awareness of potential pitfalls and went some way to assist with these difficulties. The principle of using a series of assignments to build skills in an incremental way is described in the review (see for example Schlusmans et al, 1999) and is a useful model for structuring and scaffolding, where a variety of skills need to be learnt.

5. Experience from the first collaborative assignment demonstrated the importance

of assignments in the practice of effective conferencing and collaborative skills. The new assignment which introduced students to information handling skills was successful in improving students' abilities in searching, selecting and retrieving information using the CD-ROM.

Both the information handling assignment and the initial conferencing assignment had positive effects in terms of helping students to hone various skills, indeed both assignments demonstrated the value of encouraging the development of skills by undertaking tasks and reflecting on the experience, by following the Kolb experiential learning cycle (1984). These findings are in line with work by Grattan, Brown & Horgan (1998) who report on the development, through the assessment, of communication and information technology skills for similar resource based courses.

The experiences from all three assignments described here underline the fact that for many students, resource based learning in a networked environment is new, and they need time to acquire and practise the many new skills involved and to get "up to speed" with the approach. It seems probable that this may only be achievable over a period of time and that students need to practise their various skills, perhaps in a fairly mechanistic way, in a variety of assignments, over several courses. The more time students need to spend on learning new skills, the less time they may have to spend on constructing an understanding of course content, and this may impact on the level of understanding and standard of assignment which they are able to achieve.

Section 3: Revision and Exam

This section describes student and tutor perspectives on the exam and revision period. Whilst the various course assignments covered aspects of content, together with the development of various skills, the Course Team intended to use the exam as a mechanism for assessing students' understanding of course content. The full text of the exam papers for 1997 and 1998 are included in Appendix 2.

Revision and consolidation

The revision period was clearly an important time for students to look back over their course, re-reading and re-assessing the material they had been taught, and arriving at a better understanding of course principles. Many students commented on its value as a time for consolidation.

C20 "When I was revising, it all started to come together. Revision was just the icing on the cake. I re-read some of the articles with interest, they were much more interesting the second time round. It started putting everything into perspective."

B5 " I have been re-reading it, and have been quite encouraged by the fact that some of the things I struggled with at the time, and gave up on, actually make some sense now. I must have learned something during the year."

B2 "I'm hoping I might understand the course better once I've completed my revision."

C13 "I went back over stuff: got an overview. It meant something new to me

when I was revising. I missed out the bits I hadn't time for originally. I felt

happier with earlier blocks."

These comments are reminiscent of observations by Entwistle and Marton (1994), of

students at Edinburgh University. They described "knowledge objects", meaning a

coherent understanding of the subject during the process of revision for final

examinations. Inevitably, different students had integrated material to different

extents and used it in different ways. For some, the structure was closely related to

the structure of their lectures or course books, whilst others had constructed a logical

structure related to the field of knowledge as a whole. Earlier work (Coles, 1990) on

an undergraduate medical course reports that many students found a new significance

and cohesion in their readings during the revision period. These findings suggest

that the revision period can form a highly significant part of the student's study by

encouraging the integration of disparate ideas, and a synoptic understanding of the

subject.

In this study, many students had already evolved revision practices from previous

courses, which involved the process of condensing notes or using concept maps or

associations and it may be that different approaches to revision are associated with

different disciplines. Other students appeared to be grappling with new approaches

to revision in ways resonant of their tentative approaches to assignments in the initial

stages of the course, and clearly the new study practices involved in the use of

electronic resources impacted on this.

B13 "An important part of studying the course. You find you are reading

articles in a new light...I appreciate more now than when I first read it. I use the issues and themes liberally, also the concept maps. The rbl [resource based learning] element is fantastic. I love the search, cut & paste for assembling documents, it enables me to organise my work much more easily. I would have had a large number of books open on the dining room table and copy paragraphs from different books."

C6 "I captured information to a clipboard, and added a link into an index and have my own mini CD with parts that I think are relevant to me."

C19 "This course was predominantly principles based, rather than facts to remember as in previous MST [Maths, Science and Technology] courses."

C25 "You have to revise in two ways in this course, part for the technology and part sliding across, taking SS [Social Science] principles and using them to analyse the technology. I think I revised too empirically: looked at too many facts. I should have worked my way round issues."

Of great significance to this study is that fact that most students continued to experience difficulties with the skills of investigation and reflection, with the result that they had problems in trying to select the most relevant information for the purposes of the exam, and felt that they needed more guidance with their reading, very particularly during the revision period. Some found their assignments useful in this respect.

C17 "The hardest thing was to try and focus on what was relevant. The amount of information was phenomenal. I had a great deal of difficulty getting some structure. The science foundation course taught me to

concentrate on the principles when revising."

G3 "The pure volume of reading: I didn't know where to focus, how much to read."

C27 "The main problem with revising for this exam was the sheer volume of material and wide range of possibilities of questions....It was simply not possible to do all the reading that one would have liked."

C20 "Why oh why so much reading of course material that makes it an absolute nightmare to try and revise from, with all this information in the books and CD-ROM and then the printouts from CD-ROM, the Internet and the conferences."

G2 "There are so many different areas to be covered: the worst part was knowing what to revise. It was easy to get diverted onto other subjects, to get lost."

C14 "All the [assignments] were useful for revision..it brings the block material together."

C18 " [Assignments] are always useful. I never miss an [assignment]: the work involved means you are better prepared for revision and the exam. The work that you have to do for an [assignment] can be quite intense. It's a shame if you can't use that information again. Some particular parts of it you remember more, they provide a hook which help you go back into the subject."

Students did in fact receive guidance in the form of a specimen exam paper, and results from the 1997 THD Electronic Course Survey (Heap, pers comm 29/9/97), to which students replied at the start of the revision period, indicate that most of those

who had looked at it thought it provided enough information and examples to help with revision (figure 18).

Whilst the revision period was perceived, and valued by many students as a time when they came to an overall understanding of course issues, they were bewildered by the choice of readings available to them. Even students who described fairly enlightened revision techniques, using condensed notes and concept maps to organise their body of knowledge, were still encountering difficulties in selectivity, and were probably attempting to memorise substantially more than the Course Team had envisaged.

Perspectives on the exam

Student feedback on the exams indicated that students were considerably less disturbed by their exam experiences in 1998 than they had been in 1997. These observations are borne out by comments from the Exam Board, who found a general improvement in quality of exam scripts in 1998, compared with previous years, and more first class grades were awarded than in previous years (Course Chair, pers comm 4/12/98). It is clear however from the exam markers' feedback in 1998 that various problems remained.

Whilst it would be tempting to conclude that these improved grades were a result of a more appropriate assessment, or better support for learning during the course, there may have been other reasons for the differences. The first reason relates to the method. It has previously been observed how the group environment in conferences can influence the quantity and slant of contributions. Were the strident reactions in

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the 1997 conference a result of militant 'leaders', who fomented discontent? This interpretation can probably be discounted because of the fact that similar observations were made from interviews with individual students in 1997, and secondly because of the comments on improved grades from the Exam Board. Secondly, it may be that the exam questions in 1998 were easier to answer, or perhaps to interpret, than those in 1997. The Course Team might have been influenced by student reactions to the exam in 1997, as reported in this research.

Whatever the reasons for these differences, there remained concerns with the exam in both years, which are described by students and tutors in 1997, and are reinforced by comments from tutors in 1998. The following comments relate to their inability to use evidence appropriately, or to deal with a requirement for specific content.

Inappropriate use of evidence

Many students perceived problems with the use of large numbers of academic authors as supporting evidence, and then having memorised a list of authors, many were unable to use them appropriately.

> C19 "I personally didn't have the right evidence. I couldn't remember which was which author when I came to the exam. The requirements to regurgitate references was a bit unrealistic."
>
> C4 "What I spent just as long learning were the core authors for blocks one, two and three along with the title of their articles. Could I find where the heck to fit them in though?"
>
> C25 "I concentrated hard on memorising a lot of things and then I wanted to

regurgitate it - which you can't do because you have to apply what you've learnt. I was trying to learn 30-40 authors for the whole course....The techniques used for rbl study, I think its something you tend to do in Arts subjects a lot more. Doing an English degree helped tremendously: I have had to bring in arguments and back them up."

Indeed, reports from markers in both years indicate that many students made inappropriate use of evidence to support their arguments. Whilst some students appeared to have "brain dumped" whatever they could remember, regardless of the slant of the question, others used no evidence at all.

T4 (97) "They hadn't used any evidence, or even common sense...A lot had shown an author in brackets, in a sort of random fashion."

T10 (98) "Their use of evidence was not good....those who can write an essay did the best, but a lot were seriously lacking study skills.."

T11(98) "Evidence - very few used sufficient to support their statements. They weren't using any author's names... Their inability to express themselves and use of English was poor."

T13 (98) "They weren't using evidence particularly well. The majority just scattered then about in random fashion. Themes were also scattered throughout without particular relevance."

While the size of the resource base may have been a contributing factor here, it seems likely that these problems were related to difficulties in writing within the academic genre, in line with observations by Lea & Street (1998). Given the high

proportion of students on the course from a Technology or Maths background, (according to the THD Electronic Course Survey, Heap, pers comm 29/9/97, 70% were from Technology or Maths/Computing faculties) the use of evidence in support of an argument would have been a new approach to writing.

Problems with specificity

Whilst the marking schemes for both 1997 and 1998 exams focused on process (statement of argument; use of evidence etc) for the social science parts of questions, allowing students latitude in the sources used for their answer and rewarding the ability to use course principles and construct a reasoned argument, the more technological parts of the questions were marked for the inclusion of specific content.

Some students had difficulties with the specific nature of some questions, particularly those short sections requiring a description of technology. Given the choice in readings afforded by the course, how were they to arm themselves with enough material to answer any question which might be asked?

> C23 "This exam was made harder because there was too much information.
> I'd never read so much information..I had information overload. It would
> have helped if I'd been able to select the areas I would like to show the
> examiner I could cope with. The quality of what I would have put in there
> could have been a lot better."
> C27 "With the vast amount of information that was available on the course,
> we could not possible be expected to revise everything. Why then were the

questions so restrictive?"

C17 "With such a broad content it is unfair to exam on specific detail: you may have learnt 90% of a block but missed out on ...just one page of the book."

There is an argument for stipulating a basic understanding of certain content as a requirement for passing a particular course, and it is clearly of importance to students. However the difficulty for this particular course was in defining what exactly the students should have learnt. The tutors described the dilemma:

T8(97) "I followed the schedules strictly, which meant that more people failed than probably should have done...But you need fairly tight guidelines, there's a problem of quality control...I felt that what distinguished students was a demonstration of their understanding, rather than the detail."

T12(98) "It was difficult to detect for many candidates whether they had done the course. The only way to judge fairly between candidates is to look at their use of course materials. It's not a general knowledge test."

T4(98) "[Marking schemes have] got to have some flexibility. But a useful way to get people to mark on a level playing field, so they're helpful".

T9(97) "Some students are evidently competent and do understand the subject, but I had to mark them down for points *missed out* of the marking scheme. Is this the right way round for an exam marking scheme?"

T7(97) "I made a judgement on whether each person understood what was being asked. Then cross checked this against [the marking scheme]. I have to say my perspective changed as I went through. I find pressure for time

really erodes the quality of marking. It's a case of ploughing through them, getting them done and sending them away. But you are better set up to talk to your students about revision next year."

The balance between pedagogical objectives on the one hand, and the requirements for standards and consistency on the other, may be something of an uneasy relationship. Some writers have observed that organisational influences, including the pressures imposed by increasing student numbers and large classes, have tended to favour more prescriptive forms of assessment, sometimes to the detriment of student learning. Biggs (1996) has found that attempts towards marking consistency may have deleterious effects on the students' approach to writing, by encouraging lists of facts at the expense of a cohesive argument.

These comments highlight the difficulties involved in devising appropriate assessment for resource based courses in networked environments: whether students should be expected to have acquired certain "core content"; and how to frame the assessment so that it can be marked fairly and consistently, whilst giving students the latitude which is an integral part of resource based study.

Interpretation

In addition to problems directly related to the appropriate use of the information resource, the majority of students in 1997 had difficulties with interpreting the requirements of the questions and in relating the questions to the course material they had learnt.

C30 "..there was little opportunity in the exam to show my strengths and how much I have gained from this course."

C28 "..questions seemed to have little resemblance to the course material.."

These comments were not repeated in 1998, and lead to the supposition that the 1998 exam paper may have been more straightforward to interpret.

T4(98).."Most coped with interpreting the questions OK. Scripts were better than some other years, they remembered a few names. But not spectacular!"

T9(98) " The questions were easier this year. This year was probably the best so far. They were extremely difficult last year."

T13(98) "Scripts were possibly slightly better, I got some good answers, although the average ones weren't any better. I didn't think the questions were any easier."

Exam markers in 1997 confirmed that students appeared unable to make use of the principles of the course and apply them to the new "situations" in the exam questions. The difficulty which students experienced with the interpretation of questions may be common to many exam situations. Work on problem solving transfer (see for example Conway & Kahney, 1987) indicates that students generally have difficulty in applying principles from one situation to another, and benefit not only from example solutions, but from explicit guidelines on the abstract relationship, and commonalities between problems. It may be that the "open-ness" of the questions, in attempting to cater for choice in content contributed to the uncertainty of the students in this particular case.

It is possible that another factor may be significant here. It has been previously observed how cue conscious many of the students appear to be, and how dependent on the reactions of their tutors as a guide to the "correct" way to write their assignments. It could be that in these circumstances an exam which is marked by an unknown external examiner leaves them rudderless, and bereft of cues.

C32 "Throughout this course I have had difficulty interpreting what the [assignment]questions were really asking, but had the accompanying notes and tutor to help with the interpretation. Unfortunately [in the exam] there was no such help and no time really to sit and think too long about what was required.."

D7 "Each tutor has a different approach to the course. It's not impossible to structure [assignments] to fit that particular approach. It's [the exam] an old fashioned method, but perhaps it evens out the score by marking from an outsider."

Observations on the cue consciousness of students led to speculation as to whether they fall back on this strategy when they lack the ability to judge the appropriateness of their written work for themselves. This would fit in with the picture of students who were only just beginning to emerge as successful resource based learners by the end of the course.

Are closed book, content based exams at all appropriate?

If student experiences during the revision period are to be believed, they were

certainly beginning to acquire an overview of the subject and to construct an understanding of the domain. The question remains whether the format of the exam was an appropriate way to demonstrate that understanding?

Having practised resource based study over the rest of the course, students commented on the dilemma of being faced with a closed book exam, and did not feel that it related to the resource based approach which they had been encouraged to develop. In addition, exam conditions demand that students hand write their scripts, instead of using a word processor, so they were no longer making use of their new skills in studying with electronic resources.

> C20 "The problem is you depend on these things (CD-ROM) and when you go into an exam you can't use them. I think there was too much to memorise. You learnt how to quote CD-ROM articles, how to search efficiently, then you think 'I've been using this all the time, now all of a sudden I'm left without it.'"
>
> C10 "This was very different from doing [assignments], using the CD-ROM. You don't have to remember authors, you can do all sorts of searches to dig out authors to support various views. For the exam you can't possibly rely on memory to do all this. Its a totally different feel."

Whilst the exam certainly did not test the skills of operating, navigating and searching for information in electronic form, it probably did test students' ability to achieve an overall view of the most important course principles, and to apply them in other situations. There is no doubt that the ability to extract the important elements

from a variety of sources, and to use them in new situations, as practised in an exam of this type, is an important lifelong skill. Perhaps the important question to ask is whether this was too demanding a task for students in their first experience of a resource based course in a networked environment, and for many students, their first course in a new discipline?

Additional help in exam preparation

As a result of the observations on student difficulties during revision in 1997, exam and revision conferences were set up by the Course Chair (CC) at the start of the revision period in 1998. The aims were to steer students towards more effective revision strategies; to help them to use the knowledge they had acquired during the course in a more focused way; and to give them a better appreciation of exam requirements. A total of 350 students participated in each conference and they were a scene for lively debate.

To encourage:	Assessment Design Feature
Effective revision strategies Alternative approaches to exam questions	Online debate on revision techniques Student answers and marking schemes uploaded on an exam conference

The conferences had a number of sections. The revision conference presented students with an opportunity to discuss revision techniques, and also to discuss particular course topics. In the exam conference, students were given parts of old exam questions, together with the accompanying marking scheme and a range of good and weak answers written by students in previous years. They were invited to comment on the strengths and weaknesses of the sample scripts.

CC "My goal in posting these samples is that you can see how other students tackled questions, and to learn from their efforts. In particular, learn how much of an answer is required for each part of a question so that you expend an appropriate amount of time and effort. I also hope you'll see features that distinguish fair answers and good answers."

CC "My proposal for this conference is that I post up the question and marking guide. Then I will post up one student's attempt at the answer so that you can comment on its strengths and weaknesses. A few days later I will post up the actual marks and comments made by the script marker. Then we can compare your comments on the answer with those made by the script marker. When looking at the various answers think about the following points:

- does the answer address the question?

- how much time/effort went into the answer?

- was the time/effort appropriate for the marks available?

- how many marks would you award this answer?"

An evaluation after the exam revealed that some students valued the sample questions as a focus for revision, whilst others appreciated the range of student perspectives in subsequent discussion. The student scripts posted on the conferences were well received, and although the extent of peer review was limited, some participants clearly derived useful lessons from the scripts:

G8 "I think this person comes from the 'write everything you know about..' school of answering exam questions. They are wasting a lot of words and

time putting in detail which would not gain any extra marks. I can see the time problem."

G3 "Wow! I didn't think it could be that simple! 48 words. MUST stop babbling in the exam."

G11 "Apart from accuracy of the answer, this student attempted to regurgitate all (s)he knew about coding graphics. Just copying the answer took me 12 minutes and filled an A4 sheet of paper.

    1. Danger of running out of time

    2. Difficulty in adding information. If the answer was in single line format it would be easier to see where information could be added.

    3. Realising that you have spent too long on one answer could invoke panic.

    4. Danger of alienating the marker!

    5. 286 words plus sketches. The guide says 100-150 words or a couple of annotated sketches."

G4 "This is essentially the same answer as student one, but with more detail. The time problem is an area that I need to concentrate on."

Because of lack of time in the conference, it did not prove possible to post all the official grades for the student scripts, giving students a model of first or second class answers, but several respondents felt that this would have been a helpful way of testing their own judgement.

G5 "I wasn't clear how they had been viewed by the markers. You didn't know what would have constituted a first class answer, for example."

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G8 "The student scripts were quite useful, provided they were all passes!"

As for general revision support, the Course Chair's comments revealed that whilst much of the guidance on the conference was already available in the Specimen Exam Paper, it was clear that very few students had read this properly. This is again an example of how students benefit from a variety in delivery media, and the fact that even when students are given advice and guidance, there is no guarantee that they will use it appropriately.

G2 "The sample questions gave you a focus to revise things on. It's the best revision aid I've come across yet. And getting other students' opinions was great. Gave you other areas to follow up.

G9 "You get fed up with books, or CD-ROM, it's nice to have someone talking about it: this made it easier to understand."

