

**A CASE STUDY OF THE INSTITUTION-WIDE IMPLEMENTATION OF A
MANAGED LEARNING ENVIRONMENT**

Jonathan Richard Alltree

**A thesis submitted in partial fulfilment of the requirements for the
degree of Doctor of Education**

January 2008

**School of Education
University of Sheffield**

Abstract

Recent years have seen a marked increase in the use of Virtual Learning Environments and Managed Learning Environments (MLEs) across the UK Higher Education sector. The university at the centre of this research took an institutional approach to the implementation of its MLE. This case study examines that implementation against the backdrop of the increasing use of technology to support learning, the impact of technology upon pedagogy in a range of academic disciplines and the strategic approach to managing change.

The case study draws upon a range of quantitative and qualitative data sources, the most significant of which were semi-structured interviews with 23 teachers from the university's six academic faculties. The framework for analysis was an adaptation of Bronfenbrenner's ecological model (Bronfenbrenner 1979) in which the implementation was examined in different, interconnected settings - the microsetting (the individual teacher's practice), the mesosetting (the institution) and the macrosetting (the sector).

At the level of the individual participant, the majority were enhancing the student learning experience by using the MLE to 'extend the classroom'. This did not, however, involve a substantive change to the underlying pedagogical approach. A small minority were, however, using the technology specifically to enhance the face-to-face learning experience of their students – either by 'doing things differently' or 'doing different things'. These ideas open up the way for future thinking on pedagogical approaches.

At the institutional level, there had been a transformative, second order change in the use of technology by staff and students. This had been achieved through a multifaceted approach to change involving institutionally steered but locally set usage targets, local champions, staff development and an MLE that had been developed with ease-of-use as a high priority. The implementation also drew on the experience of innovators to inform the development and roll out of the MLE. The use of the MLE was more concerned with enhancement of the student learning experience than increasing flexibility in when and where students learn – this has been identified as an important future challenge.

At sector level, the implementation was judged against five of the measures of success outlined in HEFCE's e-learning strategy (HEFCE 2005). In general, it was argued that the institution had performed well in relation to these measures, although the reuse of resources remains a challenge. The issue of increasing flexibility is another sector challenge, particularly with reports such as Leitch (2006) identifying the need for an increase in work-based learning.

New pedagogies and new technologies, such as virtual classrooms, can provide some solutions to the challenges facing the sector. Further work is needed to determine how best to exploit synergies between online and face-to-face learning opportunities.

Acknowledgements

I would like to thank a number of people who have helped me, in one way or another, complete this research.

Firstly I would like to thank my supervisor, Professor Jerry Wellington, for his guidance, feedback and encouragement during the genesis and realisation of this work. His timely and pertinent observations have been greatly appreciated.

I would, of course, like to thank all the participants who took part in the research for giving up their time so generously. The opportunity to listen to other teachers describe their practice was a really rewarding experience on many levels.

I would also like to thank my various managers during my EdD journey – Professors Tim Watson, David Bonner, Peter Bullen and Eeva Leinonen. Not only has funding been made available to cover my fees, all have been very supportive of me undertaking the programme.

My thanks go to many colleagues at the University of Hertfordshire who have been an important source of help and encouragement. This includes fellow teachers and staff in Administration, Learning Information Services and the Learning Technology Development Unit.

My fellow EdD participants were a terrific source of ideas, insight and feedback. I was very fortunate that the cohort to which I belonged gelled so well – as well as working hard, we had great fun. The EdD teaching team also made sure that the programme was a stimulating, rewarding and enjoyable experience. My thanks go to all concerned.

Finally, I must thank my wife, Dr Karen Beeton, for her ongoing support and encouragement – failing to complete the work was not an option open to me!

INDEX

Chapter 1 - Introduction to the thesis	1
1.1 Introduction	1
1.2 The UH context	1
1.3 StudyNet	1
1.3.1 StudyNet's implementation	2
1.4 The framework for exploration	3
1.5 Research questions	4
1.6 The case study methodology	4
1.7 An overview of the thesis structure	5
Chapter 2 - Literature Review	6
2.1 Introduction	6
2.2 The ecological model as a framework for analysis	6
2.2.1 Adapting Bronfenbrenner's model for this case	8
2.2.1.1 The microsetting	9
2.2.1.2 The mesosetting	9
2.2.1.3 The macrosetting	9
2.3 Key developments in the Higher Education sector	10
2.3.1 The development of MLE and VLEs in Higher Education	12
2.3.2 The incorporation of MLEs into UK Higher Education	13
2.4 Learning theories	15
2.4.1 The instructivist view of learning	15
2.4.2 The constructivist view of learning	20
2.4.2.1 Personal constructivism	20
2.4.2.2 A social perspective on constructivism	21
2.4.2.3 Why is social interaction so important?	22
2.5 Disciplinary differences in academic practice	23
2.5.1 Classification of disciplinary differences	24
2.5.2 Disciplinary differences in relation to Learning and Teaching	26
2.5.3 Do these categories hold?	32
2.6 Change and change management	34
2.6.1 Theoretical perspectives on change and change management	34
2.6.2 Factors influencing change in the Higher Education sector	36
2.6.3 Examples of the change in the Higher Education sector	40
2.6.4 Summary of 'Change and change management'	44
2.7 Summary of the Literature Review	44
Chapter 3 - Methodological Considerations and Method	46
3.1 Research questions and justification for this methodology	46
3.2 Review of case study methodology	46
3.2.1 Classification of case studies	46
3.2.2 Methodological considerations for the case study	48
3.2.2.1 Research paradigms	48
3.2.2.2 Qualitative research traditions	49
3.2.2.3 Pragmatism, bricolage and this case study	50
3.2.2.4 Trustworthiness	51
3.3 Method	52
3.3.1 Background data	52

3.3.2	The semi-structured interviews	53
3.3.3	Ethical approval	54
3.3.4	Sampling and recruitment	54
3.3.5	Conducting the interviews	55
3.3.6	Handling the data	56
3.3.7	Data analysis	57
3.3.7.1	Early analysis and its challenges	57
3.3.7.2	Further analysis supported by Nvivo	58
Chapter 4 - Results		61
4.1	Introduction	61
4.1.2	The nature of learning – knowledge, skills and the real world	61
4.1.3	Supporting learning in physical and virtual environments	61
4.1.4	Change and the learning institution	62
4.2	Demographic data	62
4.3	The nature of learning – knowledge, skills and the real world	63
4.3.1	Most subjects have contentious parts	63
4.3.2	Application and the real world muddies the waters	64
4.3.3	Exposure to contention increases with academic level	65
4.3.4	Struggling with, and coping with, contention	66
4.3.5	Shelf life	67
4.3.6	Discussion of ‘The nature of learning – knowledge, skills and the real world’	68
4.4	Supporting learning in physical and virtual environments	71
4.4.1	Face-to-face learning contexts and interactions	71
4.4.1.1	Lectures	72
4.4.1.2	Seminars/tutorials	73
4.4.1.3	Workshops, practicals and laboratory sessions	75
4.4.1.4	Interaction	76
4.4.1.5	Authenticity	77
4.4.1.6	Discussion of ‘Face-to-face learning contexts and interactions’	79
4.4.2	StudyNet and learning	83
4.4.2.1	StudyNet and communication	83
4.4.2.2	StudyNet as a conduit for resources	86
4.4.2.3	StudyNet and learning management and administration	87
4.4.2.4	Pedagogic themes relating to the use of StudyNet	88
4.4.2.5	Discussion of ‘StudyNet and learning’	95
4.4.3	Summary of ‘Supporting learning in physical and virtual environments’	102
4.5	Change and the learning institution	102
4.5.1	Why use StudyNet?	102
4.5.1.1	Internal drivers	103
4.5.1.2	External drivers	103
4.5.2	The implementation at UH	104
4.5.2.1	The planning stage	105
4.5.2.2	The development stage	106
4.5.2.3	The early implementation stage	106
4.5.2.4	The maturing stage	109
4.5.2.5	Discussion of ‘The implementation at UH’	112
4.6	Summary of the Results section	116

Chapter 5 - Discussion	118
5.1 Introduction	118
5.2 Discussion of the results	119
5.2.1 The microsetting	119
5.2.2 The mesosetting	123
5.2.3 The macrossetting	127
5.2.4 Suggestions for future studies	130
5.2.5 Summary of the discussion of the results	131
5.3 Critique of the study	132
5.3.1 Critique of the method	132
5.3.1.1 Ethical considerations	132
5.3.1.2 Sampling considerations	133
5.3.1.3 The trustworthiness of the research	134
5.3.2 Reflexive statement	137
5.3.3 Summary of 'Critique of the study'	140
Chapter 6 - Conclusion	141
6.1 The key findings of this research	141
6.2 Further work	143
6.3 Trustworthiness	143
6.4 Original contribution	144
6.5 Summary of the concluding chapter	145
References	147
Appendices	
Appendix 1 Initial Interview Schedule	158
Appendix 2 Ethical approval letter	160
Appendix 3 Request for volunteers	162
Appendix 4 Individual follow up email	164
Appendix 5 Consent form	166
Appendix 6 Final interview schedule	168
Appendix 7 Interim node structure	171
Appendix 8 Evolution of the themes	175
Figures	
Figure 4.1 Annual StudyNet Logins	109
Figure 4.2 Student rating of Learning Resources at UH	116
Figure 5.1 The role of StudyNet in extending the classroom	121
Figure 5.2 A longer sequence of classroom and online activities	121
Figure 5.3 Using the online environment to enable the classroom to be used differently in order to enhance the face-to-face experience	122
Figure 5.4 Extending the classroom into virtual space	125
Tables	
Table 2.1 Disciplinary groupings and their distinguishing trends	27
Table 2.2 Taylor's 5 stage appropriation model	39
Table 4.1 Participants' faculty of origin	63
Table 4.2 Participants' subject/discipline	63
Table 4.3 StudyNet Features and Facilities	95
Table 4.4 StudyNet training data (LTDU statistics)	107
Table 4.5 Annual StudyNet logins	108

CHAPTER 1 - INTRODUCTION TO THE THESIS

1.1 Introduction

This thesis is a case study that explores the pedagogic and implementation issues surrounding the introduction of a Managed Learning Environment (MLE) at the University of Hertfordshire (UH). This introduction will set the scene for the thesis, outlining its focus and scope. To do this, it will provide an overview of the institutional context and outline the MLE and its implementation. It will outline the framework within which the case will be analysed and articulate the research questions. It will conclude with an overview of the content of the thesis.

1.2 The UH context

UH is a large regional university with approximately 22,000 undergraduate, postgraduate and research students and 800 academic staff. The university has a broad academic portfolio, with 24 academic Schools organised into six Faculties. Originally Hatfield Polytechnic, it achieved university status in 1992. The institution has a longstanding interest in technology and computing – indeed its Computer Science course, established in 1966, was the first in the UK. For most of its history it has been teaching-led rather than research-led. Most recently it has set out its mission to be business-facing, with significant engagement with business and the professions (UH Strategic plan 2007-2012).

Since the mid 1990's there has been a strong strategic drive to maximise the benefits of technology and it was one of the first universities to merge its computer departments and libraries to form Learning Resources Centres (LRCs). The Learning and Information Service (LIS) is committed to providing efficient online services and access to a wide range of electronic resources in addition to more conventional resources, such as books and journals. In 2006, the online catalogue offered access to approximately 9,000 electronic journals, almost all via a single username and password. This digital capacity is an important background for a successful MLE.

1.3 StudyNet

In January 2001 an 'MLE Steering Group' was established and I was invited to join the group. This Steering Group included a representative sample of academics, administrators and learning technologists and was led by UH's Director of Learning

Technology. Its purpose was to steer the implementation of StudyNet - an institution-wide MLE.

In 2001/2 the main features that StudyNet offered were:

- Self-management tools (such as calendars and file storage space);
- Social noticeboards and information, mainly organised by the Students' Union;
- Access to UH's Learning Information Services, including its catalogue of electronic journals and databases;
- Module databases, with facilities to host electronic resources, post news items, access class lists and email lists and conduct online discussions.

(NB This is a snapshot only – it does not provide a full account of the features and functionality available at even this early stage of the MLE implementation)

The reason that StudyNet was termed an MLE as opposed to a Virtual Learning Environment (VLE) was because it is an integral part of the university's information management infrastructure and uses data from UH's Management Information System (MIS) to inform the automated creation of personalised portals for all users. In practice, module databases are automatically generated and the staff and students associated with a particular module are registered automatically with relevant access rights. A user's portal has links to all the modules that he/she is registered on, together with a range of other personalised resources. Therefore, StudyNet is more than just a tool to support learning – it is also a key interface for administration throughout a student's time at UH.

1.3.1 StudyNet's implementation

A range of measures were put in place to enable StudyNet to become an integral part of the student and staff experience at UH. These measures included: an extensive staff development programme, coupled with a range of other dissemination activities; a network of local support, organised by Faculty StudyNet Champions; the establishment of a StudyNet Learning and Teaching Project Group to promote the effective pedagogic use of StudyNet; and, from its second year of operation, a programme of incremental usage targets.

The 2001/2002 academic year was StudyNet's pilot year - the system went live, staff were made aware of it, offered staff development and encouraged to explore StudyNet's potential, should they wish. In this first year, the StudyNet Champions were developing their own expertise and supporting other early adopters. From 2002/2003 there has been a strategic drive to increase use, develop Learning and Teaching expertise and develop StudyNet functionality further.

This approach has undoubtedly borne fruit and StudyNet is now an integral part of academic and administrative life at UH. One crude measure of activity is the number of logins to the system and the following StudyNet Access Log data illustrate the increasing level of use since its inception. The pilot year (2001/2) saw 588,000 staff and student logins. In 2002/3, when usage targets were introduced, logins nearly trebled to 1.51 million. The following year there were 3.46 million logins, with 80% of staff and students logging in. 2004/5 saw 4.62 million logins, involving 95% of staff and students. 2004/5 also saw more than half the logins originating from outside of UH for the first time. The upward trend continued in 2005/6 and 2006/7 with logins for the latter year topping 7.7 million – a mean of approximately 350 logins for each of the 22,000 registered users.

The Access Logs also reveal different levels of engagement with StudyNet by the staff and students of different Faculties – an observation to be explored further in this case study.

Implementing this institution-wide MLE has been an iterative process and, for all concerned, a learning process. Those involved in steering and supporting the implementation have learned a good deal about the change management process. Those using StudyNet to support their students' learning have a greater understanding of the use of an MLE for this purpose. StudyNet was a key plank in the university's successful bid for a Higher Education Funding Council for England (HEFCE) Centre for Excellence in Teaching and Learning (CETL) – the Blended Learning Unit (BLU) – which was established in 2005. These are key interests of this case study.

1.4 The framework for exploration

The case study will explore the implementation from the perspective of teachers, drawn from a range of academic disciplines, who have introduced StudyNet into their teaching practice. It will look at the institutional setting in which this teaching

has taken place, and the processes and policies, against which the implementation is set. It will also consider the Higher Education setting which influences and supports the UK sector.

The study will adapt Bronfenbrenner's ecological model (Bronfenbrenner 1979) in order to set the exploration into a coherent framework. However, rather than use Bronfenbrenner's microsystem, mesosystem, exosystem and macrosystem structure to explore a phenomenon from a participant's perspective, the study will make the different settings the foci of exploration – the microsetting, the mesosetting and the macrosetting. This framework will be used to contextualise the results and structure the discussion section of the study.

1.5 Research questions

This case study will investigate the following research questions:

- How do academic staff from a range of disciplines go about their academic practice?
- How have they incorporated StudyNet into their academic practice?
- Why have these staff chosen to utilise StudyNet in the ways they do?

The questions will be explored, as appropriate, in relation to academics' local teaching environments (the microsettings), the institutional context (the mesosetting) and the wider Higher Education context (the macrosetting).

1.6 The case study methodology

Case study research will be discussed in the Methodological Considerations and Method section, but the essence of this study will be to draw on a range of data sources to explore the implementation of StudyNet at UH from 2001 to 2007. The principal data source will be semi-structured interviews with teachers from a range of academic disciplines. Other data sources include: local evaluation data; existing research on the use of StudyNet; StudyNet access data; UH policies and strategy statements; and documents relating to the wider Higher Education context. The case study will be both 'picture drawing' and 'theory seeking' (Bassey 1999) in nature.

I will make the case for acting as a methodological bricoleur and also argue that there is an auto-ethnographic flavour to the research. This has various implications,

one of which is the approach to the published literature. In particular, the Literature Review will explore several background issues pertinent to the case. It will not, however, be an exhaustive exploration of teaching using an MLE. Rather, the themes that emerge from the data will be developed in relation to published work in the results section itself. In this way, the potential for theory development, rather than theory testing, will be enhanced.

1.7 An overview of the thesis structure

The thesis contains a Literature Review, Methodological Considerations and Method section and sections for Results, Discussion and Conclusion.

The Literature Review begins with an overview of the framework for analysis, Bronfenbrenner's ecological model. The Higher Education context will be discussed in order to contextualise the implementation of StudyNet, followed by a review of the development of MLEs and VLEs. Two key perspectives on learning - Constructivism and Instructivism – will then be considered. Because there appears to have been differences in the uptake of the MLE by different Faculties, the literature relating to disciplinary differences will be discussed. Finally, Change Management theories will be explored so that the StudyNet's implementation process can be considered critically.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

The literature review will explore several important background themes in order to set the case into context. It will begin by exploring Bronfenbrenner's ecological model because an adaptation of this model will be used to frame the study. It will then chart the development of MLEs and VLEs within Higher Education, and it will explore two important pedagogic approaches – Constructivism and Instructivism – which have been a source of much discussion in the Higher Education sector. The potential to exploit either constructivist or instructivist approaches in MLEs have been made by proponents of each, so this will be explored. Because there appears to have been differences in the uptake of the MLE by different Faculties, the literature relating to disciplinary differences will be examined. Finally, Change Management theories will be explored so that the StudyNet's implementation process can be considered appropriately.

2.2 The ecological model as a framework for analysis

Urie Bronfenbrenner proposed an ecological framework with which he explored human development. He drew on Lewin's model of human behaviour, expressed in Lewin's classic equation $B = f(PE)$ (literally, behaviour equals a function of the product of the person and the environment) and argued that hitherto psychology had tended to focus disproportionately on the person, underplaying the role of the environment (Bronfenbrenner 1979 p16). He suggested that because many studies only considered subjects in one setting, the key to his ecology model was to study subjects in more than one setting and consider the interplay between settings – how one setting may influence what happens within another one (Bronfenbrenner 1979 p18).

Bronfenbrenner's model is underpinned by an analysis of systems that comprise the role a person plays in a setting, the actions they undertake and the interpersonal relationships within the setting. Accordingly, his model considers four levels of interconnected systems and their relationship to the person(s) being studied. These are:

- Microsystems
- Mesosystems
- Exosystems

- **Macrosystems**

In Bronfenbrenner's terms, *microsystem* relates to the activities, roles and interpersonal relations a person actively experiences within a particular setting (for example at work). The word 'experiences' has an important phenomenological connotation – the importance of an environment is not just manifest in its objective properties, but also in how it is perceived by individuals. The meanings people derive from situations are of particular importance to Bronfenbrenner.

Clearly an individual will experience a number of settings (for example a work setting and a domestic setting) and his/her role, actions and relationships will vary from setting to setting. Bronfenbrenner termed the interrelationship between two or more microsystems a *mesosystem*. The complexity of social networks starts to emerge as the various actors in mesosystems are considered – some may be active in the same microsystems, while each will also be involved actively in other microsystems. This interconnectedness enables knowledge and attitudes to be shared and spread across microsystems, potentially affecting meanings and behaviour within them.

Bronfenbrenner was also cognisant of the way that systems remote from a person (ie ones in which they do not actively - or directly - participate) can impact upon their own microsystems – and, in turn, the microsystem can impact upon the remote system. He termed such remote, but interconnected and mutually influential systems *exosystems*.

The overarching level of analysis that Bronfenbrenner applied to his model was the *macrosystem*. He remarked that it might be possible to discern similar patterns of exo-, meso- and microsystems relating to groups of individuals (eg university lecturers) within different cultural settings (for example the UK and Australia). But he goes on to observe that the different belief systems and ideologies of different cultures may influence the subordinate systems differently and therefore defined the consistent patterns of exo-, meso- and microsystems within a cultural setting as a *macrosystem* (Bronfenbrenner 1979, p26). For the purposes of this thesis, for example, the UK HE sector could be considered one macrosystem and that in Australia a separate macrosystem.

2.2.1 Adapting Bronfenbrenner's model for this case

Bronfenbrenner's work was primarily directed at human development and he was particularly interested in the development that occurred when a person entered a new microsystem or changed position or role within an existing microsystem – an *ecological transition* in his terms (p26). However, it is at this point that his model and the needs of this case study start to diverge. Although part of the study is concerned with individuals (the interviewed participants), their behaviour (how and why they use StudyNet), rather than their development, is the focus.

This concern alone might be overcome, but there is another reason why Bronfenbrenner's model is not fully suited to this case study. My argument is as follows: the participants closely identify with individual departments and their disciplinary subjects. This identity naturally follows from their time spent in the departments and their roles as teachers within them - Becher (1989) noted that academics identify with their disciplines more strongly than their institutions. Therefore the immediate teaching context is taken as an important setting in which to explore the teachers' actions. But another important part of the case study is the institutional structures and policies that provided StudyNet and supported its uptake – the institution's story needs to be told in order to set the teachers' action in context. Yet the degree of interaction between the individual teachers and the institution varies tremendously. Some participants play an active part in the wider institutional context (for example sitting on committees or acting in another representative capacity that involves being or engaging with policymakers) whilst others play no significant part (their allegiance and actions are almost entirely focussed on their students and their department). So some participants might view the institutional setting as another microsystem in which they actively participate and others might view it as an exosystem which has relevance, but with which they do not actively engage.

Therefore, whilst it might be possible to have some shared view where the teaching environments are considered as microsystems, it is only possible to view the wider institutional environment as either a microsystem or an exosystem, depending on the person concerned – no consistent description is applicable when considering the sample concerned. Due to the importance of considering the teaching environments and the institutional settings in their own right, I will use an adaptation of Bronfenbrenner's model that draws on its considerable strengths (exploring multiple settings; considering roles, actions and relationships; and recognising the

interconnectedness and reciprocity between settings) and make reference to his terminology, but adapt the model to meet the needs of this particular case more precisely and straightforwardly. The case will, therefore, use the *setting* as its primary focus at each level of analysis. The settings will be:

- The *microsetting* (or small setting) – the teachers' immediate teaching environment;
- The *mesosetting* (or middle setting) – the wider institutional context;
- The *macrosetting* (or large setting) - the wider UK Higher Education context.

Drawing on Bronfenbrenner once again, the description of the setting is very important.

2.2.1.1 The microsetting - the teachers' immediate teaching environment

The physical environment in this setting is relatively contained and will include the classrooms, laboratories, offices etc that teachers visit regularly as part of their day-to-day working life. But MLEs also bring a virtual element to the environment in which the various actors within the microsetting engage. The teachers' primary relationships in this setting are with their students, their academic colleagues (primarily in their own department) and their administrative, technical and other learning support colleagues.

2.2.1.2 The mesosetting – the wider institutional context

Although the physical environment can be geographically defined (the university campus and its buildings), each individual's experience of it can vary considerably. It is the functions of the environment – consultation, decision making, communication, support arrangements, staff development, social activities etc - that are perhaps most relevant here. The participants are located in this environment but their degree of interaction with the wider institution is variable. Of particular relevance to this case, the majority were not directly involved in the policy making that underpinned the implementation of StudyNet. Nevertheless, there is reciprocity between the macrosettings and the various microsettings of the participants whereby policy can and does inform practice, and the participants can – and some do - inform policy.

2.2.1.3 The macrosetting – the wider UK HE sector

The physical environment is less significant here. The sector includes all the Higher Education Institutions and bodies such as HEFCE, the Higher Education Academy

(HEA) and its subject centres, Standing Conference of Principals (SCOP) etc. Parts of the sector are enormously influential upon institutions - for example HEFCE's funding arrangements and strategies such as the strategy for e-learning (HEFCE 2005) that will shape individual institution's strategies and priorities. Agendas such as widening participation and the massification of Higher Education have had significant impact on teachers and teaching practice. Once again there is an interconnectedness here. For example, HEFCE or HEA consultations enable individuals or institutions to have their voice heard on this wider stage. Away from policymaking, teachers also engage with colleagues more widely, for example through conferences or academic publications – sharing their research and good practice and learning from others. Social networks are manifold.

My adaptation of Bronfenbrenner's framework is not necessarily better, but it is suited to its purpose.

2.3 Key developments in the Higher Education sector

The key developments in Higher Education that frame this research are the massification of Higher Education, with the concomitant increase in student numbers and student/staff ratio, the giant strides in the capability and availability of information and communication technology (ICT), and the trend towards more managerial approaches invoked by some institutions in the sector.

Kirkwood (2003) traces the use of technology to support Open University (OU) students since the 1960's. Text, radio and television became supplemented by audio cassette, video cassette, computer disks with multimedia elements, CD-ROMs and new communication routes (eg email, discussion forums). Most recently the effects of digitisation and convergence between computing and telecommunication have opened up learning opportunities that were hitherto impossible (Kirkwood 2003). Whilst the relevance of these technologies to distance learning are self-evident, they are also highly prevalent in campus based universities and often mediated, as with the OU, via a VLE or MLE.

Selwyn (2002) explored the growing drivers for technology in education in the 1980's and recorded how the Conservative government of the day was keen to promote the value of technology, with such initiatives as the £3.5 million software in schools programme and £1.5 million Modems in Schools programmes. Since 1997, the Labour government has been very pro ICT in education and has invoked such

initiatives as the £1.6 billion National Grid for Learning, which was designed to support school children's achievement of literacy, numeracy and subject knowledge (Blair 1997). The rationale for this investment has been to bring education into the information age (Watson 2001), support the needs of a knowledge economy (Skelton 2004), personalise learning, raise achievement and provide affordable mass education (Somekh 2000). Education has been highly influential in enabling society to embrace ICT more widely over the past few decades (Selwyn 2002).

Strategic initiatives in computer technology deployment in Higher Education can be traced back to the 1960's with the Flowers Committee exploring the use of computers beyond the physical sciences (Smith 2005). HEFCE has been very supportive through initiatives such as the Teaching and Learning through Technology Programmes and the establishment of the Joint Information Systems Committee (JISC), which have provided many millions of pounds support for infrastructure and e-learning initiatives. Not all initiatives have been successful – in particular, the United Kingdom 'E' University (UKeU), the fully online university that survived briefly between 2001 and 2004, was an expensive failure.

The Dearing report (NCIHE 1997) stressed the importance of Higher Education to a modern global economy and championed various aspects of Higher Education including:

- The development of the learning society, with Higher Education contributing through its teaching, scholarship and research;
- A commitment to the expansion of student numbers in higher education, based on the economic imperative of competing globally;
- The effective use of information technology in learning and teaching in order to improve the quality, effectiveness and the flexibility of educational opportunities and transform the shape and delivery of education to students throughout the world;
- The importance of increased information literacy skills for students.

The increased number of students is associated with a reduced unit cost, so teachers have to deal with both increased numbers and with increased diversity – and have to adapt their teaching practices to cope.

There has been an increase in managerialist approaches in Higher Education as the State attempts to make it more cost effective (Skelton 2004). This has resulted in the increased use of business orientated language and the creation of an audit culture. Newton (2003) argues that funding changes and associated efficiency gains have resulted in changes in the way universities function. The implementation of university Learning and Teaching Strategies, as recommended by Dearing (NCIHE 1997) has been perceived as a threat to academic professionalism. Newton notes that by the end of the 1990s many academics had tired of the quality measures imposed upon them by internal and external regulation. He viewed this as the funding councils' micromanagement of universities, citing the Institute of Learning and Teaching in Higher Education (now subsumed into the Higher Education Academy) and the Quality Assurance Agency (QAA) as key agents in this process. More recently, HEFCE's Strategy for e-learning (for the period 2005-2015) reaffirmed the view that central initiatives will influence individual practice as it intends to support institutions and individual teachers transform the future learning experience (HEFCE 2005).

Holley and Oliver (2000) also assert that universities are assuming increased power over the ways teachers go about their business. Although individuals still have some say in how they practise, choice of how to teach is becoming constrained. For example, the increasing student numbers are associated with an increase in vocationally oriented subjects and an interest in teaching methods such as Problem Based Learning (Holley and Oliver, 2000). There has also been an increased emphasis on 'value for money' and the use of performance indicators. Both Holley and Oliver (2000) and Newton (2003) argue that the erosion of lecturers' power is potentially detrimental to their professional standing and ability to teach as they choose.

2.3.1 The development of MLE and VLEs in Higher Education

Britain and Liber (1999) viewed MLEs as learning management systems that combine computer-mediated communications and on-line methods of delivering course materials. JISC distinguished between MLEs and VLEs when it described a VLE as a system where learners and tutors participate in various types of on-line interactions and an MLE as 'the range of information systems and processes that contribute to an educational establishment's provision of learning and learning management, including a VLE if the provider has one' (JISC 2000 p2). Roscoe (2002) echoed this more embracing view of MLEs, describing them as electronic

learning environments that include other management information systems (MISs). One of the valuable consequences of linking a VLE to a university's MIS (as in an MLE) is the potential for each module's VLE to be populated with the relevant student and staff details automatically.

MLEs, based on systems such as Blackboard (<http://www.blackboard.com/>) or Lotus Notes (<http://www.lotusnotes.com/>) create a portal through which students can access a range of facilities via the Internet. WebCT (purchased by Blackboard in 2005) was developed at the Computer Science department at the University of British Columbia and its range of facilities is typical of the functionality of VLEs. They include learning support functions, such as discussion forums, email, file sharing, access to course content and links to external websites. It also includes student tracking capability (Kaidan 2002). This last function illustrates a significant advance over the definition offered by Britain and Liber (1999) with the capacity to monitor student activity added to the original functions – communication and access to learning materials (and other resources).

MLEs, by their nature, can support e-learning which was a key wish of the Dearing report (NCIHE 1997). Glenaffric Ltd (2004a) suggest that MLEs will play a key part in meeting the Department for Education and Skills' (DfES 2003) objective for the seamless provision of support from School to University and life long learning.

The HEFCE strategy for e-learning states that:

e-learning can also advance the flexibility and personalisation of learning, to support progression and lifelong learning. It provides opportunities to advance workplace learning and hence the relevance of learning to employers and employees. (HEFCE 2005 p4)

The strategy (HEFCE 2005) outlines a number of aspirations for the impact of e-learning. It should enable students to be able to access information and their tutors support, expertise and guidance, as well as communicate between themselves regardless of location. Staff, on the other hand, should have tools to facilitate course design and have improved communication with students, enabling them to give feedback and support.

2.3.2 The incorporation of MLEs into UK Higher Education

In 2003 Blackboard was in use in 32% of institutions and WebCT in 20% (JISC/ Social Informatics Research Unit 2003a). In 2001 the Universities and Colleges

Information Systems Association (UCISA) conducted the first part of a longitudinal national survey of VLE/MLEs in UK Higher Education (Browne and Jenkins 2003). A second survey was conducted in 2003 and both achieved a response rate over 50%. The surveys indicated the prevalence of these systems in the sector with 81.3% of respondents in 2001 reporting at least one VLE in their institution, increasing to 86.3% in 2003.

According to Browne and Jenkins (2003), by 2003 Blackboard was the most prevalent system in the UK, found in 43.2% of respondents' institutions, with WebCT in second place with 34.1%. Firstclass was found in 19.3% of institutions, with a range of in-house and open source systems (eg Moodle and Boddington) accounting for the bulk of the remainder.

Out of the wealth of data that Browne and Jenkins (2003) discuss, two further points are of particular interest: the use of systems is mainly to supplement face-to-face learning, rather than being an integral part of the learning process or a distance learning option; and the emphasis on the enhancement of learning being the main driver for using the VLE in 2003, with a reduced emphasis on efficiency and flexibility (Browne and Jenkins 2003).

The JISC funded MLE landscape study (JISC/Social Informatics Research Unit, 2003b) highlighted a high degree of commonality between institutions in terms of perceived advantages and disadvantages of MLEs. The top three advantages are wider access to learning; administrative efficiency; and greater integration of data across the institution. The top disadvantages include cost and time; resistance to change; staff development needs; and stability and security of IT systems.

Although the number of institutions with MLEs in 2003 was high, a subsequent survey in 2005 showed a marked increase in use by staff and students (Browne, Jenkins and Walker, 2006). In the post-92 sector, the number of institutions using VLEs in more than 1000 modules had increased from 13% to 60%.

In summary, MLE/VLEs have the potential to revolutionise the student learning experience because they enable staff and students access to e-learning opportunities that were hitherto the realm of ICT experts. This is entirely consistent with the Dearing report and more recently HEFCE's e-learning strategy. They have spread rapidly across the sector, although their uptake is very variable. The potential

implications of MLE for academic practice and curriculum design (what is learned, when is it learned and how is it learned) is significant. They can support a range of learning modes such as distance learning, open learning and flexible learning.

2.4 Learning theories

This section will explore two of the main theoretical standpoints on learning in order to provide a theoretical background to the learning and teaching aspects of this study's results.

There are many theories about learning. Merriam and Caffarella (1999 ch7) discuss behaviourist, cognitivist, constructivist, humanist and social learning theories in their examination of teaching and learning practice. This section will review two theories - constructivism and instructivism. Constructivism is widely proposed as an appropriate concept of learning in the current educational literature, including the literature on various aspects of electronically mediated learning (eg Tynjälä 1998, Delgarno 2001, Downing 2001, Steel and Hudson 2001, Huang 2002, McLoughlin and Luca 2002). However, instructivism, which developed from behaviourism, is also highly relevant because its approaches have also been argued as a suitable basis for aspects of computer mediated learning (Collis and Moonen 2002).

2.4.1 The instructivist view of learning

This section will begin by discussing some of the key features of instructivist or instructional design approaches to learning. Instructional design is firmly rooted in behaviourist traditions, but also draws on cognitive psychology. Historically it is important to include the reductionist view of communication as a fundamental aspect of learning interaction, but then concentrate on the ideas of learning outcomes, matching learning outcomes to instructional activities and sequencing those activities in a systematic way. It will then look to discuss how such approaches have, in the eyes of some, become associated with didactic approaches to learning.

Instructivist approaches can be traced to engineering views of communication via transmission/reception and are rooted in the behaviourist view of learning. Shannon and Weaver proposed an information transmission model in 1949 (Romiszowski 1988 p3) which analysed communication as:

Information source → Transmitter → Signal → Receiver → Destination

Whilst viable for describing an electronic communication system, this process is over-simplistic when all the possible failure points of human communication are concerned (particularly in relation to the complexities of coding/decoding and interpretation). However, such a model of communication was important for behaviourists like Skinner to discuss learning.

The behaviourists' interest in learning is underpinned by three principles (Merriam and Cafferella 1991 p126):

- 1) The concern that learning should manifest itself in terms of observable changes in behaviour (rather than internal thought processes);
- 2) The environment is the principal determinant of behaviour – ie learning is mediated via external influences rather than internal ones;
- 3) Learning is facilitated by contiguity (ie events must be close enough in time for learning to occur) and reinforcement (ie recognising and rewarding appropriate behaviour).

Working in the 1950s and 60s, Skinner measured learning in relation to observable changes in behaviour – i.e. behavioural learning outcomes. His particular contribution was the field of operant conditioning where appropriate behaviour is rewarded and inappropriate behaviour ignored. Skinner believed that all learning, including the development of personality, developed this way and that learning could therefore be seen as a sequence of appropriate contingencies (i.e. stimuli upon which behaviour is contingent) (Merriam and Cafferella 1991 p125). So as well as highlighting the importance of behavioural learning outcomes, Skinner also emphasised the importance of a series of learning steps where learning activity is immediately followed by feedback – if a learner is correct, they move to the next level. Thus more advanced learning is achieved via a sequence of events designed to develop the desired behaviour. Whilst our understanding of behaviour has broadened beyond this stimulus-response view, the notion of correctly sequencing learning events is very important to proponents of instructivist methods.

From an educational perspective, a more useful analysis of the complexity of learning came from Gagné who, in 1965, proposed an eight stage hierarchical model of learning. The stages are as follows, with the lower levels necessary prerequisites for the higher levels (Romiszowski 1988 p19):

- 1) **Signal learning** (a Pavlovian conditioned response – response generalized and emotional);
- 2) **Stimulus response learning** (response is very precise);
- 3) **Chaining** (linked steps of learning);
- 4) **Verbal Chaining** (like chaining, but including verbal associations);
- 5) **Discrimination learning** (tasks that discriminate between ideas etc);
- 6) **Concept learning** (tasks that relate to more abstract ideas);
- 7) **Rule learning** (tasks that combine or chain concepts);
- 8) **Problem solving** (the highest level, combining concepts at a high level to solve problems). (Based on Romiszowski 1988 p18)

By the 1970s Gagné had developed his ideas, moving from an emphasis on behaviour to consideration of cognition and internal processes (such as short term memory processing). He was concerned with the internal processes and the relation to external stimuli and developed the following sequence of instructional events – cited in Laurillard (1993 p73):

- 1) Activating motivation;
- 2) Informing the learner of the objective;
- 3) Directing attention;
- 4) Stimulating recall;
- 5) Providing guidance;
- 6) Enhancing retention;
- 7) Promoting transfer of learning;
- 8) Eliciting performance;
- 9) Providing feedback.

Although Laurillard criticises this sequence because it is based on the constructs of cognitive psychology and built around, for example, observations of experiments into short term memory (Laurillard 1993 p73) it appears coherent and it is likely that much classroom practice mirrors some or all of these stages. Laurillard makes another important point though - that Gagné's system does not allow for synthesis. For example the idea of combining cognitive strategies with motor learning is not covered (Laurillard 1993 p74) - the system is, therefore, too reductionist. The complexity of learning and teaching means that any detailed, reductionist analysis is likely to find it increasingly difficult to take all the possible variations and instances under study into account.

Romiszowski (1988) observes that Gagné's key contribution was the linking of the conditions of learning to his main categories of learning – the conditions were:

- the internal conditions – readiness to learn – what learning on the part of the students needed to have already occurred;
- the external conditions – the specific instructional strategies that the teacher needed to put in place.

So far we have explored the ideas of learning being contingent on a series of (externally focussed) learning events in sequence and described in terms of the achievement of learning outcomes. Bloom also made an important contribution to this approach to learning with his categorisation of objectives of learning. He developed Mager's categorisation of learning outcomes into cognitive, affective and psychomotor domains by subdividing those first two categories (Romiszowski 1988 p20). In particular his work on the cognitive domain has had a sustained impact on educational thinking. Bloom produced his hierarchy as follows:

- **Knowledge** (remembering previously learned facts);
- **Comprehension** (grasping the meaning of material, being able to explain paraphrase etc);
- **Application** (using learned material in new situations);
- **Analysis** (breaking down material into its component parts);
- **Synthesis** (combining ideas to form a new whole);
- **Evaluation** (judging the value of material).

Whilst Bloom ranks knowledge at the lowest level and evaluation at the highest, with the remainder completing the hierarchy, it is more of a continuum than a discrete classification (Romiszowski 1988 p22). Unlike Gagné, he did not advocate particular strategies for particular learning objectives, however Bloom's work has endured and these educational objectives are in common use and important today. For example they form the basis for the cognitive skills element of the Southern England Consortium for Credit accumulation and Transfer credit level descriptors (SEEC 2003).

Perhaps the systematic approach that characterises instructional design was influenced by the grounding in a mechanistic understanding of communication and the behaviourists' objective view of the measurement of learning? Romiszowski (1988) drew together this work – like Gagné, his work matched the nature of

learning outcomes with learning tasks in a systematic manner. He was particularly interested in the methods needed by learners to meet learning outcomes and, like Gagné, divided these broadly into expositive strategies (such as telling and demonstrating) and experiential tasks (such as practice and on-the-job training) (Romiszowski 1988 p48). Romiszowski also distinguishes clearly between informational (one way) material and instructional (two way/with feedback) material. However, the text is littered with flow charts, matrices and numerous tables that further highlight the complexity of this approach when analysing such a complex topic.

Dick and Carey continued the notion of a systematic approach to designing learning activities with their ADDIE model (Anagnostopoulo 2002). This leads the development of learning environment from an initial Analysis phase, when the learning outcomes are defined and learners needs analysed; to Designing the learning activities (based on the findings of the analysis, matching outcomes to specific activities); followed by the Development of resources, narratives etc; Implementation (with learners); and Evaluating the outcome. This model has also stood the test of time – with relatively minor adjustments and is applicable more widely than just in instructional design. It is a sound planning, implementation and evaluation model that many educators in Higher Education will almost certainly follow even though they may make no specific reference to ADDIE.

What the instructional approach has contributed is: the idea of having clearly defined learning outcomes; the different types of learning outcome and how each may be linked to different types of learning tasks; and that instruction is a two way process involving information giving, student performance and instructor feedback (Romiszowski 1988 p 42). But for many involved in Higher Education, the ideas of systems, prescriptive, predetermined instructional sequences, devoid of the concepts of individual learning styles and student centred learning can seem inappropriate. For example, Pask described learners broadly as either serialists (who are concerned with detail and procedure) and holists (who are concerned with global themes and the development of broad descriptions) (Stanton *et al* 2001). The linear sequencing of instructional design methods might suit serialists more than holists. Furthermore, instructional design is typically associated with more diactic modes of teaching (Anagnostopoulo 2002). Yuen and Hau (2006) contrast this teacher centred approach with constructivist approaches and Kanuka and Anderson (1999) view instructional approaches as the polar opposite of constructivism.

2.4.2 The constructivist view of learning

Merriam and Caffarella (1999 ch7) suggest that the essence of constructivism is that 'learning is a process of constructing meaning' (page 261) which builds on prior knowledge. Armstrong has a similar view, suggesting that the way in which learners construe events and construct meaning is key to a constructivist approach (Armstrong 1996 p83). Merriam and Caffarella (1999 ch7) explore the history of constructivism, tracing it to various authors, including Dewey, Driver, Kant, Kuhn, Piaget and Vygotsky. This rich background has led to the development of various shades of constructivism. Merriam and Caffarella (1999 ch7) use the writing of Driver and Piaget to illustrate two particularly important ways in which notions of constructivism need to be considered – the social view and the personal view. The feminist perspective of Driver supports a social model of knowledge construction where individuals make meaning of the world as they engage in discussions and work together in shared tasks. Dialogue helps the individual - indeed is essential - to make sense of the world. On the other hand Piaget focused on the personal aspects of learning, in which an individual invokes an adaptive process to match his/her cognitive schemes with the real world (Merriam and Caffarella 1999).

Two of the most influential writers on constructivism are Piaget and Vygotsky. Piaget provided great insights into the cognitive processes involved in learning and Vygotsky, who, like Driver, has been described as a social constructivist (Armstrong 1996, Huang 2002) was particularly concerned with the effect of interaction with others upon learning.

2.4.2.1 Personal constructivism

Piaget's interest in the analysis of biological systems led to him being termed a '*cybernetician before cybernetics*' (Inhelder 1976 p4). It might be just as true to say he was a '*constructivist before constructivism*' because his theory of learning, which describes learning as a series of steps or stages, does not use the term constructivism.

Piaget's steps or stages are as follows: In the first instance, in order to know something, a person must interact with the relevant material. For example, a person may move physical objects, dismantle and or reassemble them or connect with them in some other way. However, complex intellectual operations might be carried out mentally (ie internally). Piaget termed these physical or mental interactions '*transformations*' and he argued that, in order to know, one has to participate

actively in such transformations. A person's knowledge develops from the ongoing interactions between the transformations and the person. Piaget's second stage suggests that knowledge is internally constructed (and developed) through sequences of interactions between the subjective and objective worlds – each successive interaction helping to shape or adapt the subjective world to be consistent with the objective world. Thirdly, the sequences of interactions are co-ordinated - the co-ordination dependent on upon the person's experience, their degree of maturation and also their volition. Piaget goes on to argue that the above stages cannot be reduced to a series of empirical associations – but that they do summarise a series of biological and intellectual assimilations and adaptations that integrate and build upon what has gone before (Piaget 1976).

Although this appears a reductionist view of learning, it has an inclusive knowledge base behind it, as Piaget has drawn upon biology, psychology, logic, mathematics and genetic epistemology (how human organisms develop knowledge) to support his theory. In addition to the authority that Piaget brings to the constructivist view, key messages for education are:- the recognition of prior knowledge as an integral part of future learning; the recognition that the co-ordination of learning interactions is dependent on experience, maturation and volition; and the need for learners to actively engage empirically and intellectually with material.

2.4.2.2 A social perspective on constructivism

The role of social interaction in learning was emphasised by Vygotsky (Huang 2002). He proposed that learners interact with the environment and with the teacher to construct (new) conceptual frameworks (Armstrong 1996 p83). Much of Vygotsky's work was based on his study of children and he proposed that there is a 'zone of proximal development', defined as:

'the distance between actual development as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers'
(Vygotsky 1978a p86)

This concept underpinned a process for predicting a child's future individual performance by exploring his or her level of problem solving ability whilst interacting with, or steered by, others. It was developed from the observation that when working with more able others, a child is able to perform better than when working alone. Vygotsky developed his recognition of the importance of working with others, saying

'human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them' (Vygotsky 1978a p88).

Elsewhere, Vygotsky (1978b) took this further, arguing that the functions that comprise a child's cultural development (e.g. voluntary attention, logical memory, the formation of concepts) are developed through social interaction (interpsychological development) before they become internalised (intrapsychological development). Indeed, he asserts that all higher level functions originate through social interaction. In addition to his position on the fundamental importance of the social interaction of learners, peers and tutors to learning, Vygotsky also emphasises that learning tasks should be natural and meaningful (Vygotsky 1978c).

Phillips (1995, cited in Merriam and Caffarella 1999) suggests that social constructivism and personal constructivism can be considered the two ends of a continuum. It would be oversimplistic, however, to suggest that Vygotsky is only concerned with the external aspects of the process, whilst Piaget is only concerned with internal processes. Both refer to the process of internalisation and to learning via social interaction. But, unlike Piaget, Vygotsky argued that the social aspects of development were a major determinant of functional ability (John-Steiner and Soubberman 1978).

2.4.2.3 Why is social interaction so important?

Social interaction facilitates learning in number of ways. Of particular importance is the opportunity for effective dialogue (Downing 2001). Learners can test and clarify their understanding by putting forward their ideas, asking questions, listening to others' views and gaining feedback. It allows them to test their understanding against their tutors' expertise (Armstrong 1996) – and the expertise of fellow learners. It is also an opportunity to experience a rich social context (Hanrahan *et al* 2001). Other group members may challenge the learner's ideas and dialogue may develop in new and unanticipated directions. All these interactions help develop Piaget's assimilations and adaptations and Vygotsky's social level (interpsychological) development prior to the internalisation of learning.

Social interaction can provide a highly motivating and supportive environment for learners (Downing 2001) and help learners to concentrate (Knipe and Lee 2002). Not all group members, however, find a social setting motivational and in some

cases it can inhibit learning. Social settings also provide opportunities for improvement of communication and interpersonal skills. All these aspects of social interaction are coherent with approaches that foster deep learning.

A number of key points have emerged so far from this review of constructivism. Knowledge is socially constructed; learners benefit from interaction with peers and tutors; learners need to be actively engaged with their learning – empirically and intellectually; learning tasks must be meaningful and natural; and the role of prior learning/current learning as a basis for future learning. Indeed these key points inform current views on constructivism in practice.

In summary, constructivism and instructivism are two different approaches to learning – the former essentially student centred whilst the latter is teacher centred. Nevertheless, both are amenable to online learning. It would be an oversimplification to suggest that instructivism is aligned with the 'I' in ICT and constructivism the 'C' - but there is some degree of truth in this, with the resource and information focus so often related to instructivist ways and the social and communication aspects of constructivism. Biggs (2003) and Ramsden (1992) both argue for more student centred approaches in Higher Education because they are associated with deep learning whilst Collis and Moonen (2002) recognise the relevance of aspects of both approaches.

2.5 Disciplinary differences in academic practice

Having explored two of the important theories of learning, this section will now explore the way different academic disciplines can be classified and then explore the implications for teaching. It will end with a word of caution about applying these disciplinary classifications to individuals.

There has been an increased interest in disciplinary differences since the latter part of the 20th Century (Craigie 1999). One of the earlier influences was CP Snow who, in 1959, explored the longstanding divide between arts and sciences when he described two academic cultures, that of scientists and that of literary intellectuals. He suggested that each had a lack of interest in each others' work and called for greater communication and understanding between these groups (Craigie 1999).

2.5.1 Classification of disciplinary differences

In 1973 Biglan made a significant contribution to the field when he categorised subjects as being 'hard' or 'soft' and 'pure' or 'applied'. In Biglan's terms, Hard/Pure subjects such as physics and chemistry have knowledge areas of an atomistic nature that are logically linked to others in a cumulative manner. There is a concern with universal principles and a predisposition to the quantitative and numerical. Research is most likely to be undertaken by teams in a collaborative environment. Soft/Pure subjects such as history, on the other hand, have a knowledge structure that is more reiterative in nature, with topic areas being revisited and developed from new perspectives. There is more concern with particular instances than generalities and the knowledge is more qualitative and interpretive in nature. Research is likely to be more of an individual pursuit, often of a scholarly nature. The Hard and Soft Applied disciplines take their knowledge structures from their respective Pure counterparts, but both Applied communities are likely to be collaborative in nature and understandably concerned with application of knowledge in practice (Biglan 1973).

Donald (1986) drew on the work of Adler, Scheffler, Hirst and Bloom to propose a conceptual framework to differentiate/describe different disciplines. Donald's framework has 4 levels of analysis:

- 1) Basic concepts;
- 2) Logical structure (how concepts are related and principles organised);
- 3) Criteria to measure truth or validity;
- 4) Methods and procedures.

He was also concerned with whether a subject was theoretical or applied and whether it dealt with life systems or inanimate objects.

Donald (1986) applied his framework to 16 courses drawn from the physical sciences (physics, chemistry, biology, etymology and geology), social sciences (3 theoretical – psychology, sociology and political sciences – and 4 applied: educational psychology, social work, evaluation and law) and the humanities (history, English, philosophy and classics). The essence of his findings is as follows:

Concepts

The physical sciences had more concepts than the other areas and they were more technical/concrete in nature. Concepts in social science were less technical and concepts in the humanities were the least technical and the most markedly abstract.

Logical structure

Relationships in science were more likely to be dependent or contingent than those in the humanities, which were more likely to be arbitrary. The coherent structure of the knowledge base in the sciences, particularly the physical sciences, was taken to indicate a more logical structure. Law was unusual in that it exhibited many logical relationships, yet the subject matter was contentious.

Truth criteria

The contrast between physical sciences and humanities was most marked. Donald argued the physical sciences had the highest claim to truth, being concerned with identifying generalities from processes, trends and sequences. Emphasis was placed upon logical structure, precision, empirical proof and double checking. Humanities were seen as fraught with uncertainties and not overly focused on logical or scientific validity. Value was placed on authenticity of argument and response to criticism, plus consistency over time. Social science fell between the two having some structure and empirical means to elicit patterns and express them in general terms, with high store accorded to experience and reliability over time.

Methods and procedures

Donald was less able to elicit generalities in relation to methods and procedures although he noted that physical science was more likely to want to analyse and specify. He analysed subject skills using the following concepts: description, selection, representation, inference, synthesis and verification. This framework for analysis appears, however, to be a blunt tool because the criteria did not differentiate between areas particularly effectively. Alternatively, Adams and Buckland's (1999) interpretation is that Donald's work indicates that the differences between subjects are not as great as indicated by Biglan.

In 1989 Tony Becher published his seminal 'Academic Tribes and Territories: Intellectual enquiry and the culture of disciplines' (Becher 1989). Becher, like CP Snow, was concerned the wider cultural issues associated with academic groups –

his work was particularly important for its wide-ranging and in-depth examination of disciplines and the communities of academics within them. He went beyond disciplinary subject matter to explore the people and cultures that both differentiate disciplines and help account for, and perpetuate, the differences. For example, just as successful athletes gravitate towards the events to which they are physiologically most suited, successful Hard/Pure scientists need to have a facility with numbers, which in turn is aligned with a facility for logical thinking. But because the research projects they are likely to be involved with are likely to be highly complex and expensive (Smeby 2000), they will also need to be able to work collaboratively. So a combination of disciplinary subject matter, ability and wider circumstance all help shape their working cultures.

Becher spent a significant part of the 1980s interviewing 220 academics from 18 institutions in the UK and America. The academics represented 12 different disciplines and Becher used ethnographic methods to explore various aspects of disciplinarity. These included disciplinary boundaries and epistemological issues, such as the nature of knowledge, the role of theory, the research techniques used and the degree of quantification employed by the discipline (Becher 1989, p2). Becher drew on Biglan's notions of Hard and Soft, Pure and Applied subject areas within his work. However, the primary focus of this text revolved around the research cultures of the disciplines and it was not until later that Becher, with co-workers including Ruth Neumann, looked more specifically at learning and teaching.

2.5.2 Disciplinary differences in relation to Learning and Teaching

Neumann, Parry and Becher (2002) undertook a review of teaching and learning in disciplines. They developed Becher's original work to give particular relevance to undergraduate provision and also provided a new framework for analysis. The components of the framework are: curriculum; assessment; cognitive purpose; characteristics of teachers; teaching methods; and requirements of students. The review draws together a number of ideas about the differences in disciplinary approaches to learning and teaching and I have derived a table that summarises some of the key trends that Neumann *et al* (2002) argue distinguish the disciplines (see Table 2.1).

Table 2.1 Disciplinary groupings and their distinguishing trends (derived from Neumann *et al* 2002)

	Hard/Pure	Hard/Applied	Soft/Pure	Soft/Applied
Curriculum	<ul style="list-style-type: none"> -Knowledge cumulative, atomistic, linear, hierarchical, quantitative bias, tightly structured, concepts and principles closely connected -Emphasis on knowledge acquisition -Focus on established facts rather than relativity and uncertainty -Uncomfortable with critical perspectives, especially early in programmes 	<ul style="list-style-type: none"> -Similar to Hard/Pure with linear sequencing and factual understanding But: <ul style="list-style-type: none"> -Less emphasis on examining conflicting evidence and exploring other explanations -Less regard for precision and accuracy in validating knowledge 	<ul style="list-style-type: none"> -Knowledge is reiterative, holistic, concerned with particulars, loosely structured, qualitative bias -Knowledge acquisition is spiral and returns to topics with increased insight -Current thinking presented early on -Encourages a critical approach to develop students' skills 	<ul style="list-style-type: none"> Similar to Soft/Pure with knowledge acquisition via a reiterative process But: <ul style="list-style-type: none"> -Less emphasis on examining conflicting evidence and exploring other explanations -Less regard for precision and accuracy in validating knowledge
Assessment	<ul style="list-style-type: none"> -Testing knowledge acquisition and experimental skills -Frequent tests -Specific and closely focussed exam questions -Answers quantitative, numerical, objective, with little need for assessment criteria and double marking -Norm referencing more likely 	<ul style="list-style-type: none"> -Testing knowledge application and integration -Greater emphasis on problem-solving than Hard/Pure -Essays, explanations, examinations including MCQs, practice-based assessments -Fitness to practice 	<ul style="list-style-type: none"> -Testing level of sophistication and understanding of complex qualitative matter -Essays, short papers, project reports, tutorial participation, interactive oral assessments -Students bring their own perspectives -Continuous assessment rather than exams -Formative work for analytic and interpretive skills 	<ul style="list-style-type: none"> -Testing knowledge application and integration -Essays, explanations, project-based assessments -Peer assessment and self assessment -Marking criteria more ambiguous and greater need for constructive feedback as skills difficult to define -Fitness to practice

	Hard/Pure	Hard/Applied	Soft/Pure	Soft/Applied
Main cognitive purpose	<ul style="list-style-type: none"> -Acquire facts, principles and concepts -Classify and categorise -Understand and interpret theory -Reason logically -Test ideas using linear arguments. -Work with accepted scientific standpoints - Skills subject related and particular career choices in mind 	<ul style="list-style-type: none"> -Problem-solving -Practical skills -Integrate and apply existing knowledge -Specific job opportunities with little claim for widely transferable skills 	<ul style="list-style-type: none"> -Creativity -Critical thinking -Fluency of expression -Analysis and synthesis skills that are applied widely -Personal growth and individual interpretation of human experience -Extensive general knowledge -Ability to debate perspectives 	<ul style="list-style-type: none"> -Developing practice related skills and eclectic knowledge base -Personal development -Reflective practice and lifelong learning skills
Characteristics of teachers	<ul style="list-style-type: none"> -Research is competitive and commitment to research greater than teaching -Collaborative and cooperative due to research demands -Teaching content un-contentious, so relatively little time spent on preparation and programme review 	<ul style="list-style-type: none"> -Tendency to prefer research and consultancy to teaching -Collaborative -Course planning essential for professional bodies but Programme review not a priority -Least time spent on preparation for teaching -High contact hours for students 	<ul style="list-style-type: none"> -Research less competitive and demanding of commitment -Premium on scholarly knowledge -Inquiry solitary so less cooperative -Subject matter open to debate so preparation is time-consuming and Programme review taken seriously 	<ul style="list-style-type: none"> -Commitment to teaching greater than research -Collaborative due to professional influences -Programme review seen as important -Substantial contact hours due to concern for theory and practical skill development
Teaching methods	<ul style="list-style-type: none"> -Lectures, laboratories, fieldwork -Few seminars and not much small class work -Sequential presentational style -Handouts for key points -Study guides and self test questions 	<ul style="list-style-type: none"> -Lectures, laboratories and problem solving classes -Simulated or real world experience that facilitates knowledge acquisition. 	<ul style="list-style-type: none"> -Small groups, seminars and discussions for controversial topics, student presentations, tutorials, occasional lectures -All support reiterative and interpretative nature of subject knowledge 	<ul style="list-style-type: none"> -Small groups and discussion in seminars and tutorials -Simulated or real world experience helps students make meaning of knowledge already acquired -Experienced practitioners contributions stressed

	Hard/Pure	Hard/Applied	Soft/Pure	Soft/Applied
Requirements of students	<ul style="list-style-type: none"> -Good memory -Numerate -Ability to solve logical problems -Able to conduct experiments -Less need for skill with prose 	<ul style="list-style-type: none"> -Good memory -Numerate -Competence in problem solving -Practical competencies -Able to apply knowledge to professional contexts 	<ul style="list-style-type: none"> -Lateral thinking -Fluency of expression -Able to read rapidly and widely -Critical facilities for evaluating and interpreting 	<ul style="list-style-type: none"> - Problem solving (especially open ended ones) -Good and pragmatic oral and written expression -Understanding of how actions shape events

Whilst Donald's (1986) analysis is valuable for developing an understanding of the differences in subject matter, Neumann *et al* (2002) are important for looking at the wider context, particularly in relation to learning and teaching. Others have similar findings.

Carpenter and Tait (2001), who interviewed 24 academics at the Queensland University of Technology, reported finding transmission oriented 'traditional' practice in the sciences and student-centred 'progressive' orientation in the Softer education faculty. Interestingly, although perhaps unsurprisingly, they found that academics used newer technology in ways that reinforced their own approaches to teaching. In this respect the technology could be seen as pedagogically neutral – or certainly not the determinant of pedagogic approach.

Hand (1999), for example, draws on his own experience as a scientist to note how science is uncomfortable with critique and that many scientists are untroubled by the lack of it, pointing to the success of science as the major concern, rather than, say, the nature of theory. He notes how little cutting edge material appears in an undergraduate curriculum and, if it does appear, it is likely to be in the third year.

Bridges *et al* (2002) undertook a survey of academic performance of 12,500 students at four universities and noted differences in assessment practices and performance between disciplines (English, Business Studies, Computer Studies, History and Law). In English and History, assessments tended to be essays, critiques or seminar contributions. Exams consisted of open questions, similar to essays. Computer Studies and Business studies included more quantitative exercises. Two general patterns were noted:

- 1) Overall, students in all disciplines performed better in coursework than examinations – perhaps because of enhanced motivation to engage with the task, gaining help from others, or staff less willing to criticise directly.

- 2) The spread of marks in quantitative assessments was greater than for qualitative assessments. Objective marking schemes are not subject to the in-exactitudes of qualitative ones and the associated cultural preferences to concentrate marks within certain ranges (eg 40-70).

Bekhradnia *et al* (2006) undertook a national UK study for the Higher Education Policy Institute and highlighted *inter alia* the differences in formal contact time between different disciplinary student groups. For example, and mirroring Neumann *et al*'s (2002) findings, the Soft/Pure subjects of philosophy and history received on average 8.5 hours contact per week, the Soft/Applied education averaged 14 hours contact per week and Hard/Applied engineering averaged 19 hours contact per week.

Lindblom-Ylännea *et al* (2006) used Keith Trigwell's and Mike Prosser's 'Approaches to Teaching Inventory' to examine differences in approach by 303 Finnish teachers in Soft sciences and Hard sciences. The Soft science teachers were more predisposed to student centred and conceptual change oriented practice, whilst the Hard science teachers were more predisposed to a teacher centric, information transfer model of practice. This too fits with Neumann *et al*'s (2002) work, where the Hard sciences were more typically associated with lectures and the Soft subjects with small group work.

Sarah North (North 2005) interviewed 20 OU students about writing style and beliefs about academic writing in arts and sciences. Her work supported Neumann *et al*'s observation that skill with prose is greater amongst the Softer subjects, but gave greater insight into the complexity of the different types of communication - the succinctness, lack of critique and more objective and monologic tone in the Hard subject essays reflecting the disciplinary view of the uncontested nature of knowledge. She also explored the approaches to writing and found that the arts students generally adopted an extended approach to writing the essay using multiple revisions whereas the science students tended to write and revise just once. Although not made explicit, this wish to revisit and enhance, mirrors the Softer subjects' recursive approach to knowledge more generally.