G10 "This was very helpful. I appreciated the advice from Nick on what we should have been doing. The best bit was seeing other students' answers. And the marking scheme was a help. I would have liked the marks each person had at the end. I could then have sorted out what was essential."

Whilst it was important that the moderator should be the Course Chair, because he had the authority to deal with factual questions on procedure, there were difficulties in facilitating the discussion, because of the weight given to any comments he made. Not surprisingly, moderating the conferences proved to be a time consuming exercise, and is not sustainable for future years.

Support for exams

In view of their disaffection with the present exam, 1997 interviewees were asked after the exam whether they were broadly in support of an exam for a course of this nature, or whether they would have preferred to see some alternative. Interestingly, roughly three quarters were still in favour of having an exam. The question was pursued further with students in the 1998 cohort, before they had started on the resource based part of the course. It appeared that whilst exams were almost universally disliked, a large majority were in favour of them in principle.

The most common reason given was the motivational effect of an exam. Students described "putting in more effort"; "relying on your own resources"; "being put on the spot". The second reason was the significance of the revision period as a time for reaching an understanding of the course, and also for covering material which had not been assessed previously. There also appeared to be reasons associated with the importance of the external credibility and validity of a degree.

> C24 "...in an exam you are required to draw on all parts of the course, which I think tests understanding how it all relates together. Also the OU has worked very hard to gain external admiration and recognition for its degrees, much will be lost if it is possible to get a degree without even sitting an exam at all."
>
> D19 "You would lose motivation over and above studying for [assignments]. It's an unknown element which gives motivation to study a bit harder...It gives you something to aim for. And immensely satisfying if you pass! It's a rite of passage. You need to feel you've been through the mill."

D22 "I firmly believe in exams. [It's] the fairest way of objectively assessing distance learning and covers most learning styles. The exam..adds credibility to the study. Exams don't only test course material, what about the value gained from the planning required, discipline, tenacity, problem solving, concentration, managing stress, the challenge of dealing with an uncomfortable situation..all good old transferable skills which can be applied to many situations.

Tutors interviewed in 1998 after the exam were asked the same question and they were also firmly in favour of exams. They were concerned about validity and the maintenance of standards.

T4(98) " The exam is testing different skills. The exam should bring it all together…It's a good way of examining how things link together. Fewer and fewer students are really nervous. You are never basically sure who has done the assignment."

T12(98) "Firmly in favour of them. They're quite right it's a memory test. But the latitude allowed in questions makes certain its not purely a memory test. If they don't mention [significant author], then where have they been?"

T13 (98) "It concentrates students' minds. You need to have some kind of formal assessment process by someone outside the tutor group. It's not that easy to get standardisation. Although I would prefer to see open book exams, so you can look things up, or carry in annotated notes."

T11(98) "You need to have an exam. It gives people an extra push, to really learn rather than copying things out. It does give us some idea of how much

they've understood."

It is clear that although conventional content-based exams may be difficult and demanding for students on resource based courses, they continue to be valued for a variety of reasons. In confirmation of this, the University Courses Survey (IET Courses Survey Project Team,1997) indicated that student attitudes to the THD204 exam were generally favourable.

Institutional considerations

Whilst the support of student learning is certainly an important function of assessment, it serves a variety of other functions. Silver (1997) comments:

> "Assessment responds, at the Open University as in other universities, to the need for accountability and to demonstrate standards, to diagnose and provide feedback for students and staff, to provide a discipline and develop and sustain motivation."
>
> (Silver, 1997 p 17)

Any designer of an assessment strategy has to abide by the regulations of the university, which require a specific number of assignments and often a course exam, as a way of ensuring that each course meets the minimum standards of a degree. There is a need to ensure that the assessment strategy is fair across the student population and that marking is consistent.

Another consideration facing university administrators is the relative cost of final

examinable components. At the Open University in 1997, out of 400 course presentations, 56 courses did not have a final exam, and relied on the submission of a final piece of coursework (Palmer, 1998). These were double marked, firstly by the course tutor, who had to verify the work as authentic, then by a second marker, and in the case of dispute, by a third person. In all cases, the system proved to be more costly and labour intensive than that of conventionally examined courses. The result is that University regulations may tend to militate against innovation in assessment.

Balanced against these considerations are the effects on student learning, and in this case the appropriateness of the strategy for resource based learning in a networked environment. Chapter 3 describes the dilemma faced by the Course Team of THD204 in designing an assessment strategy which was reliable, scaleable and in line with institutional requirements whilst meeting course aims and objectives. In response to the evaluation work from this study, attempts have been made to accommodate more flexibility in content and to provide more support in revision preparation, but inevitably this had to operate within the framework of University assessment regulations.

Whilst this study describes the difficulties resulting from attempting to design a closed book, content based exam, which was appropriate to the aims and objectives of this version of resource based approach, it is clear that there was considerable and unexpected support from both students and tutors both for exams, and the revision period which preceded it.

Revision and exam: summary and discussion

1. Many students found the revision period important for consolidating and acquiring an overview of the course.

The experiences of students during the revision period bear out observations in campus based universities by Entwistle and Marton (1994) and Coles (1990) of the synoptic value of revision, although they have not previously been documented in the context of open and distance learning. Clearly the students in this study recognised and valued this opportunity to achieve a better overall understanding of course principles. Whether this formative effect is sufficient justification for the use of conventional closed book exams as assessment is another matter, and it could be that other forms of examinable component can be designed in such a way as to encourage a similar synopsis.

2. Students had great difficulty in deciding what, and how much to revise, in view of the volume of information available to them, in other words they continued to have difficulties with this version of resource based approach.

The fact that many students were still struggling with information overload at this final stage in the course suggests that their ability to be selective, and to grasp the main points in their reading was probably still poorly developed. It seems that they were not ready to be fully autonomous, self-directed learners, and this relates to their metacognitive abilities, which previous work (Morgan & Beatie, 1997) has shown may develop gradually over the course of graduate study.

Whilst revision techniques for many students appeared to be relatively sophisticated, and accord with observations by Entwistle (1998) of students adopting a deep approach, it may be that revision in the context of resource based courses in networked environments is more demanding than conventional distance courses.

Student comments on memorising caused some disquiet, when considering an appropriate interpretation for these findings. Were students being driven to surface memorising and rote learning by the volume of information confronting them? How much memorising is acceptable practice for exams? Early work by Entwistle & Ramsden (1983) uncovered a relationship between workload and rote learning, and it is one of the common criticisms of exams that they encourage this approach to study. However, the relationship between surface or deep approaches to learning and the act of memorising may not be as clear cut as one is first led to believe. Tang (1996) has described students who are involved both in deep approaches and in memorising, and she labels this activity "deep memorising". Indeed Entwistle (1998) argues that any preparation for an exam must involve an element of memorising, which might not preclude the reaching of an in-depth understanding of the subject.

3. In the exam students had difficulty with the specificity of questions.
Student difficulties in coping with specific content highlights the dilemma for Course Teams in designing assessment in line with a pedagogical approach which encourages flexibility and negotiability of content. One of the central tenets of this resource based approach is that students should be encouraged to work in a more open-ended, flexible way, by constructing knowledge, rather than reproducing specific content. It follows that if the assessment is to be appropriate it must be

designed to test their ability to do this.

> "nearly every definition of constructivism refers to knowledge construction rather than reproduction...If we accept that as a meaningful goal of learning, then as evaluators we need to assess the intellectual processes of knowledge construction, not repetition."
>
> (Jonassen et al, 1993, p 244)

It seems likely that students might have had fewer difficulties if they had been more proficient at achieving an overall view of important course principles, and applying them in new situations.

4. Tutors were concerned at the need to maintain fairness and consistency and to guard against cheating.

This study illustrates the tension between the need to specify the coverage of particular content, in order to maintain a level playing field, set against the scope for variability and flexibility afforded by resource based learning in networked environments. Plagiarism and cheating are a particular concern in distance courses, and the exam is traditionally the only time when students can be identified as authors of their work. It may also be of concern where students are studying using electronic resources, because of the ease with which they can cut and paste material. Plagiarism appears to be a serious problem in universities generally, and a recent study in two UK universities by Franklyn-Stokes and Newstead (1995) showed that although plagiarism was not rated seriously by students it was also very prevalent, being carried out by about half the students interviewed. They described instances of

paraphrasing coursework without references, inventing data, and fabricating references. Ashworth, Bannister and Thorne (1997) suggests that this prevalence may be related to students' lack of commitment and engagement with their learning, which must surely be an argument for increasing the element of reflective learning in assessment, rather than militancy in exam procedures.

5. *As a result of observations made in 1997, revision and exam conferences were set up in 1998 to give students better guidance on revision and preparation for the exam. An evaluation of the conferences after the exam revealed that this type of guidance was appreciated as a focus for revision. The student scripts posted on the conferences were useful in demonstrating alternative approaches to exam questions.* The exam and revision conferences trialled in 1998 fulfilled a useful purpose in helping students with example solutions, and in providing a forum for debate on alternative perspectives to exam questions. This reinforces earlier work described in the review on the value of model answers in reflective learning,(see for example Mowl & Pain, 1995) although it has not been documented in the context of answers to exam questions. The trial illustrates the importance of a variety in delivery media for maintaining student interest, in line with work by Bowers & Lewis (1999). Whilst computer conferencing has been shown to be a very effective channel for additional formative feedback to students, there are clearly drawbacks in terms of the time required to moderate such conferences.

6. *In spite of the difficulties, it seems for the moment that both students and tutors are still in favour of the exam, particularly for its motivational and synoptic elements.*

Student support for a final exam must reflect the conservative nature of student opinion, and possibly a lack of experience with courses without an exam. Their attitudes to the gravity of exams are reflected in observations made by Ashworth et al (1997), who describe:

> "..a notable reverence for this most traditional form of assessment..powerfully symbolic..an examination carries with it a sense of dramatic climax. It is final, both in time and in fatefulness. The perceived formality of the examination as an Occasion lends it gravity."

> (Ashworth et al, 1997, p199)

The importance which many students attached to exams as a motivating force may reflect the relevance of extrinsic interests to their orientations to study (Taylor, Morgan & Gibbs, 1981). For example the influence of commercial sponsorship for degrees, or the relevance of a qualification to a career. Certainly, McDowell & Sambell (1999) found that motivation was the most important criterion used by students to judge the usefulness of their assessment, whether it was extrinsic, in specifying the requirements of the course, or intrinsic, in satisfying and meaningful assessment tasks. It may also be that those students who are particularly averse to exams choose courses which are not examined. Whatever the reasons, the importance of an exam to students and the significance of a time in which to reach an overall understanding of course material should probably be taken into consideration when planning an assessment strategy.

7. A traditional content based exam is probably too demanding for undergraduate

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resource based learners.

All the evidence suggests that a content-based closed book exam may be difficult to implement successfully for resource based courses in networked environments, because of the need to define content. And even if a traditional content-based exam aims to test students' ability to extract the main principles of their various readings and apply them confidently in new situations, this is probably too ambitious a target after one resource based undergraduate course. The problem has been how to help students to define their synoptic understanding of the course from a wealth of material.

As an alternative, the project has already been shown to be an effective way of supporting the aims and objectives of this version of resource based study, and if used as a device to reflect on previous aspects of the course could be given a synoptic element. Alternatively, an exam which linked questions to previous project work could be effective. For example, Fuller (isl@mailbase ac.uk, 13/3/98) describes an open book exam at Edith Cowan University, Australia, in which students are required to explain course principles, using evidence taken from a previously compiled portfolio, which they are allowed to take into the examination. A similar model is described by Collis, Andernach & van Diepen (1997) for two web-based courses with online collaborative project work which is produced as a set of Web pages. The courses both have final examinations, which are based on critical reflections of these final products from the student's own group, as well as from the other groups.

Section 4: Student Profiles

The observations made in this Chapter are exemplified in the following profiles of four students who studied the course in 1998, and who achieved varying levels of success with this version of the resource based approach. The profiles illustrate the influence of a variety of factors, including orientation to study, academic background, experience in other walks of life, and the benefit which they derived from the assessment. Names have been changed to protect anonymity.

1. Michael.

Michael was in his sixth year of study, having followed Maths and Computing courses, including all the third level courses required for an honours degree, and was hoping for a first class degree. He had a young family and worked in London, so found that study time was at a premium.

New skills which he felt had been acquired on the course included researching; using other authors' material; and producing a reasoned argument. He had used the Internet previously, but only in a limited way, for recreation, and as a result of this course found it a valuable source of information. He was less enthusiastic about the CD-ROM library, and had found the articles difficult to trace. Not surprisingly he had no difficulty with technical skills associated with operating hardware and software, but found that he needed to adapt his study time to the need to read in front of a monitor: this meant that he had to work more weekends, instead of using odd times during the day. He felt that the course was significantly more time consuming than previous 60 point courses.

His previous courses had primarily involved facts and calculation, and although in a third level project course he had had to deliver software and produce a report on the process of its design,

he had not been required to refer to other literature. He suggested that in terms of tasks the Technology foundation course had the most in common with THD204.

He had found the course and its resource based approach very interesting and the assignments had helped him to focus on the important issues.

"I used to make conscientious notes, but as I moved jobs, I made less and less notes because of time pressures. During the course, as I'm studying I think 'here is something I want to learn and need to understand'. If there is any tuning it's for [assignments], I mark sections as I go along which might be of relevance to the next [assignment]."

He had found the first assignment to be the most difficult, and stressed the importance of feedback from the tutor in order to focus on the level and depth of answer required. Commenting on the project and its collaborative approach, he had played a key role in co-ordinating group activities and found face-to-face contact was highly significant in assisting the on-line collaboration. Whilst he did not feel the conferencing had helped his understanding of course readings, he had found it useful to appreciate alternative perspectives. The small group conferences set up for the two conferencing assignments had been far more valuable in terms of discussing course materials than general course conferences, because students were being marked on their contributions.

This student was clearly very able and had already completed a number of courses, which gave him a good background in the technology. The resource based approach presented new challenges, in terms of researching material, and a new approach to writing, but the impression was that he was well equipped to meet these challenges and made good use of the assignments as a way of practising these skills, and focusing his reading.

2. *Susan*

Susan taught an NVQ course in administration and possessed a Certificate in Education. She decided to work for a degree, and wanted to choose courses which were of particular personal

interest. She saw the whole exercise as a personal challenge: "I need to show myself I can do it." This was her first Open University course.

She had appreciated working with the CD-ROM library, particularly the ability afforded by hypertext to jump to parts of articles, and to cut and paste sections of relevance. In addition, she felt the course had helped to improve her writing skills. Using the Internet was not entirely new, but the course had honed her searching techniques, and she planning to continue to use these skills in T293 (Communicating Technology) and T171 (You, your computer and the Net) next year. However, by the end of the course she still had difficulty with selective reading.

"I still tend to go over the top. Knowing when to stop is difficult."

She was very much aware of the significance of assignments in her learning process, and found that they encouraged her to study particular areas in more depth. She valued the opportunity to repeat her work during the revision period:

"A lot of things were easier the second time around, during revision."

She was very appreciative of the opportunity to practise CD-ROM searching in the information handling assignment, and felt that this had been a very useful introduction to the various search methods. The two on-line collaborative assignments had also been important in encouraging active participation in group work.

"Having an assignment to do forces you to participate."

The picture here is of a student who, after one university course, had developed some of the skills required for successful resource based learning, and clearly the assignments had been significant in supporting the development of database searching, and of on-line collaborative work. However, the researcher felt that she was typical of those students who would probably need more practice and support in future courses, before she became competent in selective

reading.

3. Jane

Jane was planning to return to work, since her children had started school, and was following a degree course in order to train as a teacher. She had studied the Social Science foundation course in the previous year and planned to take two 60 point courses next year, in the hope that she could work towards a degree in four years.

She had had no previous experience with electronic searching and this was one of the reasons for picking the course. As for study methods, she found that even by the end of the course she preferred to print off material, and had not become used to screen-based reading. When interviewed at the start of the course she did not feel she was particularly good at skim reading and found the resource based approach very time consuming.

"I have to read everything thoroughly, so it takes an awfully long time! I like to satisfy myself that I know it thoroughly."

By the end of the course, she was more confident about picking out relevant or important information, and believed that the information handling assignment had been helpful in teaching her ways of looking for significant words and phrases when reading. She was also confident in her ability to use conferencing for collaborative learning, although unenthusiastic about its use as a medium of communication with other students.

In spite of the guidance, she continued to find the resource based approach very time consuming, because of its open ended-ness. Her previous foundation course, which had been considerably more directed in terms of content, and supported with weekly tutorials, had been a poor preparation: "It almost did me a disservice". She found herself floundering with resource based learning. Clearly this student, although very determined to succeed, was ill prepared for this approach to study, and might have benefited more, had it been introduced at a later stage in her academic career.

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4. Fergus

Fergus was a retired engineer, who decided to study Arts and Social Science courses in order to broaden his views. He was in his seventh year of studying.

He found to his surprise that he preferred reading text in its electronic form, rather than paper copy, and was delighted with the CD-ROM library, particularly with the use of hypertext. He felt he had acquired more confidence in using the computer and some ("but inadequate") facility in searching and retrieving information. He felt comfortable about researching topics for study, having practised this in previous courses, and had no difficulty with constructing summaries of his reading, again as a result of earlier courses. He was aware of the pitfalls in dealing with extensive information resources:

"I still have to exert a great deal of self control, or I tend to read too much."

He was enthusiastic about the opportunity to practise CD-ROM searching in the information handling assignment and found the on-line assignments valuable in practising group collaboration. He had some interesting comment on the formative effects of revision:

"I have found there is a post-course period when the information taken up during the course seems to re-organise itself in my mind, and re-appears later, making even more sense. Revision has revealed yet more depths, like a good painting or piece of music always does."

He had reservations about the level of the course, however:

"What might have been more effective? Perhaps a more modest target might have been easier to grasp. Many of the sections were presented with resources from which one might have developed a PhD! Wonderful academic quality though...perhaps it should have been third level?"

This student was well equipped to deal with the resource based approach, with skills and a discipline knowledge acquired from a wide range of previous university courses. Whilst studying intensively at the computer, and use of the CD-ROM library had introduced him to new study routines, it was the researcher's impression that he had plenty of time in which to accommodate this.

CONCLUSIONS

This case study describes the development of assessment strategy as part of an evolving scenario, made possible by the continuous and rapid feedback facilitated by computer conferencing, and in particular the evaluation work from this research. The design and modification of assignments on this course shows that it is possible to use assessment as a way of fine-tuning the course pedagogy. A considerable investment in the preparation of course materials means that Open University distance courses must have a life of a number of years, and assignments, which are generally written on an annual basis, have a role as a way of emphasising, or fine-tuning, particular "messages" given out in the course texts. For courses which are networked, computer conferencing offers the potential for frank and rapid feedback on a course and its assessment, from both students and tutors, and allows for the ongoing development of assessment in response to experience and evaluation.

It is clear that the tensions generally encountered in assessment design are common to the resource based approach in a networked environment, although they may be more difficult to resolve. Within the framework of Open University assessment regulations, it has proved possible to evolve a more supportive approach to this version of resource based learning, although a requirement for a closed book exam remains part of the strategy. This account describes the importance of marking consistency, balanced against the need to provide for flexibility in content and approach.