Newton *et al* (1998) also explored knowledge differences when they explored the conceptions of 'understanding' in Soft/Pure history and Hard/Pure science (chemistry and physics). The research was based on interviews of lecturers and recent graduates in the two areas and revealed marked differences between the disciplines. Science had two broad conceptions of understanding – as a 'capability in application' and as 'having a mental structure'. The notion of 'capability in application' viewed understanding as the ability to acquire/remember natural laws and then apply them to solve problems. The 'mental structure' aspect of

understanding was the capacity to explain laws and to be able to see how self-contained laws could be integrated into larger units, gaining overall conceptions of what is going on. In contrast, the view of understanding held by the historians was of a reconstruction of events, including the origins of the events and plausible reasons for why they occurred. Deeper understanding was characterised by the ability to view the event(s) in the wider historical context. The possibility of prediction (analogous to science application) from this was viewed as limited – events are rarely so similar that outcomes can be readily predicted. The paper also explored related learning and teaching methods – it associated science more with the transmission of information and history more with the facilitation of learning and developing cooperative learning in order to piece information together.

2.5.3 Do these categories hold?

So far this section has developed categorisations of the different disciplinary groups using Biglan's matrix and has drawn on a number of studies to reinforce the ideas contained within the matrix. But it is important, however, not to use these trends to generalise to specific instances. For example, although many Hard/Applied academics may prefer research to teaching, that does not mean all do – nor does it mean that those that are committed first and foremost to research do not apply themselves effectively to teaching as well.

We cannot go from generalisations to specific instances partly because this is a logical limitation of the research process (eg inductive reasoning can fail). Of course this limitation is not confined just to this situation – the point is made here though because of the real danger of stereotyping people and practices by virtue of their discipline. Becher was very aware of such a potential pitfall when he drew on his participants' data to illustrate their impressions of the different disciplines - 'the non-academic lawyer', 'the adventurous zoologist', 'the cautious botanist' etc (Becher 1989 p30) - and he suggested that these snapshots could not be considered even 'profiles', but perhaps 'silhouettes' (Becher 1989 p31).

A second issue is the unit of analysis. Although Becher's (1989) work explores disciplines, he argues that the concept of a discipline is not the most useful when discussing spheres of professional practice - rather the specialism should be considered the fundamental unit of analysis (Becher 1989 p6). This is because when the contextual imperatives (the logically arranged explanations associated with Hard subjects) and contextual associations (the less well related ideas

associated with Soft subjects) are explored, specialisms in different disciplines can appear very similar, whilst specialisms within the same discipline can vary markedly (Becher 1989 p6). Neumann *et al* (2002) give examples such as biology which has both Hard/Pure and Soft/Pure elements and sociology which is almost entirely Soft/Pure, except for sociometrics which is Hard/Pure. Other 'disciplines' are in fact interdisciplinary, drawing on several different disciplines for their knowledge base and methods – health disciplines are a good example of subjects drawing on Hard and Soft traditions. Neumann *et al* (2002) also note that some disciplines change over time – linguistics having changed to mainly Hard/Pure as a result of the introduction of the computer into its research culture.

Barnett *et al* (2001) provide two challenges to the Biglan model as the definitive way to analyse disciplines. Firstly, they use a different, three part classification - Science and Technology; Humanities and Arts; and Professional subjects. And secondly, they look to how fluid disciplines and their boundaries are in the real world. They examine the flux within disciplinary knowledge and distinguish three ways in which disciplinary knowledge (and curricula) change. Firstly the field of study may develop a new overall structure - eg nursing, relatively new to Higher Education is still developing its balance between the Soft and Hard knowledge components it draws upon. Secondly, new topics emerge within a discipline – eg the emergence of tourism and leisure within business studies. Thirdly, new techniques become incorporated into a discipline that change the nature of knowledge explored, such as the use of computers to aid research in history (Barnett *et al* 2001). Their view is of increasing fuzziness and 'porosity' between disciplines, auguring the end of disciplines as discrete bodies of knowledge (Barnett *et al* 2001 p441).

Bridges (1998) reviewed the history of interdisciplinarity in UK Higher Education, tracing it back to the 1960's and noting its challenge to the existing disciplines. He also highlighted other important influencing effects – the introduction of modular degrees in the 1980's, which allowed for more flexible study patterns and often permitted students to construct degrees that spanned the traditional disciplines. Hagoel and Kalekin-Fishman (2002) explore the concept of interdisciplinarity – specifically the process and consequences when an individual's knowledge and epistemological understandings span disciplinary boundaries. Their auto-ethnographic work charts in detail Hagoel's experiences as she trains in a Hard science (immunology) when already a practitioner of a Soft science (sociology).

She provides rich analytic insights into the cultural differences she encountered. She highlights some of the limitations of uni-disciplinary approaches (eg the inadequacy of the methods to solve real world, complex problems) and ways that different disciplines' perspectives can complement each other (eg the sociologists' focus on social causes of disease and the medical practitioners' primary focus on patho-physiological causes together bring a more complete picture of the problems and possible solutions). Hagoel also realised, from her sociology stance, that, in fact, the medical practitioners were already incorporating a 'naïve sociology' (Hagoel and Kalekin-Fishman, 2002 p303) into their thinking, recognising the blurring of boundaries already inherent in the professional practice.

This section has explored disciplines and the potential implications for curricula and teaching. It is important to note that there are a number of cultural differences between disciplines and also differences in the sort of knowledge that teachers work with and the way that knowledge is structured. It is equally important to be wary of going from the general to the particular. In other words, although a discipline as a whole may exhibit certain characteristics, it does not follow that particular individuals adhere to all the characteristics. Indeed, as the results of this study will suggest, we should all be wary of stereotyping.

2.6 Change and change management

This section will explore theoretical aspects of change and change management and then discuss some of the issues particularly related to change in the Higher Education sector. It will conclude by examining some case studies of how change relating to MLE and VLEs has been implemented in the sector.

2.6.1 Theoretical perspectives on change and change management

Mary Boyce (Boyce 2003) drew on the literature in Higher Education, sociology and organisational theory in her review paper on change management in Higher Education. She was particularly interested on sustainable change. Her paper contrasted two types of change – first order change, which is incremental and structural in nature with second order change which is radical or transformational. Most importantly second order change is irreversible.

Ackerman (1997) discriminates further, distinguishing between three types of change. Developmental change which is first order in nature, incremental and enhances or corrects current practices or procedures. It may be planned or simply

emerge. Transitional change, on the other hand, is second order and is typically planned - a new state is envisaged that is different to the existing one.

Transformational change describes a more radical change from the existing state, when the organisation and its members are required to change their basic assumptions. Sometimes the introduction of new technologies can be 'disruptive' and result in second order change.

As inferred above, change can be planned or emergent. Emergent change may result from decisions that are apparently unrelated to the change, but are in fact based on management's implicit assumptions, so the emergent nature may be more internally influenced than perhaps at first apparent. Alternatively, change may be driven by factors outside the managers' control, either internally or externally (Conole undated). Of key importance is the idea that these emergent, unplanned features of change will mean that it is not an entirely linear or predictable process.

In their examination of the pharmaceutical industry, Huff and Huff (2000) describe a four stage model of change from both an organisational perspective and a group or individual perspective. The four stages are so closely aligned between organisation and groups/individuals that the stages can be amalgamated as:

- Working in a stable state characterised by incremental change ('business as usual')
- Thinking about unanswered questions and considering the possibility of radical (second order) change
- Exploring second order alternatives to the *status quo*
- Enjoying a 'honeymoon period' in the new framework

Huff and Huff (2000) explored the motivations from moving from the *status quo* to implementing radical/transformational alternatives. Their analysis suggested that as the status quo progresses, small adjustments and improvements to processes are made – however some issues will arise for which there is no straightforward solution (the unanswered questions) and, in the absence of solutions, difficulties will build up and stresses emerge. It is at the point when the cumulative stresses outweigh the (comfortable, settling) inertia of maintaining the *status quo* that more radical solutions need to be contemplated.

The final stage of Huff and Huff's (2000) analysis is tantalising – in terms of sustainability, it is not the honeymoon that counts, but whether the new order persists in the longer term. Argyris (1999) describes two types of organisational (and individual) learning – single loop and double loop. Working with Donald Schon, Argyris was interested in how organisations get feedback on their systems and processes – detecting and correcting error. Single loop learning is a relatively unquestioning process of using feedback, rather like a thermostat correcting the temperature of a system. Single loop learning uses accepted heuristics, formulas and approaches. Double loop learning goes further because it involves questioning the underlying assumptions of the organisation, system or process. Error is corrected not by making a simple adjustment within, for example, a process, but by a change to a policy, system or organisation fundamental. But there are two types of double loop learning: the first is evidenced by changes in outcomes, the second is characterised by the continuing rigorous (double loop) practice of examining underlying assumptions. Argyris argues that the first type of double loop learning may lead to temporary change whereas the second, more rigorous, type is more likely to lead to sustained change (Argyris 1999).

2.6.2 Factors influencing change in the Higher Education sector

Like all large organisations, the drivers for change in the HE sector will include internal influences (such as local strategy, individual enthusiasm for change and the structures that facilitate or inhibit it) and external influences (such as HEFCE policy, the QAA and commercial pressures).

Eckel *et al* (1999) stressed how the independence of university departments results in complicated, often distributed, decision making. They stressed how effective leadership for change involves dialogue and collaboration between the leadership team and those affected by change in order to properly engage the campus community. It also involves aligning time, resources and awareness-raising with a major change effort.

Boyce (2003 p120) describes universities as 'loosely coupled systems with diffused decision making', ensuring that change is complex and that organisational change initiatives frequently fail. In the context of this research, it is important to note that she based her notion of 'loosely coupled systems' on Weick's work from 1976, which preceded the creation of the post-92 universities. These new universities tend to have a more central (CNA derived) management system than the

traditional institutions with their devolved decision making arrangements (Quinsee and Sumner 2005). As a consequence, the post-92 institutions may be less 'loosely coupled', with more concentrated decision-making systems.

Several authors refer to the increase in managerialist approaches to running universities (Oliver undated, Weeks 2000, Newton 2003, Lisewski 2004). Oliver (undated) argues against the managerialist culture and for academic autonomy. He explores some of the barriers that universities face when implementing change and stresses that change can be experienced as loss (of role, of identity) by staff. He appears worried by such issues as the increase in team working by academics, viewing this as a loss of autonomy. When discussing sustainable change in relation to e-learning, he argues that rather than have change imposed, what occurs naturally is sustainable e-learning – this appears to be reconceptualising the *status quo* accompanied by piecemeal development (analogous to Boyce's first order change) as a sustainable way forward. In what is a common thread in the Higher Education change management literature, he argues against top-down change initiatives, drawing on Wenger's view of how groups try to influence each other's practice. Examples include:

1. Members of one group participate in the activities of others in a peripheral way (eg academics on management committee take messages back to academics)
2. Specialist brokers who have links with a number of groups enable rapid sharing of new ideas around an institution (eg ICT Champions)
3. A community with power, including budget holders and policy makers require staff to change (eg using targets and audit)

Oliver suggests the networking and sharing inherent in the first two are more effective at bringing about sustained change than the coercive nature of the third.

When considering an institution's propensity for top-down or bottom-up approaches, Conole categorises institutions according to four cultural styles - bureaucratic, collegiate, innovative and enterprise (Conole undated).

Collegiate institutions typically separate administrative and academic management, have unclear reporting lines, rely on committees for decision making and are characterised by ground-up initiatives that focus on local interests. This is said to typify traditional/old universities.

Bureaucratic institutions have strong central management with a clear hierarchy of control and decision making. The central management has strong control over strategic direction. This is the more typical image of a post-92 university.

Innovative institutions have flexible structures in order to adapt rapidly – they are geared up to change. Functional activities are often linked to strategic priorities and often span subject areas. Some post-92 and old universities are embracing this model.

Enterprise institutions are very business-like and sensitive to external financial opportunities. Responsibilities are clearly demarcated and business plans based on market analysis and needs. This business like orientation is more commonly found in US institutions.

The role of culture in change is only part of the picture – Conole also stresses how the people involved and the institutional processes are also fundamental to successful change.

Newton (2003) analysed the implementation of a student centred Learning and Teaching strategy at a new university. The university embarked on an unsuccessful top-down implementation, which was not accepted because of:

- Academics' loss of autonomy
- Policy and strategy overload
- Bureaucratisation of teaching
- Local practice and local culture
- A proposed shift in emphasis from 'teaching' to 'learning'

He noted how staff in such circumstances can either cope or resist by such methods as avoidance or reconceptualising the strategy so that it fitted with their actions. There was a tension between the (professional) academics and the corporate management style (re-emphasising Conole's view of the importance of the people as well as management style and policies). The upshot of the implementation was that the imposed strategy had to be redeveloped and Newton's conclusion was that strategy should not be decided centrally, but a process that gave local ownership and belief was crucial.

In the same way that the Dearing report articulated the challenges facing British universities, the 1997 report of the Committee of Review of Higher Education Financing and Policy reinforced the changing times in the Australian Sector (Taylor 1998), including the need to embrace ICT. Having identified the need to embrace change, Taylor (1998) argues for a dual track approach – the small scale innovation of enthusiasts or 'lone rangers' and a more strategic approach to enable the wider institutional community to 'appropriate' those innovations with more widespread applicability. Boyce (2003) also supports the notion of building on previous success as an important mode of working. Taylor (1998) points out that the academic innovators work best when relatively unconstrained in the way they tackle the challenges they are facing, resulting in developments that are context specific, and may sit outside institutional policies. From an institutional perspective this can be high cost, low return activity.

In order to help spread lone ranger innovations, Taylor (1998) suggested a five stage approach, summarised in Table 2.2. This was developed specifically in relation to ICT.

Table 2.2 Taylor's 5 stage appropriation model

Stage	Characteristics:	Support required
Orientation	Staff encouraged to consider new (viable) options	Time to reflect and plan, especially as a team
Adoption	Staff adapt existing practices to new approach	Training in technical aspects of ICT
Evaluation	Real-time and retrospective evaluation/reflection of the change	Discussions framed within relevant educational theory
Innovation	Develop new practices further, as relevant to their contexts	Support to redevelop, repurposing the above three stages once more
Institutionalisation	Managers, in particular, take steps to embed new practice	Reviewing and developing policy, including relevant reward and recognition

Importantly he emphasises the benefits of these 'appropriators' working collaboratively and the benefits of allowing staff to tap into established practices.

This process is essentially an evolutionary approach in which risk is minimised and anxiety reduced (Taylor 1998).

Also writing from the Australian perspective, Janet Hanson (Hanson 2003) noted the key drivers for increasing the use of ICT in universities were an increase in student numbers; an increasingly diverse student population with additional support requirements; and an increased need for flexible Learning and Teaching strategies with the concomitant need to review delivery methods. She reviewed the implementation of new strategies at a number of Australian universities and was particularly interested in the role of senior management, central support, staff development and reward and recognition.

Hanson's research involved visits to a range of institutions to interview key stakeholders. Key messages to emerge were: the importance of senior managers with vision and a willingness to support that vision; the importance of effective deliberative strategies to develop policy so that stakeholders were able to bring their influence to bear; the use of senior staff as champions (for e-learning); the proper funding of initiatives, with an emphasis on team rather than individual funding support; centrally coordinated staff development that worked collaboratively with faculties; and appropriate reward and recognition, including prizes, fellowships and promotion opportunities. Critical to success was gaining staff support for the implementation (Hanson 2003). Drawing parallels with the UK system, she emphasised that strategic statements were insufficient without appropriate support and motivation.

2.6.3 Examples of the change in the Higher Education sector

Andrew Hannan (Hannan 2005) undertook an Economic and Social Research Council (ESRC) funded project to study the innovative ways which Higher Education staff at 15 institutions responded to the different challenges facing them. He established some important factors that were associated with a successful Learning and Teaching innovation:

- The innovator had encouragement from HoD, Dean or authority person
- The institution viewed Learning and Teaching on a par with Research
- Colleagues and people in authority showed an interest in outcomes of the innovation
- Resources were available to fund innovation

Hannan (2005) also produced a useful categorisation of innovation as either individual (in line with an individual's enthusiasm), guided (for example, supported by funds that were directed at general notions of improving teaching) or directed (in line with institutional priorities). These are readily recognisable ways that change may occur within an institution.

Bell and Bell's (2005) case study of implementing a Blackboard VLE at Northumbria University highlights some areas of good practice and also some unanticipated outcomes that are paralleled in this (ie my) research. Their paper studied VLE implementations at four universities, but much of the detail is of the Northumbrian case. It was a top-down implementation that involved planned staff development and responsive staff support arrangements.

They encountered a number of challenges including:

- The MIS information that was used to populate the VLE was not accurate – they had to work closely with relevant administrative staff to overcome this;
- The MIS data did not record which staff were teaching on which module – they had to introduce a non-electronic (presumably manual) system to load this information - eventually leading to a self sign on system;
- They did not initially take into account the development needs of technical and administrative staff and had to devise appropriate support programmes;
- They had to produce multi-faceted staff development and support, including linked topic training sessions.

Bell and Bell's (2005) analysis used Rogers' model to categorise staff as innovators, early adopters, late adopters and laggards. They observed the valuable roll of student expectations as a driver for some of the early majority and the late majority. There had been a clear management drive with a road map for engaging with relevant issues, such as Quality Assurance, copyright and Intellectual Property Rights (IPR), legal issues and plagiarism

Bell and Bell (2005) categorise the institution as a learning one and stressed the importance of the implementation including all stakeholders. They categorised their institution's management style as collaborative with transformational leadership.

Their approach did not appear to rely on targets, but they achieved 90% staff take up of the system and 72% of students over a four year period.

Liewski (2004) analysed the institution-wide implementation of an MLE at the University of Salford. This involved a strategic top-down approach with engagement targets for all modules to have a web presence on Blackboard within three years. At Salford, the Learning Technologies Strategy is viewed as central to its programmes' delivery and support (Liewski 2004). In a parallel with Taylor (1998) the approach was to take successful bottom-up innovation (an organic emergence of expertise based on enthusiasm, soft money to encourage e-learning and informal central support) and embed widely using top-down strategy led initiatives. A steering group with links to relevant committees and units was established and the implementation involved the targets (see above), staff development and support (technical and pedagogic), working with Faculties and Schools on relevant planning in business plans, and awareness raising and the provision of guidance and exemplars.

Liewski's phenomenological approach was based on interviews with a small number of the strategists, support team and academics. External drivers for the initiative included: the need to keep abreast of others in the sector; improved access and flexibility for students; student expectations; and the global Higher Education context. Internal drivers include building on tradition and the view that it was natural to have a strategic approach building on work of innovators to keep the momentum going. This shift from bottom-up to top-down was seen as a continuum. Success factors were seen as: giving people time; a clear vision of what is wanted and, operationally, how to get there; and, necessarily, effective communication at all levels (Liewski 2004).

The implementation at Salford is ongoing and Liewski explored the use of targets for web presence and flexible curricula at some length. He suggests that they are 'technical-rational' and should work best in closely/tightly coupled systems where outcomes are predictable. However, Salford is a loosely coupled system (as are many universities (Boyce 2003)) and therefore a tension is inherent in this approach. The solution, he argues, is an effective dialogue between academics, management and central units, based on mutual understanding and respect for culture and beliefs.

Quinsee and Sumner (2005) discuss the implementation of an institution wide VLE at City University in 2003, exploring whether it was evolutionary change or transformational. Drawing on Boys' (2002) work, they consider whether the implementation was essentially an integration of existing systems or a major rethinking of City's educational and organizational processes. Their research was based on semi-structured interviews of key decision makers (academics, administrators and managers). Their findings suggested that there was no consensus about the relationship of e-learning to pedagogy – whether or not it was more student centred, whether the technology or the pedagogy was driving change (but suggesting that both needed to be considered in parallel); the importance of properly locating the services supporting the implementation; the importance of good communication with all stakeholders; balancing the technological and pedagogic imperatives; effective staff development and motivation, including, but not relying on, reward and recognition; and a clear strategic direction, with e-learning integral to strategy, not standing alone (Quinsee and Sumner 2005). Overall, although the implementation was supported by a 'big bang' launch and staff development drive, they were now in a 'bedding down' (p154) phase and a quieter period of integration - therefore they suggest theirs was an evolutionary approach not a revolutionary one.

In order to facilitate change, Surry and Land (2000) draw on an instrumentalist view, where the focus is on the user of technology and see 'the adoption of technology as an outgrowth of a wide variety of social and human factors in addition to more widely cited organizational and product factors' (Surry and Land 2000 p146). The adoption of technology is very much rooted in the individual and the context and their analysis of supporting staff is grounded in the different needs of different groups. They use Keller's ARCS model as a basis for their recommendations. ARCS relates to **A**ttention gaining strategies, **R**elevance strategies, **C**onfidence building strategies and **S**atisfaction strategies and is concerned with motivating and supporting staff through change – the argument being that all these strategies are necessary to motivate people to participate. They map these categories against the needs of innovators, early adopters, early majority, late majority and laggards, illustrating, for example, how an organisation and individuals may need a different attitude to risk as far as innovation and embedding established practice is concerned. Throughout their analysis is an emphasis on: effective multilayered dissemination activities; supportive and context

relevant development (including peer tutoring); adequate funding and other resources; and appropriate reward and recognition.

Like Quinsee and Sumner (2005), Surry and Land (2000) reflect on the relationship between technology and pedagogy – does technology lead to new pedagogy? They conclude that there will be a mix – sometimes technology will enable existing practices to be conducted in new ways, and sometimes they will result in new theoretical perspectives on pedagogy emerging.

2.6.4 Summary of 'Change and change management'

A number of general points have emerged from this section. From a theoretical perspective, change can be considered first order/evolutionary or second order/transformational and that institutions (and individuals) can engage in single loop learning or double loop learning. Second order change is most likely to be sustained if accompanied by double loop learning.

The point was made that universities are complex institutions, often with diffuse decision making structures. Change strategies need to respect and work with the institutional processes, the culture and, most importantly, the people. The recent increase in managerialism in the sector means that this is a particularly pertinent message.

From a practical perspective, the literature and experiences of various institutions revealed that there is no one method that works – that will depend on the culture, the processes and the people. But there were a number of pointers to good practice, including: the importance of a clear vision and good communication; the different needs of different players at different stages of change (for example, innovators and the subsequent adopters); the importance of effective dialogue; the value of collaboration; an understanding of the cost – human and financial – of change and a commitment to address the attendant needs; appropriate/effective reward and recognition strategies; and understanding of the interaction between technology and pedagogy.

2.7 Summary of the Literature Review

The Literature Review began by proposing that a variation to Bronfenbrenner's ecological model of human development was used as a framework for exploring the

research's findings. This will be fit-for-purpose and focus on the microsetting, the mesosetting and the macrossetting.

The rise and rapid spread of the MLE within the Higher Education sector was described and the potential for this technology to transform the student learning experience evinced. MLEs enable staff and students access to e-learning opportunities that were hitherto the realm of ICT experts. They offer support for a range of learning modes and can support more flexible ways of learning. Their emergence is in line with Dearing's recommendations (NCIHE 1997) and now championed by the HEFCE's Strategy for e-learning (HEFCE 2005).

Constructivist and instructivist approaches to learning were reviewed and it was argued that both are amenable to online learning. Instructivism is generally associated with more teacher centred practice and constructivism with more student centred practice. Difference in approaches was also explored in the section on disciplinary differences. In particular, the cultural differences between disciplines, differences in the sort of knowledge that teachers work with and the way that knowledge is structured were detailed. These factors inevitably have consequences for curricula and the student learning experience.

The final section explored change: emergent or planned; first order/evolutionary or second order/transformational; single loop learning or double loop (sustaining) learning. Universities are complex institutions, often with diffuse decision making structures. If they are to be successful, strategies to support change need to respect and work with the institutional processes, the culture and the people.

CHAPTER 3 - METHODOLOGICAL CONSIDERATIONS AND METHOD

3.1 Research questions and justification for this methodology

This case study will investigate the following research questions:

- How do academic staff from a range of disciplines go about their academic practice?
- How have they incorporated StudyNet into their academic practice?
- Why have these staff chosen to utilise StudyNet in the ways they do?

In order to contextualise the answers to these questions, the research will need to examine the institutional setting within which the participants are using StudyNet and also locate their use of StudyNet within their overall approach to academic practice. This contextualisation will draw on local documentary evidence and other data to explore the institutional context, inevitably involving a mixture of quantitative and qualitative data. Using a modification of Bronfenbrenner's ecological model, the discussion will review the findings in terms of the academics' local teaching environments (the microsettings), the institutional context (the mesosetting) and the wider Higher Education context (the macrosetting).

Wellington (2000) summarises some key aspects of case studies as their facility to involve multiple methodologies, their concern with how and why things happen and their lack of intervention. Case study is therefore an appropriate approach for addressing these research questions.

3.2 Review of case study methodology

3.2.1 **Classification of case studies**

Case study research has been classified in a variety of ways. This section will review Bassey's, Yin's and Stake's views in order to set this research's terminology and framework in context.

Bassey (1999) describes three categories of case study:

- 1) *Theory seeking and theory testing case studies*. The implication here is that the case being studied is believed to be a particular instance of a more general state of

affairs. Generalisation and/or propositions, of a fuzzy nature, are intended outcomes.

2) *Story telling and picture drawing case studies*. Although primarily descriptive in nature, such studies should be analytical studies of educational issues and should produce theoretical insights. Any generalisations are likely to be discursive in nature. *Story telling* cases are more longitudinal in nature, whereas *picture drawing* cases are more an instance in time. Unlike theory seeking and theory testing case studies, the cases under study are of interest in their own right.

3) *Evaluative case studies*: This category refers to studies where evaluation of a particular educational activity is of primary importance. The generation of theory is not a necessary consideration.

Yin (1994) advocates case study for investigating 'how' and 'why' type questions in a real life setting. He too identifies three categories of case study.

1) *Explanatory case studies*. These studies seek to explain causal relationships and indicate how the findings may be applied in other circumstances. They are analogous to Bassey's theory testing studies.

2) *Exploratory case studies*. These are used to explore an issue and help develop the associated theory. These are analogous to Bassey's theory seeking studies.

3) *Descriptive case studies*. These are used not just to describe a situation, but to help develop key insights or discover key phenomena. They are analogous to Bassey's story telling/picture drawing case studies.

Stake (2000) also describes three types of case study. His first two categories, *Intrinsic case studies* and *Instrumental case studies* have much in common with Yin's and Bassey's classifications. However, his *Collective case study* category, in which multiple cases are studied, introduces a new factor for consideration. The rationale for collective cases, or multiple cases studies, is that they will provide a better understanding than a single case study, coupled with greater potential to apply the findings more widely.

Bassey considers multiple cases outside of his basic classification and links their purpose straightforwardly to improved generalisation (Bassey 1999 p99). Yin also chooses to discuss the role of multiple case studies outside of his basic classification. His argument for multiple cases draws on replication logic rather than sampling logic. The multiple cases are not chosen to increase the chance of gaining a representative sample, but carefully selected to see whether subsequent

case findings are similar (literal replication) or different, but predictably so (theoretical replication) (Yin 1994 45-46).

This case study is congruent with Bassey's story telling category. The subject is intrinsically interesting to me; the study has a longitudinal perspective; it is analytical and should produce theoretical insights; and any generalisations are likely to be discursive in nature. These characteristics, coupled with resource considerations, mean that only a single case will be studied, rather than using a multiple or collective case study approach.

3.2.2 Methodological considerations for the case study

A case study involves an in-depth study of a particular case and this pragmatic form of research is not defined by the methods of data collection it employs. In fact, for Stake (2000) the key decision for the researcher is not a methodological one – qualitative or quantitative – but what is to be studied? Once the case is decided upon, appropriate methods can be drawn from either or both of the quantitative and qualitative traditions.

The methods available to the researcher are numerous. For Yin (1994), sources of evidence include documentation, archival records, interviews, direct observations, participant observations and artefacts. Robson (1993) adds questionnaires and standardised tests to this list. Cohen *et al* (2000 ch9) suggest the interpretive and subjective dimension of case studies are particularly suited to educational research and assert that a method of observation should always be used. However, this rather prescriptive insistence is at odds with Stake's (2000) view that the case should determine the appropriate methods.

3.2.2.1 Research paradigms

The theoretical framework – complete with its assumptions and beliefs - that underpins a study is termed a paradigm (Robson 1993). Lincoln and Guba (2000) describe five research paradigms: positivist, post-positivist, critical theory, constructivist and participatory. Positivist and post-positivist paradigms have a very objective perspective and rely on quantitative methods. Critical theory is particularly concerned with power and inequality issues. The participatory paradigm draws on aspects of both constructivism and critical theory, but is particularly concerned to accord participants and researchers equal status.

The constructivist paradigm is concerned with how people construct meaning and construct theory. From an ontological perspective, it recognises multiple realities. From an epistemological perspective, it recognises that the researcher sets out to understand human experiences from the participant's perspective and that they jointly create these understandings (Denzin and Lincoln 2000 ch1). Its methods are qualitative in nature, typically conducted in a naturalistic setting (Denzin and Lincoln 2000 ch1). The constructivist paradigm is sometimes called the interpretive paradigm. However, Miller and Crabtree (1999) argue that this can cause confusion between the paradigm itself and a key aspect of data analysis typically associated with this and other qualitative paradigms, namely interpretation. The constructivist paradigm is, therefore, one of a number of interpretive paradigms. The criterion it uses to judge the value of its findings is trustworthiness, the key components of which are credibility, transferability, dependability and confirmability (Lincoln and Guba 1985, Robson 1993, 402-407). The methods for achieving these components of trustworthiness will be discussed in the Method section.

3.2.2.2 Qualitative research traditions

A number of research traditions are associated with qualitative, or interpretive, research. Amongst the most common are Ethnography, Grounded Theory and Phenomenology.

Ethnographers explore the culture of the group under investigation. They typically use participant observation, immersing themselves in the culture of the participants in order to understand their perspectives (Miller and Crabtree 1999).

Grounded Theory uses interpretation to extract theory from data (Charmaz 2000). Its early champions, Strauss and Corbin, incorporated positivist and post-positivist notions of rigour (Denzin and Lincoln 2000 p14), involving systematic approaches to simultaneous data collection and analysis and theoretical sampling. Charmaz (2000), working from a constructivist perspective, emphasises the importance of participants' subjective meanings as a source of theory and understanding.

Phenomenology embraces several interpretive approaches, all characterised by a recognition of the primacy of the subjective consciousness and that this consciousness bestows meaning (Cohen *et al* 2000). Despite the variety of approaches used, Phenomenology's aim is an analytic description of phenomena that is not influenced by prior assumptions (Holloway 1997). However, as prior

assumptions are difficult to remove from the research process, reflexivity is an important aspect of this tradition (Cohen *et al* 2000).

3.2.2.3 Pragmatism, bricolage and this case study

Researchers have to be pragmatic. At the February 2006 EdD weekend Jon Nixon asserted that researchers do not have to always use established methods – rather they need methods that are fit-for-purpose. Researchers have to be able to resource their research, they need skills and expertise relevant to their chosen methods, they require the goodwill of participants to contribute to their research and they have to work within other limitations, such as ethical constraints. As discussed previously, Stake (2000) argued that defining the case and using methods appropriate to its particular needs are more important than higher level methodological considerations. This creates a potential tension between research theory and research practice – should theory determine practice or should practical needs override theoretical considerations?

This is not new ground and the researcher who works with more than one method or even more than one paradigm can claim to be working as a *bricoleur*. Denzin and Lincoln (2000) describe the *bricoleur* as a researcher who uses a variety of methods and tools to develop a *bricolage* – a set of representations that are pieced together to form a whole picture (*bricoleur* is French for ‘carpenter’). They go on to describe two types of *bricoleur* – one who works within one paradigm only - the *theoretical bricoleur* - and one who works within several, possibly competing, paradigms – the *researcher-as-bricoleur*. Miller and Crabtree (2000) also concur that it is legitimate to draw on different paradigms and methods if the research question justifies it.

Case studies rely on multiple sources of data to bring rich description to the topic under investigation. This case study will draw on both quantitative and qualitative sources of data. It will use documentary evidence, such as policies and strategies, and statistical data, such as MLE usage figures to set the case in context. The primary sources of data, however, are the semi-structured interviews, which will capture the participants’ experiences of teaching in the changing educational environment at UH. Although the study will draw on aspects of ethnography (I work in the same environment as the participants, wrestling with similar influences and also making choices in relation to my own teaching), Grounded Theory (I have set out to explore others’ subjective experiences of the case) and Phenomenology (I

have tried to explore the case with as few preconceptions as possible – although inevitably some are evident - and recognise the importance of reflexivity).

Therefore, it is reasonable to assert that this is essentially an interpretive study, located in the constructivist paradigm and the researcher will be acting as a *theoretical bricoleur*.

3.2.2.4 Trustworthiness

Qualitative research should be conducted in a rigorous and systematic manner (Robson 1993 p402) in order to assert the worth of the findings. Rather than talk in positivistic terms of validity, Robson argues that the results of qualitative research should be 'trustworthy'. Trustworthiness is based on Lincoln and Guba's (1985) work and has four components: credibility, transferability, dependability and confirmability. The following overview is based on Robson (1993, 402-407).

Credibility - For research to be credible, the researcher should be able to demonstrate that the 'subject of the enquiry was accurately identified and described' (Robson 1993 p403). This has parallels with internal validity in quantitative research where the research design has to account for any threats to internal validity, such as maturation and regression to the mean.

Steps to attest to the credibility of the research include *prolonged involvement* with the subject matter so as to properly appreciate the culture of the case. *Persistent observation* of the most important aspects of the case (this is pertinent to observational studies). *Triangulation* of the data is achieved by drawing upon different sources of evidence, different methods of collecting data and involving, if possible, different investigators. *Negative case analysis* involves refining hypotheses until they account for all the data. *Member checks*, where participants are asked to confirm the accuracy of their contributions or comment on the interpretation of their contributions, are an important way of adding credibility to the process.

Transferability - This refers to how readily the findings can be transferred to another situation and is analogous with generalisability in quantitative research. A key aspect of quantitative research is that it sets out to make statistical generalisations about a population and then enable the reader to be able to make inferences to specific instances (i.e. to a different case).

The various non-representative sampling methods and lack of statistical analysis typically found in qualitative research means this sort of generalisation is not possible. Whilst authors such as Stake (1995) argue for *naturalistic generalisation* (where readers learn by vicarious involvement with the case) and Bassey (1999) argues for *fuzzy generalisations* (where the possibility, rather than probability, of an outcome is predicted), Robson believes that the responsibility for generalisation lies with the reader of the research rather than the author. In order for this to happen, the researcher should ensure that all the detail and information that the reader might need to make such a judgement should be included in the report.

Dependability - In quantitative research, the closest analogue to *dependability* is reliability. If the data and processes cannot be depended on, the results cannot be credible. As for credibility, *triangulation* is an important strategy for ensuring that the data and findings can be depended upon. Secondly, can an independent person audit the documentation, relating the research process to its outcome in order to verify, for example, that the processes are clear and systematic and safeguards against bias have been satisfactory?

Confirmability - This is analogous to objectivity – of particular interest is whether the findings are grounded in the data rather than the result of researcher bias. Once again, potential for audit is taken as the mainstay of confirmability. Robson acknowledges that it is not likely to be practicable for all small scale studies to be actually audited.

This study will use such techniques as triangulation, detailed description of the process and a reflexive account to support the trustworthiness of its findings. The detailed description of the research process should enable an audit to be undertaken.

3.3 Method

3.3.1 Background data

Various local documents were gathered to help contextualise the case study. These included:

- UH Policy and Strategy statements
- Minutes of the StudyNet Development Group meetings

- Minutes of the StudyNet Learning and Teaching Group meetings
- StudyNet login data
- QAA reports (eg Institutional audit thematic trail)
- CETL documentation
- Local research studies
- Other data used to describe and analyse the UH context

Relevant references to these data have been inserted into the results section where appropriate.

3.3.2 The semi-structured interviews

Interviews were used because they are flexible/adaptable and have the potential to enable the researcher to access rich and illuminating material (Robson 1993, p229). Various types of interview are described in the literature. A *structured interview* is essentially a questionnaire that is completed by the researcher. A *semi-structured interview*, as the name implies, has less structure and permits variation in the order topics are addressed and the phrasing of the actual questions and interactions with the participants. An *unstructured interview* addresses a general area of interest or concern, but the discussion is largely in the control of the participant. This last type has been used in therapeutic settings more than research (Robson 1993, 228-241).

This research incorporated semi-structured interviews because of their flexibility and potential to elicit meaningful information. In order to maximise the potential the guidelines below will be considered.

The structure of the interview was as described by Robson (1993, 234-235):

- *Introduction* – to review the purpose of the interview and confirm arrangements regarding confidentiality.
- *Warm-up* – a few straightforward questions to put the participant at his/her ease
- *Main body of interview* – a logical progression covering key topics that can be varied as necessary. Any contentious questions should appear later rather than earlier.
- *Cool down* – a few more straightforward questions to defuse any tension that may have developed.
- *Closure* – Thanking the participant and finishing the interview

As far as possible, questions were clear, concise, understandable and unambiguous. The following question types were avoided (Robson 1993, p232):

- *Long questions*
- *Double-barrelled or multiple questions*
- *Questions involving jargon*
- *Leading questions*
- *Biased questions*

With the above guidance in mind, the initial interview schedule (Appendix 1) was constructed to enable the research questions to be addressed in a potentially meaningful manner.

3.3.3 Ethical approval

UH requires all research conducted by its staff that involves human subjects to gain permission from the appropriate UH Ethics Committee with Delegated Authority. This ensures that the normal safeguards and assurances are in place (e.g. informed consent prior to participation, protection of confidentiality, no undue risk of harm).

Accordingly, ethical approval was sought from the Joint Radiography and Physiotherapy Ethics Committee at UH. The process involved providing an overview of the study's objectives and methods, the interview schedule and sample correspondence. Permission was granted without conditions. A copy of the approval letter can be found in Appendix 2.

3.3.4 Sampling and recruitment

The inclusion criteria for the study were:

- A member of UH academic staff
- Using StudyNet to support their students' learning

In order to explore the differential uptake of StudyNet by different faculties, it was important that all faculties were represented. There were no exclusion criteria.

Two methods were used to recruit participants to the semi-structured interviews. In the first instance, an email was sent to all academic staff outlining the study and

requesting volunteers (Appendix 3). The people who responded to this email were then sent an individual email (Appendix 4) with further details and a formal invitation to take part. Nineteen participants were recruited in this manner and comprised the self-selected component of the study.

It became apparent that the representation across faculties was not particularly even and four potential participants from underrepresented faculties were identified and invited to participate. These participants were known to me as people with an interest in Learning and Teaching (three were StudyNet champions and one had won an award for a StudyNet related teaching initiative). They constituted the purposive component of the sample.

3.3.5 Conducting the interviews

The interviews were conducted between March and May 2004. In order to minimise any perceived imbalance of power between myself and the participants, each interview was conducted at a place of the participant's choosing, usually an office or teaching room booked for the purpose. Some participants, however, suggested it was more convenient to visit my office. Whichever venue was chosen, it had to be quiet and private.

At the start of each interview, the purpose of the study was reiterated and the participant was reminded that he or she could withdraw from the study at any time without prejudice. Following this, the participant was asked to sign a consent form (Appendix 5).

After thanking them for agreeing to help me, I used the schedule to guide the interview, simultaneously adopting a flexible approach. The main headings were used to signal a new focus for the conversation. The prompts were used as appeared appropriate at any given time. Not all prompts were used as this would probably be disruptive to what were generally relaxed and relatively free ranging discussions. If the participant was pursuing an unanticipated line of thought, I tried to ensure my contributions were appropriate, perhaps trying to develop the point or summarise to ensure I understood. I tried to strike a balance between directing the conversation to areas that I wanted to learn about and simultaneously facilitating the participants to talk about the learning and teaching issues that they particularly wanted to emphasise (Denscombe 2004). Interviews typically lasted between 60 and 75 minutes.

Proponents of Grounded Theory recognise the interaction between the data collection process and data analysis. Moving between data and results in an iterative manner is part of Grounded Theory practice (Sim and Wright 2000 p152). I was processing the data between interviews and even during the interviews as new insights developed whilst attending to a participant's contributions. These developing insights into the case meant that the later interviewees experienced different prompts and probes, reflecting these new areas of interest or emerging themes. The iterative nature of this process was most concretely manifest in amendments to the interview schedule that were made over the course of the data collection period. The final schedule is shown in Appendix 6.

3.3.6 Handling the data

All interviews were recorded on a cassette tape recorder. The transcription was undertaken by an audio-typist who was experienced in transcribing research material. Although some argue that typing the transcript myself would be a valuable opportunity to relive the interview and gain greater familiarity with the subject matter (Sim and Wright 2000) this could have taken up to 200 hours for all transcripts and was not a realistic commitment. The cost of audio-typing (£1200) was met by a UH Learning and Teaching Development Fund grant.

The transcripts were verbatim records of the interviews, although some utterances, such as 'uh-huh' or 'you know' were omitted. This is permissible where the intention is to conduct thematic analysis, as opposed to linguistic analysis (Sim and Wright 2000 p148).

There were occasional blanks in the transcripts where the audio-typist could not make out a participant's words. As soon as each transcript was returned to me (typically within one to two weeks following the interview) I compared the transcript and the tape to ensure its accuracy. There were only occasional typing errors that needed correcting and I was quite often able to fill in any blanks. At this stage the transcripts were anonymised by removing any names (including the participant's and those of any colleagues that were mentioned).

Once this had been done, a member check (Cohen *et al* 2000) or member validation (Sim and Wright 2000 – originally Silverman 1985) was carried out as follows. A hard copy of the transcript was sent to the relevant participant so that

they could verify its correctness and fill in any remaining blanks (if appropriate). They were also given the opportunity to make any additional observations or, indeed, amend what they had said if they believed that it did not accurately reflect their views. This ensured that each participant had the opportunity to reflect on their contribution and verify that it was a satisfactory account of their experiences and views.

When the scripts were returned, I incorporated any amendments and additions into a final script. Several people made minor changes. One person made substantial changes to the grammar. He requested to see my amended version and then made further suggestions for the final version. Two people apologised for the 'rambling' nature of their contributions – verbatim transcripts, even without some of the superfluous utterances, can contrast with more grammatically correct written communications (Standing 1998). Hard copies of the final versions were produced for the main part of the analysis.

3.3.7 Data analysis

3.3.7.1 Early analysis and its challenges

As already mentioned, data analysis began during the interviews themselves when summarising and exploring what was being said. Even at this stage, early coding was taking place, almost unintentionally. My first involvement with the transcripts was listening to the tapes and reading the first draft of the transcript. As well as correcting the first draft, this was a useful opportunity to relive the interview and annotate the transcript. These annotations were mostly highlighting areas of immediate interest, perceived importance or possible links to related issues in other transcripts. I did not note aspects of non-verbal communication such as laughter, although occasionally noted a speaker's emphasis. Although it is clear that the transcripts are not complete accounts of the interviews (Cohen *et al* 2000 p125 and p281), nevertheless, I believe that by the time they had been reviewed and amended by participants, they were fit-for-purpose records for extracting important insights.

I then reread each transcript in its entirety several times in order to immerse myself in the data. This helped contextualise each participant's contributions and is the start of a process termed progressive focussing (Parlett and Hamilton 1976 in Cohen *et al* 2000 p148). At this point I was cross referencing ideas from one

participant to another – the early emergence of codes and themes. From this, I began to develop a coding system involving short phrases or sentences that encapsulated an apparently relevant idea or category – Cohen *et al* (2000 p148) suggest codes should have some meaning rather than just be a numeric code. They also suggest codes should be reasonably discrete.

Qualitative research generates large quantities of data and it has to be handled carefully to avoid data overload (Cohen *et al* 2000 p147). Each transcript was approximately 20 -25 sides long, meaning that I had over 500 pages of data. I soon decided that traditional methods of coding data using, for example, colour coding, cutting and pasting from multiple hard copies, margin notes, 'post-its' and summary sheets were not going to suit me or my small office. I also found it increasingly difficult to read transcripts from beginning to end as I wanted to cross refer ideas with other transcripts more immediately – the priority shifted from assimilating the whole to drilling down deeper. In addition, my increasing number of codes made it difficult to remember whether a code existed or not (on several occasions I created a new code only to later find an almost identical one already existed). Miles and Huberman (1984 in Cohen *et al* 2000 p149) suggest that up to 90 codes can be retained in the working memory – I was certainly at the limit of my working memory.

3.3.7.2 Further analysis supported by NVivo

At this point (end of August 2004) I took a break from the research and resumed in May 2005. The issues I had been facing were ameliorated by using NVivo computer software to assist with the analysis. All transcripts were imported into NVivo in rich text format and the analysis continued using 'code and retrieve'. Coding involves identifying particular parts of the text (eg word, sentence, paragraph) with a particular code whilst retrieving enable all the text associated with a particular code to be displayed (Richards and Richards 1998). Using the code and retrieve function, I coded each transcript according to the main categories on the interview schedule one at a time – for example 'how the participant went about his or her teaching' or 'how StudyNet was incorporated into teaching'. In NVivo terms, these high level categories are tree nodes.

I then retrieved the data in each tree node one at a time and coded relevant phrases, sentences, paragraphs according to the codes I had already derived. Each tree node was reviewed on a number of occasions, each time the codes

within it were refined and grouped so that a new structure of nodes and sub-nodes (child nodes in NVivo's terminology) emerged.

This was a dynamic and organic process. The more important ideas were retained whilst less important ones fell by the wayside. A number of overlapping ideas became evident and some nodes became subsumed by others. Eventually the categorisations became more coherent and meaningful. By January 2006 there were 5 tree nodes and nearly 200 child nodes (see Appendix 7). Several tactics were particularly useful during the analysis stage:

1) Producing graphic representations of these nodal hierarchies was really useful for ensuring that the emerging structure was logical. It also helped to identify areas of overlap between similar child nodes in different tree nodes. These similarities were then refined as necessary (either by merger or clarification of the distinction) – 'eliminating redundancies' (Cohen *et al* 2000 p285).

2) It was also helped by talking through ideas with colleagues – this usually took the form of informal discussions about some aspect of teaching practice relevant at the time. It became clear that emerging insights from the research influenced my thinking about learning and teaching issues (and *vice versa*). Presenting preliminary findings at national conferences (SOLSTICE conference 2006 and the International Blended Learning Conference 2007) were also valuable opportunities for feedback.

3) Throughout this process I asked myself the following sorts of questions: What is going on here? What underlying idea links these thoughts together? How do these ideas relate to each other? Are these ideas really similar, or are there important differences? What is really important? What are the implications for practice? These rather down-to-earth questions were helpful for clarifying my thoughts and filtering and reducing the data.

4) I produced a draft 'results' section, where relevant quotes were cut and pasted into a word document and drawn together with summary statements. The process of weaving together these draft narratives made me question my categorisation very critically.

5) I asked a colleague to review a sample of five transcripts and the draft results in order to see whether the themes that I had identified appeared reasonable.

Cohen *et al* describe four distinct stages in the analysis:

- Generating natural units of meaning
- Classifying, categorising and ordering these units of meaning
- Structuring narratives to describe the interview contents
- Interpreting the interview data

(Cohen *et al* 2000, p282)

They acknowledge that this is a rather positivist view and my experience suggests that this is not a linear, but recursive and iterative process (for example, structuring the narratives in the draft result section helped inform the further development of the categories).

The final interpretation occurred as the draft results sections were further analysed, interrogated and refined so that key messages and mature themes emerged.

CHAPTER 4 – RESULTS

4.1 Introduction

The underlining theme that emerges from this case study is that everyone is learning! Perhaps most obviously, the students are learning for their degrees. Whilst the teachers provide support and guidance for this learning to occur, they too are learning about how best to teach their subject in a rapidly changing environment. The institution is learning within a changing environment – perhaps best considered in terms of the top-down and bottom-up contributions of its staff and students. And finally, the sector is also learning how best to promote and support the drive to embed technology more firmly in the student learning experience.

Firstly the demographic data will outline various characteristics of the participants. This will be followed by the main results, presented in three main themes that emerged from the analysis:

- The nature of learning – knowledge, skills and the real world
- Supporting learning in physical and virtual environments
- Change and the learning institution

4.1.2 The nature of learning – knowledge, skills and the real world

What do our students learn? This section will explore the nature of learning at UH, as perceived by the teachers. In particular it focuses on subjective and objective aspects of knowledge, the longevity of knowledge, the application of knowledge, the progressive nature of higher education provision and the issues that these raise for students and staff. Disciplinary differences will be highlighted, as will the more frequent commonalities.

4.1.3 Supporting learning in physical and virtual environments

How do we support our students' learning? This section will discuss the principal learning contexts (e.g. lectures, tutorials, online discussions) that teachers use to support their students' learning. Building on the previous section's discussions of the nature of learning, it will explore some of the factors that teachers use to match contexts to the intended outcomes of learning,

4.1.4 Change and the learning institution

This section will discuss some of the factors that are driving change at UH, including teachers' innovations, local policies and the provision of new technologies. It will explore the interaction between teachers' and these factors and highlight the importance of both top-down and bottom-up contributions to the change process.

4.2 Demographic data

Twenty three teachers participated in the study. Twelve were female and 11 male. They represented all Faculties and in order to identify the Faculty of origin, their quotes are colour coded as follows.

Green = Business School (BS)

Red = Engineering and Information Science (EIS)

Blue = Health and Human Science (HHS)

Violet = Humanities, Law and Education (HLE), Interdisciplinary Studies (IDS) and Art and Design (A+D)

A single colour coding was used for the Faculties of HLE, IDS and A+D in order to simplify the presentation and in recognition of the overlap - the IDS person taught languages; and the Soft, non-scientific similarities between Humanities, Education and Art and Design

Participants are shown by participant number and Faculty of origin in Table 4.1. Their subjects/disciplines are shown in Table 4.2. Their highest disciplinary qualifications were: Professional diploma (n=4); Bachelor degree (n=6); Masters degree (n=7); MBA (n=3); and PhD (n=3). Seven had undertaken disciplinary research.

The teachers had been teaching in Higher Education for between 3.5 and 26 years (Mean 10.7 years). Their highest teaching qualifications were: None (n=4); Certificate (n=1); Postgraduate Certificate (n=12); Postgraduate Diploma (n=4); Bachelor of Education (n=1); and Master of Education (n=1). Ten participants had undertaken pedagogic research.

Table 4.1 Participants' faculty of origin

Faculty	Number of Participants	Participant number
BS	6 (2F, 4M)	P2, P8, P9, P10, P18, P19
EIS	3 (2F, 1M)	P4, P6, P18
HHS	9 (6F, 3M)	P1, P5, P11, P12, P13, P14, P15, P16, P22
HLE/IDS/AD	5 (2F, 3M)	P3, P7, P20, P21, P23

Table 4.2 Participants' subject/discipline

Faculty/Faculties	Disciplinary areas of participants
Business School	Politics 1, Economics 1, Business 3
Engineering and Information Science	Engineering 1, Computer science 2
Health and Human Science	Physiotherapy 2, Nursing 3, Midwifery 2, Radiography 2
Humanities, Law and Education/Interdisciplinary Studies/Art and Design	Philosophy 1, Languages 2, Design 1, Education 1

4.3 The nature of learning – knowledge, skills and the real world

What do our students learn? This section will explore the nature of learning at UH, as perceived by the teachers. In particular it focuses on subjective and objective aspects of knowledge, the application of knowledge, the progressive nature of Higher Education provision, the variable longevity of knowledge and the issues that these raise for students and staff.

One of the tenets of this section is that some content is more contended or uncertain or subjective than other content, and that such subject matter needs a higher level of intellectual engagement by the students – it might be particularly suited to more discursive or dialogic learning activities. Furthermore, handling uncertainty will need greater intellectual maturity on behalf of the students (Perry 1970).

4.3.1 Most subjects have contentious parts

Whilst it was clear that the degree to which material was contested varied from subject to subject, all the participants recognised that some parts of their students' curricula included material that was subjective or contestable in some way. Participants also supported the notion that the more subjective material might be particularly suited to discursive or dialogic learning methods.

... but a lot of it is contested. Like Marx or Weber or Foucault ...clearly these are areas that are contested knowledge. ...on the other hand you may be looking at ... problems of the imbalance of supply and demand for housing for example which is perhaps more objective than discursive. P8

Unsurprisingly, Hard subjects such as engineering and computer science tended to be working with more objective material, whilst the Softer subjects had a higher proportion of contested or uncertain material. Some of the more vocational subjects (for example, health) were multidisciplinary in nature, with the natural science aspects seen as less contentious and the social science aspects more contentious.

It is more hard factual knowledge in this one because they have got to learn things like protocols that the networks use and there is nothing subjective about that.... it is much more explaining the world as is it rather than making their own judgments about it. P17

There is a mix. We teach pure science, physics, which is extremely objective, number based ... physics is physics, but we also teach the sociological side which is not part of my remit, but there are gender issues and other contentious issues that we do teach on the course. P5

4.3.2 Application and the real world muddies the waters

The following section also reinforces the notion that uncertainty or contestation does increase the difficulty for the learners and such material requires higher level learning.

So where does contention creep in? Applying knowledge (for example, using general principles) to real life situations was frequently identified as a point when things became more contentious or subjective. It was clear that real world situations are complex, multi-factorial and often not suitable for prescriptive actions.

... they have got to realise that you can't just look at a theory, come up with a number and apply it in the real world, you have got to realise that the variables that exist there are so wide... P2

The multi-factorial nature of people inevitably brings a degree of complexity to any system they are part of. People are subject to complex cultural and behavioural differences. Ethical and moral issues are a rich source of debate and disagreement. People even differ from a biological perspective in their physiological and pathological responses to stimuli. Unsurprisingly the participants from health backgrounds provided particularly pertinent contributions on the complexity of

humans and the difficulties associated with application of theory to practice. For example:

.. whereas, quite clearly, other things <such as> intensive care and children arresting and dying are far more discursive... some of those debates are very rich. P12

Because people are individuals and there is no one way of doing things... all you can do to them is say 'If you have got this situation, you need to think about ABC and then make a rational decision from this range' P15

Moving away from people, uncertainty could be found in a range of situations such as the interpretation and application of policy, the error found in real world data and the unpredictable behaviour of inanimate systems. All these examples gave extra challenges to the participants to enable the students to learn appropriately.

I think they come in expecting <healthcare policy> to be black and white. 'You tell me it is this, this and this and that is what I have to do' and you say 'well no actually it isn't that straightforward, it has got to be analysed, it has got to be looked at..' P22

*... and what I try and get them to think about is how you would tackle something where you might have what is known as 'dirty data' and how would they deal with it and that becomes the subjective element ...*P10

...there are some pieces of equipment for instance that it would be easy for me to say 'Ignore this gauge, it is not working' ... but I think it is much better to just allow the students to see <the inaccurate readings> and then you can have a much more meaningful discussion. P4

4.3.3 Exposure to contention increases with academic level

Most participants recognised that as students progress through a programme they were expected to deal with increasing amounts of contention and uncertainty.

Whilst some emphasised progression between years, others made more of an undergraduate/postgraduate distinction. For example:

At undergraduate level we are teaching them what is on the <X-ray> image, how it looks like and it tends to be, forgive the pun, black and white. It is only at a postgraduate level we start actually picking that to bits and saying well a picture is a picture and it is open to interpretation and it is almost as much an art as it is a science... P5

Increased contention was not just the result of encountering new and more complex material. The same material could be re-explored more deeply. This progressive

and recursive nature of knowledge, typical of the social sciences, was emphasised in health:

... initially <when> you start off at the first years it is very much black and white type knowledge that is introduced; then you cover recurring things, as it were, throughout the second and third year where it becomes more and more discursive and adaptive ... P11

One exception to this general trend was noted by the participant from philosophy who put forward the view that the interesting and important parts of the subject were those that were contestable or uncertain – and that they were introduced from the start of the programme:

...but it is the case that in humanities generally and in philosophy in particular the interesting questions are the ones that are open ... I suppose the difference between humanities and perhaps some of the science subjects is that <in philosophy> those start at day 1, whereas if you are doing natural science or maths or something, you learn established stuff for most of your undergraduate time, it is only towards the end that the open questions come into view. P23

4.3.4 Struggling with, and coping with, contention

A number of participants expressed the view that students struggle with uncertainty. The intellectual struggle itself can be discomfoting, but there are also practical consequences of uncertainty, such as pressure on time to explore the subject area more fully in order to understand it; the increased level of difficulty can result in more challenging assessments; or the difficulty of resolving a complex real life dilemma.

Very often they don't believe you when you say 'This is an open question, I want to hear what you think about it'... and very often they are quite uncomfortable with the thought that there isn't a correct answer that they can reproduce in an exam. P23

People do struggle with <accepting that there is not a single correct answer> - and I do too sometimes - and often people, particularly when they are time pressured, want you to tell them what to do, and it is not that easy..... P15

A number of the teachers adapted their approach and provided tools to enable the students to cope with this uncertainty. Sometimes they protected the students by simplifying the issue. A common strategy was to give the students a framework or guidelines to work within so that the students' decision making was highly directed:

....the students who are fresh in and have little in the main life experience and little experience of working within the NHS, they need very often fairly stringent guidelines as to what they should do. P12

A lot of what we do is putting together flow charts and algorithms and things like that, trying to help that decision making. P15

Such solutions are not always viable, or indeed desirable, when considering the evaluative and decision making skills that Higher Education students need to develop. Enabling students to be able to decide what is valid was seen as very important. Some lecturers were able to articulate clear principles for decision making, such as using objective criteria or distinguishing between premise and opinion. But others were less specific in how students should decide, suggesting that students needed to develop a justification, but without detailing the basis of such a judgement. For example:

That is a standard part of economics, whether something should be or something ought to be, normal philosophical distinction between those, so whether you base your arguments on premises or opinions. P18

...so students have to justify their decisions and make an argument for it. P9

Another facet of helping students with learn to deal with uncertainty was concern for developing their confidence in this uncertain world and an appreciation that uncertainty was a fact of life and something to be embraced rather than seeing it as something that undermined their subject area. For example:

So the great teaching challenge with this kind of stuff is to get students to, on the one hand have the confidence to - well not just to have the confidence to give their own answers - but to understand that this stuff isn't deficient just because there isn't an agreed right answer.... P23

4.3.5 Shelf life

This section will explore the longevity of the material students work with. All teachers were able to identify parts of their curricula that did not change regularly and some material that was refreshed virtually each time it was taught. This was true of vocational and non-vocational courses. The material that did not change so much included discipline fundamentals, principles and the works of key or seminal authors. For example:

... the principles underlying what is a good piece of software are the same.... P6

... if you are talking about Marx's theory of work and exploitation that clearly isn't going to change... P8

The material that changed more frequently was indicative of the developing knowledge base in the subject, such as new research findings. For the vocational courses, the introduction of new working practices and workplace technology was an important driver for including new subject matter for the students. Sometimes change was led by new areas of interest for the lecturer.

It is changing all the time mainly due to new technologies taking over P3

.. but there are new things coming out, so data mining is becoming more popular, knowledge management and these are the things that we need... P10

At the same time as adjusting the curricula to take into account the evolving knowledge base, workplace practices etc, the teachers also recognised the importance of developing the students' skills to enable them to continue to be able to thrive after university.

I aim to develop the skills more than the shelf life of the knowledge. If you have got skills in finding flaws in arguments then you have got a skill for life... P9

4.3.6 Discussion of 'The nature of learning – knowledge, skills and the real world'

Themes relating to two aspects of knowledge that have potential consequences for learning have been described – the subjectivity or uncertainty of knowledge and the shelf life of knowledge.

All subjects were found to have subjective elements and objective elements, although the softer subjects were associated with more uncertainty and their students were more likely to encounter this early in the course. Although a fairly blunt classification of knowledge, this is broadly in agreement with the findings of Becher (1989) and Neumann *et al* (2002). The presence of certainty and uncertainty within all the teachers' areas of practice reinforces the view of Becher (1989) and Neumann *et al* (2002) that the discipline is too coarse-grained a categorisation. Becher (1989) suggested that specialism might be an appropriate unit of analysis, but even this is not fine grained enough for some of the participants who identified more subjective/more objective aspects of their subject down to topic level.

It is possible to begin to consider the implication of these findings to the challenge of curriculum design (which will be returned to later in the Results section). Gibbs (2000) suggested that the balance of different learning activities varies from discipline to discipline and that this reflects the balance of the different types of knowledge that students work with (for example, science students learning propositional knowledge and social scientists exploring different explanatory frameworks). When the contentious material was explored in more detail, application and evaluation were typically associated with uncertainty. Both these are higher order learning objectives according to Bloom's taxonomy and were more likely to involve discursive learning activities. In their work on UK and Finnish academics, Lindblom-Ylänne *et al* (2006) found an association between Hard subjects (typically involving less contentious material) and more information transfer/teacher focussed methods and Soft subjects (typically involving more qualitative knowledge) and more conceptual change/student focussed methods. Gibbs (2000) also suggested this was the case, at the same time questioning whether these differences in pedagogic approach are justified, particularly as they are often influenced by institutional and departmental cultures and norms.

Although the students found dealing with uncertainty difficult, even unsettling, it is important to recognise that this is a characteristic of higher level learning and a necessary facet of learning to work with and through. Watson (2001) argues that it is important that schools develop learners that recognise the uncertainty associated with knowledge, and in doing so he reinforces the view that schools do not prepare their students for the more challenging approach found in Higher Education. Perry's (1970) stages of intellectual development mark out the steps that learners go through when moving from a certain, dualistic understanding of the world, to recognise uncertainty in the form of multiple explanations, through a relativistic position with difficulty deciding between conflicting alternatives before finally committing to a position. Others have noted disciplinary differences in the degree and timing of the challenges students face, for example Gibbs (2000) suggests that science students may not have to progress as far through these stages early in their courses, whereas students of Softer subjects will find themselves challenged much earlier on. This reinforces the findings of the present study.