Finally, it appears that there are particular students who benefit from this type of

study more than others, whether because of their orientation to study, or perhaps because they have reached a particular stage in their academic career. It seems that students' ability to study effectively using this resource based approach is related to their academic background, previous courses or experience in other walks of life, and this reflects findings from the review on factors influencing the success of self-directed learning.

This account now uses the findings on perspectives to the various assessment strategies to assess the relevance or practicality of the framework of assessment design for resource based learning in networked environments, which is described at the end of Chapter 2.

Essays and reports

Assessment does not necessarily have to be online, or particularly innovative, to be appropriate to courses making intensive use of technology. Positive reaction to essays and reports underline the fact that these conventional approaches to assessment can play a useful focus for reading, which when accompanied by rich feedback from tutors may be particularly of value where students are unclear how to adjust to this version of resource based approach. The act of writing these essays or reports provides students with the opportunity to practise communicating within the discipline. They may therefore be an appropriate strategy for providing scaffolding, whilst at the same time allowing scope for open-ness and flexibility.

The experience here illustrates that the marking of essays and reports may offer new challenges to tutors and course teams, who are required on the one hand to allow for

flexibility in content, and on the other to ensure uniformity of marking over the student population.

Marking schemes/model answers

The uploading of marking schemes and model answers was helpful in assisting students to an understanding of the particular academic genre, and probably helped in the development of a reflective approach to learning. However, they should be used with care, since there is a danger of encouraging strategic approaches in students and of being over-prescriptive in subject content.

Peer review

The use of online peer review was appreciated as a way of enhancing feedback and encouraging a reflective approach. However, the exercise was both time consuming, and unfamiliar to students, and would need to be include as an integral part of the assessment strategy, if it were to be implemented over a whole course.

Online collaborative project

The online collaborative project was successful in providing the scope for individual responsibility and initiative and gave students the opportunity to choose an area of study, thus affording scope for open-ness and flexibility. It gave students hands-on experience of resource based learning in a networked environment, and supported the development of information handling and collaborative skills. However, the online collaborative aspects required competence in online debate and in group management skills, which these students did not have. They therefore benefited from an earlier assignment which gave them the opportunity to practise and reflect

on these skills, and this illustrates the value of using assessment to develop skills incrementally.

Assignments for the practice of skills

The information handling and online collaborative assignments illustrated how the practice of skills can be integrated with subject content into assignments, and can influence both the timing of their acquisition and the direction of tutorial support. The findings show that students' competence with the various skills was integral to new ways of studying with electronic resources, and their lack of competence impeded their progress with course content. Students appear to have benefited from the assignments offering practice in the information handling skills of operation and navigation, the collaborative skills of online debate and online group management. However, at the end of the course they were still experiencing difficulties in selective reading and in formulating their need for information, and the assignments appear to have been less successful in cultivating investigation and reflection.

Exam

Although there are obvious drawbacks in attempting to devise a content based closed book exam for a course which embodies open-ness and flexibility, and as an assessment strategy it is not included in the model for assessment of resource based learning in networked environments, this study found unexpected support for exams both from students and their tutors. Exams were important to students for their motivational effect, in providing the stimulus to work harder, and their synoptic effect, in helping to draw the course principles together. Tutors valued them for the same reasons, in addition to their contribution to fairness across the student

population.

These findings confirm the applicability of the framework of assessment design, however they also underline some unexpected practicalities in the implementation of assessment strategies. The extent to which the framework could be useful in other contexts, with different students at different stages of their academic career are explored in the next Chapter, which describes a second resource based course in a networked environment.

CHAPTER 7. ASSESSMENT FOR RESOURCE BASED LEARNING IN A NETWORKED ENVIRONMENT: A SECOND COURSE.

Having described the characteristics of assessment strategies which were appropriate for the undergraduate course THD204, it was decided to extend the study in order validate extension of the findings and to establish the extent to which the framework of assessment might be further generalised.

A short study of a second course which also employs a resource based approach in a networked environment was carried out in 1998. The on-line course H802: "Applications of IT in Open and Distance Education" forms part of the Open University's MA in Open and Distance Education, and so it is a more advanced level of course, attracting a different type of student. There are also differences in the approach used in the two courses. In contrast to THD204, which was described in Chapter 1 as partially resource based, because students made use of custom written course material in addition to learning by open access to the electronic resources, the course H802 has a much greater dependence on the resource based approach and has very little purpose written course material. Indeed, three out of four blocks have no printed course material except for a Study and Assignment Guide. As for networked learning, there is a much greater dependence on online collaboration in H802, and it forms an integral part of the assignments. So where THD204 probably belongs to Mason's (1998) "wraparound" model, H802 belongs more to the "integrated" online model, with the result that students are afforded more freedom and flexibility in their study.

Overview of the course

The course offers practical experience in on-line activities and interaction, collaborative work and Web searching, and is designed to cater for practitioners in open and distance learning. It was presented for the first time in 1998 to 60 postgraduate students, world-wide.

The course has four blocks, three of which are presented primarily on-line through a Web-based Virtual Campus (Stratfold, 1998). The Virtual Campus has three categories of resource within an integrated environment: a Bulletin Board system (BBS); an on-line Study Guide; and links to further information resources. The approach is largely experiential, and collaborative, the emphasis being on on-line activities and peer learning, rather than on reading course materials, and students are expected to make use of a range of Web resources, and to decide on which ones to focus. The Course Team describe the adjustments in approaches to studying which this implies:

> "If one combines access to peers and other resource people with access to the enormous and ever-growing range of information resources now available over computer networks, then the differences between conventional 'packaged' courses and on-line courses become even more apparent. Students and trainees can roam the networks and locate the information and resources they need. But they will need help to develop the necessary skills in

specifying their needs, in locating the appropriate information sources and in handling the resultant information."

<div align="right">(Kaye, H802 Course Guide, Open University, 1998 p 11)</div>

The course is assessed by five assignments, and a final project which acts as the examinable component. The assignments are closely integrated with the activities and are designed to assess skills in on-line interaction, collaborative working and preparing "prototype" materials (H802 Assignment Guide, Open University, 1998). General criteria for assessment include the development of higher cognitive skills, such as critical reflection, appreciating alternative perspectives and formulating a coherent argument. Apart from assessing the students' understanding of key concepts, the first two assignments award 30% for the way in which students make use of the various resources of the course, thus rewarding a systematic and effective approach to the appropriate use of information. There is a similar element in the assessment criteria for the final examinable component.

Most assignments require students to produce essays based on issues debated on-line during the various activities, and to draw on evidence from messages contributed to on-line discussions, and other resources, in order to illustrate course issues. An example is given in Appendix 6. Indeed, the Course Team envisaged that this would validate the importance of contributing to online discussions (Mason, 1999). One assignment, which may be of particular interest to course designers wishing to support the resource based approach, requires students to produce a set of hyperlinked pages to the most significant parts of resources on a particular topic. Students have to select the most relevant sources, summarise their content, with a

personal commentary on their relevance, and link them in a way which reflects the relationships between them.

The final project is designed to act as a synoptic device and requires students to reflect on their readings of Web resources, experiences and conference interactions during the whole course, in order to provide an assessment of the role of technology in mediating learning. This involves a comparison of the effects of learning from print materials versus learning from hypertext environments, or through interaction with peers.

In view of the fact that the project is the examinable component, a number of safeguards are included. In order to verify identity the tutor is asked to certify the work as being that of the student. In addition, students are required to participate in e-mail and conferencing on the subject of their project, and also to specify any help received.

The formative aspects of assignments are augmented in a number of ways. Each assignment description includes the assessment criteria, which are also used by tutors as the marking guide. In addition, in one assignment students are encouraged to submit drafts of their assignments for comment, before final submission. The course team also experimented with a real time chat event in 1998, in which students were invited to peer review a colleague's assignment script.

Method

Data on student perceptions were collected using flexible open ended telephone

interviews and e-mail questionnaires, supplemented by comments and reflections on

various activities throughout the course as recorded on the Bulletin Board System.

The interview schedule is included in Appendix 6.

Interviews were carried out with a total of 11 students after the end of the course.

The students' names had been supplied by their tutors as representing a range of

abilities, and being potentially informative contacts. The questionnaire used as a

basis for these interviews included a series of related questions, designed to elucidate

the general area of interest and to provide the basis for a form of guided

conversation. The questions were sent by e-mail, and respondents, particularly those

for whom English was not a first language, could prepare their responses and reply

by e-mail, following up further points by telephone. In addition, the interviewer was

joined to the course Bulletin Board System from the start of the course, and having

posted an outline of this research project, together with a personal introduction,

invited comment from students. Students also introduced themselves on the Bulletin

Board System with a personal resume, and this provided some background on their

interests.

Data analysis involved the iterative reading of e-mail and Bulletin Board System

messages, together with interview notes, leading to the emergence of trends and

common categories. The account is illustrated with verbatim quotes from students.

Findings

Skills for resource based study

The interviewees came from a wide range of higher education and other institutions, and were either planning, or already concerned with the design and delivery of on-line teaching materials. They were all graduates and two also had doctorates. The data gathered here reflected in part their first hand reflections as learners, but also their opinions on the acceptability of similar learning and teaching models with their own students.

In common with THD204, this course provided an extensive range of resources, from which students were invited to browse and select material of interest and relevance to their written work. Respondents found the approach rewarding, but it also appeared that the approach had made study of the course very time consuming. Students described the need to locate material on the Internet and print it out, often slow and frustrating unless there were facilities to do this at work during the day, added to the requirement to read through and respond to Bulletin Board messages or sources flagged by fellow students.

It rapidly became clear however that in contrast with the undergraduate students on THD204 the interviewees from H802 were already competent self-directed learners, and had not experienced serious difficulties with resource based study. Whilst they recognised that the resource base contained more information than they required, and some commented on the lack of time for studying as thoroughly as they might have wished, they were confident in their ability to select appropriate parts. The time

constraints imposed a survival strategy on many students, who had sensibly used their preparation for assignments as a device for focusing on the reading which had to be done.

> H10 "We were in a tight schedule of activities and assignments, so I read what seemed relevant at the time. No doubt I missed things that would have helped, but you can't read everything, and this is true whether you're working on-line or in a library."

It appeared that the ability to be selective in reading was not new to these students, and had probably been acquired over their period of undergraduate study.

> H10 "Being selective in reading is a skill that I had to acquire as an undergraduate, as I suppose all students do, but I certainly had to adapt it for use on Web resources and the BBS [Bulletin Board System]."
>
> H1 "I easily understood that reading everything was impossible....obviously a problem to be easily overcome at the level of an MA."

There still remains the possibility, as discussed in Chapter 6, that this ability may be more closely associated with some disciplines than with others, and a comment from one student on this course suggests that this could occasionally be a problem:

> H13 "In my case my first degree was in engineering, which was a very programmed style of learning, where everything studied had a specific purpose. This probably explains why at times I have struggled to know

whether I have read enough of the right references."

As for skills they had acquired during the course, students mentioned on-line collaboration, including moderating skills, Web searching and constructing Web pages, although most were already familiar with screen-based working, and generally with study routines using a computer. Therefore, in terms of information handling skills, it looks as if they acquired some operation and navigation skills during the course, but they were already competent in the more complex cognitive skills of investigation and reflection. In contrast with THD204, the philosophy of the course emerges as being far more practically, and skills orientated, although grounded in theory. So, instead of needing to acquire particular skills in order to study the course materials, as is probably the case in THD204, students on this course were using the course materials to reflect on their experiences with various skills.

When asked whether they would have had difficulties with this version of resource based approach when they were undergraduates, or indeed whether it would be appropriate for their own students, the responses produced some very interesting reflections which to some extent related to cultural and national differences in teaching approach. Some felt that the approach was completely unrealistic for undergraduates, whilst others felt that either it was appropriate for later years in an undergraduate course, or alternatively that students should be exposed to it, but with more guidance to the resources.

H1 "Undergraduates students here need to learn, and memorise what they have learnt. You need to be at graduate level to do a course like H802."

[Belgium]

H5 "Undergraduates need to be given a framework to work around. They

don't know how big the whole thing is." [UK]

H9 "Quite impossible, to my mind. [Undergraduate] students don't

understand the concept of research. Students are still lost on our postgraduate

course. You almost need to experience the benefits of research before you

understand why you need to acquire it, before you see the point of it." [UK]

H6 "Compared to traditional education, undergraduates would flip. The

amount of work is a lot more. Listening to a traditional lecture is much

easier. But these are skills which are necessary to learn." [Norway]

There were some very interesting comments on the nature of students' ability to be

selective in their reading, and the ways in which this might be effectively supported.

Some respondents felt that this was in some way related to an in-depth understanding

within a particular discipline, rather than being a free standing, transferable skill:

H7 "I also think that the ability to select is based in knowledge not skill. I see

it as more age, experience and literacy level, rather than academic level,

though of course this overlaps. Where does the ability to read "between the

lines" and quickly cotton onto the drift of an argument come from?...I

guess with my own students, who have English as a second language, I would

simply scale the basic resources down a bit and maybe talk through them as

well before encouraging wider fields...appropriate scaffolding. At any point,

what we have to develop is the *criteria* and then we learn to *discern* from

them. Supporting students may be more a matter of responding to students'

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use of resources with constructive help."

H8 "I am not entirely certain there is in fact a separate skill associated with this. A developing understanding of the subject area would certainly assist in this."

These comments bear out observations by Marchionini (1995) on the need to recognize and understand a problem as a pre-requisite to searching for information. It also resonates with work by Perry (1970) and Morgan & Beatie (1997) on the gradual development of metacognition in undergraduates.

Attitudes to assessment

In common with experiences described in Chapter 6, students found the assignments useful as a focus for their reading.

H1 "They require from you to draw something coherent from what you recently learned."

H11 "They were a really important focus and the activities were a great idea. A tremendous way of building into the learning experience."

It was apparent that the assignments, in association with the various activities, had also been successful in offering practice and reflection on the use of various skills. Clearly the students appreciated the experiential approach, and some found that it had immediate practical application.

H5 "As a result of this experience I have given my own students more

practical, reflective tasks in dentistry."

H4 "They were very appropriate, some directly relevant to my work at

present: we are experimenting with collaborative on-line learning."

Moreover, the fact that the activities were an essential part of requirements for the

assignments was appreciated, because it guaranteed the involvement of all students,

in common with experiences on THD204.

Some findings reported by Lea (2000) for the same course describe students'

difficulty in using the conference messages as a resource for assignment writing.

She suggests that this difficulty was related to the fact that students were being asked

to transfer material between two academic genres. Conference messages, which

were seen as reflecting student centred learning, and perceived as having less

authority or validity than academic papers, were being used for a more conventional

essay style genre. These findings are not reflected in the present study, but this could

be because students were not specifically asked about this point.

Interestingly, one student suggested that an open ended, experiential course of this

nature should logically be assessed in a more negotiable way.

H7 "I'd rather write my own questions. It would be more appropriate. The

experience is probably different *as lived* than *as anticipated* by the Course

Team."

Quite how a negotiated assignment would work in practice, when balanced against

institutional considerations of uniformity and quality standards for large population courses, is difficult to envisage, although McConnell (1999) describes the successful implementation of iterative assignment development with small groups.

The role of on-line collaboration

Students were asked whether the on-line collaboration had contributed to the resource based approach, and observations from students on this course bear out those made in Chapter 6, namely that it provided an important supportive role in giving the opportunity to share alternative perspectives to reading, and of course in providing moral support.

> H11 "There were a good few instances of enlightenment. I'm very much in favour of this interaction. I think it's essential in a support role, rather than for collaboration. It's useful to discuss your thoughts with other people, even if they don't respond much."
>
> H7 "Generally talking about things helps sort out ideas..understanding how others approach a subject is a part of the data that one turns around in one's mind...it enriches the input, widens the comparisons."
>
> H8 "The discussions certainly provided a different perspective...certainly generated feelings of comradeship or community."

Their experiences underline the pedagogical advantages of integrating open access to electronic information resources with online collaborative learning, in line with comments by Collis (1998) and McConnell (1999).

On the practicalities, it appeared that successful on-line collaboration required a moderator, and was often more time consuming and less flexible than working independently, and this bears out observations from other studies (see for example Kaye, 1992; Collis, 1996). Moreover, it depended on the regular participation of all group members, and clearly did not suit all students. Students on this course did not have the opportunity to meet face-to-face before embarking on their collaboration, as many THD students did. However, there was some feeling that a real time meeting to organise task allocation could have been beneficial, and would have alleviated some of the time pressure imposed by the deadlines for the various tasks.

Peer review

Students were offered the opportunity of participating in a peer review exercise, using a real time chat facility, and 15-20 students took part over a 24 hour period. One student volunteered to submit a script, and fellow students were required to review it and agree on a grade, using the assessment criteria supplied with the assignment notes. In line with findings from other online peer review exercises (see for example Davis & Berrow, 1998; Gibbs, 1999; McConnell, 1999) the exercise prompted students to provide constructive comment on strengths and weaknesses. Moreover, the fact that the medium imposed a time limit on the activity and introduced a social element to the proceedings probably encouraged students to participate. Certainly the exercise seems to have been more enjoyable, in comparison with the THD204 peer review exercise, although it is not possible to say whether it was any more instructive.

H10 "There was a tendency to wander from time to time, but we pulled

ourselves back to the table quite successfully. Some small talk and greetings which were quite controlled considering we hadn't met before ...all this produced an atmosphere conducive to sharing reflections which indicated the possibility of rich exchange...wanting to communicate more complex thought"

The examinable component

In sharp contrast to the feedback received from THD204 students, all the H802 students interviewed were enthusiastic about the use of a project as a final examinable component, and none of them felt that the course was invalidated by the absence of an exam. They gave a variety of reasons for their views, including the increased flexibility it allowed and the time for reflection and integration of ideas, although clearly some felt rather differently about exams for undergraduate assessment.

H3 "It allowed flexibility and freedom. The way I worked involved an iterative process, because I knew I might not have the time to spend at the end."

H8 "It is just as valid: perhaps there should be a choice. On reflection, neither an exam, nor a project can truly demonstrate or measure what I have learned. To turn it back on you, Janet - who are these really for?"

H5 "I was able to look through and research the topic, and be more discerning and reflective. But as for my students, without an exam they don't have anything to focus on. Exams are the only way to force them to do work."

There were several students to whom a final exam was anathema, and would perhaps not have chosen to study on a course with an exam.

H9 "I was exceedingly grateful there wasn't one. The one thing that appealed to me immediately. I might not have done the course if there had been one!"

In view of the importance which the THD204 students attached to the revision period, H802 students were asked whether they had reached a synoptic understanding of course issues by the end of the course, and whether the examinable component had been instrumental in helping them achieve it. Many students felt that the project had contributed to their overall understanding, although others felt that their understanding of these issues was still being formed. It does not look as if the reaching of a synoptic understanding was as important to these students as to those on THD204, and this may be reflective of the type of course and the degree of independence of the students. It is possible that their interpretation of a synoptic understanding in the context of this course was more closely related to the extent of its practical applicability, as these comments suggest:

H6 "The project was synoptic in a way, yes. But the material from this course will always stay open. I will continue to use this material, and add to my knowledge."