All teachers identified some areas of their curricula that had a long shelf life and other parts that needed to be updated regularly. The need for currency in Higher

Education is unsurprising and has implications for the teacher and students. Barnett *et al* (2001) highlighted three ways in which the knowledge in a field might develop. Firstly, the field of study may develop a new overall structure – for example, nursing is relatively new to higher education and is still developing its balance between the Soft and Hard knowledge components it draws upon. Secondly, new topics emerge within a discipline - for example, the emergence of tourism and leisure within business studies. Thirdly, new techniques become incorporated into a discipline that change the nature of knowledge explored, such as the use of computers to aid research in history (Barnett *et al* 2001). Barnett *et al*'s categorisation is broadly found within these participants' subject areas, which include a number of disciplines relatively new to higher education that are exploring disciplinary boundaries and working with new technologies. The teachers clearly recognised the need to keep up to date, for example through their own or published research, but a number also made an effort to be alert to relevant press stories to use to illustrate theory or stimulate discussion in a topical manner, so as to help contextualise content and motivate their students. Biggs (2003 p109) notes the use of topical references as a good strategy for personalising teaching, though he cautions teachers that groups such as international students might have greater difficulty relating to topical or culturally specific references.

It was also clear that some of the material that had a long shelf life was of the contentious sort – indeed Becher (1989 ch1) noted that in the social sciences some of the Softer issues nevertheless retained currency – whilst at other times it was the less contentious material that was long lasting, especially underlying principles.

From a curriculum design perspective, one key implication of the longevity of content is when considering designing specific resources based on that content. It is less cost effective to invest heavily in developing a resource that will be out of date within a short time. Whilst it is possible to produce some types of fit-for-purpose multimedia resource very cheaply, top quality distance-learning resources can be very expensive. One way to militate against this is to share costs and a number of collaborative ventures produce resources jointly. Another important way to offset cost is to share resources and one HEFCE strategy for e-learning success criterion is a culture in which subject communities can share materials (HEFCE 2005). This will be developed later in the discussion.

4.4 Supporting learning in physical and virtual environments

This section will initially explore how the participants supported their students' learning in the principal face-to-face learning contexts (e.g. lectures, tutorials, seminars and practicals) that teachers use to support their students' learning. Building on the previous section's discussions of the nature of learning, it will explore some of the factors that teachers use to match contexts to the intended outcomes of learning and then relate some of the findings to the published literature. It will then explore how StudyNet was used to provide online support for learning, firstly describing its use, then exploring the pedagogy. These findings too will be explored in relation to the literature.

4.4.1 Face-to-face learning contexts and interactions

This section will begin by outlining the main learning contexts that are used to support face-to-face learning, namely lectures, tutorials, seminars, practicals, workshops and laboratories. It will dispel the myth that lectures are typically information giving, didactic activities. It will also highlight the inconsistent terminology used to describe some of the other learning contexts. The section will then explore two key themes that emerged, the importance of interaction and engagement, and the importance of authenticity to support learning. It will conclude with the ways in which StudyNet has been incorporated by teachers - often by supplementing existing contexts but sometimes by introducing new approaches to their learning and teaching.

The participants identified a range of face-to-face teaching activities, including lectures, seminars, tutorials, practical sessions, workshops and laboratory sessions. Although the notion of a lecture was generally consistent between participants, the meaning of the other terms was not universally consistent. Furthermore there was lack of agreement as to the nature of workshops, laboratories and practicals. In fact, in most instances, group size was probably the most consistent factor that distinguished lectures from the other teaching activities. Unless there was insufficient space (e.g. for cohorts over 2-300), lectures were delivered to whole cohorts. Except where the cohort was small anyway (e.g. <40 students) the other activities were conducted with the cohort divided into smaller groups. This was summarised very succinctly:

... we have less students in a seminar or a tutorial than we have in a lecture. P2

4.4.1.1 Lectures

Almost all the participants used lectures for some of their teaching. The exceptions were a participant whose role was to support the development of practical skills and two humanities lecturers whose focus was developing language skills. One said:

Lectures can't work in English <language skills development>. What is the point of me standing there giving them a lecture for one hour? P7

For the majority, though, lectures did form part of their repertoire and most commonly used to introduce or contextualise a subject - '*to map out the terrain*' P8 - and impart content. They were typically associated with larger groups of students – between 60 and 250 students – which were divided into smaller groups for other learning activities such as seminars and tutorials. Those participants that had smaller class sizes anyway (eg <40) tended to suggest there was little difference, in practice, between timetabled lectures and seminars (characterised by a good deal of interaction and variety).

Of all the teaching contexts described, lectures were the most teacher-centric and were more likely to have didactic elements. This might typically be some form of presentation by the teacher. Nevertheless, most participants said that they tried to incorporate opportunities for interaction – either to check understanding or encourage students to think about or engage with content and provided activities for students to work with others on a variety of tasks.

I throw lots of questions at them to get them to think about the application of <the subject>..so I try and keep it interactive... P10

<the lecture> is not just standing up and spouting for two hours ...maybe splitting into small groups, buzz groups for a bit of brief discussion... P14

... I will give them a small case study and get them to work in groups and that is a lecture. P2

Class size did appear to affect the amount of interaction achieved. The majority of teachers strove to create interactive environments with their groups, but as class size increased, there was a shift towards more didactic sessions. With this sample, the shift started when group sizes reached the mid 100's and it became apparent that there was less agreement that lectures were still interactive:

My lectures <with 150 students> seem to me like large group tutorials....so it is still very highly active. P4

You are quite limited what you can do with lectures <to 130> so I tend to use them for the very black and white knowledge material, so it is simply delivery, if you like... P11

As numbers grew even larger, there appeared to be a threshold around the mid 200's where there was agreement that satisfactory interaction in lectures was difficult to achieve. The following is typical of teachers working with this size of group:

Most of us try to develop some sort of interaction although it is very difficult with 240 students in the class. P19

With the exception of the lectures involving very large numbers, the variety and interaction inherent in many of the participants' lectures suggested that these were far removed from the stereotypical didactic learning experiences so often described. They were instead rich and engaging learning contexts and, although often more teacher-centred than some other sessions, they were still learner orientated.

4.4.1.2 Seminars/tutorials

Some teachers specifically considered tutorials to be one-to-one sessions with students, particularly those seeking academic support. But the majority described both tutorials and seminars as sessions with a relatively smaller group of students (7-40 in the case of these participants). In fact, the terms 'seminar' and 'tutorial' were not used consistently. Some used 'seminar' and others 'tutorial' to describe what appeared to be similar activities. Alternatively, a single term, say 'seminar' could be used by different people to describe patently different types of activity. One participant summarised this very succinctly by saying *I never know where seminars stop and tutorials begin. P1*

The only consistent distinguishing feature was that when these sessions were led by students, they were always termed 'seminars'. Perhaps the key issue is that the students understand what is required of them, regardless of the title. What was clear was that seminars/tutorials were viewed as contexts where a greater level of interaction (than in lectures) could be achieved:

... there is more of a chance for the students to interact with each other and yourself and the material. P1

The increased interactivity associated with these sessions meant they were often used for content that was less clear cut than in lectures or as opportunities to use knowledge rather than just acquire it. For example:

The things we have tended to do in the tutorials are things that are perhaps less clear cut ... the students may need more help in interpretation of the information. P13

<a tutorial> is much more about application than knowledge. P17

The seminars/tutorials described followed a variety of formats and often involved students working in pairs or small groups. Discussion was an important part. Activities included exploration of case studies, role play, debates, guided discussions, guided reading and structured worksheets. Seminar/tutorials were also an opportunity to contextualise learning. Not all participants discussed the reasons for deciding a particular format or activity for particular aspects of learning, but some had clear reasons. For example:

I think <Human Computer Interaction> is probably the less certain, you can't give a right or wrong answer for something, so they prefer to work in groupsso they can discuss things. Whereas, in Operational Research <which is more mathematical> they will work on individual problems... P10

In most instances the teachers took primary responsibility for scaffolding, guiding and facilitating the students' learning, setting the agenda and setting priorities. But as far as student-led seminars were concerned, the role of the teacher in structuring the session was more subtle, with a greater degree of openness to students' taking control.

.. each week they know what to prepare.....but it is student-led ... so if they choose to do something relevant that is slightly different... we do <that>. P9

Some lecturers emphasised the importance of students' contributions and welcomed the opportunity for them to bring their knowledge and experience to the forum. This was recognised, in some instances as being greater than that of the lecturer. This practice was overtly valuing the students and empowering them:

... if a seminar is for an hour they should be presenting something which opens them up for discussion, debate, exchange of ideas. They are third years, they are about to qualify, they should have some insight, they should be able to question and they should be able to think. ... it is about them sharing their knowledge and expertise. P12

4.4.1.3 Workshops, practicals and laboratory sessions

Fifteen of the 23 participants included workshops, practical or laboratory sessions in their repertoire. These were spread across the faculties as follows: EIS 2/3 or 67%; Health 6/9 or 67%; Business School 3/6 or 50%; and HLE/IDS/A+D 2/5 or 40%. With some participants, there was some overlap with these activities and seminars and tutorials – in practice they might be largely indistinguishable. However, others made a clear distinction – they provided time for students to actively participate in tasks in order to develop practical skills and understanding. As with seminars and tutorials, workshops, practicals and laboratories typically involved smaller groups and the opportunities this gave for greater interaction with students.

For example, the vocational skills in physiotherapy, nursing and radiography that had psycho-motor components – such as treating respiratory ‘patients’ or preparing a ‘patient’ for an X-ray would be developed in practical sessions (as well as in the workplace environment) where the patients would be role-played by fellow students. Engineering students needed to work in well equipped laboratories to develop their skills and understanding of the practical aspects of their subject. Computer scientists needed to develop skills in using software programmes in computer laboratories. For example:

The workshops will be mostly about introducing software ... it is setting them exercises ... ‘try and take that picture with that soundtrack’ ... ‘get this animation to run’ or whatever...and the emphasis really is just getting them used to the tools. P17

The development of practical skills was not independent of developing knowledge, understanding and application.

A practical ...is a mixture of information behind a certain practical skill and demonstration and then the students actually practising skills on each other. P1

As with seminars and tutorials, there was not a consistent way to distinguish between a workshop, a practical and a laboratory session – what they were termed was probably due to local practices or conventions. Once again, from a students' perspective, what is probably most important is that they understand the purpose of the session and the expectations of the contributions of all concerned are known. From the perspective of a community of practice that can extend into the workplace, using the normative descriptions of that community should take precedence over some notion of standardising the terminology across disciplines.

4.4.1.4 Interaction

These face-to-face contexts were seen as an invaluable opportunity for interaction – between the teacher and students and between students themselves. As mentioned above, smaller numbers were seen as conducive to these interactions. In addition, staff wanted students to be actively engaged with their learning.

Various rationales for teacher-student interaction were elicited. These included guiding the students' actions and/or thinking, gaining verbal or non-verbal feedback about their understanding or performance and giving feedback/clarification in an adaptive manner. The non-verbal aspects of this face-to-face communication were illustrated as follows:

I think that is important that they are with you as you do that and I can explain if someone is looking puzzled, 'Do you understand?', 'Where are you lost?' etc. P10

The relevance of non-verbal communication will be discussed later, as picking up the nuances of face-to-face dialogues are more challenging in online environments.

The above aspects of interaction (guiding activity, gaining feedback and giving feedback) can clearly be related to components of a learning cycle. The active engagement of students within this cycle will involve a range of activities, such as reading, discussion, debate and role play etc. Many teachers stressed the importance of student-student interaction within this setting and various ways of facilitating student-student interaction were cited. Students' capacity for dialogue/discussion was implicitly recognised, their subject knowledge and wider experiences more explicitly referenced. For example their dialogic capacity and subject knowledge feature here:

I can set them up to debate. They have done the preparation and they come in and I say 'You take that viewpoint, you take that viewpoint. Now work in your groups and now come together and debate'. P9

Teachers regularly acknowledged the value that the students' prior knowledge and experiences bring to face-to-face settings. This knowledge and experience could be intrinsically valuable to interactive experiences. For example:

So because we have a ... lot of international students it is an ideal way of getting them to talk to each other so when they do a presentation about what they know in terms of marketing in Brazil, for example, because they know their own country, the other students will get a lot of exposure into the other cultures etc. P19

Alternatively the intrinsic value of their knowledge and experience is less important than the ways they can be used to make the learning process more engaging to the students and thus foster interactivity:

Rather than talking about the shift from geocentric to heliocentric models of the solar system - and using those two words you have already lost a third of your students - you use case studies from the students' own lives and you can get to the real philosophical issue more directly and more concretely like that. P23

Face-to-face settings are particularly suited to two-way communication and its capacity to support interaction. The desire on the teachers' part to encourage interactivity clearly aligns their practice with constructivist approaches and notions of good teaching.

4.4.1.5 Authenticity

The majority of participants drew upon the real world to inform the learning contexts and learning activities they devised for their students. This emphasis on authenticity is not surprising - most participants were teaching on vocationally orientated courses (and even ones that were not so directly vocational, such as some of the humanities subjects, still look to employability issues). Authenticity could manifest itself in various ways:

The commonest use of authenticity was the use of realistic scenarios or problems to contextualise the students' learning and promote understanding of the vocational aspects of their subjects. For example:

...so the whole physiotherapy department is doing scenario-based learning where we try and use real patient scenarios to base the next few weeks of the students' tutorials and practicals around to try and make it more realistic. P1

A natural extension of the authentic case being introduced into the curriculum is physically taking students to the authentic environment in order to contextualise their real world research tasks in a real world environment. Several teachers did this. For example:

So the first assignment in semester B is ... a small case study type of investigation into Marks & Spencer which required them to go to Marks & Spencer and spend some time. Obviously they have been to Marks & Spencer but this was essential that they read and observed what they are doing in reality and then try and link it up with some of the theoretical aspects of it. P19

Participants were also keen to draw upon the authentic experiences of people in the field. This brings current expertise to the students, together with a degree of credibility on behalf of the speaker – unlike many of the lecturing staff the guest speakers practise in the current work environment. For example:

For example, one of the lectures we had was a clinical specialist in care of the elderly, in intermediate care, who came in and said how she had implemented the National Standards Framework P13

The students' own authentic experiences also provided powerful devices for contextualising their studies and linking theory and practice. Such strategies enable students to relate their own concrete experiences directly to abstract concepts. For example:

I will say to them 'Describe this kind of patient to me' ... and you can then see them hanging what you tell them on to a real person. P15

I do use personal narrative as well... getting <the students> to tell their stories in small groups... then looking at actually what can we tease out of here in terms of learning... I will then come back in with 'well I have looked at the research and... this is what some of the theorists are saying.' P22

The participants also used simulation to mirror real world situations. This was either to simulate an activity in order to develop a specific skill and its associated (procedural) knowledge or to mirror a real world situation, so that the students learn how to apply their knowledge by being introduced to relevant challenges in an authentic manner. In either instance the teachers are aligning the learning need to an appropriate means of enabling that learning. For example:

... because that is what you get in the real marketing world, you will get a lot of information in a very short period of time, you have to start thinking, take notes, then go away, think about it, apply what you know and then put it in practice. P19

It is a principle right across the school of education that we should be modelling what is going to happen in the real classroom... P21

Despite its possible shortcomings, simulation can be used because it is safer to learn a skill in a simulated environment - students can make mistakes without dire consequences.

We have got these dolls that you can do anything to <such as passing a naso-gastric tube>, it is not the same but at least you can talk through the whole process to actually practise various things like that far more safely. P12

This protection that simulated learning activities afford can be beneficial for both patients (in the above case) and the students as they are able to develop their skills and confidence in circumstances where feedback and reassurance is part of a supportive learning environment. This can be preferable to having a negative outcome in a real environment that can cause long term loss of confidence and apprehension.

4.4.1.6 Discussion of 'Face-to-face learning contexts and interactions'

This section will discuss the above findings in relation to the use of physical learning spaces. The relationship of physical learning spaces and virtual learning spaces will be developed later in the thesis.

Lectures are the commonest form of delivery in higher education (Ramsden 1992, Bligh 1998). One of the most comprehensive works on lectures is Donald Bligh's 'What's the use of lectures?' (Bligh 1998). Drawing on an extensive review of the literature, Bligh argues that whilst lectures are probably as good as other methods for the transmission of information, they lose effectiveness for other educational aims such as promoting thinking and personal and social adjustment; and developing attitudes and behavioural (ie psychomotor) skills (Bligh 1998). He even challenges the notion that they are a way of inspiring an interest in the subject, suggesting that any inspiration is usually too short lived to translate into action (p19). Biggs (2003) argues that information transmission is an important function of lectures, as is the opportunity for the lecturer to put his/her personal interpretation on the subject. However, the natural drop-off in ability to attend after 15 minutes or

so means that requiring students to listen for lengthy periods will not be an effective teaching strategy. He suggests (Biggs 2003, p115) that the term lecture is almost generic, describing a range of Learning and Teaching activities, typically associated with larger classes. Both Biggs (2003) and Bligh (1998) suggest that for lectures to be effective, they need to be used for the purposes to which they are most suited and need to be based around a series of activities involving student interaction. In this regard, the participants in this study are engaged in this sort of practice – the stereotypical notion of a lecture as a primarily listening activity was not found, save for some teachers with very large groups. It appeared to be group size rather than discipline that determined the conduct of a lecture. Biggs (2003 p108) also notes that very large groups can be impersonal, which reinforces the notion that they might be less desirable than smaller and more interactive classes. The reason that some classes are so large is possibly down to departmental culture, but several authors link it to the efficiency of teaching large groups (Ramsden 1992 p153, Carpenter and Tait, 2001). Ramsden (1992) also suggests that lectures persist because some staff like the power associated with this format (p155).

If lectures leaned towards instructional practice (particularly with very large groups), the small group activity of seminars and tutorials seemed to be more associated with constructivist learning activities, where the student voice was heard and valued and dialogue was essential to their conduct (Gravett and Petersen 2002). Bligh (2000) argues that such small group activity is particularly suited to teaching thinking skills and problem solving. He had previously used the intuitive argument that if you want students to develop certain skills, they have to be put in the situation where they use the skills (Bligh 1998). Laurillard (1993) describes in detail the importance of an adaptive dialogue between teacher and students in her 'conversational model' and these seminars and tutorials are clearly situations where teachers are enabling such a dialogue.

Ramsden (1992) stresses the importance of student-led peer learning activities (p91). In order to get the best from such sessions, some training might be necessary and a structured agenda may confer additional benefit (p113). Some of the benefits of peer learning include the potential for students to hear different interpretations, to learn to evaluate the different interpretations, the opportunity to develop meta-cognitive insights (p90) and the capacity of group discussions to lead to wide and complex outcomes (p113).

These small group learning situations are opportunities to deal with the higher order aspects of learning, very often related to application of theory or discussion of grey areas. Unlike (more traditional) lectures, these are clearly opportunities to empower students.

The workshops and practical and laboratory work are usually small group activities too. Bligh (1998 p195) suggests that laboratory work is undertaken to enable students to develop behavioural skills, such as manual skills and observation, and scientific thinking (p8). Both Ramsden (1992 p172) and Bligh (1998 p195) suggest that laboratories can also enable students to apply theory to practice, but Ramsden gives a much longer list, including problem solving, developing professional attitudes and values, interpreting and presenting data and team working.

Nevertheless, Ramsden (1992) goes on to warn that in laboratories and practicals teachers too often undermine the process by helping the students too much (p164). Furthermore, he suggests that such activity is very costly and questions whether they are always necessary. Gibbs (2000 p47) reinforces this view with the case of the University of Southern Queensland which uses virtually no laboratories for its engineering programme, despite them typically being a staple for such degrees. The university uses work-based learning instead. According to Ramsden (1992 p166), the key to successfully planning student learning begins with deciding what is to be learned, then how the student might go about that learning – and only then considering the techniques to use.

Interactivity and authenticity can relate to notions of dialogue, constructivism, active learning and situated learning. The interactivity and authenticity that these teachers provided facilitated a dialogic approach to learning – the environment was used to enable the sort of beneficial teacher-student dialogue and student-student dialogue that Laurillard (1993) and Gravett and Peterson (2002) discuss. McDowell (2002) interviewed staff at three UK universities about their use of electronic resources and found that many staff used such resources to support authentic learning tasks. Her work involved a range of Soft and Hard disciplines, but she drew on a term coined by Kuechler in the social sciences to describe this activity as 'bringing the world into the classroom' (McDowell 2002 p260) which certainly resonates with this study's findings in relation to authenticity.

Summers *et al* (2005) reinforce the view that real life problems are more stimulating for students, whilst Jennings *et al* (1997) point out that teachers often provide 'ideal' examples so as to eliminate distractions from the point they are trying to make. Stein *et al* (2004) stress the importance of authentic learning experiences, noting that they can provide a safe and supportive environment. Stein *et al* (2004) are particularly interested in the situatedness of learning and view authenticity as 'the intersection of the 'mind' of the discipline with the here and now of the pedagogical moment' (Stein *et al* 2004 p241). The creative challenge for teachers is to balance what is personally meaningful for the students with what is purposeful for the subject and its culture – how best to bridge the gap between university learning and the community of practice beyond? Stein *et al*'s solution is for educators to use the perspectives of the learner, the nature of the discipline and the nature of learning within that discipline to develop an authentic approach that encourages deep learning and the legitimate peripheral participation described by Lave and Wenger (1991).

The literature on authentic learning includes many references to problem based learning (PBL) (Savin-Baden 2004, Carusetta and Cranton 2005, Dochy *et al* 2005, Wheeler *et al* 2005) which has similarities with the scenario based learning described by participant 1. Dochy *et al* (2005) advocated a student-centred, collaborative PBL approach which the authors argue: enables students to develop their understanding; is motivational; encourages group work; integrates theory and practice; and allows for multiple solutions. Even though the participants in this study were not using PBL, their pedagogic practices have several resonances with this experiential (Savin-Baden, 2004) form of learning – the practices are also generally student-centred, collaborative, constructivist in nature (although only one person explicitly volunteered this to be the case) and designed to motivate and link theory and practice. Furthermore, these methods of learning are also valuable ways of inculcating communication skills, team-working and problem-solving, which are highly valued by employers. Influential reports such as Dearing (NCIHE 1997) and the more recent Leitch report (Leitch 2006) emphasise the importance of embedding such skills into educational practices. Sanders (2001) found that in the United States in 1999 there had been a marked shift to the use of problem solving as key to developing ICT skills compared to 20 years earlier. Although this focussed on school teachers, not Higher Education, it was based on the views of over 1400 teachers and reinforces the idea that realistic methods are of value in learning.

Whilst constructivist approaches support the notion of authentic learning tasks and collaborative tasks, further support for the importance of active learning comes from Chickering and Gamson's (1987) influential paper on good practice in undergraduate teaching. Chickering and Gamson argue active learning – in which students will learn by actively engaging in appropriate learning tasks rather than by being passive recipients of knowledge – as a key principle of good practice. In fact, interactivity and authenticity support more of Chickering and Gamson's principles - Bangert (2004) suggests that they can encourage active learning, communicate relevant (high) expectations, encourage interaction between students and encourage students to spend time on task.

It is important to note that many of the issues discussed are not unique to the face-to-face situation and the thesis will now explore how the online world can both supplement face-to-face learning and how it often emulates the practices in the classroom.

4.4.2 StudyNet and learning

This section of the results will explore how the teachers used StudyNet. Whereas face-to-face teaching was explored in terms of different learning activities (lectures, practicals etc), their use of StudyNet will be explored in terms of two main affordances: To facilitate communication and to facilitate access to resources – essentially the two affordances implicit in the notion of 'information' and 'communication' technology. This will be followed by four sub-themes that explore the learning context: Module administration/learning management and (the pedagogic themes of) Extending the classroom, Enhancing face-to-face interaction and Evolving the curriculum.

4.4.2.1 StudyNet and communication

Three features of StudyNet were underpinned by their focus on communication – the Module News facility, email facility and Module Discussion forum.

News facility

The News facility is a straightforward means of one-to-many communication that all people registered on a module site can access. News items require a user to click on the header to pull up the message to read it. As well as text, news items can have hyperlinks embedded in them and have attachments. Staff and students can

post news items. The News function is not designed for dialogue – it supports one way transmission of information effectively, which is what the teachers were using it for. It was seen as a virtual version of the departmental notice board. The majority saw it as a means of facilitating module administration, although a few used it to provide learning materials:

I use it mainly as a notice board... it is a very convenient way of communicating to a large number of students. P8

I have used <the News function> to put some exercises up there so perhaps writing exercises that they can print off and bring to the class the next week or a reading exercise. P21

Email

The email facility is a simple email editor, but the cohort information contained within the MLE enables emails to be sent to individuals, groups or a whole cohort very easily (this information also enables class lists to be generated). Unlike the news facility, emails can be directed towards individuals and are an example of a push technology, with the message being 'pushed' to a user's inbox. The facility is for staff to send emails to students and *vice versa*, rather than for student-to-student communication. It was seen as an efficient means of communicating with students, for example:

I always contact students via email nowadays, it is the quickest way to do it. P14

The use of email to communicate with students preceded StudyNet - but a major benefit of the email function was access to a current email list of the students registered on their module. And the converse of this – the certainty that students had the staff addresses.

...the ability to communicate with students via email through StudyNet is wonderful, you don't have to run around trying to set up an email list, you can be fairly certain now that students have access... P17

Discussion forum

The discussion forum is essentially an electronic bulletin board Staff or students can post a message to start a dialogue on a topic of their choosing. Others can post replies, either to the original contribution or to other contributions. Staff can close discussion threads to further contributions should they wish. Many different discussion threads can be conducted in parallel with each other.

The commonest use of the discussion forum was simply for students to initiate issues of importance to themselves. The topics of discussion threads could vary from students seeking help in relation to module content, module administration or practical issues such as meeting up. Many of the teachers saw the discussion forum as a facility for students to help each other. It was also useful for giving staff insights into the students' understandings and concerns.

It was very good. Sometimes it is useful to understand what the students don't understand, especially near the assignment somebody might say 'What are these theories that they want us to put in the assignment?' P19

These student initiated discussions supported the students' own agendas, which might include policing disruptive class behaviour, arranging to meet face-to-face to study, or a completely social dimension, unrelated to the module. The strong student preoccupation with assessment was ever-present. For example:

The students often use the discussion forums to meet face-to-face ... especially about the coursework so they will organise face to face meetings. P13

....perhaps too much about the assignments and seven-a-side football... it became the discussion board for the campus. P18

Some tutors employed strategies to encourage students to participate in discussion. These included setting up structured tasks - particularly ones that were assessed - or using positive reinforcement, such as rewards for participation:

We have had some real success with the discussion this year but only with a bit of threat and incentives really...set it as part of their assignment and it worked fantastically. P15

The sites need moderating and there were different approaches to the questions students asked. Some staff saw it as their responsibility to answer students' queries, whereas others were keen for students to help themselves:

Yes so whatever they wanted to do or announcements they wanted to make so I had to police it quite a lot. I looked every day and responded every day to their academic comments. P18

.. sometimes they ask questions about stuff they haven't understood in class ... with those I tend to let them see if they can sort it out themselves, but then if it looks like they are floundering then I will put up an answer. P1

A small minority of participants believed that some uses of the forum could be unhelpful. A particular concern was its potential for criticism of a module or its staff. In such instances the one-to-many communication and the permanence of discussion forum contributions were considered particularly unhelpful, giving much greater credence to complaints than they deserved:

...a number of students have used that as an opportunity...to whinge .. What I think StudyNet does is, it amplifies and exaggerates the minority of whingers so you get a quite false impression of the impact that the course is having on the student body as a whole.... P8

Two valuable qualities of the discussion forum were its perceived efficiency and equality. Efficiency stemmed from the one-to-many communication aspect, plus the way that it enabled students to help each other – a form of peer learning that provided a resource for all in addition to the tutor's input. The equality aspect related to the way that all students could access these student-student and staff-student dialogues. A number of teachers encouraged students to use the discussion forum for seeking help deliberately so that all could access the resulting interactions:

I tend not to take too many personal emails from the students, I would say to them ... 'This is a really nice question, please post this to StudyNet'. So it allows me to be a little more effective about how I communicate with all of the students, I don't answer the same question three or four times. P4

4.4.2.2 StudyNet as a conduit for resources

The other principal use of StudyNet was to enable students to access electronic 'resources'. Such resources might focus on one or more parts of a learning cycle – they might be purely academic content/information (e.g. an article or videoclip) or include content and direction for a learning activity (e.g. 'read this and reflect on these questions'). A resource may provide feedback on understanding (e.g. a quiz) or might include content, direction and feedback (a learning object by some people's definition, e.g. the Reusable Learning Object CETL). The majority of participants saw the resources as either electronic versions of the materials students would normally be given anyway or some supplementary learning materials:

I do try to put supplementary material within there rather than just the hand-outs so then during lectures I can point students to StudyNet to say 'if you are looking in

this folder there is x, y and z. I haven't got it here, but if you look at those they feed into this topic area'. P11

From the teachers' perspective, the resources came from three sources: themselves, their students and third parties. The teacher generated resources were typically those used to support teaching sessions, such as PowerPoint presentations, lectures notes, quizzes and other guidance.

The capacity to draw on student-generated resources was not, at this stage, widely developed. One tutor had used StudyNet to enable separate groups from a cohort to view the presentations their peers had created for student led seminars:

...the peer learning <that results from> being able to see all the other presentations ... it is useful seeing their own topic, that they have done, interpreted differently ... I think that has been very useful. P13

However, the facility of StudyNet to create ready links to a wide range of third party resources was widely exploited. These resources that were linked to could broadly be classified as websites (and the whole range of resources embraced by that) and the university's electronic catalogue of academic journals:

... it tends to be more about directing them towards web sites because the thing is there is an awful lot of very good philosophy on the web. P23

... very often I post URLs to good academic papers that the University has access to. P6

4.4.2.3 StudyNet and learning management and administration

The above sections have described the use of the basic StudyNet functions – the results section will now examine the uses to which the communication and resources functions were put to use, beginning with administration.