H8 "Synoptic understanding of the course issues is still occurring: the activities, assignments, provided a focus, but ...I feel that there is a channelling of this understanding of course issues - I would like to think I would be able to go beyond this or even interpret issues from my own unique

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perspective - I have to do this anyway in my own work situation - in the end

this is what matters for me - 'relevance and application'. Did the examinable

component do this for me No! Would I have been able to achieve a synopsis

myself? Probably."

Clearly the students on this course had very different perspectives to those on the

undergraduate course, and comments suggest a vocational orientation to study

(Taylor, Morgan & Gibbs, 1981). The findings are resonant of a description by

Collis (1996) of professional learners, being self-directed learners who focus their

learning on a specific field which is of direct and immediate relevance to their work.

The professional learner makes the decision on the relevance and application of the

information in front of them, in contrast to formal and traditional educational

settings, where these decisions are taken by the teacher. Similar observations come

from recent findings on the motivation for study of part time education postgraduate

students at three London universities (Pratt, Hillier & Mace, 1999). The study

indicated that students' priorities were to upgrade their theoretical knowledge in order

to inform professional practice.

Discussion

A comparison of the experiences of students on these two courses reveals some

interesting insights into the relationship between the learner, resource based courses

in networked environments, and their assessment.

In comparison with THD204, the course H802 offered students more latitude and

open-ness in their study, with a greater reliance on resource based and collaborative learning. But the students were different too. Perhaps the most striking difference between the two groups was their competence and confidence as resource based learners. Whilst the undergraduates were struggling, particularly with the complex skills of investigation and reflection, the postgraduates already possessed these skills and were in addition confident in managing their own learning.

The implications of this finding are that if resource based courses in networked environments are introduced early in the undergraduate curriculum, students will need particular support in the process of resource based study, together with sympathetic assessment, probably staged over a programme of study. The alternative is to restrict this approach to courses directed towards students at the end of their undergraduate career, when they are more likely to possess the necessary cognitive skills, and discipline knowledge.

There are many similarities in the experiences of the students on these two courses. Students on both courses found this version of resource based approach rewarding, but it also appears to have been a time consuming way of studying. There were differences in the underlying reasons for this: where the undergraduates experienced difficulties in information handling skills and in new ways of study with electronic resources, the postgraduates were more concerned with the process of retrieving information from the Internet. These factors should be taken into consideration by course developers when considering appropriate media to deliver electronic resources.

On both courses, on-line collaboration has been valued as an integral part of resource based study in networked environments, and in providing alternative perspectives and moral support, although on H802 its role was considerably more significant. Difficulties in the management of online collaboration, and with the time consuming and inflexible nature of collaborative work were experienced by students on both courses.

With reference to the framework for assessment design of resource based courses in networked environments, developed at the end of Chapter 2, student perceptions on the role of assignments in the learning process were similar on both courses, and their feedback on various aspects of assignment design is compared below.

Essays and reports

Essays and reports were used on both courses as a way of providing a focus for reading, and H802 students particularly found them helpful for prioritising their efforts.

Assignments supporting specific skills development

The assignments also provided practice in, and supported the development of various skills, although students on H802 probably had a more protracted opportunity to do this, because of the activity based structure of the course. Students valued practice in web page construction, web searching and online collaboration. Clearly, assessment can provide valuable opportunities for the supportive development of various skills, and the mechanism of tying activities to assignments, has much to recommend it because it encourages an experiential approach, accompanied by reflection in the

written assignment.

Peer review

Electronic versions of peer review have again been shown to be useful as a formative exercise in supporting a reflective approach to study, and the experience on H802 suggests that the real time collaborative approach may encourage more students to participate.

Project work - examinable component

Project work was again effective in accommodating open-ness and flexibility, whilst supporting a self-directed approach.

Student views on exams were dramatically different on the two courses, and it could be, as suggested in Chapter 6, that student perspectives on exams may be a reflection of their previous experience of end of course assessment. It is also possible that particular forms of final assessment, and any motivational and synoptic effects, are more important at certain stages of academic life, or for particular orientations to study, than others.

In summary, the findings here support the validity of the framework of assessment design for resource based learning in networked environments developed in Chapter 2, although the differences between the two studies underline the fact that the type of course and the level of student will influence the degree of support, and the skills which the assessment must support.

CHAPTER 8. CONCLUSIONS

Recent advances in the use of communications technologies in Higher Education have led to an explosion of interest in networked learning, which offers the potential for more open ended and flexible study in an Open and Distance Learning (ODL) context. A new generation of courses combines access to a wide variety of resources in electronic form, with the construction and negotiation of meaning through online collaborative interaction. The resource based approach has been used in Higher Education for a many years based on print resources, and there is much to be learned from experience gained in this context, however the use of electronic media presents new challenges.

The version of resource based learning referred to in this thesis has the following characteristics:

- Self-directed learning
- In an ODL context
- Achieved by open access to a large electronic information source
- Integrated with online collaborative learning.

In common with other pedagogic models which aim to develop self-directed learning, resource based learning in networked environments aims to develop in students the confidence to assume responsibility and autonomy in learning, and the cognitive and affective skills needed to make choices and manage their own learning.

The process of resource based learning in networked environments has in addition some aspects in common with print based project courses, because it requires students to develop the information handling skills of investigation and reflection. This means that students need to assume responsibility for their learning, making choices in what they read, assessing their readings critically, and integrating the knowledge they have acquired into written work.

However, the use of electronic, as opposed to print based, resources offers new opportunities, in the possibilities for tailoring searches and combining information sources to meet particular requirements. It also dramatically increases the scale and diversity of the resource base, with the result that students may be confronted with more choice than would have been feasible in a print based environment. In addition, students need to develop operation and navigation skills, in order to negotiate the electronic environment, together with online collaborative skills, so that they can collaborate effectively.

It follows that assessment strategies for self-directed learning in other contexts may also be appropriate for resource based learning in networked environments, although the assessment must in addition accommodate the particular requirements to develop information handling and online collaborative skills, whilst allowing scope for choice and flexibility. As a result of a review of the literature, a framework for the assessment of resource based learning in networked environments was developed. Since very little research has been undertaken into student perspectives on resource based learning in networked environments, this project set out to establish the skills needed and those already possessed by learners, and the extent to which assessment

might support resource based skills development. The applicability of the framework was judged on that basis, and is discussed here, for the two courses covered by this study.

A case study of one Open University undergraduate resource based course (THD204: "IT and Society") was undertaken over a three year period, with three cohorts of students and their tutors, and the findings were compared with a short study of student perspectives on a second postgraduate resource based course (H802: "Applications of IT in Open and Distance Education"). The qualitative data was compared with, and underpinned by existing quantitative data from the IET Courses Survey 1996 (IET Courses Survey Project Team, 1997) and the THD Electronic Survey carried out annually by the THD Course Team.

The course "IT and Society" is a second level, 60 point course which in 1998 was delivered to 1400 students. This course provides access to a personal library of academic articles on CD-ROM and guidance to sites on the Internet, in addition to more traditional printed course materials. The students and tutors are all networked, allowing for online interaction throughout the course and frank and rapid feedback on the course and its assessment. The course is assessed by six assignments, one of which is a double weighted on-line collaborative project, and a final, closed book exam.

The second resource based course, H802 "Applications of IT in Open and Distance Education", has a much greater dependence on the resource based and collaborative approach, and has very little purpose-written course material. This on-line course is

designed to cater for students who are already practitioners in open and distance learning and offers practical experience in on-line activities and interaction, and Internet searching. The course is assessed by five assignments, which are integrated closely with various practical activities, and a final project which is the examinable component.

Main Findings

An initial pilot research project, on THD204, was designed to gain an understanding of student perspectives on the resource based approach. In 1996, data were gathered from 21 in-depth interviews and observations.

The findings confirmed the importance of information handling and online collaborative skills for resource based learning, but also showed that many students had not developed these skills adequately by the end of the course. It was also clear that there were conflicts and tensions between course aims and the assessment, and these findings first alerted the Course Team to the need to re-appraise the assessment strategy of this course.

In 1997, data on student perceptions on resource based study and its assessment were gathered from four computer conferences, to which 400 students were joined, and around 60 telephone interviews. Feedback from course tutors was also collected, again using computer conferences, to which all 50 tutors were joined, and from telephone interviews with three exam markers. In 1998 the Course Team made a

number of refinements to the assessment strategy, and these were evaluated by the writer using data from four computer conferences, again covering 400 students, 40 telephone interviews, and 20 e-mail respondents. This was supplemented with feedback from the tutor conference and telephone interviews or e-mail exchanges with 24 tutors.

The findings from this research illustrate how various forms of assignment can support the practice and development of skills, whilst providing a focus for course content. There were four areas in which the findings of research were used to refine assessment, and they are summarised below.

Initial Finding	Assessment design feature	Evaluation
1. Students experienced initial difficulties in writing assignments appropriately.	Network used to deliver model answers and marking schemes and peer review exercise after assignment submission.	All features were helpful in providing guidance on the writing requirements of the course.
2. Information handling skills were poorly developed, even by the end of the course. Problems with information overload.	A new information handling assignment was introduced, to offer practice in searching, retrieving and writing précis.	Assignment was successful in helping students to practise skills and to arrive at a strategy for tackling future searching tasks.
3. Students experienced problems in the management of online collaboration during the final online collaborative project.	An earlier online assignment was modified to encourage students to consider strategies for effective online group management.	Positive benefits for many groups and improved collaboration in final project, in comparison with previous years.
4. The exam presented many problems with information overload and student inability to focus on core content.	A new revision conference offered a review of previous answers to exam questions and guidance on approaches to the exam.	The conference was well received, students deriving useful lessons from scripts and discussion. But not a complete solution to the mismatch between resource based aims and content-oriented exam, because of problems with lack of openness and core content.

Table 8-1. Assessment design and refinements on THD204

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In the second study, of the course H802, data on student perceptions on resource based study and its assessment were collected using flexible open ended telephone interviews with a total of 11 students after the end of the course, supplemented with comments and reflections recorded by students on the course Bulletin Board System.

The study provided an insight into the differences between delivering a course such as this to undergraduates and postgraduates. In sharp contrast to the undergraduates interviewed on THD204, the postgraduate H802 students were already fully fledged as self-directed learners, and had little difficulty with the resource based approach. Their experiences, as described in the study, served to contextualise those of the undergraduates and have fed into a more complete understanding of student perspectives on resource based learning and its assessment.

Limitations of study

A common criticism of case studies is that they provide rich and informative data, at the expense of generalisability. However in this case, comparisons with previous work described in the review, and with findings on the second course, serve to illustrate the applicability of a framework for the assessment design of this version of resource based learning which may be generalised to other courses.

There may also have been sample bias, in that students knew they were taking part in a study of assessment, and this could have affected their responses. The assessment

and exam conferences could also have attracted a higher proportion of "strategic" students than is represented in the population at large. The findings are validated by the fact that they achieve a good fit with the quantitative data, and by the repetitive nature of the data received from three cohorts of students at a wide variety of points in the assessment process.

And lastly, the researcher was a course tutor, and therefore intimately concerned with teaching the course. Whilst this helped greatly in understanding student attitudes, it would almost certainly have influenced the interpretation of findings. However the researcher did find that her position changed during the course of the study, which indicates that findings were not being shaped to fit preconceived notions. For example, she had assumed that exams must not only be inappropriate, but also unwelcome as an assessment for a resource based course, but in the light of the findings on student and tutor support for exams, she was persuaded to modify her views.

Addressing the research question:

What is an appropriate assessment strategy for resource based courses in networked environments?

This section discusses the research question and sub-questions in the light of findings from this research project. In the introduction, the sub-questions were divided into three strands, which are used below for discussion points.

1. What skills are required by networked resource based learners?

What factors influence successful resource based study in networked environments?

In confirmation of the work described in the review, the findings of this study show that effective resource based learning in networked environments requires the use of the information handling skills of operation, navigation, investigation and reflection, in addition to online collaborative skills. Integral to the use of these skills is a familiarity in studying in an electronic environment.

It appears that some of these skills may take longer to acquire than others. For example, the students on the undergraduate course became competent in operation, navigation and in online collaboration, through practice, particularly in various assignments, but the more complex cognitive skills of investigation and reflection caused more serious difficulties, which students were still experiencing at the end of the course.

The postgraduate students did not experience difficulties with investigation and reflection, and it appears they were already competent self-directed learners before they started the course. However, during the course they had successfully acquired new skills in operation and navigation.

Previous work described in the review suggests that the development of investigative and reflective skills is influenced by a variety of factors, including prior subject knowledge, metacognition and self confidence, and observations from this study on

the differences between the two groups of students bear this out. Clearly the degree of open-ness and flexibility of the course will impact on the importance of investigation and reflection. Whilst many undergraduates were bewildered by the open-ness of the approach, it was familiar to the post-graduates, who already had the necessary skills to cope with it.

Finally, the findings describe a variety of factors which influenced the acceptability of the resource based approach. Clearly the orientation to study, and the stage in academic development are important factors, and this is graphically illustrated by the student profiles described in Chapter 6, in comparison with the postgraduate students described in Chapter 7. Some students who were more familiar with investigative approaches than others attributed this to previous experience in other disciplines, and it may be that studying from a variety of information sources is more familiar to Social Sciences and Humanities than to Technology courses.

2. Which skills should be assessed for a resource based course in a networked environment?

Which aspects of assessment support this version of resource based learning effectively?

Can assessment be a teaching/learning opportunity in this context?

The question of which skills a resource based course should assess depends whether skills are to be developed during the course, or whether it can be assumed that they have already been acquired. There will be variation in the needs of students at different stages in their academic career. For example, the findings describe how

most undergraduates had much to learn in terms of studying effectively from a large electronic resource, and therefore benefited from more practice of these skills through the assessment.

Arguably the skills of investigation and reflection may need to be developed, and therefore supported through the assessment, over a programme of study, and this is illustrated by the rate of progress of the undergraduates in this study. On the other hand, practical skills related to familiarity with the operation and navigation of a particular environment may only require limited practice before students become proficient.

The findings confirmed the value of innovative assessment strategies such as the electronic delivery of model answers, marking schemes and peer review as a way of enhancing formative feedback to students, in assisting the development of critical and analytical skills, and in demonstrating alternative approaches to written work.

Staff and student perspectives on the online collaborative project have shown that in confirmation of previous work, not only does a project offer scope for individual choice and flexibility, it is a successful way of putting both resource based and collaborative learning into practice. The information handling assignment, online collaborative assignment and the project, have illustrated how skills can be developed through practice and reflection. The experience with the initial online assignment on THD204, and its subsequent effect on the effectiveness of online collaboration in the project, have demonstrated how skills can be developed in an incremental way, through an appropriate assessment strategy.

The activity based structure of H802, in which each assignment was linked to a number of activities, demonstrated the value of another experiential approach to skills development, accompanied by a reflective exercise in the assignment.

Assessment need not be online, or even innovative, to be appropriate for resource based learning in networked environments. It became clear that traditional essays and reports were valued by students on both courses, particularly when accompanied by rich feedback from tutors, and they provided a useful focus for reading. They may be of particular value, and act as scaffolding, when students are adjusting to the new demands of a resource based approach.

It is not claimed that content based exams are necessarily the most appropriate assessment for resource based study, however the undergraduate course exam which followed a traditional format, and was content based, attracted considerable and unexpected support from both students and tutors. It was clear that they valued its motivational effects, and the powerful element of synopsis, which helped to draw the course together. Tutors were also concerned about fairness across the student population. These findings were not repeated with the postgraduate course, probably because students were at a different stage of academic development, and may have had a different orientation to study, although many considered exams essential for their own undergraduate students.

Given the importance of assessment to students and the way in which it influences the direction of study, it can be used as a way of harnessing, and motivating students

in their studies. Distance courses normally have a life of several years, over which time course materials remain essentially unchanged. Assessment, which in the Open University is changed every year, can be used as a way of fine-tuning course pedagogy, and of providing extra flexibility. In this way, assessment can be seen as an important teaching and learning opportunity, which has probably been under-exploited in an ODL context.

This study has illustrated how this can be effected. Because of a close liaison between the Course Chairs and the researcher, it has been possible to integrate the findings of research directly into modifications in assessment. This iterative process has helped to fine-tune course pedagogy, by influencing not only the acquisition of particular skills, but also the timing of their acquisition and the direction of tutorial support.

3. What is an appropriate framework for the assessment design of resource based learning in networked environments?

This section compares students' perspectives on assessment in the two courses and considers the extent to which they support the framework of assessment design. The findings of this study support the assumptions in the framework, namely that assessment must be aligned with the objectives of self-directed learning, whilst at the same time developing information handling and collaborative skills, and allowing scope for open-ness and flexibility in content. The findings also confirm the appropriateness of the various assessment strategies described in the review.

However, there was variation in the extent to which each criterion for assessment design was important and this underlines the importance of recognising the degree of freedom afforded by the course, the likely level of academic development of the students, and the skills to be developed by the course.

- *Aligned with objectives of self-directed learning*

The framework predicted that appropriate assessment should be aligned with the objectives of self-directed learning. These include the exercise of active learning, responsibility and autonomy, self judgement and a reflective approach, and metacognitive development. The way in which this criterion is interpreted should probably depend on the level of course and the type of student likely to undertake it.

For example, in this study there was a conspicuous difference between the two student groups with respect to their development as self-directed learners, and a corresponding difference in the level of the learning outcome. Whilst the undergraduates were grappling with a new freedom in their study, the postgraduates were operating within more familiar territory and were competent at self-directed study. Therefore, whilst it was important to encourage autonomy in the undergraduates, and they probably needed scaffolding in making appropriate decisions, the emphasis for the postgraduate course was more a matter of designing an assessment which afforded them the autonomy offered in the rest of the course, and of recognising their exercise of it.

On both courses, project work was clearly much appreciated as a way of providing hands-on experience of the integration of resource based with collaborative learning, whilst encouraging self-directed study. Peer review exercises were piloted on both courses, and proved successful in enhancing feedback and encouraging a reflective approach, although evidently the undergraduates found the exercise difficult, and would probably have benefited from further practice in this area.

- *Developing information handling and online collaborative skills*

The framework suggests that these skills are necessary for this version of resource based learning, and that assessment may need to develop student abilities in these areas. Of course, the extent to which the practice of particular skills forms part of the assessment should depend on the level of skills which students are already expected to possess.

Strategies such as the information handling assignment in THD204, and the experiential approach to activity linked assessment in H802 illustrate how the development of appropriate skills can be encouraged through practice and reflection. A successful incremental approach to skills development is illustrated on THD204, by the assignment which encourages reflection on the management of online collaboration, in preparation for later online collaborative work.

The experience here shows that it is important to identify, and differentiate between pre-requisite skills for a course, and those which the course will seek

to develop, so that the assessment can reflect these aims.