StudyNet has an important role in supporting module administration. This was partly associated with providing module information such as the definitive modular document, timetables, reading lists, assessment titles etc, and also associated with communicating via the News facility and email. Information flow was often one-way and one-to-many – which can be achieved with either News or email. Where dialogue was required, this was often of a one-to-one or one-to-few nature, most appropriately met by email. For example:

The features I have used is to put up course information, information about the course, I put up hand-outs and worksheets, I put up maps and travel information for specialist placements, some documentation that they need for their portfolios... P5

What was clear was that there was not a standard approach - people achieved the same aim using different facilities. For example, although most teachers posted their PowerPoint presentations in the teaching materials area, some attached them to News items. One person's logical structure is not necessarily another's – if it was, the framework provided by a VLE would be used in consistent ways by all users. Because students are registered on a number of modules that may each have a differently structured website, several participants felt it advisable to provide guidance to the students as to how their site was being used. For example:

I have been organising it and I think next year I shall actually put on table contents and tell them where to find things... telling them that 'that is in teaching materials, that is in module information...' P9

4.4.2.4 Pedagogic themes relating to the use of StudyNet

The previous sections have explored the functional capacities of StudyNet as a conduit for communication and providing access to resources and have given an overview of how the MLE can support learning. However three important pedagogic themes emerged – 'Extending the classroom' and 'Enhancing face-to-face interaction' and 'Evolving the curriculum'. Although each can be described satisfactorily and have distinctive characteristics, they are not mutually exclusive.

Extending the classroom

The communication and resource provision capabilities described provided a means for supporting learning activities before a classroom session and afterwards. StudyNet was seen as a means for increasing 'contact' with students, perhaps most floridly expressed as follows:

I just don't like the idea of a student being in contact with me for four hours per week... it would not be uncommon... for them just to get four hours each week and then turn up next week not knowing where they are at... essentially I am using <StudyNet> to drip feed the students during the week so they can't run away from <me>, giving them a nudge or a prod about the subject. P4

The extension of the classroom is primarily longitudinal – StudyNet mediated learning activities or opportunities can begin before a class and continue after it finishes. It enables teacher-student and student-student dialogue to continue and it enables the teacher to guide and support independent study time more easily - and in new ways. This typically occurred by providing resources to more readily support independent study and through the opportunities for communication afforded by StudyNet. The teacher may have deliberately set out to extend the classroom in a structured or planned way, but often students just avail themselves of opportunities spontaneously, based on need – as discussed in the communication section above.

In fact, there were relatively few instances of the classroom being deliberately extended beforehand. The value of priming students for forthcoming sessions was highlighted by a few teachers. For example:

So... when they come into the next session I know that they have been told what material they have to look up. P19

...I put quite a lot of material in the news about tutorials, what we were going to do, what I expected P16

In accordance with the policy on StudyNet use, the majority of teachers made lecture materials available so that they could be studied before and/or afterwards. Whilst this could enable better preparation for class, there was not much evidence that this was routinely seized upon. It did, however, raise several discussions points concerning classroom spontaneity, interaction and attendance. Some teachers reasoned that advanced information could affect spontaneity or engagement in class. For example:

... I know there are... advantages of putting them up before so they can print them off and have a look at them, but a lot of the time, especially with tutorials, you want them to interact there and then, you want them to be spontaneous... P1

... it stops them from thinking as well, if you give them material earlier on. P9

Some, but not all, teachers were concerned that making lecture material available to students in this way might encourage students to miss class. There were mixed experiences of student attendance, with some participants believing that attendance was unaffected and others believing that it had reduced due to StudyNet. The participants were generally concerned that missing class was detrimental to students:

I don't think it has <affected attendance> to be honest. I know we would all like to think that students can be totally independent but I think students have great difficulty bringing material to life without a lecture. P6

There were several examples of capturing the content of the classroom so as to extend the 'contact' after a class:

... if they do stuff on flip charts then I might actually type that up and present it the week after. So StudyNet is useful for that in terms that you can type it up and put it up there. P22

... I would go with some slides into the class and then based on what we have used and what we have discussed, I would improve the slides slightly and then post it and then they would have it as provision or a record of the lecture ... P19

Enhancing face-to-face interaction

As emerged in the general discussion of teaching, interaction was highly valued by teachers. At this early stage of implementation there were a couple of specific examples of teachers using the technology to enable them to explicitly enhance the face-to-face interaction – this was going beyond the notion of making the students better prepared for a classroom – as mentioned in the 'extending the classroom' theme – here the teachers were using technology to enable them to use the time in class differently. Because such an approach relies on the use of the MLE outside of the class, it can, however, be considered a subset of 'extending the classroom'.

The theme is illustrated as follows. One teacher set out to change the nature of the face-to-face activity (learning things differently?), the other to ensure the content of the face-to-face teaching met the students' needs more closely (learning different things?). They will be presented as two mini case studies.

Case study 1 – 'Learning things differently'

One microeconomics tutor taught a cohort of 870 students. The original delivery format had been a traditional lecture (to a quarter of the cohort, 200+ students, repeated four times) followed by a seminar (with smaller groups around 30 students). The referral rate on the module was high, but staff resources and timetabling arrangements were not amenable to change. The tutor recognised that the opportunity for interaction, particularly in a crowded room was limited:

Though we try and involve the students, it is very difficult if you have got people sitting on stairs at the side of the room or almost sitting on each other's laps, so sometimes it is a matter of survival. We have had disciplinary problems in lectures just because of overcrowding like rats in a box ...P18

So the tutor changed the way the time was used by providing 'virtual lectures' in advance of the large class session, which now changed from a traditional lecture to a 'workshop' with an emphasis on interaction between students.

So we have ... virtual lectures. which are audio visual multi media presentations, which are available to the students before they have contact with the lecturer on a particular area of work and then in the traditional lecture time we have workshops....they are given actual exercises which are ... based on the content of the lectures, so it might be about small business or a pollution case or something like that.. P18

These virtual lectures and workshops are followed by the traditional small group seminars, as before. So even though the contact time and staff resources involved are unchanged, the technology has been used to make the face-to-face time more interactive. Two groups in particular gained additional benefits from this approach – the overseas students, for whom English was not their first language and students with disabilities, such as dyslexia:

What the overseas students appreciate is the fact that they can listen <and> read captioning as well because we did it multi-sensory for the reasons of accessibility for students with impairments, but it was the overseas students who benefited the most... P18

The outcome of this way of changing face-to-face interaction was a marked improvement in student performance. The referral rate reduced by 40%, the students with dyslexia achieved an average of 2 grade points higher in this module than their other studies and the overseas students found the combination of text and narration particularly helpful for developing their language skills.

Case study 2 – 'Learning different things'

One engineering tutor used a combination of StudyNet, email, Mail Merge and an Excel spreadsheet to generate and distribute weekly tutorial sheets to around 150 students. The system ensured that although all students were set the same problems, each had unique data sets to work with. This enabled them to discuss the problems, but meant that they could not share answers. The system also collected the students' worked solutions and marked them and returned

individualised feedback. The turnaround time for this entire process (from distributing the worksheets to returning the feedback) was less than a week. Each weekly worksheet was directly related to that week's lecture so that once students left the classroom they were engaged with a supportive process that enabled them to work on the lecture's subject matter over the next six days. They then received almost immediate feedback on their performance.

So what I am doing is I am forcing the students to work on a regular basis... I am also feeding back to them on a regular basis so they don't have to wait three or four weeks to get the results of their efforts, they get their results within a few hours... P4

The system also generates a league table of the results week by week that the students can access. The league table is anonymised, but each student can identify his/her own performance. The purpose of the league table is to provide cumulative feedback about the students' performance and to engender some social competition.

... it is a proper league table, it shows them what they got this week, what they got for all of the weeks and it tells them their current position and whether they have gone up or down. I am trying to see whether that social competitive, so to speak, works and is a driver. P4

The example so far is one of using technology to 'extend the classroom' in a very effective way. But the information that the system provides is also used to inform the content of the next lecture (doing different things). The tutor spends the first 10 minutes or so of the next session reviewing areas of difficulty revealed by the data:

So I have got another graph which says to me 80% of the students, for instance, all got questions 1 and 2 right, but only 30% of the students got questions 3 and 4 right. So you can look at where the students are falling down... it gives you an instant feedback on where they are struggling and where you can start to provide some remedial work. P4

The use of data like this is a way of personalising learning in situations involving large numbers and is ensuring that the dialogue with students is enhanced. This brief description does not do full justice to this development. It has certainly been very successful on this highly mathematical, compulsory, year one module. Whilst nothing else changed in terms of delivery, the failure rate reduced, from approximately 50% the previous year, to 23%.

Evolving the curriculum

The impact of StudyNet cannot be entirely disentangled from the wider impact of ICT upon the curriculum. Both have resulted in a need for the curriculum to evolve to meet the challenges and opportunities afforded.

The curriculum can be considered in terms of what is learned and how it is learned. Some of the issues about how students learn have already been considered in terms of extending the classroom and enhancing face-to-face interaction. The main themes that will be considered in this section relate to what is learned.

The evolution of the curriculum can be considered in terms of the new skills that students needed. At the most basic level, this included the need to learn keyboard and other ICT skills. Despite the current notions of students as digital natives, fully conversant with ICT, at the time of data collection, computer skills could not be taken for granted. Not all students had adequate skills and, in any case, as StudyNet was new to the students, they needed to learn how to use it. Although included in a general induction package to all students, some teachers felt the need to offer greater help. This was commonly expressed by the participants from Health. For example:

... the computer skills of our students are actually extremely low. We wanted them to give in part of their portfolio submission by emailing it to us, not StudyNet but emailing it to us. Most students didn't even know how to put an attachment on an email.... P5

However the greatest impact of StudyNet and the web upon skills related to knowledge management – sourcing and evaluating relevant information. The internet has led to a huge increase in the amount of information being published, the currency of that information and the ease with which it can be accessed. This could readily facilitate one common theme in higher education, the need to read around a subject:

So those who have got the hang of electronic journals and things like that you see in their reference list more and more complex journals coming up they have been introduced to a whole different set of reading material that they wouldn't necessarily have used before....P15

The supply and accessibility has inevitably raised new challenges as well as opportunities – and the challenges were much more to fore of the participants' thoughts. The most evident concerns were the students' capacity to evaluate the quality of sources and select the most appropriate ones. For example:

Some of the good students are <using a range of resources> really well ... and the poorer students ... are still using Google and the most unsophisticated sites and coming up with absolute rubbish sources of information. P6

They need to have those information skills and questioning skills, all those sorts of skills in order to sort out the rubbish from what is actually relevant. P21

Another example of simultaneous benefits and disadvantages of readily accessible information was highlighted when some participants saw the wider range of electronic material being used as references as a problem, because they themselves were not necessarily familiar with the resources. Another participant, however, recognised that although they might not be familiar with all resources, the ready accessibility meant that sources could be inspected more readily.

Before you had maybe a dozen journals and you could assess the quality of them for yourself I think as people find more and more information it is difficult for us to keep up to assess the quality of that and we have to take a lot of things at face value. P15

... I have got more control because if I am marking something and I see someone has put a web page I will look at it to see what exactly does it say.... P16

Knowledge management forms part of all students' curricula, typically delivered by the Learning Information Services staff by arrangement with the module teams. They have had to constantly adapt their input to keep up with the increasing challenges posed by the plethora of information sources and search facilities. At the same time, the teachers often saw themselves as filters for the students, guiding them to the most appropriate sources, cognisant of the level of study (so first years would typically get more guidance than third years). In parallel with filtering, they also tried to influence the students' skills through feedback. For example:

Certainly at first year level we are a little more prescriptive in trying to filter the material to the students. P4

You try and direct them to the good stuff by linking to it in StudyNet sites. You try and wean them off the bad stuff simply by explaining to them in their essay feedback that the reason this essay has not scored a high first is that it was drawing on poor quality stuff.. P23

4.4.3 Discussion of 'StudyNet and learning'

The use of the different facilities has been explored at UH before. Thornton *et al* (2003) distributed a questionnaire survey to all academic staff and achieved a response rate of just over 30%. Table 4.3 shows the high level of use and value placed on the different facilities. The least used and valued was the discussion forum, which will be discussed in more detail in the communication section below.

Table 4.3 StudyNet Features and Facilities (adapted from Thornton *et al*, 2003)

Total 261 respondents	% using this facility	% using this facility that rate it 'quite useful' or 'very useful'
Module Information	89	88
Teaching Materials	79	94
Module News	79	87
Module Discussion forum	53	60

Communication

The results relating to the use of StudyNet for communication highlight some of the benefits and possible downsides of this affordance. There was an overlap in the use of the various communication tools for different purposes – for example supporting a learning dialogue, imparting instructional information and imparting academic content. Koszalka and Ganeson (2004) produced a taxonomy that illustrated this overlap with, for example, email having one-to-one and one-to-many capability that could support learning (dialogue), instruction (monologue) and information (content). Although one-to-many communication tools are efficient, they may not always be effective. The importance of dialogue in learning has already been emphasised and this section will now explore the use of one of the (efficient) one-to-many tools, the discussion forum, for supporting learning dialogue.

There are differences between face-to-face and online discussions that give each particular strengths and weaknesses. The asynchronous nature is valued by students because they can access discussion when and where they want. Some students view online communication as a more social and convivial means of communication (Harasim 2000). Like some of the students referred to by the participants of this study, Weisskirch and Milburn (2003) found in their content

analysis of 40 forums that there was a mix of subject related and social communication.

Contributions to online discussions may be more reflective because of the need to compose in writing (Hammond 1999) and because of the permanence of the record allowing time to reflect (Jefferies 2003). Weisskirch and Milburn (2003), in their review of the literature, also agree that contributions are more reflective and suggest that a wider range of people contribute, thereby giving voice to new groups. Two groups that are mentioned in this context are quiet or reserved students and females. Whether or not contributions from female participants are more likely is equivocal (Hong 2002) and O'Donoghue *et al* (2001) also highlighted the contradictory views about students' willingness to contribute online. Hammond (1999) suggests that people who participate are willing to take risks and have a sense of responsibility to the group.

Although some people gain from just reading discussions - Hammond (1999) termed such people 'silent learners' in preference to the more pejorative 'lurkers' - effective discussion needs people to contribute (Jefferies 2003). One barrier to participation is the permanence of the messages (Hammond 1999). At the same time, people need to have access and be skilled enough to contribute - Motiwalla and Tello (2000) suggest that additional training may be required to equip all students with the skills to participate effectively in online discussion. Participants also need to feel confident in the worth of their contributions and Hammond (1999) suggested reticence to contribute may result from a lack of positive feedback on their own writing. The tutor has an important role in moderating discussions so that students are willing to contribute and do so in a way that supports higher level learning (Salmon 2000).

Salmon (2000) proposed a five step model to create effective learning via discussion forums, based on her experience and research at the OU. The first three stages include ensuring participants have access and motivation, a period of online socialisation followed by the sharing of information. The final two stages are concerned with knowledge generation – an important aim for a constructivist approach. The penultimate stage still relies upon moderation but the final stage is when participants have developed sufficiently to continue knowledge generation activity with little need for support from a moderator. Salmon (2000) emphasises the importance of a moderator facilitating students through this series of steps –

with the emphasis on facilitation rather than more traditional instruction. Creanor (2002) reinforces this view in her report of two online forums. She concurred that discussion forums need teachers to keep posting to keep them going and cautions against the instructional approach – when one moderator lapsed into their old instructional role, learning was inhibited and failed to progress beyond stage three. Jefferies (2003) also noted that teachers intervening in a discussion could stop a discussion thread in its tracks and argues that moderating discussions needs even greater sensitivity than working face-to-face with students. She also suggests that knowledge creation is very challenging in an online environment. Jennings *et al* (1997) make the point that participants are able to clarify meanings more easily face-to-face than online.

In this study, several participants noted how a common topic for discussion was assessment. This is unsurprising because, as Gibbs (2004) recognises, students are highly assessment focused. Monteith and Smith (2001) suggested that students generally prefer face-to-face contact and this section has highlighted that although discussion forums may be particularly good for reflective contributions and for allowing different groups to find their voice, they are more challenging in other respects. They need effective moderation that requires a constructivist view of learning, with the tutor as a facilitator more than an instructor, if knowledge creation and momentum are going to continue. The low level of use and perceived usefulness of discussions by these participants could well be improved by better training in devising appropriate tasks and moderation skills training for staff, coupled with ensuring students have the necessary skills to use the forums. It is important to remember, however, that the majority of these participants' students were undergraduates who can and do meet face-to-face – just as authenticity is important for learning tasks, for discussion forums to be used by students, they need to be underpinned by a genuine reason for using one. Often this will be because the forum will be more convenient for some of the students some of the time. A secondary reason could be to enable/encourage the students to develop the skills and confidence to participate in online discussion (even if they can meet conveniently). This would then open up greater options for communication for them in future.

The next section will revisit the pedagogic issues underpinning the use of online learning environments, including discussion forums, in more detail.

Pedagogy

The three pedagogic themes – extending the classroom, enhancing face-to-face activity and evolving the curriculum have been considered, one way or another, by other authors in other settings. These themes do, however, encapsulate key issues for curriculum design and are of crucial importance for the continuing embedding of VLEs in the student learning experience. The first two, *inter alia*, have implications for how students learn, whilst the third is mostly concerned with what they learn (knowledge and skills). The discussion will consider the issues related to how students learn first.

Academics regularly assert that the use of technology should be determined by pedagogy, not dictated by the technology. Watson (2001) stresses this, suggesting that to do otherwise would be putting the 'cart before the horse'. In order to do this, Jefferies (2003) argues that teachers need to know the affordances of the technologies – the opportunities and limitations they extend to learning – and they also need a model of pedagogy on which to base their decisions. Rather than use the terms instructivist and constructivist, she talks of (knowledge) acquisition and (learner) collaboration, recognising that both have their part to play in Higher Education. Collis and Moonen (2002) argue that pedagogy should be about acquisition and contribution – this is a development of the idea of students participating in a community of practice, suggesting that opportunities to go beyond mere participation to actually making a contribution to the knowledge of the community. This is a high level analysis that should direct teachers towards the sorts of activities and learning opportunities that they might wish to devise or structure for their students

Moving towards a more functional analysis of the way in which technology can support learning, Bell *et al* (2002) produced the Department of Education, Science and Training (DEST) classification of web supplemented, web dependent and fully online practice. Web supplemented suggested that the use of the web is optional, web dependent involves an online component that is an integral part of a course alongside face-to-face learning and fully online a programme has no face-to-face component. This is paralleled by Harasim's (2000) three level taxonomy: Adjunct mode, where online runs alongside the normal teaching; Mixed mode, where the online aspect is fully integrated into the curriculum and is a normal part of the course and assessment; and totally online mode. The majority of teachers in this study were using technology to 'extend the classroom' – to increase contact with

students in a variety of ways. Leidner and Javernpaa (1995) view this as technology redrawing the physical boundaries of the classroom and Weisskirch and Milburn (2003) suggest this is a learner centred approach. However, the teachers 'extending the classroom', were not usually trying to do anything substantively different from before. In most cases, although the use of StudyNet had the potential to add value to the student learning experience (in some cases substantially – e.g. mini case study 2), students could probably manage without using the VLE if they chose – it was not an integral part of the course. This accords with the web supplemented or adjunctive views outlined above.

But others suggest that technology and e-learning can go beyond this. Salmon (2005) argues that the adoption of technology to do what we already do is analogous to humans trying to fly by mimicking birds flap their wings – good for birds, but wholly unsuccessful for humans. In order to fly, a new paradigm is needed (Salmon 2005). But what is this new paradigm? Salmon does not explicate the new paradigm in her paper, although her well known publications on e-moderating and e-tivities (Salmon 2000 and 2003) detail essentially constructivist approaches. A number of other authors, such as Huang (2002), McDonald and Twining (2002) and Collis and Moonen (2002) also link constructivist approaches with online methods. Collis and Moonen, (2002) suggest online teaching involves 'activity planning, monitoring and quality control' (p 219) as opposed to delivering content. But it is important to remember that these constructivist elements can and do exist in technology free settings.

The participants in this study who were deliberately using the technology to enhance the face-to-face experience are closer to moving towards a new paradigm. Not perhaps in the sense of something that goes beyond instructivism and/or constructivism, but in terms of using the technology to rework the students' face-to-face learning experience. Case study 1 involved a definite shift towards more constructivist practice, encouraging greater student-student face-to-face dialogue. The enhancing face-to-face component of case study 2 involved using technology to personalise and improve the face-to-face dialogue between tutor and students – work very much in keeping with Laurillard's conversational framework (Laurillard 1993).

The discussion will now consider 'evolving the curriculum' – with its specific take on what students learn. Clearly curricula change and evolve over time as subject

matter develops, relevance and focus shift and new skills take on greater importance. In this case, it is the wealth of information generated, the variable quality of the information and its ready accessibility that are driving change in the curriculum. There has been considerable effort institutionally and nationally, through bodies such as JISC, to make electronic resources available to students (McDowell 2002). Some of this is really useful to the learning experience – as was found by a number of this study's participants, McDowell (2002) suggests that relevant information can bring 'the world into the classroom' with such resources as government reports, legal documents and company reports. But there is also a plethora of information of uncertain quality, including self-published (Harasim 2000) and unregulated (McDowell 2002) information. More than ever, students need the skills to search for and select appropriately from computer databases (NCIHE 1997). The term used to describe these skills is 'information literacy' (McDowell 2002, McDonald *et al* 2001). Without these skills they will either use inappropriate material, overlook relevant sources of information or become weighed down by the sheer volume – information overload (McDonald *et al* 2001).

The three main groups who have an interest in this area are teachers, students and librarians. As with any skills, students need to develop information skills properly and McDowell (2002) has highlighted a tension between librarians and academic staff over the development of information literacy. McDowell is very concerned to ensure the student experience has a balance between developing autonomy and providing student support and suggests that librarians are keener than lecturers to foster independence early on. Her qualitative research involving 11 academics from three UK universities revealed that some of her participants recognised that they inhibited student independence by being over-prescriptive in guiding reading – sometimes through concerns about plagiarism. McDowell recognises that librarians are the experts on the changing world of electronic information and argues the importance of librarians and academics working in partnership.

Lazonder (2003) is also concerned with student autonomy or self-regulation. His interest is in developing student computer search skills and uses the literature and his own experience to argue that skill development is inhibited by being over-prescriptive. He goes on to argue that realistic or meaningful tasks should underpin skill development. Interestingly, like Foster (2000), Lazonder acknowledges that self-taught students will adopt naïve strategies, but argues for a minimalist approach to guiding students as they learn. He notes that conducting effective and

efficient searches involves procedural (how to enter search terms etc) and intellectual expertise (using the optimum search terms and analysing the results). Having good domain expertise and background understanding will lead to more effective and efficient searches. This is important for teachers to recognise because working from their level of domain expertise might make it more difficult to empathise with less expert students taking longer to find and sift information, possibly with less success.

McDonald *et al* (2001) reinforce the need for appropriate intellectual expertise, such as investigation and reflection, to locate, evaluate, organise and use information. They draw on their research with OU students to argue that postgraduates are better equipped than undergraduates in these key areas. Their particular interest was resource based learning and they used concept maps to help students navigate the resources. Tergan *et al* (2006) draw on the literature to argue that concept maps help students to develop information literacy and suggest that if students learn to develop such maps, it will help them be able to organise, store and retrieve their knowledge. Concept maps help students make links between the different areas of a knowledge domain which is associated with deep learning (Biggs 2003, Ramsden 1992) and is also inherently constructivist in approach.

When discussing information literacy development, Löffström and Nevgi (2007) refer to Biggs' notion of constructive alignment, in which all aspects of learning, teaching and assessment support each other. Like Lazonder (2003), they argue for students working on realistic and meaningful challenges and stress that although the learning tasks should be contextualised, effort needs to be made to enable students to transfer their skills beyond the immediate context.

This section has reinforced the study's participants' view that the importance of developing students' information literacy skills is greater than ever in view of the quantity and accessibility of information available today. The evolving curricula need to develop the procedural and intellectual skills necessary using embedded learning opportunities that are meaningful and aligned with the other learning, teaching and assessment practices that support the students. The use of concept maps may have a particular part to play in help students organise the plethora of knowledge that they encounter. As independent learning is a general goal of higher education, these skills need to be developed in a way that enable students to work independently – academics should work with librarians to ensure that their

understanding of new knowledge sources is up to date so that both groups work in a coordinated manner to support the students.

4.4.3 Summary of 'Supporting learning in physical and virtual environments'

This section has explored how the participants have integrated StudyNet into their teaching. In order to do this, an understanding of the students' wider (ie face-to-face) picture was very important because the potential for each environment to supplement or complement the other is where the real power in the use of MLEs lies. A key practical issue for the teachers to resolve is how to design curricula that make best use of technology and face-to-face learning opportunities to meet the students' needs and those of the staff.

4.5 Change and the learning institution

This section will discuss some of the factors that are driving change at UH, including local policies and the provision of new technologies. It will explore the interaction between teachers and such factors and highlight the importance of both top-down and bottom-up contributions to the change process.

The first part of this section will explore the participants' reasons for using StudyNet whilst the second part will explore in more detail the university's implementation of StudyNet in order to contextualise their reasons.

4.5.1 Why use StudyNet?

For the majority of participants, the rationale for integrating StudyNet into their teaching was multi-factorial and they recognised both internal and external drivers. The most commonly recognised factor was the university's policy that StudyNet would be used to support all modules. The extent to which this actually influenced individual's practice was, however, variable. For a number of the participants, the impact of StudyNet upon their practice was significant. For example:

... what has amazed me totally truthfully is now when I think a year ago I was hardly using it at all and I don't feel I could actually run the modules without it now. I really do feel that. P12

The reasons why teachers chose to use StudyNet fell into two broad categories – internal drivers and external drivers.

4.5.1.1 Internal drivers

Broadly speaking, the two intrinsic drivers that teachers described were benefits for themselves and benefits for their students. Benefits to tutors either focussed on facilities within StudyNet that improved their ability to do their job, its potential to save time (usually after some 'pump priming' effort first) and to give them greater flexibility in where and when they worked. For example:

... benefits are the lecture material is available to students and the workshop material is there. I can contact students easily. I know what my up to date class list is. I can put useful information up like exam papers ...a whole variety of things I find useful, and the <saving> of time. P10

It has certainly cut the workload down. It meant a lot of initial work... but it means that next year my workload should be a lot less. P14

The fact that it is accessible remotely as well allows me to work at home or allows me to work during the weekends and upload additional material during the week and during weekends. P4

Benefits for students included better communication, access to resources and the ability to meet the different expectations of individual students. This flexibility was seen as important. For example:

... but if students do have different learning styles - which is fairly obvious that they do - then if we give them a range of approaches then they can respond in the way that suits <each one> . P18

4.5.1.2 External drivers

A dominant theme as to why staff engaged with StudyNet was the university policy. This was not confined to the health participants, but most did say that the Faculty targets were their initial driver. It was apparent that meeting targets was done with a degree of resignation by some, whilst others were not swayed by policy:

It was very much driven by University policy initially, it just appeared and they said 'you will now use this' so at the time you kind of looked at it and thought 'I have got to use it, what can I do with it?' P11

Often I put stuff on StudyNet simply to fill departmental requirements, not because I think it has been a useful thing to do but because we need to do it so I have done it. P5

...but nevertheless I am pressured to <put lecture notes on StudyNet> and I am not going to do that....P8

However, as the above infer this was only the initial driver – once staff had engaged with StudyNet, other benefits, more akin to internal drivers, became apparent:

I think I only ... started using it because we had a directive in our school saying all first year modules and all MSc modules must use StudyNet...but once I started using it I actually thought it was really helpful and could actually save me lots of time and that was very appealing. P6

So it is a mix of factors; requirements on the part of the University... and the expectation of the students and I suppose to a degree my own convenience. P8

The quotes above illustrate the multi-factorial nature of the teachers' decision making and also refer to one of the two strongest external drivers – pressure from the students. Student pressure was not necessarily perceived in a negative way:

Also I think the process is very much driven by students.... there will be great praise of staff that do use <StudyNet> but 'so and so doesn't use it at all', and they will have no qualms of naming and shaming. So to a certain extent students do drive the process.... P11

I probably use it because it is there and the students' expectation... that the materials will be available on StudyNet. They scoff at academics who don't put material up, they are not happy with that at all. P18

Most times I think we are ahead of them, but it is funny how it is increasingly student-driven. You will get an email saying 'the session for next week is not on StudyNet' and this sort of thing and you think it is fantastic. P15

Alongside of the policy that encouraged staff to engage with StudyNet were a raft of support opportunities, including local champions and staff development sessions.

These were perceived positively:

...but I do think the personal issue helps, having somebody there who was interested, knew roughly how it worked and helped out where necessary. P1

The University does good regular updating sessions for staff because I think it can be quite confusing if you have not used it much... P11

These drivers will be revisited in the discussion on the implementation at UH below.

4.5.2 The implementation at UH

This section covers the implementation of StudyNet from an institutional perspective. It is not a complete description of the system or process, but reflects the key StudyNet functions and the stages that have been involved. The

implementation of StudyNet can be subdivided into several stages – the planning stage, the development stage, the early implementation stage and the maturing stage. This history is based on the minutes of meetings, policy documents and other papers relating to the main group involved in the implementation – the StudyNet Development Group (SNDG) and the StudyNet Learning and Teaching Project group (SNLTPG). In 2005 the SNLTPG was wound up as the Blended Learning Unit was set up and absorbed its remit.

During the course of the development various committee titles changed but these have not been reflected here as they do not materially affect the story. The section draws on UH policies, minutes of meeting and other relevant internal documents.

4.5.2.1 *The planning stage*

The UH Strategic Plan 1998/9 – 2001/2 outlined a commitment to increasing flexibility in the delivery of courses. E-learning was considered integral to this aspiration and the Learning Technology Development Unit (LTDU) was the focus for project planning and delivery of an MLE to support e-learning.

A number of previous departmental e-learning initiatives had been conducted in conjunction with LTDU and considerable experience and expertise had been developed. In 2000, the University's Learning and Teaching committee asked LTDU to develop a proposal for an MLE. A fundamental priority was that the MLE could integrate with ('talk to') the university's MIS. After considerable research and consideration of various commercial VLE/MLEs, LTDU recommended an in-house developed system, based on Lotus Notes. This could integrate with the MIS and the unit had considerable experience of Lotus Notes for VLE support.

The Senior Management were engaged through a series of discussion papers and when they were satisfied with the proposal, it was taken to the Academic Board and Board of Governors (Piper and Bullen 2005). Tim Wilson, one of the Pro-Vice-Chancellors, produced a vision paper (Wilson 2001) mapping out different levels of engagement with e-learning. The paper also included commercial opportunities, for example increased participation through online Distance Learning and the potential to market electronic learning materials. The office of the Vice-Chancellor has been an important source of support for the implementation and Tim Wilson has retained a personal interest in this agenda since that time. In 2003 he became the university's Vice-Chancellor.

4.5.2.2 The development stage

The fundamental brief was for a robust system that was user friendly and efficient (eg using automated processes whenever appropriate). A steering group – the SNDG - was established in January 2001 and included members of LTDU, representatives from faculties, the MIS team, administrators and academic registry. In addition a number of known e-learning and Learning and Teaching enthusiasts were involved from across the Institution.

This wide representation was underpinned by dialogue - Faculties needed to both understand the implementation and feed into its design specification. These early discussions were frequent, complex and multifaceted. Issues raised included administration, hardware, interoperability with the MIS, MLE name (minutes of the SNDG 16th February 2001), equal opportunities, access rights, system security, support arrangements (minutes of the SNDG 22nd February 2001), copyright, equal opportunities, an online dissemination forum, staff skill development, staff monitoring capability, evaluation and data protection (minutes of the SNDG March 12th 2001), promotional strategy and a staff training development programme (SNDG StudyNet progress report April 2001).

The resulting requirement analysis underpinned the development of an easy to use portal for staff and students that was automatically personalised to an individual's needs by using MIS data to provide information about staff/student status, departmental and programme affiliations, modules teaching on or studying on etc.

4.5.2.3 The early implementation stage

In autumn 2001 the system went live and a total of 22,692 StudyNet accounts were automatically set up for students and staff (StudyNet progress report October 2001). There was a major programme of staff development with some 644 staff attending that year (see table 4.4). In this year there were no engagement targets, staff were just encouraged to try out the system. Each Faculty had a StudyNet Champion (also a member of the SNDG) who promoted StudyNet and supported colleagues who wanted to use it. The Faculty Champions soon developed a network of departmental champions – essentially local enthusiasts - and so experience and support began to cascade across the Institution. The University's

Learning and Teaching Strategy 2002-2005 included the intention that StudyNet will 'become an integral part of learning and teaching activity for all university students'.

Table 4.4 StudyNet training data (LTDU statistics)

Academic Year	Number of training sessions	Number of attendees
2001/2	69	644
2002/3	30	361
2003/4	25	381
2004/5	19	218
2005/6	24	340
2006/7	35	**654

** included additional sessions including 'Blogs, wikis and podcasting workshops', overseas training sessions and a one day 'Technology in Blended Learning Seminar'

In early 2002, in response to Tim Wilson's 2001 vision paper, the Vice-Chancellor and Deans' (VCAD) decided that the SNDG should concentrate on the more technical aspects of StudyNet whilst a new group – the SNLTPG – should consider the pedagogic implications. There was a high degree of overlap in membership between the SNDG and the SNLTPG (no administrators sat on the latter group) and the SNLTPG reported direct to the Vice-Chancellor. This group was responsible for promoting and supporting the pedagogic use of StudyNet. The two main planks it used to support these ends were usage targets to encourage engagement and a variety of activities to share/disseminate good practice (SNDG discussion paper May 2004)

In 2002/3 there was an institution wide campaign to encourage staff and students to engage with StudyNet. A suggested minimum level of engagement was developed by the SNDG and after first seeking comment from the Vice-Chancellor, this was approved by the university's principal Learning and Teaching committee, the Academic Quality Enhancement Committee (AQEC). The recommended minimum engagement levels were then adapted for local relevance by Faculty AQECs or Learning and Teaching groups.

The targets in 2002/3 were:

- 1) All level 1 and M level Modules will use StudyNet as a major means of communicating with students outside scheduled classes. As a minimum each Module site should:
 - use the Module News facility

- provide relevant Module Information (eg aims and learning outcomes, timetable, assessment details/assignment specification, staff contact details, teaching groups)
- use the Reading List function

2) Fifty percent of level 2 and 3 Modules should use StudyNet in a similar manner to that outlined for level 1 and M level Modules.
(StudyNet usage targets, AQEC November 2002)

Usage of the system began to increase markedly, nearly tripling from the first year to the second. Table 4.5 shows the annual login numbers for StudyNet since its implementation, with comment about relevant milestones. Figure 4.1 shows the same data to illustrate the almost linear increase in StudyNet usage year on year.

Table 4.5 Annual StudyNet logins

Academic Year	Number Logins	Comments
2001/2	587000	No usage targets
2002/3	1508000	Usage targets implemented
2003/4	3464000	Over 1600 logins on Christmas day – possibly reflecting the university's multi faith population
2004/5	4769000	For the first time over half the logins were from off campus – the tipping point in terms of remote access
2005/6	6303000	Over 63000 logins occurred between 2 and 3 am – system in use 24 hours per day
2006/7	7671000	Year on year increase is still progressing in a linear manner – see Fig 4.1

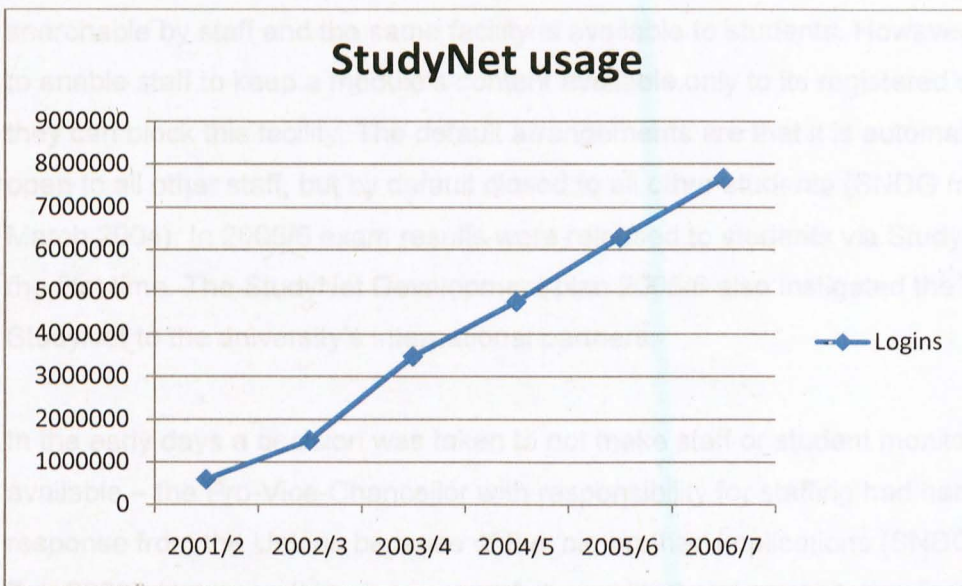
Data source – StudyNet access logs

One immediate and unintended consequence of the increased utilisation of StudyNet was that it highlighted that the time lag inherent in updating MIS data at the start of the academic year (several weeks in some cases) was problematic – if students were not registered on the correct modules at the start of term, they could not access their module websites or 'databases'. Prior to the implementation of the MLE, these temporary inaccuracies in the data had little consequence. Now the data were much more visible than before and errors had immediate consequences. The response was threefold: an automated system for error reporting by students was developed and implemented, alerting the relevant administrator to the student's plight; the administration staff prioritised the input of registration data; and the key information resources of all module databases were made available to all students so that an unregistered student could have some access to their

resources, whilst the MIS data were corrected (Minutes of the SNDG December 2002).

The issue was taken to the university's Information Management Committee in 2003 (SNDG minutes Nov 2003) and subsequently administrative staff have prioritised this aspect of data entry so that student data are now highly accurate and current. However, obtaining accurate staff data in relation to which module they are teaching on has been more problematic. This data was not normally kept on the MIS and had to be entered manually, with responsibility originally lying with the Head of School. However, this proved to be an unrealistic expectation and now a system of self-enrolment is in place and has worked successfully for the past three years.

Fig 4.1 Annual StudyNet Logins



4.5.2.4 The maturing stage

This stage was characterised by two main thrusts – the ongoing development of the StudyNet platform with increasing functionality and encouraging use through incremental targets, dissemination and support.

Developments, including a quiz function, integration with plagiarism detection software and the creation of group areas within module databases, were implemented by the end of 2002/3. Subsequent developments included exemplar sites for staff and students to view, a core skills support site and the ability to link

module databases in a master slave arrangement (SNDG minutes May 2003). At the next meeting the skills site was linked to a forthcoming initiative to provide online support to PDP (Personal Development Planning) (SNDG minutes October 2003). Automatic sign on for Athens has been in place since 2004 (SNDG minutes January 2004). Other developments have included the inclusion of RSS (Really Simple Syndication) feeds, podcasting and video streaming capability, wikis, blogs and personalised careers management information. These developments clearly draw on the emergence of web 2.0 technologies in the wider world.

As the system has become more powerful, it has also become more complex and in order to keep the interface usable, many options are available only by accessing options menus or changing the configurations of websites. The use of default menus can have powerful consequences. For example, in order to encourage sharing between staff (both of resources and teaching ideas) all modules are searchable by staff and the same facility is available to students. However, in order to enable staff to keep a module's content available only to its registered users, they can block this facility. The default arrangements are that it is automatically open to all other staff, but by default closed to all other students (SNDG minutes March 2004). In 2005/6 exam results were released to students via StudyNet for the first time. The StudyNet Development plan 2005/6 also instigated the roll out of StudyNet to the university's international partners.

In the early days a decision was taken to not make staff or student monitoring data available – the Pro-Vice-Chancellor with responsibility for staffing had had a cool response from the Unions because of the 'big brother' implications (SNDG minutes Feb 2003). However, this was successfully revisited and a monitoring function was introduced in 2005/6 for its potential for research, audit and student support. This move was supported by the Staff Unions and the Student's Union. There are, however, strict limitations on how the data can be used including using it for student 'support not sanction' and not using it to monitor individual members of staff (Code of Conduct for StudyNet Evaluation data, UH 2005).

The dissemination activity has continued in parallel with staff development. Table 4.4 shows the level of engagement with LTDU workshops which had stabilised after the first year at around 300 teachers per year. However, the integration of Group areas, Blogs, wikis and podcasting facilities from 2004/5 onwards led to a demand for additional workshops focussing on just these activities. Written materials were

produced eg copyright and IPR guidance (SNDG minutes January 2004) and screen capturing software produced how to guides for some of the procedures (e.g. how to use the online submission facility) but an evaluation of ongoing support found that staff preferred to use 'human' rather than text or online support when using StudyNet. Champions and colleagues were generally preferred to hard copy or electronic guides. Most staff needed time after the training sessions to explore StudyNet further (Piper and Bullen, 2005). Faculties each produced their own strategies, but key planks included group emails that raised awareness and offered tips; lunchtime seminars where staff could hear from colleagues about their use of StudyNet; and one-to-one support – either from the Faculty Champion or local Champions, enthusiasts or just a colleague who knew how to help. Further to this, a StudyNet conference was established in 2003/2004 and showcased 'best practice'. Around 200 staff attend this conference annually.

In 2004 the university began to construct its bid for a HEFCE CETL. A cornerstone of the bid was the institution's success with StudyNet and the support activities, including the SNLTPG (minutes of SNDG March 2004). This bid was based around pedagogic development of StudyNet and it was accepted around this time that although staff and student engagement was high, the potential for StudyNet to enhance the student experience was not being fully exploited. The recognition that e-learning opportunities could be used to enhance learning and increase choice was reflected in the 2004/7 targets which applied to all students and included:

Staff should reflect on how learning might be further enhanced and choice increased within their areas. ... Faculty action plans should include mechanisms for facilitating these considerations and encouraging and evaluating implementation as appropriate....

(University StudyNet Learning and Teaching Policy for 2004-2007)

This theme as developed in the CETL where the term Blended Learning was used to describe:

.....educational provision where high quality e-learning opportunities and excellent campus-based learning are combined or *blended* in coherent, reflective and innovative ways so that learning is enhanced and choice is increased.

(UH CETL bid April 2004)

The CETL bid was successful and the Blended Learning Unit was established in April 2005. It continues to develop approaches to Blended Learning and support its uptake in the University. StudyNet usage has continued to climb, with 7.7 million logins in 2006/7. StudyNet is an integral part of learning and teaching and student

support. Around 95% of staff use StudyNet to communicate with students, to manage modules and provide teaching and learning materials (Piper and Bullen 2005). Direct comparison with other universities is, however, difficult because different VLE/MLE offer different functions that might affect engagement levels.

4.5.2.5 Discussion of 'The implementation at UH'

This has been, and continues to be, a complex and challenging initiative. This section will now explore the implementation in relation to the change management literature.

Nature of the institution

UH is a post-92 university which inherited all the CNAAs management systems at its outset. The central management team exerted, through budgetary control, a strong influence over decision making and had strong control over strategic direction. Using Conole's classification (Conole undated), it would until recently, be classified as a bureaucratic institution. In the last two years, however, much budgetary control has been devolved to the 24 academic Schools, which are now termed Strategic Business Units. Faculties still exert influence over their Schools (for example, they control HEFCE student allocations so that they can target student numbers on strategically important courses). At the same time, the Office of the Vice-Chancellor retains strong control over the strategic direction of the university and is currently in the process of embedding more agile processes and developing third stream income. So although the university is, perhaps, more 'loosely coupled' than it was, there are still effective top down influences on decision making. Using Conole's classification once more, it is less bureaucratic and could be readily identified as innovative with enterprise aspirations. It is not surprising that it may not fit one category or the other absolutely - Davis (1998 p81) distinguishes between classifications that 'carve nature at the joint and those that do not' and here we have an instance of a classification attempting to pigeonhole practice (carve the real world) in an artificial manner.

Nature of the change

It is pertinent to ask whether this implementation has been incremental/first order change or transformational/second order change. Quinsee and Sumner's (2005) account of the VLE implementation at City University has a number parallels with UH – a major VLE implementation with systems integration; the balancing of technological and pedagogical imperatives; and a clear top down strategic

direction. They concluded that their implementation was evolutionary rather than transformational, mainly because it was a development and integration of existing systems. At UH it could be argued that the implementation was transformational – the MLE was new and, although it drew on developments from elsewhere and integrated existing systems, the impact on the university and all who interact with StudyNet has been substantial. No longer is e-learning support the preserve of a few enthusiasts, it is integral to the practice of virtually all staff and students. Whilst the pedagogy has not yet been transformed in all instances (currently this is probably still the preserve of a significant, but growing minority), the embedding of electronic support for learning, teaching, administration and, increasingly, social networking has been transformational. Boyce (2003) included reversibility in her view of transformational change - it is inconceivable that UH will ever return to a pre-StudyNet means of working, reinforcing the notion that this has been transformational, second order change.

Has this change involved single or double loop learning? The innovation was based on the lessons learned by the innovators using e-learning prior to StudyNet being applied to a strategic implementation affecting the wider institutional community. This is in keeping with what Taylor (1998) and Boyce (2003) argue is good practice. The actual roll out would fit with Hannan's (2005) directed approach, with its supported, top-down features. But top-down approaches are not unproblematic – they need to provide effective support and have effective communication to ensure staff buy-in (Surry and Land 2000). When deciding on whether an organisation was using single or double loop learning, Argyris (1999) was concerned with the mechanisms and nature of the feedback sought to detect and correct error. The principal conduits for feedback have been via the representatives on the SNDG, the annual (StudyNet) Learning and Teaching conferences and the university's Annual Monitoring and Evaluation Reports, in which programme leaders evaluate the delivery of their programmes. In addition, several in-house studies into the use of StudyNet by staff and students have been commissioned (e.g. Jefferies *et al* 2004, Thornton *et al* 2005, Kornbrot *et al* 2006, Alltree and Quadri 2007). The minutes of the SNDG highlight a significant level of responsiveness to feedback. Single loop learning is a relatively unquestioning process of using feedback whilst double loop learning questions the underlying assumptions of the organisation, system or process. Since StudyNet has been introduced a number of policy changes have been made (eg the Learning and Teaching policy, the code of conduct for evaluation data) and a number of system changes (eg StudyNet developments

including the addition of blogs, wikis and group areas). All of these have to potential to transform practice in one way or another. Although the mechanisms for evaluation are not as inclusive as they might be - discussion with some individual members of staff suggests that not all people feel totally enfranchised in the debate – there are fairly extensive and multifaceted channels for detecting and correcting error, suggestive of double loop learning.

Parallels with other Institutions

Several other institutions have written about their experiences of substantive implementations of e-learning.

There were some interesting parallels with the implementation of Blackboard at Northumbria University, described by Bell and Bell (2005). They too had some unanticipated outcomes. Like StudyNet, the institution-wide use of the VLE made previously hidden errors in the MIS data much more obvious. Both institutions had to act rapidly in concert with administrative staff to correct this. The upside is that these systems now have an effective check on data accuracy, resulting in more accurate central databases. Like UH, the Northumbrian MIS data did not record staff registration on modules and a manual system was necessary. The StudyNet system has gone through several iterations to ensure this manual system is efficient and effective – it now works on a combination of self-sign on and automatic re-enrolment. Northumbria did not take into account the needs of technical staff – the case at UH was somewhat different in that the technical staff do not have a direct role in using StudyNet – they support staff to ensure, for example, staff have working computers with university specification software. But technical questions relating to StudyNet are dealt with by Faculty Champions and LTDU (and informally through colleagues). Although there was some initial call for specialised training, it has not materialised – although technical staff are, of course, eligible to attend the generic StudyNet training.

As with Bell and Bell (2005), student expectations have been a valuable driver for some of the early majority and the late majority. They too had to develop approaches to quality assurance, copyright, IPR and plagiarism. Like UH, they had a strong strategic drive but they did not use targets to encourage roll out. Nevertheless, they achieved an impressive engagement of staff (90% of staff four years in). The uptake by students is, however, surprisingly low at 72% (Bell and Bell 2005) compared with the uptake by UH students at around 95% (Piper and

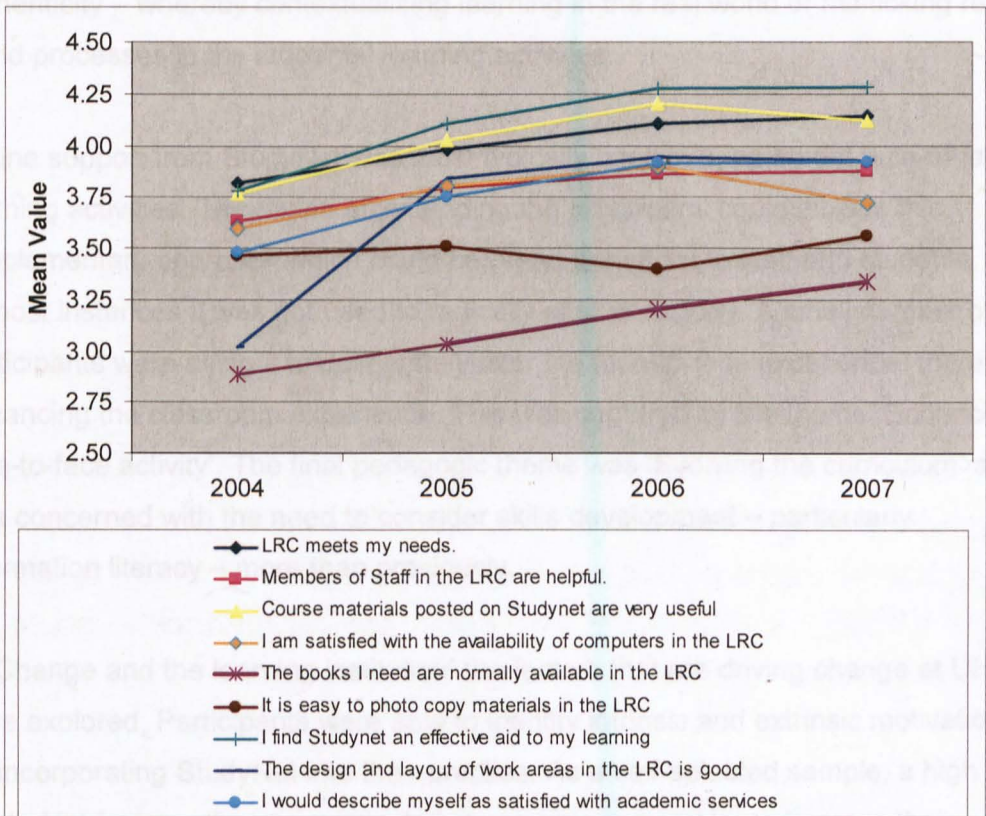
Bullen 2005). It is the belief of the SNDG and SNLTP that the engagement targets influenced uptake of StudyNet by staff and also directed them towards activity that the students would find useful (eg loading lecture notes and presentations, out of hour queries). It may be that this direction, although given to staff, may have contributed to such a significant level of uptake by students.

The experience of the University of Salford, as analysed by Liewski (2004), also had parallels with UH. As well as drawing on existing practice (as with Taylor 1998 and Boyce 2003) they built on existing practice and provided a number of support mechanisms. They also used a steering group to guide the implementation, liaising with relevant departments and using targets to drive the use of the MLE in a true bottom-up, top-down approach. Liewski was not sure how well the top down aspect would work in light of the loosely coupled nature of this long established university, which probably has more devolved decision making than UH, but was optimistic that an effective dialogue between academics, management and central units, based on mutual understanding and respect for culture and beliefs would help keep the momentum. Liewski's external drivers also bore comparison with UH, both concerned with improved access and flexibility for students, meeting student expectations, keeping abreast or ahead of others in the sector and the global Higher Education context.

The pedagogic concerns at UH were shared by Quinsee and Sumner (2005) and Surry and Land (2000). All are concerned with pedagogy driving the use of the MLE or VLE, not the technology. It could be argued that the use of targets that effectively say 'use the technology' might undermine this intention. The findings of this study are that, in most instances, in the early stage of the initiative, pedagogy was not dramatically different. There were perceived improvements in communication and module administration and these impacted to a greater or lesser degree upon the student learning experience – and the staff teaching experience. Only a small number, at this stage, were radically altering what they did with the students. But what was clear is that all the staff who were engaging because of the targets were developing invaluable technical skills, such that what was a challenge three years ago is automatic now. The technological cart may have led the pedagogic horse for a period, but the horse is now well positioned to assume control. Further support for the notion that this was an appropriate way to manage the implementation comes from a UH Student Union survey (Walker 2007) and the National Student Survey (NSS) 2007. In the NSS the university was rated 7th overall in the sector for its

learning resources (NSS 2007). A sample of 507 students surveyed by the UH Student Union rated StudyNet 1st and 3rd out of 9 factors relating to learning resource provision. Figure 4.2 illustrates this highly positive endorsement of StudyNet over the past 4 years (a score of 5 would indicate total agreement with each statement in the key – a score of 1, total disagreement).

Figure 4.2 – Student rating of Learning Resources at UH (Walker 2007)



4.6 Summary of the Results section

The results section has explored three main themes. In ‘The nature of learning – knowledge, skills and the real world’ it showed how the disciplinary differences so often described were present, but there was a good deal of commonality. For example, all were dealing with uncertainty or contention – the Hard subjects most likely later in the course. The students struggled with this uncertainty and contention and a number of strategies were used to try and help them with this. There was also recognition that this was the nature of the subject matter in Higher Education – a necessary rite of passage maybe. Furthermore, most participants were able to identify areas of their subject that had a long shelf-life and other areas where new material was needed every time a course as delivered.

In 'Supporting learning in physical and virtual environments' it could be argued that teacher-centric approaches were as much a function of class size as discipline. Almost all the teachers included lectures in their repertoire and unless class sizes were very large (eg several hundred students) these were highly interactive events, far removed from the stereotype. Smaller class activity was particularly used for the more difficult or contentious matter, such as application of theory to practice or evaluation. There was also a strong drive to make learning relevant by the use of authenticity – whereby contextualising learning in the real world or mimicking real world processes in the students' learning activities.

Online support from StudyNet was most typically used to supplement face-to-face learning activities. The notion of 'extending the classroom' could include this supplementary approach which could be (very) beneficial to staff and students, but in most instances it was not used to radically alter pedagogy. A small number of participants were using it to deliberately alter the face-to-face experience, thereby enhancing the classroom experience. This was captured by the theme 'Enhancing face-to-face activity'. The final pedagogic theme was 'Evolving the curriculum' and it was concerned with the need to consider skills development – particularly information literacy – more than previously.

In 'Change and the learning institution' the factors that are driving change at UH were explored. Participants were able to identify intrinsic and extrinsic motivations for incorporating StudyNet into their practice. As a self-selected sample, a high level of intrinsic motivation, particularly to experiment and try to improve their students' lot is not surprising. External drivers included pressure from students and the university targets for use. The latter appeared to have been particularly successful at encouraging a university wide take-up of StudyNet. This may have been due to the type of institution – an innovative and enterprising university with, nevertheless, a strong element of central control. The high uptake was also due to the support and dissemination activities that were in place and maybe because there was not a coercive and highly monitored approach to following up target achievement on an individual level. It is fair to say that this has been a transformational implementation that involves second order (institutional) learning.

CHAPTER 5 - DISCUSSION

5.1 Introduction

The research questions underpinning this case study are:

- How do academic staff from a range of disciplines go about their academic practice?
- How have they incorporated StudyNet into their academic practice?
- Why have these staff chosen to utilise StudyNet in the ways they do?

In pursuit of answers to these questions, a central theme to emerge is that learning is ongoing in every setting I investigated: the teachers are learning about how to integrate new technology into the learning environments they create for their students (and of course the students themselves are learning within and without those environments); the institution is learning about a major ICT implementation that is intended to meet the needs of staff and students in a 21st century learning environment. It needs to do this through an understanding of the ways in which students learn; a recognition of the different approaches that might be necessary for different disciplinary cultures (and other factors, such as class size); and the ways that change can be effected on an organisational scale. The sector is also learning how best to promote and support the drive to embed technology more firmly in the student learning experience.

It emerged that, as part of their learning experience, our Higher Education students had to engage with uncertainty. It was also clear many found this uncomfortable. In fact, just as students and teachers have to work with and overcome uncertainties, so do institutional decision and strategy makers and the sector. A crystal ball would make life so much easier!

Also evident was the interconnectedness between all three settings. Unsurprisingly the strongest links were between adjacent settings, but some links span all three settings. This interconnectedness may have an element of directedness (e.g. HEFCE guiding institutions to use technology via strategy and funding initiatives and the Institution 'directing' staff to use the MLE through the use of targets) but in each case these interconnections are actually dialogic or two-way.

This discussion section will discuss the study's findings in relation to the research questions and by using the adapted Bronfenbrenner framework – the teachers' microsettings, the institutional mesosetting and the macrossetting of the UK Higher Education sector. It will then offer a critique of the methodology and make a case for the findings' trustworthiness, including the potential for the findings to be transferred to other contexts. This critique will include a reflexive statement that will help readers to contextualise the findings and aid decisions about their transferability to other settings.

5.2 Discussion of the Results

5.2.1 The microsetting

Much of the practice of the participants could be readily aligned with constructivist approaches. Generally speaking, they valued social interaction between students, they drew on authentic scenarios and processes and, even when they were lecturing, there was an emphasis on interactivity and engagement, rather than a one-way 'delivery' of information. They all recognised areas of practice that were less certain/more subjective than others – this was often associated with the application of theory or matters involving human beings – and often chose to deal with these uncertain areas in smaller, highly interactive settings. Arguably the more certain information could be learned through more instructional means and the more complex and uncertain information best suited to socially based techniques. Although some had used web technologies in the past, for the majority, the arrival of StudyNet as something to be integrated into their teaching was a very new challenge.

They rose to this challenge for a variety of different reasons – because of natural interest or aptitude; a wish to experiment; envisioned benefits for themselves or their students; pressure from students; or because they felt obliged to comply with a university/Faculty directive. The centrally provided support to do this was appreciated, as was the support of their immediate colleagues who were also wrestling with similar uncertainties.

The manner in which they rose to the challenge varied. Administratively, there was much in common. The news facility, email and resources section was used for one-to-one and one-to-many communication and also for providing information such as timetables, module documentation, reading lists, assessment titles etc. Once

students have got used to the supply of information and communication via this means, it is likely to have a generally positive impact on the student experience in terms of convenience. In the first years of the implementation, students were unhappy about printing up items that had hitherto been provided (free of charge) in paper format. Initially, teachers responded by providing hard copies of anything deemed essential to have in this format – but that has reduced now and newer students no longer appear so concerned (this may be a case of ‘what they haven’t had, they don’t miss’ or a more relaxed attitude to working electronically).

From a pedagogic perspective, however, it is not so clear that the participants were significantly changing the learning experience. Two of the main drivers for the introduction of StudyNet are summed up in the BLU’s bid document (BLU CETL bid document 2004) – enhancing student learning and increasing flexibility (choice in when, where and how students study).

At the early stage of the implementation, flexibility of study – certainly in any way that meant less attendance (at fixed times in fixed places) - was not a major consideration for any of the participants. It was acknowledged, for example, that students who missed a class could catch up more easily if they had lecture notes provided via StudyNet, but opting out of a class on this basis was not seen as desirable (in fact, a point of concern for some). Interventions to enhance student learning were, however, more prevalent. This is best summed by the theme ‘extending the classroom’.

Almost all participants used StudyNet in some way to extend the classroom. Typically this involved making lecture notes or presentations available in advance of a class (either for convenience or to enable pre-reading) or providing them with weblinks and other electronic resources (eg reading, self-test quizzes) to supplement the module. In addition, some participants provided students with materials that were created during a class to enable them to reflect upon or review the activity of a class retrospectively. The discussion forum was also used to begin a dialogue before a class or continue it afterwards. All these examples could provide powerful opportunities for students to learn more effectively, but these learning opportunities were mostly optional and did not change the fundamental nature of the learning environment that the participants were structuring for their students. Using the DEST classification (Bell *et al* 2002) this was web supplemented teaching or using the MLE in adjunct mode (Harasim 2000). Figure

5.1 illustrates the relationship between the online and physical environment graphically – the figure illustrates the time line (from left to right) whilst the overlap indicates the potential for each environment to inform the other. Figure 5.2 shows a sequence of physical/virtual learning episodes - the colour gradation illustrates the transition that occurs in between classes where students can consolidate what has gone before and orientate themselves to the class ahead.

Figure 5.1 The role of StudyNet in extending the classroom. The overlap indicates the potential for each environment informing the other.

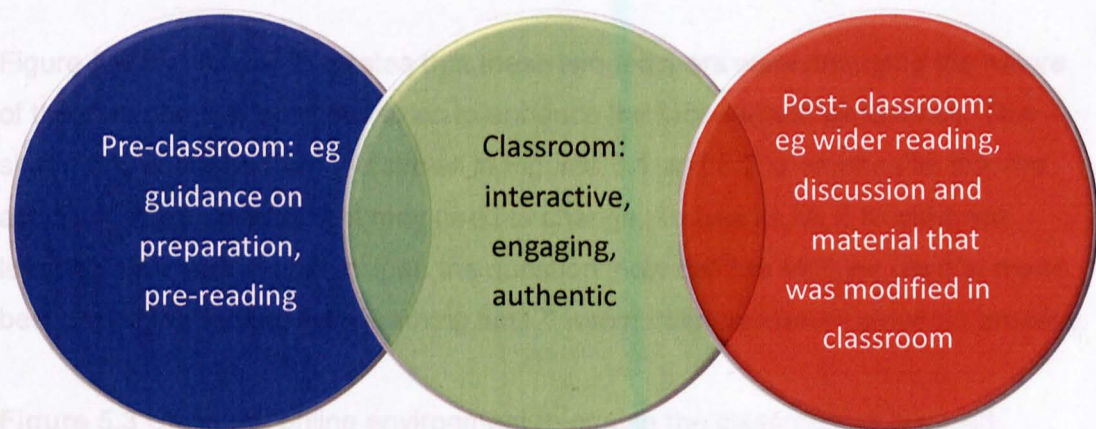
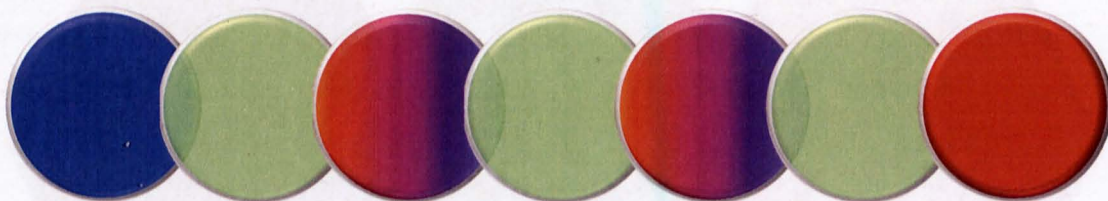


Figure 5.2 A longer sequence of classroom and online activities.