- *Allowing scope for open-ness and flexibility in content*

Resource based courses will vary in the degree of freedom and latitude

offered to study. It is clear that the use of electronic resources, particularly

where students are given access to Internet resources, will inevitably give

students greater scope and flexibility. The concept of open-ness is unfamiliar

to many undergraduates, who may need initial guidance in defining their

choices and selecting between them. Importantly, the emphasis on open-ness

and flexibility highlights the significance of self judgement and a reflective

and critical approach, as the student must be able to judge the relevance of the

material in front of them.

In this study, the post-graduate course offered greater open-ness and

flexibility than the undergraduate course, and therefore it was important to

give a similar level of affordance in the assessment. In the undergraduate

course, the project offered choice and flexibility in content, but the final

closed book exam did not, and therefore students experienced particular

difficulties. On both courses, the conventional essays and reports were

appreciated because they gave a framework and goals to work towards,

during resource based study.

Implications for the teaching and assessment of resource based courses in networked environments.

1. Many students appreciate the benefits and flexibility of resource based learning. However a reliance on screen based study requires adaptations particularly for part-time students, and until it becomes accepted practice, provision may need to be made for a significant proportion of the course to be studied away from the computer.

2. CD-ROM has been shown to be a very user-friendly medium for a database of multimedia resources, and the consequent variety of routes into the data including hypertext links, free text searching, themes and concept maps support a range of approaches.

Use of the Internet as a general resource and also for private pages of information causes some difficulties because of the time taken to seek out and download relevant material, at the students' expense. There are also problems with the variable quality of resources. These factors should be taken into consideration by course developers when planning appropriate media to deliver electronic resources.

3. The development and teaching of resource based courses requires a recognition of the importance of supporting the process of student learning. In order to be effective resource based learners, students need to develop information handling and online collaborative skills. In view of the time taken to acquire and practise these skills, there may be a trade-off against the amount of course content which students are able to study.

4. Assignments can be used not only to help students towards an understanding of course content, but also to develop the skills to learn in a resource based way. They have been shown to be particularly effective in the practising of skills associated with database searching, and computer conferencing. The use of an experiential approach, by integrating practical activities with assignments is a useful model in this context.

5. Clearly, the stage of academic development will influence the cognitive and affective skills which students have developed. Therefore it is important to consider the target audience and the likely level of skills they may already have, so that the assessment can support those skills which require to be developed.

6. A variety of assessment devices to support the resource based approach have been trialled in this study.

- Model answers can be a useful way of providing students with concrete examples of the academic genre, and are deliverable using networking, either as additional feedback on assignments in the early stages of a course, or as a preparation for exams. Student scripts can also be used as a way of illustrating alternative approaches.

- Course teams could consider the value of including assessment criteria in the assignment notes, as a way of helping students to understand the requirements of the course. However it can be problematic to ensure that students' interpretation

of assessment criteria accords with that of the Course Team.

The following three suggestions represent a challenge to course developers. Whilst being desirable approaches it is recognised that they may be difficult to implement successfully.

- Draft forms of an assignment could be submitted electronically for formative comment, prior to formal submission. Students to be awarded marks for submitting a draft.

- A low weighting could be given to the first or second assignment of the course, in recognition of their formative importance. This would be more attractive if a good mark were not "lost" by the low weighting. If some form of assignment substitution were employed, either the first, or second assignment could be counted for a low weighting.

- Peer review is useful as a way of developing judgement, and has been demonstrated in a distance context using networking. A collaborative, real time approach probably makes the exercise more enjoyable, and is therefore more likely to engage students. Marks could be awarded for peer review which expresses scope for improvement in a helpful way.

7. Project work has been shown to be a very effective way of assessing the resource based approach, and providing practice in researching skills, and on-line conferencing provides a supportive environment. However, this research underlines

the importance of initial real time meetings in the form of a face to face meeting, audio conference or on-line chat, together with the appointment of a group co-ordinator, for the effective management of on-line collaborative working.

8. Whilst traditional content-based exams are difficult to implement successfully for resource based courses, exams continue to be valued by both students and tutors for a variety of reasons, and it is important to be aware of this fact when planning an assessment strategy. In addition, the revision period is significant for many students as a time to consolidate their learning, and it is important to ensure that they have a reasonable period in which to do this.

9. Alternative forms for an examinable component might include a project, which if used as a device to reflect on previous aspects of the course, could be given a synoptic element. An open book exam which required students to link questions on course principles to examples from coursework, perhaps previous assignments, could also be effective.

The Contribution of this Research

This research has developed a framework of assessment design for resource based learning in networked environments, and its applicability has been tested against two resource based courses. Student perceptions on the assessment strategies in these two courses have demonstrated the contribution of assessment to the support of resource based learning, and the variables which influence the applicability of the

various criteria for assessment design.

This research demonstrates a successful interplay between evaluation and teaching practice. The involvement of the Course Chair in the design of the research was critical in the implementation of many of the suggestions arising from the findings. An innovation of importance for ODL courses is the illustration given here of the iterative refinement of assessment in order to fine tune course pedagogy. Whilst it is relatively easy to modify course pedagogy in a campus based environment, the situation is very different on a large scale ODL course, such as those run by the Open University, where the course materials, once written, remain in use for a number of years. The examples in this research illustrate a mechanism for fine tuning the focus and direction of student learning and tutorial support, through the assessment structure.

This research begins to unpack the complexities behind the resource based approach and has provided new information on the skills required by students on resource based courses in networked environments. It has led to a fuller understanding of the educational effectiveness of the approach for distance learners, and highlights the importance of providing support to undergraduate resource based learners in the process of learning.

The findings on student support for exams and the synoptic value of revision bear out some earlier work in traditional universities but they have not been documented previously for ODL courses. They challenge current assumptions on the detrimental effects of exams, in terms of encouraging a surface approach to learning.

As for methodology, the research has piloted the use of e-mail for a reflective follow-up, after interviews, and found this to be a productive way of generating full and informative responses.

Suggestions for Further Research

Inevitably an exploratory study of this nature which was designed to give some insight into a new area of research is likely to generate more questions than it answers, and this section suggests various directions for further work.

The findings described in this thesis refer primarily to students on one course, and therefore their validity and generalisability would be extended by observations on other resource based courses at different academic levels, in different disciplines and in different institutional contexts, so that the framework for resource based assessment could be tested further. A longitudinal study of students undertaking more than one resource based course might yield useful information on the development, and transferability, of cognitive and practical skills from one resource based course to the next.

Some findings from this research suggest that some courses may be better than others in preparing students for the flexibility and choice offered by this version of resource based learning. Further work might explore the influence of the nature of discourse on the skills required for the resource based approach.

Observations on the synoptic value of revision would be interesting to follow up, and very little work appears to have been undertaken in this area. Further research would be needed to establish whether these findings are applicable to other distance courses and whether the effect is related in some way to the amount of time allocated for revision, or perhaps to the level and type of course.

The findings have uncovered the extent to which undergraduate resource based learners rely on their tutors for interpretation and direction, and of course for informative feedback. This role is particularly critical in a more open-ended, flexible approach to study. It would be useful to establish the most appropriate ways of providing tutorial support for resource based learning, in terms of support for skills development, and approaches to open ended learning.

Summing up

This research project has interesting resonances with my personal experiences as a research student, learning in a resource based way and using distance technologies not only as a research tool, but as a channel of communication and a major source of information. Many of the findings constitute a recognisable reality in a personal context and have prompted my reflections on my own personal development as a researcher.

The requirements for PhD theses are rather dauntingly open-ended, in that so little is specified at the outset. I empathise with the student in the pilot study who said "I like learning...but have I learnt what I was supposed to learn?".

I found the resource based approach was certainly a rewarding way to study. With respect to observations made in this thesis on the ability to be selective and judicious in reading, my ability developed as the limits of this research became more defined, and as my understanding of the subject area deepened. Perhaps the understanding I have now achieved constitutes a "knowledge object"? As to the significance of model answers, I benefited greatly from seeing theses written by other students, in arriving at an awareness of the requirements of a research degree.

In terms of personal development as a researcher, I learnt much about the planning and execution of a research project from my two supervisors. Through discussion with them and communication with an academic community, I learnt about the value of peer review and the need to appreciate alternative perspectives, which has, I hope,

led to the development of a more focused and critical approach to writing for

publication, and in particular for this thesis.

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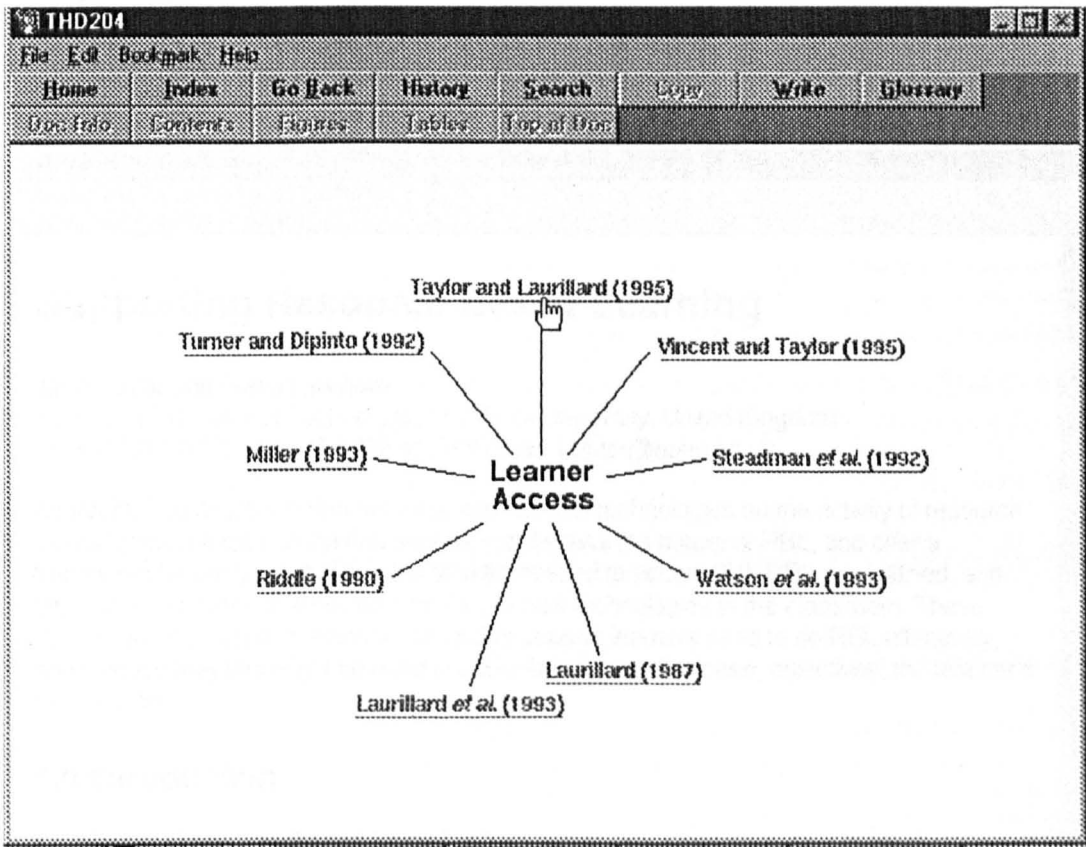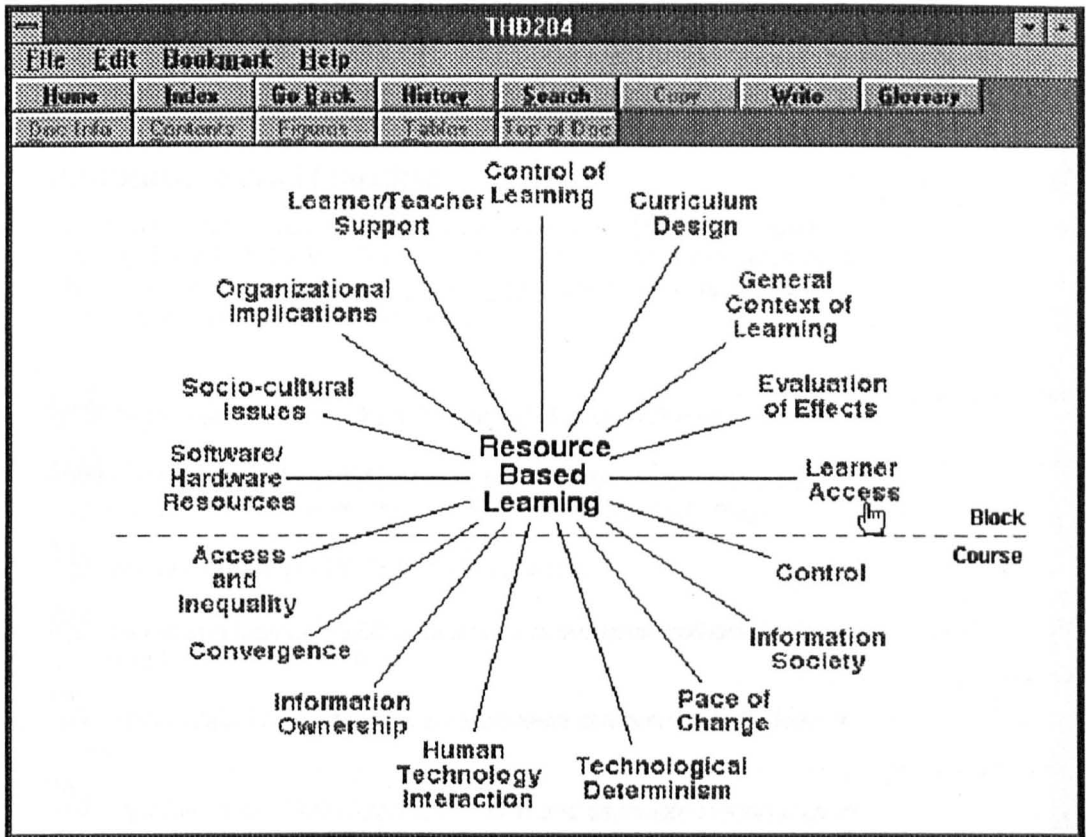
APPENDIX 1. CD-ROM RESOURCES FOR THD204

1. Access by menu

2. Access by concept map

3. Access by bibliography

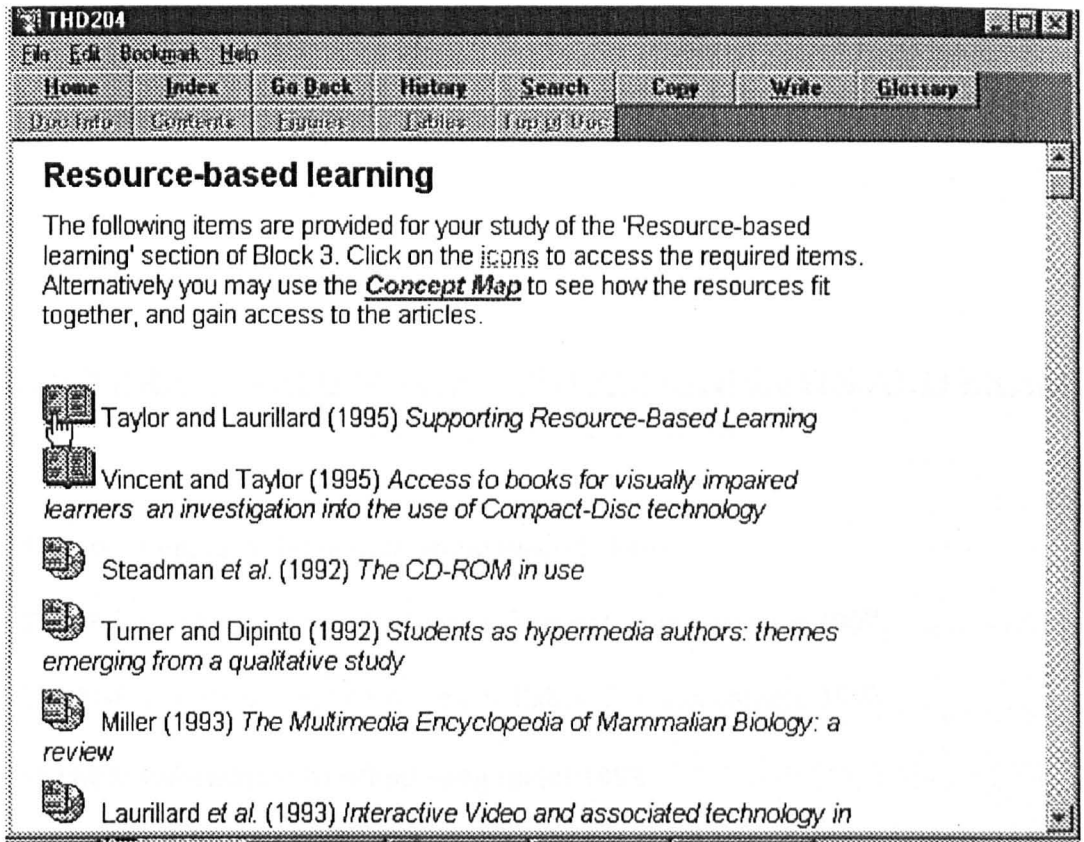4. Top of document

APPENDIX 1. CD-ROM RESOURCES FOR THD204

1. Access by menu

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THD204                                                          _ □ ✕
File  Edit  Bookmark  Help
  Home   │  Index  │  Go Back  │  History  │  Search  │  Copy  │  Write  │  Glossary
  Doc Info │ Contents │ Figures  │  Tables  │ Top of Doc
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Block Menu

Block 1   **Differing perspectives**

Block 2   **IT and change in the workplace**

Block 3   **IT and learning**

Block 4   **IT and the home**

Block 5   **IT futures**

Catalogues of material

Bibliography for Blocks 1 to 5

PICT Papers

Software Catalog

Utility software

Video clips

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THD204                                                          _ □ ✕
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BLOCK 3

IT AND LEARNING

The menu below provides access to articles that are suggested as resources for the different parts of Block 3.

Resource-based learning

Theories of learning and information technology

Computer supported collaborative learning

Educational applications of ISDN

Technology-based training in companies

IT and gender in education

2. Access by concept map

3. Access by bibliography

4. Top of document

APPENDIX 2. THD204 SELECTED ASSIGNMENTS AND EXAM PAPERS, 1997 AND 1998.

1. TMA06: Online collaborative group project, 1997

2. TMA04: Conferencing and on-line collaborative assignment 1997

3. TMA04: Conferencing and on-line collaborative assignment 1998

4. TMA02: Information handling assignment 1998

5. THD204 Examination 1997

6. THD204 Examination 1998

1. Online collaborative group project, 1997

Tutor-marked assignment TMA06

The cut-off date for this assignment is **17 September 1997**.

This assignment is double-weighted and hence counts for 30% of your continuous assessment mark.

It relates to Block 5 IT Futures and in particular a combination of ideas from the Part 2 Virtual Reality and Part 3 Flexible Working.

This is a group activity, to be undertaken in groups of 3-6 students.

What to do

Read the fictitious newspaper article 'Flexible working set to soar?' printed at the end of this TMA.

Imagine that your group has been commissioned to advise either an individual employee or a potential employer, by providing a critical assessment of the newspaper article and the issues it raises. (Your group should choose one of these 'clients'.)

With the other members of your group, discuss this article in a computer conference, with a view to advising your client on, for example the relevance of the technology to flexible working, the social issues raised for the flexible worker, or even the impact of flexible working on environmental issues.

As a group, select some course themes or design issues to use as the basis for your critique of the article. Choose one theme/design issue for each member of the group. No two members may have the same theme/design issue.

As a group, write a summary which explains why the group has chosen those themes/design issues. Specify which client you are working for.

Write your own *individual* critique of the article, based on the course theme or design issue you have negotiated with your group.

As a group, write a conclusion to the individual critiques prepared by the members of the group.

Don't forget. Your written work is a commission for a particular client. It must state clearly who the client is, and be appropriate for that client.

Submit your assignment. It must comprise three sections:

- The group-prepared summary giving the themes/design-issues chosen by the group for its members and reasons for their selection; the client should be specified. Every group member must submit an identical summary.

- A main body, which is your individual critique of the article. This part is to be a critical assessment of the newspaper article based on one of the course themes/design issues.

- The group-prepared conclusion giving your overall assessment of the newspaper cutting and your recommendations for your client. Every group member must submit an identical conclusion.

Your group discussion (in your own computer conference) should lead to a summary that provides some form of justification for your group's choice of course themes/design issues, and lead to a conclusion. Statements such as 'We think it's important' will not be considered adequate justification. Try to consider all the themes/design issues and then decide which might be the most pertinent to your client.

Note that your assessment will be based not only on your written report, but also on the group discussion and your contribution to it. For this reason, all group discussion must take place in your group conference, which your tutor will have access to. Alternatively, the group discussion may be reported in the conference by a member.

Allocation of marks

The marks for this group project will be allocated as follows:

Group element (total 30%)

Report summary	10%
Themes discussion in conference	10%
Report conclusion	10%

Individual element (total 70%)

General structure and coherence of argument	30%
Use of supporting evidence and course materials	20%
Contribution to group tasks and discussion in conference	20%

2. Conferencing and on-line collaborative assignment, 1997

Tutor-marked Assignment TMA04

The cut-off date for this assignment is **25 June 1997.**

The impact of developments in computer support for collaboration in education and training

From the information in the course and your experience with CMC (computer mediated conferencing), what impact do you see developments in computer-supported collaborative working having upon individuals' experience of education and training over the next decade?

In this assignment you are not expected to write an essay. Instead you will have the opportunity to partake in a 'computer supported collaborative learning' experience. Your goal is to discuss the various issues raised by CSCL within a group of 5-6 students and in your own private conference.......One of the aims of this assignment is to try and establish small-group working in preparation for the final group project (tma06).

What to submit
You should submit the following to your tutor, together with the PT3 form:

Part 1 (60% of the marks). Paper copies of at least three, and no more than five complete messages that you contributed to the discussion on this topic to your small-group conference. The total length of the messages should not exceed 7000 characters, as measured by the headers of the CoSy messages.

Part 2 (40% of the marks).
a) (10%) Your definition of computer supported collaborative working appropriate to education needs arising from the discussion that takes place.
b) (30%) A summary of the discussion which has taken place in your group conference, including those aspects of the subject you consider were well covered by the discussion - and giving your answers to any important aspects that you think are important which were not covered.

(THD204 Assignment Book 2, Open University,1997 p 4)

3. Conferencing and on-line collaborative assignment, 1998

Tutor-marked Assignment TMA04

The cut-off date for this assignment is **24th June 1998**

The impact of developments in computer support for collaboration in education and training

From the information in the course and your experience with CMC (computer mediated conferencing), what impact do you see developments in computer-supported collaborative working having upon individuals' experience of education and training over the next decade?

In this assignment you are not expected to write an essay. Instead you will have the opportunity to partake in a 'computer supported collaborative learning' experience. There are three elements to the assignment:

a) As a group you will use the various documents on computer supported learning and working to help devise a strategy for managing the group project (TMA06).

b) As an individual you will contribute to the discussion by:
contributing short extracts, or your interpretation of them, from the course materials that support the group's discussion;
commenting on the contributions of other members of your group in order to move the discussion forward;
remaining active over an extended period of time (2-3 weeks).

c) As an individual you will provide a summary of the group's discussion.

What to submit

You should submit the following to your tutor, together with the PT3 form:

Part 1 (50% of marks)
Paper copies of five of your contributed messages to the group conference. Each of your messages must be supported by at least one other message (maximum of two) that demonstrates how your contribution has moved the discussion forward.

Part 2 (50% of marks)
a) (35%) Provide a 400-500 word summary of the group's discussion of computer supported collaborative learning and working.

b) (15%) Provide a statement of the group's proposed strategy and your personal assessment of the strategy (200-300 words)

<div align="center">(THD204 Assignment Book 1, Open University, 1998 p 17)</div>

4. Information handling assignment, 1998

Tutor-marked assignment TMA02

Cut-off date: 13 May 1998

Part 1 Electronic Communication (*25% of marks*)

Write a brief explanation (maximum 500 words) of the term *layered architecture* as used in the implementation of local and wide area communication networks. In your explanation, you should describe how the various layers interact to achieve reliable data transfers between two systems on the network. Use sketches as appropriate.

Your explanation should make clear the primary benefits claimed for layered architectures and point to any potential weaknesses.

Part 2 CD-ROM Searching Techniques *(35% of marks)*

The CD-ROM resources can be accessed and searched using a variety of processes, such as indexed course and block themes, free-text search, document summaries and concept maps.

Using the course theme 'control' and the block theme 'managerial choice' write a report (500-700 words) comparing the use of three different search methods. The goal of the search is to prepare for part 3 of this assignment.

You must use the free-text search option, but you may choose the other two. All searches should be restricted to the Block 2 and the PICT articles.

The report should detail each of your searches, making clear what outcomes were achieved, and offer an assessment of the various methods for the given task. Be objective in your assessments.

Part 3 IT in the Workplace *(40% of marks)*

'Proposition: A preoccupation with control is dysfunctional in terms of operator skill, motivation and performance.' Buchanan, D.A. (1986) 'Management objectives in technical change' CD-ROM, block 2.

Write a precis (500-700 words) of a single CD-ROM article that best explains (for you) Buchanan's proposition, in the context of the objectives of British management in investment in IT in the manufacturing industries.

(THD204 Assignment Book 1, Open University, 1998 p 13)

5. THD204 Examination 1997

THD204/S
A LEVEL TWO COURSE EXAMINATION 1997
INFORMATION TECHNOLOGY AND SOCIETY.
[rubric ommitted]
Time allowed: 3 hours

Answer any THREE *of the following questions.*

Question 1

i)   What are the principal differences between bit-mapped and vector graphics.

ii)   Describe three course design issues that you consider have contributed to the growing use of the digital representation of all forms of information. Illustrate your answer with at least two examples of the use of *digital representations* of information.

iii)   Briefly describe one of the three micro approaches to the social shaping of technology discussed in the course. Use your description to explain the differences between the macro and micro approaches to the social shaping of technology.

Question 2

i)   Define the term *topology* as used in connection with computer and telecommunication networks. Illustrate your answer with a labelled sketch of a single type of local area network topology.

ii)   What is the role of a protocol in the transfer of data between communicating computer systems and what advantages might be gained from employing *standard* protocols (eg TCP/IP).

iii)   Based on your reading of the course materials, what evidence would you offer to support the argument that 'the deployment of LANs promotes a non-Taylorist management structure'?

Question 3

i)   Write a brief description of the *World Wide Web (WWW)*.
(Use sketches if this helps your explanation, but ensure they are clearly labelled.)

ii)   Describe two technological factors (i.e. course design issues) that you consider have contributed most to the phenomenal growth of the World Wide Web. Justify your choices by explaining how these factors have influenced growth of the WWW.

Question 4

i) Briefly explain why *data compression* is necessary, at least in the short term, for the delivery of multimedia services into the home.

ii) Describe how Asynchronous Digital Subscriber Lines (ADSL) could enhance home access to new interactive entertainment and information services.

iii) It has been claimed that IT systems and services are rapidly removing any privacy that we have. What evidence would you offer in support of such claims, given the current levels of privacy offered by the Data Protection Act 1984?

Question 5

i) What is rehabilitation technology?

ii) Highlight the factors you regard as crucial to the successful deployment of rehabilitation technology in the home. Justify your choices by references to appropriate evidence from the course materials. (Hint: think in terms of *design issues*.)

iii) A charitable institution is considering purchase of a mobile robot (similar to Walkie in TV 5) and you have been asked to help with a social evaluation. Prepare an outline case of three factors you regard as essential for this evaluation, justifying your selections.

Question 6

i) Briefly explain what you understand by the term *Open Systems*.

ii) Describe the features of the layered design of the Open System Interconnection (OSI) Reference Model architecture that allow OSI compliant LANs to be constructed using alternative standards (e.g. Token Ring and Ethernet).

iii) Many national governments have implemented policies that require all large IT purchases to conform to the OSI Reference Model. What benefits do these governments believe they can achieve by introducing such policies?

(Open University, 1997)

6. THD204 Examination 1998

THD204/U
Level 2 Course Examination 1998
INFORMATION TECHNOLOGY AND SOCIETY

Time allowed: 3 hours

[rubric ommitted]

Answer any THREE of the following questions.

Question 1

i) Briefly explain the process of digitising a short sound clip, including reference to the factors that limit the perceived (aural) quality of the digital representation.

ii) Describe how digital speech recognition and synthesis systems can be applied to the problems of human technology interaction. Illustrate your answer with at least one example of the use of a speech recognition or speech synthesis system.

iii) Based on your reading of the course materials, discuss the argument that the development of speech recognition and synthesis systems is a direct consequence of the *social shaping of technology*.

Question 2

i) Briefly explain the term *Integrated Services Digital Network* (ISDN).

ii) Describe the potential benefits of ISDN to a small company (>10 employees) that communicates with its customers via telephone, fax, e-mail and the World Wide Web.

iii) The company uses high-end personal computers and workstations to provide page-layout and pre-press facilities to marketing and advertising agencies; work that requires close collaboration between graphic designers, graphic artist, and editorial staff. Why might this company benefit from management style built on the ideas of "flexible specialisation" rather than one based on the ideas of "Taylorism"?

Question 3

i) Explain the essential differences between synchronous and asynchronous computer mediated communication systems.

ii) Discuss the design issues associated with an synchronous CMC service that is to be used to facilitate international collaboration between two schools.

iii) Many Universities are actively pursuing distance learning programmes built around the new communication technologies. Based on your reading of the course materials, and your personal experiences what advice would you offer the teachers developing such programmes?

Question 4

i)   Briefly explain the difference between *privacy* and *security*.

ii)   Describe three factors that you consider would improve the overall level of security of a database storing personal information. Your description should clearly explain the benefit of each factor. (Hint: think in terms of the security guidelines suggested within the Data Protection Act.)

iii)   It has been claimed that IT systems and services are rapidly removing any privacy that we have. Video surveillance systems watch our streets and electronic payment systems track our shopping habits. What evidence would you offer in support of such claims, given the current levels of privacy offered by the Data Protection Act 1984?

Question 5

i)   Briefly explain the major differences between flexible working and teleworking.

ii)   An employer is considering a teleworking trial. Assuming all employees involved in the trial will be provided with a PC and printer, what other two items (equipment or service) would you consider essential for the participants? Justify your recommendations.

iii)   The Banking, Insurance and Finance Union (BIFU) is on record as strongly opposed to the introduction of teleworking. Why should employee representatives be so concerned by such developments and how might employers allay their concerns?

Question 6

A small company (>10 people) has asked you for advice about the Internet as a means to improve technical support to their customers.

i)   Provide a brief explanation of what the Internet is and the range of applications it supports.

ii)   Which two of the Internet tools that you have encountered on THD204 would you recommend to this company and why?

iii)   Access to the Internet is claimed to be inequitable and yet the present and previous governments have included greater access in their manifestos. What particular factors do you consider contribute to these concerns of inequality and what policies would you advocate to Government to maximise levels of access?

(Open University, 1998)

APPENDIX 3. PILOT PROJECT BACKGROUND INFORMATION

1. Background information on respondents

2. Study patterns and computer use

3. Interview schedule

APPENDIX 3. PILOT PROJECT BACKGROUND INFORMATION

1. Background information on respondents

Gender

Male	Female
14	7

Network access

Trunk call	Local rates
8	13

Location of students

Study Centre	No. students
Glasgow	6
Dundee	7
Elgin	3
Inverness	1
Kirkwall	2
Oban	1
Thurso	1

Location of computer

Home	Work	Both
16	2	3

Foundation course

Technology	13
Maths	4
Science	1
Arts	2
Social Sciences	1

Age (14 respondents)

20-30	3
30-40	5
40-50	6

Occupation (20 respondents)

Seeking employment	1
Professional	6
Technical	12
Homemaker	1

2. Study patterns and computer use

The information here was gathered indirectly from questions during the interviews and partly from observations during the face to face interviews. This information has only been recorded for 17 respondents, since not all the students were forthcoming on these details during the interview.

1. Male, married, with three small children. He had his own study at home and studied in evenings, and also at work, where he needed to take paper copy. His wife was studying and using the computer as well.

2. A water engineer, male, with a young family. He decided to restrict study at the computer (including computer conferencing and CD-ROM) to his machine at work. So he would skim, print out, then read at leisure at home. His time for study at home was late evening, after the

children were in bed.

3. A social science graduate, female, doing the course because of changing demands at work (in a library): she needed to learn study skills, particularly to assess the relevance of documents. She was working full time, and studying at home. The computer was bought for the course.

4. Married, male, one small child, studying in the evenings only. The computer was set up in the hall, as being the only available space, so could he could only study after nine o'clock in the evening. The computer was bought from a warehouse, and had to be returned three times because of hardware failure: he missed participation in conferencing and much of the material on CD-ROM for a total of two months.

5. Male, married, one small child. He worked in a study at home. He had the computer before the course, but had upgraded it for THD204. He worked shifts at a nearby RAF base, and was able to study then as well, however there was no computer available at work, and this influenced when and whether he needed hard copy for study. The phone bill after using the Internet at trunk call rate was perceived as "horrendous", but he remained enthusiastic, and continued to use it.

6. An Arts graduate, male, he was doing extra points for a teaching qualification. He bought his computer for the course, and it was set up in the bedroom. His wife was also studying, and using the computer.

7. Female, living on Orkney, working part-time and looking after a young family. She studied at home during the day, when she was not at work and the children were at school, but she had to share her study room with the television, so study at other times was difficult: and the CD-ROM was not portable to other parts of the house.

8. Male, working offshore on an oil rig. He studied partly in his cabin on the rig, and partly at home. He had access to a computer in both places, but when he was offshore, he needed to print off material in order to study in his cabin. He found the CD-ROM was very useful because it fitted well into his weight limit on the helicopter transfer to the rig

9. Female, married, full time job with commercial training unit. She worked in the dining room at home, in evenings and weekends. She bought a computer for the course, and her husband was studying, and using the computer as well. She did not feel "at home" with screen based reading, and felt, apologetically, that this was a function of age.

10. A part time crofter, female, married, with three young children, living on a small island in Orkney. She bought a computer by mail order. Hardware failure meant that she lost contact with conferencing & CD-ROM use for three weeks, at the start of block five, and had to rely on paper copy. She studied mostly at home, but also in odd time slots, for example on the boat (two hours) to the shops.

11. Teacher, male, no children, working evenings and in holidays. He had his own study at home.

12. Policeman, male, working shifts. He studied as much at work as at home. The computer was at home, so he printed out material for studying at work.

13. Male, single, working in local government, studied exclusively at home. He was in his last year of study before getting his degree. He did not want to be deflected from his goal, and was not interested in doing more than was strictly relevant to assignments and the exam.

14. Computer programmer, female, with four dependent children. She studied in lunchtimes at work, and at odd periods during the day, for example when waiting for a train, or alternatively late in the evening. She preferred studying at home when lying on her bed, or in

the bath, where obviously paper copy was needed. Her computer based study had to be undertaken at work. She felt very short of time: she had no time for reflection, no time for frills, she just wanted the degree.

15. Male, engineer. All his study was undertaken at home, and he had a separate study at the house. He had hardware problems with the sound card and CD-ROM, and the computer was out of action for several weeks, but fortunately this was at the start of the course.

16. Female, working full-time, isolated geographically: she carried out conferencing, Internet and CD-ROM study at work, and did the rest of her study at home.

17. Unemployed, married male in isolated area. He was horrified at the overheads involved in the course, and virtually stopped all conferencing and Internet use after the first telephone bill. His wife was studying with the OU as well, so both were using the leased computer from the OU. Hardware breakdowns meant he was without a computer for three weeks.

3. Interview schedule

<u>1. Information to be collected before/after interview</u>

1.1 Date

1.2 Respondent Number   1.3 M/F

1.4 Age (est)   20-30
                30-40
                40-50
                50-60

1.5 Location of equipment: home/work   1.6 Own space/shared

1.7 Equipment: bought/leased/borrowed

1.10 Distance from nearest town(> ?population)
<u>Comments/observations</u>

<u>2 Introduction</u>

2.1 Foundation courses:

2.2 Have you needed any technical support, other than that provided by OU?

2.3 Daytime occupation? (Find out indirectly.)

2.4 Did you answer the online questionnaire supplied on CD-ROM03?

<u>Comments/observations</u>

<u>3 Using the CD-ROM</u>

3.1 Any previous use of CD-ROM?

3.2 Any technical problems in setting up, or installing software?

3.3 Did you use the introductory tutorial on rbl? Any problems/opinions on it?

<u>4 Studying using the CD-ROM</u>

Have a look at block 5. You were asked to study using the long routes for parts 1
and 5.

4.1 I want to know how you set about studying part 1. Which activities did you do?
 1 2 3 4 5 6 7

4.2 How did you set about searching the articles on the CD-ROM?

4.3 Did you make notes on paper? Print out parts? Cut and paste/annotate? Use bookmarks?

Comments/observations

Now look at block 5, part 5:

4.5 How did you set about choosing the readings on the CD-ROM?

4.6 Did you read whole, or part articles?

4.7 Did you answer any of the questions in section 6?

And now part 3:

4.8 How did you study this section?

4.9 Which activities did you do?

4.10 How did you search for the articles on the CD-ROM?

4.11 Which bit of the course do you think taught you most about studying using rbl techniques?

4.12 Why did you choose that one? What does it teach you?

Comments/observations

----

5 Sample search

(Remote students should at this point talk to a tape as they try out the search)
5.1 Using CD-ROM disc 2, show me how you would go about answering this question:
How is IT being used to promote flexibility and open access to learning and training resources?
Observation of searching techniques used:

Block bibliography
Index (block themes)

297

Concept map
Full text search
Boolean logic
Memory/serendipity
Doc Info
Cut & paste

Any analysis?
     evaluation?

5.2 Have you searched using block themes, or course themes?

5.3 When would you use a full text search?

5.4 Have you used a concept map when studying? What for?

5.5 How did you search the resource for tma06?

Comments/Observations

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6 Course conferences

6.1 Previous use of bulletin boards, e-mail, conferencing?

6.2 Any use made of Cosy for acquiring information to supplement course
materials?

6.3 What sort of information?

6.4 Have you put any messages into conferences other than local tutor group?

7 Internet

7.1 Previous use of Internet ?

7.2 What did you think of the introductory section on the Internet?

7.3 Internet use is required in two exercises in block 4, p67 and p68
Did you do either of these exercises? How did they go?

7.4 Did you use the THD home page at all? When and why?

7.5 Having completed the course, do you now feel confident about using the Internet
to get information? Will you be using it again?

Comments/Observations

----

8 TV Programmes

8.1 Did you watch them?   1 2 3 4 5

8.2 Did you video them?

8.3 Any programmes rerun for use when preparing tmas or project?

9 Conclusion

9.1 Do you prefer learning from a range of resources, as supplied on this course, or would you prefer a course where all the material was supplied in one text by the course team? Why do you feel like that?

Is it: more work so less welcome?
     a real opportunity to be master of your own learning?
Do you prefer more independent working?
Do you feel you have been abandoned?

9.2 Do you see any advantage for a remote student in this method of learning? In what way?

Comments/Observations

APPENDIX 4. 1997 THD ELECTRONIC COURSE SURVEY FIGURES

Figure 1. "How would you characterise your attitude to resource based learning?"

Figure 2. "Do you think that resource based learning increases your study time?"

Figure 3. "CD-ROM screen layouts are simple and easy to use."

Figure 4. "The menu design makes it easy to locate items of interest quickly."

Figure 5. "Cutting and pasting extracts from several documents is simple to do."

Figure 6. "What proportion of CD-ROM articles have you printed, in order to complete your studies?"

Figure 7. "Reading articles from the screen is uncomfortable."

Figure 8. "Reading any study material from the screen imposes severe limitations in terms of the time and place I can study."

Figure 9. "Copying extracts helps to group ideas together."

Figure 10. Faculty

Figure 11. "Do you feel the course has helped you to: formulate an argument, select competing evidence, cite evidence in support of your argument."

Figure 12. "What elements of the course have given you most difficulty?"

Figure 13. "It is difficult to determine which CD-ROM articles should be reviewed."

Figure 14. "I would prefer the option of fewer articles which are 'required' reading, than making my own selection from lots of articles."

Figure 15. "How useful have you found your tutor's comments and feedback on your TMAs?"

Figure 16. "Have you enjoyed the opportunity of working collaboratively with other students?"

Figure 17. "Do the Specimen Exam Paper and notes provide enough information and examples to help with your revision?"

Figure 1:

How would you characterise your attitude to Resource-based Learning?

Figure 2:

Do you think that Resource-based Learning increases your study time?

Figure 3:

CD-ROM screen layouts are simple and easy to use?

Figure 4:

The menu design makes it easy to locate items of interest quickly?

Figure 5:

Cutting and pasting extracts from several documents is simple to do?

Figure 6:

What proportion of CD-ROM articles have you printed in order to complete your studies?

Figure 7:

Reading articles from the screen is uncomfortable?

no. of respondents

| Agree | 2 | 3 | 4 | Disagree |

Figure 8:

Reading any study material from the screen imposes severe limitations in terms of the time and place I can study?

no. of respondents

| Agree | 2 | 3 | 4 | Disagree |

Figure 9:

Copying extracts helps to group ideas together?

Figure 10:

Faculty

Figure 11:

Do you feel the course has helped you to:

Figure 12:

What elements of the Course have given you most difficulty?

Figure 13:

It is difficult to determine which CD-ROM articles should be reviewed?

Figure 14:

I would prefer the option of fewer articles which are 'required' reading, than making my own selection from lots of articles?

Figure 15:

How useful have you found your tutor's comments and feedback on your TMAs?

Figure 16:

Have you enjoyed the opportunity of working collaboratively with other students?

Figure 17:

Do the Specimen Exam Paper and Notes provide enough information and examples to help with your revision?

APPENDIX 5. METHODS OF DATA COLLECTION 1997/1998

1. ASSESSMENT CONFERENCE 1997
Attitudes to assessment
Conference discussion points
Model answers, marking schemes and peer review
Conference discussion points
Assessment conference evaluation
Interview schedule

2. TUTOR CONFERENCE 1997

3. PERSPECTIVES ON THE PROJECT 1997
Interview schedule
E-mail follow-up

4. PERSPECTIVES ON THE EXAM 1997
Interviews
Interview schedule
E-mail follow-up
Post exam conference
Conference discussion points
Tutor perspectives on exam marking
Interview schedule

5. ASSESSMENT CONFERENCE 1998
Conference discussion points

6. TUTOR CONFERENCE 1998

**7. PERSPECTIVES ON INFORMATION HANDLING
ASSIGNMENT TMA02 1998**
Interview schedule

**8. PERSPECTIVES ON THE EFFECTS OF THE
COLLABORATIVE EXERCISE IN TMA04 ON GROUP
COLLABORATION IN THE PROJECT TMA06, 1998**
Tutor feedback
Conference discussion points
Student feedback
Questionnaire
E-mail follow-up
Project collaborative conference
Conference discussion point

9. PERSPECTIVES ON REVISION CONFERENCE 1998
   Interview schedule: conference participants
   Interview schedule: Course Chair

10. PERSPECTIVES ON THE EXAM 1998
    Interview schedule: students
    Interview schedule: tutors

11. STUDENT PROFILES
    Interview schedule

APPENDIX 5. METHODS OF DATA COLLECTION 1997/1998

1. ASSESSMENT CONFERENCE 1997

The conference was run in parallel with the continuous assessment, and a total of 38 students in 1997 were joined. This was a self-selected sample, and it seems likely that the students were representative of those most active in computer conferencing, and probably most likely to offer an opinion on the course.

Attitudes to Assessment

Conference Discussion points

thd-assmnt/general #1 from nwh2 730 chars, Thu Apr 17 16:50:15 1997

TITLE: Calendar of events

Now CoCo has created the conference I can put up some information about events and activities for this conference. This sequence of messages provide the starting points for each of assignments 1-5.

What we would like is to get some feedback from you about the course assessment. It would be interesting to learn what you regard as the more important elements of the course and therefore what topics should feature in the assessment.

We'll try to keep the discussion topical by concentrating on activities just after the cut-off dates. I'm sure the assignments will be freshest at that point.

I will be putting up the marking guides for some questions, so if you have obtained permission for a late submission, please act responsibly.

If after reading these messages you have some thoughts about what we might do, then post them here.

Nick

thd-assmnt/general #8 from nwh2, 376 chars, Sat Apr 19 16:55:34 1997

TITLE: TMA01

Starting now:

What were your general reactions to TMA01? Did the TMA test appropriate parts of the

course? How could we change the assignment to improve it from your point of view?

Nick

----

thd-assmnt/general #31, from jrm24, 388 chars, Wed Apr 30 12:20:17 1997

TITLE: Essays and social science

Several of you have mentioned struggling with reading the social science in this course, and

secondly the art of constructing essays. Both of these elements are an integral part of this

course, so there's no point in discussing whether they should be there or not. But did you find

the advice on writing essays any help? What would be helpful?

Janet

----

thd-assmnt/general #40, from coco, 2814 chars, Fri May 9 15:30:12 1997

TITLE: Getting ready to write

Here is one way to prepare for tma 02. I would be interested to hear if you have other ways,

or better ways. And is this kind of thing helpful to you?

Coco

This is the process I went through, in order to prepare for the tma.

[lengthy detail excluded here]

----

thd-assmnt/general #53, from jrm24, 1097 chars, Thu May 15 10:22:55 1997

TITLE: Summarising

OK, here is a summary of what we've discussed so far.

1. Several of you mentioned that the feedback you got for tma 01 set the scene for you, and now you have some idea of what to expect for subsequent tmas.

2. Several had problems in writing essays, and found that the process was unfamiliar and time consuming.

3. Some mentioned difficulties in reading social science articles, and Nick pointed out that many of the SS articles were selected from non teaching sources, where the written style was less approachable than traditional course texts.

4. Some people experienced difficulty in striking a balance between their use of previous experience or of material outside course texts, and the information provided for them in course texts.

5. It was felt that some parts of block 1 (technical) had not been fully tested by the assignment, and that there could be a role for CMAs.

6. Many of you want more feedback on what was expected: whether in the shape of model answers, a list of main points, or a marking breakdown.

Does this reflect your views? Have I missed anything vital?

Janet

----

thd-assmnt/general #121, from jrm24, 997 chars, Fri Jun 13 12:28:00 1997

TITLE: Summary

Its high time for one of these. Lots of interesting points here.

1. Many of you thought that the tmas so far have presented you with too much confusing detail in the question and notes. Combined with the requirement to work to a tight word limit, this left some people concerned that they could be missing out vital detail because they hadn't understood the question.

2. Related to this is the fact that there appears to be considerable variation between tutor

groups in the amount of assistance in "interpretation" of the tma before the cut-off date.

3. The question of tutor discretion in marking was discussed, related to the varying

backgrounds of tutors. There was also some criticism of marking turnaround times. Should

students be involved in more tutor assessment at the end of each course? (Incidentally, this

course has an annual assessment in which you will be invited to participate.)

I hope this represents your views: if it doesn't please say so!

Janet

---

thd-assmnt/general #139, from jrm24, 478 chars, Mon Jun 23 12:54:07 1997

COMMENT: Peter, I was interested in your remark "far too much material that repeats

itself..particularly on TMT" This is the first block in which you've had exposure to rbl, with

its opportunities for choice in what you read, and encouragement to scan through articles on

CD-ROM, and just read relevant parts. Do you feel you have been left without sufficient

guidance to start on this? Is there some way tutors could help with this? Ideas please

everybody!

Janet

---

thd-assmnt/general #145 from jrm24, 470 chars, Wed Jun 25 09:33:07 1997

COMMENT: Well that's very interesting, Brigid and Andy. I would like to know from as

many students as possible:

1. What sources did you use to do the tma? (ie Reader, CD-ROM, Internet)

2. Did the tma help you to develop any of the following skills:

search, selecting, organising information, reading and making sense of academic articles;

3. Did working with other students in your small conferences help with any of the above?

Janet

Model answers, marking schemes and peer review

After assignment cut-off dates[1], conference participants were given the opportunity to see the marking schemes used by tutors. They were also presented with model answers, which are sometimes given to tutors with marking schemes as a way of defining the content required for shorter parts of the assignment. Finally, they were presented with a model essay and asked to "mark" it using the tutor's marking scheme.

Participants in the peer review trial were required to strip the identification from their scripts and send it as an attached file to the researcher, who redirected scripts to other students. The marks and comments on the scripts were returned to the researcher, who redirected them back to the originating student. Participants were then asked to mark their own script and then to use the assessment conference to discuss their experiences. Eight students participated in the trial.

Conference discussion points

thd-assmnt/peerassmt #1, from coco, 2883 chars, Mon May 19 09:39:53 1997

TITLE: TMA02 part 1

Here is the answer which was sent out with the marking notes to tutors.

The reliable transfer of data files between LAN modes requires the use of 'protocols', that is a set of rules governing the entire sequence of information transfer across a telecommunications system (THD204 glossary). Development of these protocols may be enhanced by the use of layered architectures (eg OSI). Protocols may be defined by proprietary standards (eg IPX) or international standards (eg TCP/IP and ISO OSI). International standards ensure that users may purchase LAN equipment from several vendors and be assured of inter-operability.

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[1]The cutoff date is the date by which the assignment has to be submitted to the tutor.

[lengthy detail excluded here]

The proposed division of the 30 marks was

  Use of protocols 5%

  Role of standards 5%

  Numbered sequence of packets   10%

  Calculation of frame check sequence of cyclic redundancy code   10%

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thd-assmnt/peerassmt #2 from jrm24, 258 chars, Mon May 19 13:07:50 1997

This is a comment to message 1

COMMENT: I wonder what you think of this..How did the model answer correspond to your

interpretation of the question? Would you find model answers helpful feedback after tmas?

Do you think your tutors should be marking to model answers..or not?

----

thd-assmnt/peerassmt #17, from coco, 865 chars, Fri May 23 10:55:01 1997

TITLE: Try your hand at this..

Well here is the marking guide for the second part of the tma. Its quite brief, and it

concentrates on the 'process', or development of argument in the essay, rather than the

'content' or facts which individuals might use.

The next 3 messages contain an essay written by a student in answer to this tma. For brevity,

the list of refs and extracts have been omitted. I suggest you try to review the essay's

strengths and weaknesses, based on these criteria.

Here is the marking guide:

Explanation of 'political' role of IT in the workplace.   10%

Characterisation of the 'positions' (or theories) marking

the development of IT's political role   15%

Implications of these positions   15%

Choice of extract and its use in the essay   10%

----

thd-assmnt/peerassmt #51, from jrm24, 1433 chars, Mon Jun 2 14:17:22 1997

TITLE: Summary

Looking back over the messages in this conference so far, I've come up with the following:

1. Most of you thought model answers were a good idea as feedback for students, particularly

with reference to the factual parts of the course.

2. Opinion was divided as to whether they were such a good idea for tutors, in case this

provided too rigid a framework.

3. As for its correspondence to your interpretation of the question, one or two pointed out

aspects which might have been relevant but which had been missed out of the model answer.

Perhaps they were a waste of word allowance?

4. Related to this, some were concerned at tutor discretion in marking. How much variation

was there likely to be between one tutor and the next? Perhaps it was important to get to

know the foibles of individual tutors? No-one had suggestions for a better system!

5. Presentation of essays was discussed and opinion was divided as to how important this

was. A tutor mentioned the importance of clarity in essay construction as it is a form of

communication.

6. Only one student had comments on the strengths and weaknesses of part 2 and I don't

know whether it's because:

- there weren't any obvious strengths and weaknesses

- the whole exercise looked as if it would take too long

- most of you are not interested in the social science part.

Does this represent your views?

Janet

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thd-assmnt/peerassmt #60, from coco, 880 chars, Mon Jun 9 17:15:44 1997

TITLE: Peer review trial

Here is your chance to put yourself in the role of a tutor. To join in, you need to do the

following:

1. Remove your name and id from the page headers of your answer to tma03.

2. Save your work as a plain text file (name.txt)

3. Send this to Janet (jrm24) as an attached file. Please send this file from within Cosy. Do

not use other networks!

4. Janet will then send you another student's tma.

5. Using the marking notes, mark the script and write a couple of comments to your fellow

student.

6. Send the information in 5 by e-mail to Janet. Do not return the original tma script! Your

comments (anonymous) will be redirected to the original student.

7. Try and mark your own script. Put a message in this conference to let us know

- whether you found this a helpful exercise, and why

- any drawbacks.

Good luck!

Coco

Assessment Conference Evaluation 1997

During the run-up to the final assignment in 1997, all assessment conference

participants were contacted as a follow-up, and a total of 15 students volunteered to

be interviewed.

Interview schedule
1. Which type of assessment helped you most in studying the course?
(Assessment types: essays; reports; cmc and summarising discussion; project; exam.)

2. What did you find most helpful about the assessment conference and why?
(Trials included: model answers; advice on essay construction; marking schemes; peer review)

3. Would you recommend we introduce any of these feedback exercises (marking notes; model answers; peer review) to the whole student population next year?

2. TUTOR CONFERENCE 1997

The tutor conference runs annually for the duration of the course and acts as an

electronic "common room" for tutors and a channel for reflection or communication

with the Course Team. All tutors (50) are automatically joined to the conference.

Since the researcher was also a tutor on the course, she participated in this

conference, which included comment of relevance to the assessment of resource

based learning. Any comments used in the thesis were included with the agreement

of the author.

3. PERSPECTIVES ON THE PROJECT 1997

Attitudes to the project assignment were evaluated immediately after the submission date, using telephone interviews of 15 students selected at random from tutors' lists of students willing to be interviewed. Eight students from two project groups were interviewed in two audio conferences and a further seven respondents were interviewed individually. All interviewees, together with students who had been interviewed after the assessment conference, were e-mailed with further questions, with the aim of following up the discussion and prompting further reflective comment; this follow-up received 20 responses.

Interview schedule

1. Did you like having a choice of topic, to study in depth?

2. Was it a good way of integrating what you had learnt on the course?

3. Which sources did you use?

4. How much of block five did you actually study?

5. In what ways have you collaborated?

6. What are the advantages of collaborative work?

7. Disadvantages of collaborative work?

8. Would you prefer to have been assessed in some other way?

9. Looking back, what improvements would you make to the assignments on this course?

E-mail follow-up to interviews

1. Do you now have an understanding of what course and design issues are all about? If so, when did the light dawn?

2. Do you now feel confident in researching and pulling out relevant points from a wide range of sources?

4. PERSPECTIVES ON THE EXAM 1977

Attitudes to the exam were evaluated using four sources of data: two on-line conferences and a telephone interview survey with students, supplemented by interviews with tutors. The first of the on-line conferences was a self-help revision conference set up by one of the students, the aim of which was to discuss answers, or outline answers to exam questions. The conference also contained extensive comment on revision methods, together with messages describing the concerns facing students as they prepared for the exam, so it was in itself an interesting source of data. The conference had 400 members, which represented about half the total student population for the course. Students who contributed interesting comments to the conference were e-mailed, asking for contact details for an interview.

Interviews

Telephone interviews were carried out in the week immediately after the exam. The sample of 25 students was made up of the 12 students who had contributed messages to the revision conference, together with a random selection of 13 students who had participated in the THD Electronic Course Survey earlier in the year and had volunteered to provide further feedback. It seems likely that these students may have been more articulate in their views than students who had not participated in the revision conference or submitted a response to the electronic survey. After the interviews, all the respondents were e-mailed with a follow-up question which had emerged as a result of the interviews, and 19 students replied.

Interview schedule
1. How did you approach your revision? Did you have a particular technique?

2. Did you choose particular parts to revise? How did you choose what to revise?

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3. What sources did you decide to use for revision?

4. What effect did the resource based learning have on your revision methods?

5. Do you now feel that you have a grasp of course themes and issues? If so, when did the light dawn?

6. What were your impressions of the exam? Did it correspond to your expectations?

7. Did it test your understanding of the course? What would be more successful?

8. Which questions did you answer? What influenced your choice of each question? Did you find any of your tmas useful in preparing answers?

9. Did you have an appropriate store of evidence to use?

10. Should this course have an exam at all?

E-mail follow-up to interviews

What do you think you have learnt on this course, in terms of skills and abilities? How could this best have been tested?

Post exam conference 1997

A post-exam conference was set up by the researcher, with the aim of obtaining feedback and reactions immediately after the exam. A total of 200 students joined this conference, and contributed some 200 messages. The conference was the scene for a lively and sometimes acrimonious debate. Having discarded the messages which contained nothing more than irrelevant or emotive expressions, this left a total of 80 substantive comments made by 53 contributors.

thd-postexam/postexam #2, from jrm24, 213 chars, Fri Oct 17 15:05:21 1997

TITLE: Impressions

What were your impressions of the exam? Did it correspond to your expectations? Do you

think it tested your understanding, or any of the skills you have learnt on the course?

Janet

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thd-postexam/postexam #105, from jrm24, 401 chars, Sat Oct 25 16:45:26 1997

TITLE: If you were them..

Think what have you learnt on this course: how could it best have been tested? Apart from the

content, your LANS and WANS and the Edge ref you weren't able to use, there was also a lot

of emphasis on the art of independent study; on using a wide variety of sources, and on using

evidence to support an argument. How do you best demonstrate your competence at this?

Tutor perspectives on exam marking 1997

In addition to obtaining feedback from students, the researcher was a marker for the
1997 exam, which provided an insight into the realities of script marking and the
quality of exam scripts produced by a range of students. A further three script
markers were contacted for their views on marking and the quality of student scripts,
at the end of the marking period.

1. Were you able to follow the marking scheme? Did it lay emphasis in the right places?

2. Should a marking scheme follow the same format as those for tmas?

3. What were common misconceptions and failures? What advice are you saving for next year's students?

4. Were the scripts typical of previous years?

5. Have we made it difficult for students to do well in this exam? Did it bring out a fair picture of their understanding?

5. ASSESSMENT CONFERENCE 1998

An assessment conference was set up for students along the lines of that organised in 1997, and 34 volunteers were joined. The conference had the same goals as in 1997, and the students were provided with marking schemes after assignment submission and the opportunity to participate in peer review, as before. A total of six students participated in the peer review trial. The data collected in 1997 informed many of the discussion points raised with students in the conference in 1998.

Conference discussion points

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thd-assmt/general #2 from jrm24, 338 chars, Mon Apr 20 13:59:02 1998

What were your general reactions to tma01? Did the tma test appropriate parts of the course?

How could we change the assignment to improve it from your point of view? Was the

feedback you obtained from your tutor appropriate? Will it affect the way you tackle tma02?

Do the comments your tutor made reflect the overall grade you obtained?

I look forward to hearing from you!

Janet

----

thd-assmt/general #35, from jrm24, 480 chars, Tue Apr 28 11:23:26 1998

TITLE: Summarising

Looking back at the messages over the last week, it appears that you are faced with an initial

bafflement in how to answer tmas. Is this something you face for every new course you come

to? Is it worse on this course, and if so, why?

Feedback is obviously important for the above reason, and must vary from one tutor to the

next (because we tutors are human like the rest of you). How can we make it a more level

playing field for you?

Janet

---

thd-assmt/general #75 from jrm24, 276 chars, Mon May 11 19:21:00 1998

TITLE: TMA02 and studying with the CD-ROM

I would be interested in your ideas on studying with the CD-ROM, post tma02. What are

going to be your favoured methods of searching from now on? Have you learnt any new

strategies for skim reading articles in electronic form?

Janet

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thd-assmt/general #84, from jrm24, 378 chars, Thu May 14 10:30:49 1998

COMMENT: Lois, I was interested in your question: "how much of this is needed for the

exam?" Which leads me to ask you "Does the presence of an exam influence the way in

which you study the course?" And leading on from this: "should OU courses have an exam at

all, or should they rely solely on tmas for assessment??"

Janet

---

thd-assmt/general #118, from jrm24, 165 chars, Tue Jun 9 09:48:21 1998

TITLE: Course Home Page

Who has used the course Home Page? Is it useful as a way of directing you to relevant

sources? How could it be made more useful?

Janet

---

thd-assmt/general #131, from jrm24, 175 chars, Fri Jun 19 12:04:11 1998

TITLE: Online collaboration

I wonder what you have learnt about online collaboration. Have there been useful lessons

which you can put into practice for the project?

Janet

---

thd-assmt/general #161, from jrm24, 270 chars, Wed Jul 1 10:03:52 1998

TITLE: Marking schemes

Nicky thought that marking schemes (or a list of assessment criteria) like this one ought to be

available to students before you write your assignments. Maybe she's right. Should they be

included in the tma booklet? What do you think?

Janet

---

thd-assmt/general #210, from jrm24, 2036 chars, Sat Jul 25 19:59:51 1998

TITLE: Your comments on this conference

What I put here is by no means a conclusion, more a sort of mini working document, to be

amended as appropriate. The fact is that those of your comments which point in the same

direction as those from last year's assessment conference, or the interviewees, carry more

weight. And the same applies in reverse! So I will be feeding your observations to other

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groups, to see whether they agree with you or not...

1. Tma interpretation. The main theme of discussion has centred around the correct interpretation of tma questions. Many of you have mentioned difficulties in matching the question itself with the notes and marking criteria. Some also referred to over-rigid word length, or prescriptive assessment criteria coupled with open ended questions, and the variation in marking characteristics between faculties, and perhaps the effects on a multi-disciplinary course.

The course team are writing assessment criteria into tmas next year (a kind of abbreviated marking scheme) so hopefully this will help students in their interpretation of requirements.

2. Online collaboration and use of conferencing. There was concern that conferences were under-used, and that there was variation in the degree of tutor participation.

Well, how do you get students participating more, and earlier? Its a continuous process of adjustment in the assessments, and this year for the first time, students were required to participate in groups for tma04 as a practice run for tma06. It remains to be seen how successful this strategy has been. Next year, students will be required to submit messages to their tutor group conferences as part of tma01. As for tutors, well they get paid for 8 hours online tutorial work, and I have to say it is easy to use up this time.

3. Topics covered briefly were:
-course website. Not much response. Maybe new website addresses cited in conferences could be posted for future students.
- studying with CD-ROM. Some found tma02 a useful introduction to information handling techniques.
- exams and the way you study. Some people thought it made a significant difference throughout the course.

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That's it. Comments welcome.

Janet

6. TUTOR CONFERENCE 1998

As in 1997 the researcher participated in the tutor conference for the course, to which

50 tutors were joined, and was able to keep a watching brief on any discussion

related to assessment. As in 1997, any quotes were made with the authors' consent.

7. PERSPECTIVES ON INFORMATION HANDLING ASSIGNMENT (TMA02) 1998

An evaluation of student perspectives on TMA02 was carried out in 1998,

immediately after the assignment cut-off date, and before the students had started on

the resource based part of the course. Feedback was obtained using telephone

interviewing of 20 students and the same questions sent by e-mail to a further five

students. The respondents were volunteers from a random sample of 80 students

taken from an introductory computer conference to the course, to which all students

are joined. In order to provide some insight into the kinds of skills with which

students were already equipped, they were also asked to give some background on

their educational careers to date, and their motivation for studying.

> *Interview schedule*
>
> 1. Which search methods did you describe in your tma?
>
> 2. Which is going to be your preferred method of searching from now on?
>
> 3. What did you learn from this tma? Was it helpful in learning to find your way about the CD-ROM? Learning how to skim read/make a precis?
>
> 4. Had you done any CD-ROM/Internet searching before the course?

5. How familiar are you with researching topics for study, as opposed to courses where everything is given to you in course books?

6. What was your motivation for doing the course/for studying?

8. PERSPECTIVES ON THE EFFECTS OF THE COLLABORATIVE EXERCISE IN TMA04, ON THE GROUP COLLABORATION IN THE PROJECT TMA06.

In response to observations made in 1997 on on-line collaboration during the project (TMA06), the Course Team modified TMA04 in 1998, in order to coerce students to reflect on the practicalities of collaboration at an earlier stage in the course. This refinement was evaluated using feedback from both tutors and students.

Tutor feedback

It was anticipated that feedback from tutors, drawing on experiences with group collaboration over a number of years, would shed some light on any improvement in collaboration, or lack of it. A discussion thread was set up in the tutor conference, and then e-mails containing the same questions as the discussion points were sent to 12 tutors, some of whom were known to possess a range of forthright opinions, and others who were less active participators in the tutor conference. They all replied.

Discussion points

98-tutors/tma06 #45, from jrm24, 385 chars, Sat Sept 19 09:51:48 1998

TITLE: Group collaboration

I'm doing an evaluation of various refinements in the assessment strategy and would welcome your feedback on the collaborative aspects of tma06. Did the "practice collaboration" in tma04 have any impact (+ve or -ve) on group organisation in tma06? Have you noticed any differences in group collaboration over the last couple of years?

Student feedback

An e-mail questionnaire was sent to 25 students, drawn at random from participants in a recent course conference, eight of whom replied. They were e- mailed with a follow-up question, to which six replied.

E-mail Questionnaire

1. In your opinion, did your group collaboration for the project work well?

2. What factors influenced the success, or failure of collaboration?

3. Did you find that the collaborative approach was supportive of your study of block five? In what way?

E-mail follow-up

Were there any problems which you envisaged in your strategy for group collaboration in tma04, which became reality in tma06? Was it a useful preparation?

Project collaboration conference.

The interview data from students was supplemented with data from a conference on group collaboration, which ran during the preparation of the project, to which 130 students were joined, 11 of whom contributed 17 substantive messages.

Conference discussion point

thd-projteam.exper #1, from nwh2, 460 chars, Mon Aug17 14:17:00 1998

TITLE: Welcome

I thought it might be useful to have somewhere we can share experiences of using CMC to

undertake a group project.

For example, how many groups have actually sorted out their tasks prior to individuals

launching into document searches?

How are groups coping with the holiday period? Have groups got a coordinator or chair

person? If your group is working well, can you tell us why? If your group has problems, can

others help with ideas?

Nick

---

9. PERSPECTIVES ON REVISION CONFERENCE 1998

Revision and exam conferences were set up and moderated by the Course Team

Chair to provide students with a better preparation for the exam. They were

evaluated after the exam using telephone interviews with six students and the same

questions sent by e-mail to a further five students. This data was supplemented by a

face-to-face interview with the Course Chair. Of the 11 students, six had contributed

interesting comments during the conference, and a further five had joined the

conference, but not participated in the discussion.

Interview schedule: conference participants

1. What were your experiences with the exam. Did it meet expectations?

2. What were the greatest problems with revision?

3. Did the revision conference guide you in appropriate directions?

4. Which aspects were most useful? You tried some peer review: was this
easier than earlier on?

5. What would have helped more?

Interview schedule: Course Chair

1. What do you think were the most useful/successful aspects of the conferences?

2. Were the comments predictable? Did they provide any new insights into the student
perspective?

3. You tried various models, in terms of inputting question/marking scheme/student script.
What worked best?

4. Were there problems in being the examiner and in moderating a conference of this type?
What about cue conscious students?

5. What do you think about the ethics of giving student scripts out for other students to see?

6. How much time did moderating this conference take? Is it sustainable in future years?

10. PERSPECTIVES ON THE EXAM 1998

Data on attitudes to exams in general were collected at the time of the evaluation of TMA02 in 1998, from the same 25 students. The aim was to gather further information on various questions relating to the exam which had arisen in 1997. In addition a transcript was made of student comments on the exam conference, recorded after the exam.

Interview schedule: students

1. How do you feel about having an exam at the end of this course?

2. Would you be happy with some alternative, eg a project perhaps?

3. Have your previous courses had exams?

Tutor attitudes to the exam were evaluated using telephone interviews and e-mail follow-up with six out of 11 of the exam markers, who were contacted after the marking period for their views on the quality of the scripts, and comparisons with previous years.

Interview schedule: tutors

1. What were your impressions on marking the exam this year? Were most students able to interpret the requirements of the questions? Were students using evidence appropriately?

2. Have you any comments on the marking scheme?

3. Did you notice any improvement over last years scripts?

4. Should the course continue to have an exam? Is it appropriate?

11. STUDENT PROFILES

In view of the richness of some of the data received from students during the evaluation of TMA02 in 1998, it was decided to follow up four of these students with

telephone interviews after the exam, in order to establish their overall attitudes to the course, any new skills acquired and the role of assessments in supporting their ability to learn in a resource based way. The students described in the thesis were chosen because they were typical of many students encountered in this research, and they were at a variety of different stages in their degree studies.

Interview schedule
(Questions 1-4 were asked during the evaluation of TMA02)
1. Why are you following an OU degree course?

2. What stage are you at in your studies?

3. What was your reason for doing this course?

4. What will you take away from the course in terms of skills?

5. Were there any difficulties in studying which you continued to face throughout the course?

6. How did it compare with studying any previous courses?

7. Did certain assignments help with the development of particualr skills? If so, which ones?

9. Have you any suggestions as to how they could have been more effective?

APPENDIX 6. H802 BACKGROUND INFORMATION

1. Examples of H802 activities and assessment
   Activity 2, block 2: Small group 'searching and learning'
   Activity 3, block 2: Small group 'Web course and materials design'
   TMA03: creating a hypertext document using html
   The Examinable Component

2. Data collection: student perceptions on resource based learning
   and its assessment
   Interview schedule
   Introduction to Bulletin Board System

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APPENDIX 6. H802 BACKGROUND INFORMATION

1. Examples of H802 Activities and Assessment

"Activity 2, block 2: Small group 'searching and learning'
The aim of this activity is to investigate the rationale for using Web search procedures as learning processes. You will have to work with your group preparing an account of a search task that you have collectively investigated for uploading to the electronic form.. The search task will be carried out as follows:
-     The group decides on the topic they will search for.
-     Each member carries out the search using a different search engine.
-     The group compares and discusses experiences and results.
-     The group compiles and submits a report recommending a procedure for 'learning by searching'.

Activity 3, block 2: Small group 'Web course and materials design'
The purpose of this activity is to learn about the issues of design and organisation involved in the development and delivery of Web-based courses. Each group prepares an account of an investigation or evaluation they have carried out for uploading to the electronic forum by the end of week 5. The investigation or evaluation will be carried out as follows:

- The group agrees on two or three subject areas of interest.
- Group members individually investigate the Web for examples of actual courses in those subject area; descriptions of courses; relevant materials; descriptions of tools for the building of courses. Findings are reported back to the group.
- The group agrees on a set of 'bullet points' relevant to an assessment of the approaches to teaching exemplified by these sites.
- The group compiles and submits a report on the design of Web-based courses in these subject areas. The report will contain links to the sites in question, along with illustrative material."

<div align="right">(H802 Course Guide, Open University, 1998, pp 22-23)</div>

"TMA03: creating a hypertext document using html
This TMA requires you to develop some aspect of the work you have done in activities 2 and 3 of the block.

You are to produce a set of linked Web pages which functions as a guide to the most significant elements of the work described in the block set book (Web-based instruction, ed by Badrul Khan). You are expected to select those writers, projects and ideas which seem to you to have most to offer to developers of open and distance education, or organise them into a coherent information structure in which the physical links between topics reflect their conceptual relatedness, and to present them in a way that is easily navigable, and makes your organisation explicit....Write your own short commentaries on them, creating links where possible to the writers' own or related Web sites. You may use relevant comments from the Course Forum discussion, and include graphical illustrations.... if you wish. The guide is to consist of approximately 10 screens designed and linked in the manner you choose and incorporating references to at least 12 of the contributions in the book.

Marks will be allocated on the following basis:
- Explicitness and coherence of the rationale for your selection and structuring of ideas from the book. (30%)

- Design of the guide - clarity, interest and ease of navigability. (30%)

- Quality of your comments on individual contributions - understanding of the original, relevance of your remarks, use of reference to Course Forum or other sources of comments. (40%)"

<div align="right">(H802 Assignment Guide, 1998, p 11)</div>

"The Examinable Component

The H802 Project Question takes the place of an examination for this course. It carries 50 per cent of the overall course grade and is submitted at the end of the course. You are advised to look closely at the question at the beginning of the study year and to consider its requirements as you work through the course.

H802 Project Question (cut-off date 26 September) 4000 words.

Interaction in the learning environment takes place in three ways: with the course material, with other students and with the tutor.

Discuss this statement in relation to your experience of distance education on H802.

Resources to use
You are expected to draw on aspects of all four blocks in preparing your answer. In addition to the content of the four blocks, you are expected to consider your experience of learning from print material generally, and how that differs (if at all) from learning in a hypertext environment such a multimedia and the Web. Both of these types of resource (print and hypertext environments) should be compared with the kind of learning that takes place through online interaction. Detailed references to conference interactions should be made: for example, analysing learning exchanges amongst students or comparing them with exchanges with a tutor.

You may also include a critique of the question itself: for example, do you think these three aspects of learning are the only ones or that they are indeed different from each other? Confine your analysis to distance education specifically.

You are expected to assess the role of technology in mediating the learning. How significant do you think technology is in managing, facilitating or impeding learning? Discuss these issues with reference to the literature you have studied for H802 and also with reference to your experience and that of your fellow students.

Assessment criteria

The word length for this examinable component is 4000. Marks will be allocated on the following basis:

- Demonstrating an understanding of and critical use of the course material.   (30%).

- Argumentation of the question and setting out a comprehensive answer.   (30%).

- Analysis of online interactions and intelligent use of personal experience.   (30%).

- Style and written presentation.   (10%).

Verification

The assessment strategy for this course replaces the traditional controlled examination with the examinable component and so we must take into account the need for proper verification of a student's identity. It is essential that the examiners should be satisfied that the work submitted is substantially the student's own, admittedly prepared under tutorial guidance. To this end:

1. Tutors and individual students will share responsibility for verifying the student's work, and your tutors will provide and assurance that to the best of his/her knowledge you have produced the work.
2. You must send in two copies of your submission to the address given in the booklet *Information for Students Submitting Examinable Work.* Keep a copy.

3. You will be expected to:
• engage in an e-mail exchange about the examinable component before it is submitted.
• participate in and contribute to computer conferences about the work.
• obtain a letter from an appropriate person (eg head of department) certifying that the submission is your own work.
    4. If the Examination and Assessment Board for H802 is not satisfied with the evidence you present to verify the origins for the work, you will be required to take a viva, or be awarded a fail grade."

<div align="right">(Open University (1998) H802 Assignment Guide, pp 6-7)</div>

2. Data collection: student perceptions on resource based learning and its assessment

Interview schedule

1. You were given a vast range of resources to study from in this course, instead of tailor made written materials. Did you have problems in deciding what, and how much, to read? Were there any other problems in studying in this way?

2. In this context, did you find that online collaboration assisted you, maybe in deciding what to read, or in debating an interpretation of your reading?

3. What skills do you think you have acquired on the course? Of course there were technical skills, what about working in virtual groups, learning to be selective in reading Web sources, set text books or conference messages?

4. Do you think particular assignments helped you develop these skills? If so, which ones? How did they act as an aid to learning?

5. Would you have found the resource based approach more difficult to cope with if you had been an undergraduate? In other words, were there "graduate skills", or maybe discipline related skills, which you feel were relevant?

6. How do you feel about the validity of a course which has no exam? Did it alter your

approach to study? Do you feel you have arrived at a synoptic understanding of course issues without one? Did the examinable component do this for you?

Introduction to Bulletin Board System

Msg #122 of 122; posted 23/2/98 by Janet-M

H802 Plenary Area/Researching H802

The Third (wo)man

[extensive detail omitted here]

You will be participating in resource based learning in some parts of this course, so it will be interesting to know whether your experiences bear out those of the students on THD204. What about the relationship between resource based learning and assessment in H802? Does the assessment system support this method of study, or does it just test what you know? Having worked through activity 2, would you have been as capable of undertaking resource based work, when you were an undergraduate? Whilst on some courses the assessment systems are not always clearly integrated with the aims of the course, do you feel this is the case for H802? Would you be able to comment on the relationship?

I hope we can use these questions as a means to reflect on the design of the course, how it acts as an aid to learning, and how assessment might be used to support particular aims and objectives.

Janet