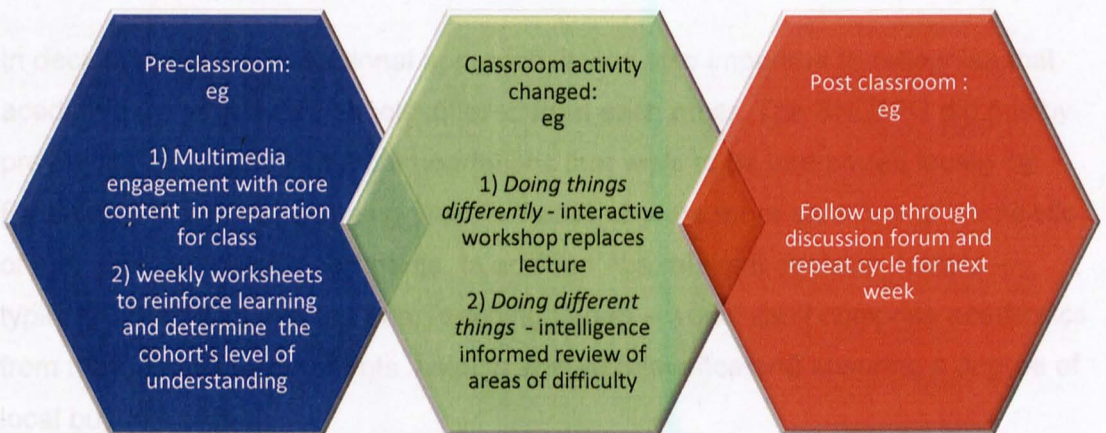


Even though they were using StudyNet to enhance the learning experience, very few teachers, at that time, were rethinking their pedagogy substantially. The exceptions are illustrated by the two case histories that showed how teachers were using technology to specifically enhance the face-to-face learning experience. The first one used multi-media to engage the students in advance of a class so as to increase interactivity in very large (200+) groups of students. The second was one of the few examples of extending the classroom is a systematic and compulsory

way, and then using the intelligence gained to inform and enhance the face-to-face part of an ongoing learning conversation. Both these teachers' work could be considered web-dependent (Bell *et al* 2002) or mixed mode (Harasim 2000). These classifications do not, however, capture this crucial distinguishing feature that they were using technology to make optimal use of the precious face-to-face part of the student learning experience. Students value the quality of face-to-face teaching (Bekhradnia *et al* 2006) and at UH there is little appetite to reduce face-to-face contact, even though it would suit many students' lifestyle (Alltree and Quadri 2007).

Figure 5.3 graphically illustrates that these two teachers were changing the nature of the classroom experience so as to enhance the face-to-face experience. The shape has changed from the circles in Figures 5.1 and 5.2 to emphasise that the activity in each environment may need to change. To use an MLE to enhance learning, teachers should include the question 'how can the MLE be used to make best use of the face-to-face learning time?' within their curriculum planning process.

Figure 5.3 Using the online environment to enable the classroom to be used differently in order to enhance the face-to-face experience.



Another important feature of this adapted Bronfenbrenner model is the interconnectedness between settings. The degree of interaction between the individual teachers and the mesosetting – the institution - varies tremendously. Some participants played an active part in the wider institutional context by, for example, sitting on central committees or responding to policymakers requests for

stakeholder input (such as an open invitation to contribute to the university's Strategic Plan or a recent space utilisation survey). Others, on the other hand, choose not to engage in this way. In the context of StudyNet two participants sat on the SDG and on the SNLTPG whilst an analysis of the online feedback system that helped the StudyNet team develop the system (data collected 24.11.06) revealed that eight of these participants had given feedback to the team (four had used it once, one had used it four times, one had used it five times and the remaining two, six times each). In respect of the StudyNet implementation, the other areas of direct engagement with the institution was via the targets – which had influenced the majority, although some said they were not relevant to their practice – and the StudyNet support mechanisms – training workshops and the network of StudyNet champions. These themes will be picked up in the next section – the mesosetting.

5.2.2 The mesosetting

The two-way interconnectedness of staff to the wider institutional setting is important because the institution drew on expertise and ideas from innovators in academic and central departments (ie Learning and Information Services and LTDU) as a backdrop to the implementation of StudyNet. Interconnectedness with the sector is also important where UH was also influenced by parallel developments elsewhere. More recently the HEFCE e-learning strategy and the CETL initiative have been important influences upon practice.

In deciding upon an institutional approach, it was also important to recognise that academic Departments/Schools differed from each other. The SNLTPG did this by presenting its targets as recommendations that were to be interpreted locally by Faculties – the inference being that the Faculties were more sensitive to the needs of their own Schools/Departments. In addition, the relevant decision makers – typically a Faculty Learning and Teaching Group – would itself comprise academics from the Schools/Departments, helping ensure relevance and ensuring a degree of local buy-in.

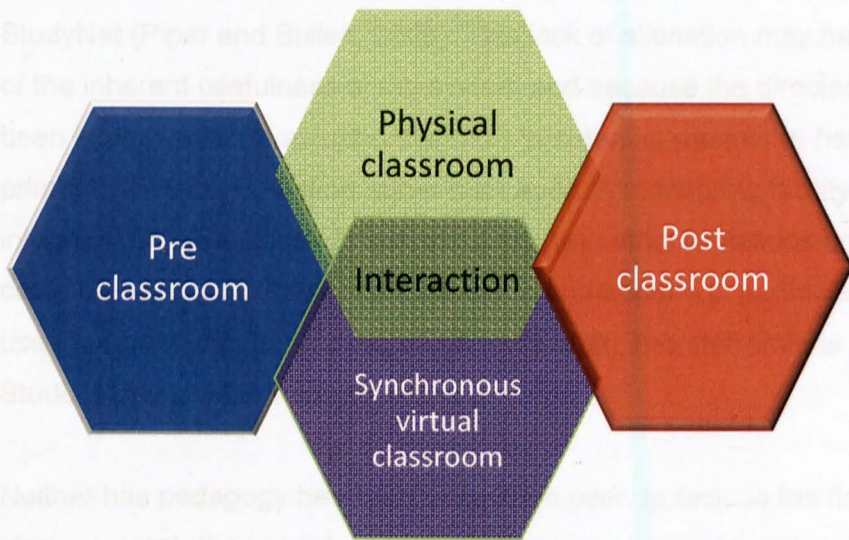
This study has gone some way to understanding further the commonalities and differences between the different academic disciplines. The 'Supporting learning in physical and virtual environments' theme was particularly valuable here. There was a recognition that some of the Harder subjects tended towards the instructional in the early stages of a programme (when compared to the Softer subjects) but also suggestive of the idea that teacher-centric (ie instructional) approaches were as

much a function of class size as discipline. Nevertheless, there was a strong aspiration to use constructivist approaches across the board and this aspiration was often reflected in practice. As a tool for supporting instructional methods, typically through the provision of information, an MLE can readily provide one-to-many learning opportunities in a cost effective manner. But constructivist methods typically rely on dialogue and this does provide additional challenges for those participating in an online world (i.e. good induction, good moderation and an authentic reason to engage in dialogue in an online manner). The paradox here is that, as these participants have shown, a good deal of the learning in Higher Education is concerned with application and evaluation and is particularly suited to dialogue and social aspects of learning. The face-to-face environment is, however, particularly suited to such dialogic learning and, despite some benefits, the online environment presents additional challenges to engaging. So does this mean that the MLE should focus on the information aspects of learning in higher education, leaving the higher order learning needs (e.g. application and evaluation) to face-to-face learning environments? It is certainly an approach that sits comfortably with the theme of using the online environment to support the enhancement of face-to-face learning – but one that will leave one potential goal of the MLE – to increase flexibility in where and when study takes place - unresolved.

As Browne and Jenkins (2003) noted, in practice the use of MLEs has focused on supplementing face-to-face learning with an emphasis on the enhancement of learning rather than increasing flexibility. This may be because experience has found that effective social learning via an MLE is too taxing for many students (and staff) to embrace it and exploit its potential. Yet many students want flexibility (Alltree and Quadri, 2007). Two institutional developments may help address this. Firstly, the ongoing development programme of StudyNet (and other MLEs) has seen more social software tools incorporated (e.g. group areas, blogs, wikis) – and having a greater range of options perhaps will open up this online avenue for social learning – allowing flexibility in when and where study takes place. Secondly, virtual classroom software, such as Adobe Connect (<http://www.adobe.com/>) or Elluminate (<http://www.illuminate.com/>), support a fully interactive (video, audio, text and desktop) and synchronous learning experience. These systems allow an experience that is very close to physically attending a lecture or seminar – but through an internet connection. Although still tied to a fixed time in order to interact, such tools offer the facility to extend the classroom in a completely different way ('transversely' rather than longitudinally?). Such approaches can replace the

classroom or enable some participants to attend virtually alongside people in the physical classroom. Figure 5.4 illustrates this latter concept that is being piloted at UH by the BLU and by others elsewhere in the sector. Maybe in time the virtual classroom could become the dominant form for some types of learning activity for many students?

Figure 5.4 Extending the classroom into virtual space.



At first sight, the process inherent in Figure 5.4's model is to: question existing practice and decide which parts of the curriculum are best suited to face-to-face activity; adapt the pre and post online environment accordingly; and to offer a virtual attendance option. In fact there is a more subtle consideration to be made. The fundamental question should not be 'what is suited best to face-to-face?' but 'what is particularly suited to real time, interactive and naturalistic dialogue?'. This is because that is what such technology can offer – it cannot offer physical interaction or share kinaesthetic experiences. Nevertheless, such technology offers a powerful alternative to physical attendance and the institution will have to make decisions with considerable financial, and strategic implications if it to invest in institution wide support for such technological functionality.

This section will now reflect on the institutional approach to the introduction of StudyNet - did the institution handle this implementation well and what else did it learn? As has been argued, this has been transformational, second order change, characterised by its irreversibility. It is also an example of double loop learning with

plenty of feedback opportunities - the SNDG, the annual (StudyNet) Learning and Teaching conferences, the inclusion of a StudyNet section in the Annual Monitoring and Evaluation Reports and several in-house studies into the use of StudyNet by staff and students. So it has had elements of a top down/bottom up implementation – but the most controversial aspect has been its directed approach, as Hannan (2005) might describe the setting of targets. The use of targets to drive the uptake of the MLE could have either alienated staff or ridden roughshod over pedagogy, or both. Overall it appears that staff have not been alienated, with around 95% using StudyNet (Piper and Bullen, 2005). This lack of alienation may have been because of the inherent usefulness of the system and because the directed approach has been implemented in a supportive, non-threatening manner. It has been ‘policed’ primarily via self-evaluation rather than audit. A monitoring facility was only integrated into StudyNet in autumn 2006, with strict limitations on how the data could be used (student support, research and audit) – in particular it was not to be used for monitoring individual members of staff. The staff Unions and the UH Student Union were involved in this decision.

Neither has pedagogy been run roughshod over. In fact, as the findings of this study suggest, the impact on pedagogy, *per se*, has not been great in many instances. The typical use has been to supplement the normal student learning experience (typically by extending the classroom). As the UH Student Union study (Walker 2007) suggests, StudyNet has been greatly appreciated by students (the mean level of agreement with the statement ‘course materials posted on StudyNet are very useful’ was 4.1 out of 5 and agreement with ‘I find StudyNet an effective aid to my learning’ was 4.3 out of 5). But some teachers are adapting pedagogy (e.g. enhancing face-to-face learning) and showing benefits to student learning – these lessons from innovators are beginning to filter into the development and support activities of other staff (e.g. the BLU workshop programme).

So it is argued that the institution has managed this well – the technological cart has never really gone before the pedagogic horse, although it might have vied for the lead at times. To continue with equine analogies, many members of staff have been led to StudyNet’s ‘water’ and have chosen to drink - the result being a considerable upskilling of staff across the institution.

Nevertheless the potential for the cart to overtake the horse is still present. For example, another affordance of new technology - to digitally record what happens

in a classroom - is also influencing pedagogy. It is relatively easy to video a class, record the audio and slides used in a teaching session using tools such as PowerPoint or SMIRK (<http://smirk.herts.ac.uk/>) or simply record the audio using a digital voice recorder in order to create a podcast. Some teachers are using these recording methods to archive sessions for students for review or to add flexibility, whilst others do not, fearful that students will cease to attend. A BLU podcasting campaign in 2006/7 encouraged staff to engage with the technology and over 200 staff began recording their lectures as they delivered them in the classroom and posting the resultant sound file on StudyNet (Blended Learning Unit 2007). The pedagogic rationale may vary from teacher to teacher but, once again, there has been a considerable upskilling of staff in terms of digital recording practice, working with audio files and using the relevant upload facility within StudyNet.

The introduction of StudyNet created a step change in practice and has been associated with generally positive feedback by students and staff. The student experience overall has been enhanced and in many instances the student learning experience. But, like the participants, the learning institution is still dealing with uncertainty and, at present, is in a state of evolving change. Increasing flexibility in how students learn could necessitate a similar step change in both culture and practice – particularly if it is brought about by virtual classroom technology such as Adobe Connect or Elluminate. This could have an impact at the microsetting, mesosetting and the macrosetting. The last setting is particularly interesting because, with physical setting less prominent in the learning experience there could be considerable implications for competition between universities.

5.2.3 The macrosetting

Clearly there has been a major advance in the sector, in line with the aspirations of the Dearing report (NCIHE 1997). There is a greater role for technology in learning and substantive strategies have been put in place. I will explore this setting with specific reference to the HEFCE e-learning strategy (HEFCE 2005). This strategy was developed through a consultative process, indicative of HEFCE's willingness to get buy-in and to draw on the expertise within the sector. The respondents to the consultation argued against promoting fully e-learning experiences, favouring a blended approach for campus based students (Glenaffric 2004b) - although the term 'Blended Learning' does not appear in the final strategy, this sentiment is reflected throughout. This consultatory approach to strategy development

reinforces the notion that learning is taking place at all the settings this research has explored.

The interconnectedness of the university to the macrosetting is manifest in two ways – firstly it contributed to the consultation and secondly it benefited directly from an important action referred to in the strategy – the implementation of the CETL programme. The BLU CETL bid was based on several factors: the level of uptake of StudyNet; the institutional approach; the value of the SNLTPG; and the dissemination and support activities (UH Stage 2 Submission for a Centre for Excellence in Teaching and Learning in Blended Learning. October 2004). The BLU has had a significant impact at UH (Blended Learning Unit 2007) and is engaging in a dialogue with the sector in the following ways: organising and hosting an annual international conference; producing a range of guides and case studies; presenting work at other conferences and in proceedings and peer reviewed journals; welcoming visitors (UK and International); hosting joint workshops with others in the sector; and supporting other institutions to benchmark their own practice as part of the HEA e-learning Pathfinder project (<http://www.heacademy.ac.uk/ourwork/learning/elearning/pathfinder>). This interaction with the sector is mutually beneficial – as said before, everyone is learning.

The HEFCE strategy outlines seven measures of success – this implementation can be judged against each, but the five most relevant are:

- 1) Students are able to access information, tutor support, expertise and guidance, and communicate with each other effectively wherever they are. They are able to check and record their achievement in a form designed for multiple uses to enable personal and professional development. (HEFCE 2005 p9)

StudyNet does offer enhanced communication options for students and many do take advantage of using these. For learning, however, there is still much potential to increase the collaborative online aspects of learning. In line with these participants' views, Thornton *et al* (2005) showed that the online discussion forums were used less often than the resource focussed or one way (ie News) communication tools. Personal development planning tools are now embedded in StudyNet, but their uptake is low in many areas – student engagement is most likely to occur when associated with summative assessment (Blumhof and Morgan 2007).

- 2) Tutors have tools for course design to enable better communication between them and their students, giving feedback and targeted support. Individual teachers have access to information about the materials available, and support for continuous improvement of them. (HEFCE 2005 p9)

As above, tutors do have new avenues of communication open to them and many more resources available. However, like students who have to cope with much more readily available information, so do tutors. They too need enhanced information literacy skills and these are likely to be developed to a different extent in different individuals. Further staff development in this area is probably of value. Tools for course design are being developed by the BLU and elsewhere, but the notion of a new pedagogy is still developing – this research has made some contribution to the principles that might be employed. Others are also working on this – a recent report from the Institute of Education introduces an interesting taxonomy to describe the continuum that MLE supported learning encompasses (Jara and Mohamad 2007).

- 3) Subject communities are able to share materials in ways that enhance their ability to produce customised high quality courses. They are supported to work collaboratively in designing materials, which are effectively quality assured and widely disseminated. They have access to research information to inform curriculum development and research-based teaching. (HEFCE 2005 p9)

Sharing of resources has some way to go. Some universities have open access to many of its teaching resources (for example MIT and the OU). JISC has supported a project called JORUM which enables teachers to load resources for sharing across the sector. There is a facility in StudyNet to allow any teacher to view the resources on any other teacher's modules (unless access has been blocked). However, whilst teachers may link to other resources as a supplementary measure (as described in the research), many strive to create their own resources that reflect their own view of a topic. In recognition of the need for further work in this area, JISC has recently released an invitation to tender specifically for teams prepared to develop courses around existing resources

http://www.jisc.ac.uk/fundingopportunities/funding_calls/2007/10/reuseofcontent.aspx).

- 4) Staff are supported at all stages to develop appropriate skills in e-learning, and these skills are recognised in their roles and responsibilities and in reward structures. They have access to

accreditation for their level of skills and professional practice in linking learning technology with teaching. (HEFCE 2005 p9)

There has been considerable time devoted to developing the skills of the staff in how to use our MLE and this was a common strand in other implementations described in the literature review (eg Liewski 2004, Bell and Bell 2005, Quinsee and Sumner 2005). There are accreditation schemes for learning technologists e.g. the Certified Member of the Association of Learning Technology (CMALT) scheme (<http://www.alt.ac.uk/docs/cmalt-prospectusv4.pdf>). However, this is a specialised option that would be too advanced for many teaching staff at UH. The sector is clearly still interested in this and JISC have just announced a research project to investigate the impact of working in technology enhanced environments upon staff (http://www.jisc.ac.uk/fundingopportunities/funding_calls/2007/11/evolutionofwp.aspx).

- 5) ICT is commonly accepted into all aspects of the student experience of higher education, with innovation for enhancement and flexible learning, connecting areas of Higher Education with other aspects of life and work. (HEFCE 2005 p9)

The use of the MLE as a portal to student services, social aspects of student life, module databases and central resources would suggest that the ICT is now an integral part of student learning. Study options are more flexible to a point, but as argued, the use of StudyNet at the time of data collection was more to do with enhancement than flexibility. The more recent survey (Alltree and Quadri 2007) suggested that there is an appetite and aptitude for flexible learning that is yet to be met. The advances necessary to develop flexibility for campus based students will also provide support for other developments in work-based learning, as called for by HEFCE (HEFCE 2005 p4) and Leitch (2006).

5.2.4 Suggestions for future studies

As with much research, answering questions raises further questions. It has clearly identified further issues for the university to consider and work on. In particular:

There needs to be further pilot work on the use of virtual classroom and videoconferencing technology – can it satisfactorily replicate classroom attendance and would students find such an option of interest? Furthermore, the university needs to conduct research to help it decide whether this is an avenue it wishes to pursue, with all the cost, cultural and estates implications.

Further work is needed on ways to get the best synergies from the face-to-face and online learning environments – firstly for the university’s core business of campus based students, but secondly for the future work-based learning market. Indeed the second area for development needs considerable market-research to see whether employers are prepared to fund and support such learning opportunities in the way Leitch (2006) argues they need to.

There is also a further need to explore the barriers to reusing or adapting materials already in existence and to explore the impact of technology on staff and institutions. These questions are more related to the HEFCE e-learning strategy, than this research’s findings, *per se*, but they have emerged from the discussion.

5.2.5 Summary of the discussion of the results

This research has sought to answer the following questions:

- How do academic staff from a range of disciplines go about their academic practice?
- How have they incorporated StudyNet into their academic practice?
- Why have these staff chosen to utilise StudyNet in the ways they do?

The answers have not been supplied in neat packages, but are spread throughout the analysis that has been conducted within an adaptation of Bronfenbrenner’s ecological framework.

At the level of the microsetting, there were disciplinary differences, but also many commonalities – indeed class size seemed as great a determinant of teacher-centred approaches as discipline. As far as learning and teaching is concerned, the majority of the participants were enhancing the student learning experience through using the MLE to ‘extend the classroom’. This was, however, reliant on existing means of working - there was no substantive change to pedagogical approach. Two teachers were going much further and using the technology specifically to enhance the face-to-face learning experience of their students – either by ‘doing things differently’ or ‘doing different things’. These ideas open up the way for future thinking on pedagogic approaches.

At the level of the mesosetting, it has been argued that this has been a transformative, second order change. In this university, the approaches to change used have resulted in a sea-change in the use of technology by staff and students. The emphasis on enhancement rather than increasing flexibility in how students learn does, however, leave a significant challenge to be considered further. There is an appetite amongst many students for more flexible learning opportunities, whilst at the same time, there is a desire for face-to-face learning opportunities. Further work is required to see how effectively newer technologies such as videoconferencing and virtual classroom technology can go to providing new, more flexible but highly interactive opportunities for students. This is a decision the university needs to confront because it has significant costs (eg licensing, culture changing, estates implications) and potential benefits (e.g. meeting students needs, recruitment, engagement with a wider community).

The issue of greater flexibility and wider engagement with the community is also essential to the macrosetting analysis. If the UK is to meet its aspirations for wider involvement of Higher Education in educating and skilling the workforce, it needs the tools to engage. The macrosetting analysis also suggests that the implementation at UH has gone some way to realising HEFCE's view of how e-learning should be embedded.

5.3 Critique of the study

This section will begin with a critique of key factors in the method employed, including the ethical approach, the sampling process and an argument for the trustworthiness of the findings. This will be followed by a reflexive statement in which I articulate my values and the setting in which I operate. This should give the reader greater insight into the values that have informed the research, helping both with interpreting the findings and determining the degree to which the findings can be transferred to other settings.

5.3.1 Critique of the method

5.3.1.1 Ethical considerations

The involvement of the participants was underpinned by sound ethical practice from recruitment to interview and through to the member check. No pressure was put on people to participate – conversely I took pains to make sure that any participant could withdraw without prejudice. The participants were properly informed about the

study – its purpose and what participation would mean. Confidentiality has been preserved by anonymising contributions and leaving a degree of vagueness about the precise subjects taught. The questions asked of participants were not inherently sensitive and the conduct of the interviews was friendly and non-judgemental – none should have felt the interview was an unpleasant or intrusive experience. None reported any such feelings. I am confident that the research plan was ethical – however the researcher should not be the arbiter of his/her own ethical practices which is why the sanction of the Radiography and Physiotherapy Ethics committee was important to me.

5.3.1.2 Sampling considerations

The sample of participants cannot be considered truly representative of UH teaching staff. This is based partly on the inclusion criterion that volunteers should be StudyNet users and partly because they were either self-selected or individually invited to take part (the small purposive component of the sample).

The inclusion criterion was there because I wanted to explore how StudyNet was being used, not why it wasn't – that would be a separate research project. Undoubtedly some people are not using StudyNet – this research does not tell us about that group.

It is fair to argue that the self-selected group are not necessarily typical – they were interested enough in the subject area and sufficiently motivated to offer to take part and follow that offer through. They were not necessarily an expert group though – several prefaced the interview to that effect – but were generally disposed to an interest in learning and teaching issues. By virtue of the fact that they were using StudyNet, they could all be described as early adopters, but relatively few were being genuinely innovative in pedagogic terms (again many were willing to admit this). Just because this group could be described as early adopters and in some cases innovators, one cannot draw conclusions about individuals who did not put themselves forward for the research – many of whom may be innovators and early adopters. The general population will also feature late adopters and (the rather pejorative) laggards. Readers wishing to transfer these findings to other settings should include the early adopter status of many of the participants in their deliberations.

Equally, the small purposive component of the sample – four participants - is not representative. These participants were included to increase the representation of hitherto underrepresented areas and they did help achieve this (even though Health was still slightly dominant). The purposive element also brought another dimension to the results because two of these four were innovators rather than early adopters (participants 4 and 18). This should be seen as a positive aspect of the sampling process, fully in keeping with qualitative principles.

5.3.1.3 The trustworthiness of the research

As stated in the methodological considerations section, qualitative work should be conducted in a rigorous and systematic manner so as to attest to the worth of the findings. Robson (2003) argues that the results should be trustworthy and this has four components: credibility, transferability, dependability and confirmability. This section will explore the trustworthiness of this study by exploring each of these components in relation to the research undertaken.

Credibility - For research to be credible, the researcher should be able to demonstrate that the 'subject of the enquiry was accurately identified and described' (Robson 1993 p403). Triangulation is also an important aspect of credibility. I argue for the credibility of this study's findings through the following:

- There is a thorough description of the setting - the university, the MLE and the participants.
- There was prolonged engagement with the participants in the form of lengthy interview and follow up to ensure each one was satisfied with the transcript.
- The member check (as referred to immediately above) ensured that the participants had the opportunity to correct and amend their contributions if they felt that their views had been incorrectly transcribed, or if their words did not, on reflection, represent their views.
- The use of various data sources to inform the case study (for example data about training and staff development, local policies and other locally undertaken studies such as Thornton *et al* 2003 and Alltree and Quadri 2007).
- I immersed myself in the analysis, firstly listening to the tapes and then reading and re-reading the transcripts, then reading and re-reading the thematically oriented sections of the transcripts as the themes emerged.

- Discussing my findings with my supervisor and colleagues – this has occurred over a prolonged period and has enabled the findings to be distilled and refined accordingly.
- Submitting a selection of my transcripts to a peer for confirmation of my interpretation
- Presenting my findings at relevant academic conferences (eg SOLSTICE Conference, Edgehill, 2006 and the 2nd Annual Blended Learning Conference, Hertfordshire, 2007)

Dependability - The qualitative analogue to reliability is *dependability*. As with positivist research, if the data and processes cannot be depended on, the results cannot be credible. Once again, triangulation is an important strategy for ensuring that the data and findings can be depended upon. The dependability of the research is therefore argued through:

- The use of multiple perspectives in the case – the participants' views have been both set in context by the use of the documentary and other data used in the analysis. This has simultaneously provided support for their views and my interpretation.
- The detailed description of the research method and analysis given in the method section of this report
- The interpretation of a selection of the transcripts by another

Confirmability - This is the qualitative analogue of objectivity – of particular interest is whether the findings are grounded in the data rather than the result of researcher bias. Potential for audit is taken as the mainstay of confirmability. Robson (1993) acknowledges that it is not likely to be practicable for all small scale studies to be actually audited. I have tried to overcome this by:

- Providing a detailed account of the research process, including a description of the evolution of the themes, as detailed in Appendix 8. This detailed description of the research process should enable an audit to be undertaken.
- Demonstrating ongoing dialogue with others about the research, for example the conference presentations and the involvement of a peer in the analysis.
- Providing a reflexive account of myself and my involvement with the research and the wider agenda within which the research is set.

Transferability - This refers to how readily the findings can be transferred to another situation and is analogous with generalisability in quantitative research. A key aspect of quantitative research is that it sets out to make generalisations about a population and then enable the reader to be able to make inferences to other specific instances. The typically non-representative sampling methods found in qualitative research means this sort of generalisation is not possible. Stake (1995) argues that *naturalistic generalisation* is possible, by which readers learn by vicarious involvement with the case. Bassey, on the other hand (1999) argues for *fuzzy generalisations* in which the possibility, rather than probability, of an outcome is predicted. However, Robson believes that the responsibility for generalisation lies with the reader of the research rather than the author. Each of these views of generalisation probably has something to offer – a good description of a case should be an immersive experience and *naturalistic generalisation* could readily occur. Also, any informed reader of qualitative research must be aware that it is not associated with certainty of predication – generalisations must be *fuzzy* at best. My preferred stance is that of Robson because I think that due to the shortcomings of qualitative work in terms of prediction, it is the responsibility of the reader to make a judgement about how relevant the work is to any setting that they may wish to transfer it to. Accordingly, it is the quality and detail of the description of this case that its potential for transferability rests upon. The following factors informed the quality and detail of the description:

- The university was well described – a large post-92 university with a management structure shifting from bureaucratic to innovative and enterprising.
- The participants were well described in terms of age, gender, research, learning and teaching background and discipline. They were largely self selected and the majority early adopters rather than innovators, in terms of the use of StudyNet.
- The implementation was well described, particularly in terms of the support structures and policy (e.g. engagement targets) that were in place.
- The outcomes in terms of teaching practice and associated drivers were described in considerable detail.

There should be sufficient detail in this research for an interested reader to make reasoned and sound judgements about its transferability to another setting.

5.3.2 Reflexive statement

Values inevitably impact upon any research (Boyd 2000) and every observation is dependent upon the theory in which it is framed (O'Hear 1989). The influence of values and theory apply to both quantitative research and qualitative research. However, the longstanding positivist tradition, in which the world is seen as objective and with one reality (albeit theory-dependent), is confident in its methods and the knowledge they derive. The interpretive tradition recognises subjectivity and multiple realities. In accepting that their values influence the research, interpretivist researchers do not attempt to depersonalise their work (Greenbank 2003). For example, they write in the first person, whereas positivist researchers write in the third person - in the mistaken belief that this takes the individual (and his/her values) out of the equation. There is an irony here in that the oft attacked interpretive world is very willing to qualify its findings whilst the positivist aggressor appears to be somewhat blind to its own. One of the principal means by which the interpretive paradigm addresses the criticisms of being value laden is for the researcher to provide a reflexive account (Greenbank 2003).

A reflexive account is typically autobiographical and lays out the researcher's values. For the reader, its purpose is to help them understand the relationship between the researcher and the research – perhaps rather simplistically - it helps readers locate the research by having an understanding of where the researcher 'is coming from'. But from the researcher's position, working reflexively involves questioning their values and assumptions in relation to the research – and as such it informs the research. Reflexivity is not just a product; it is part of the process.

In my case, there are two areas I feel might be of value to the reader – my background and early career as a physiotherapist and my career in education and its interplay with this research.

My background is that I am male, born in the mid 1950s, and left grammar school with maths and sciences 'A' levels. According to a Myers Briggs assessment, I veer towards extroversion rather than introversion; thinking rather than feeling; judging rather than perceiving; and intuition rather than sensing. In my mid 20s I trained as a physiotherapist. I took a master's degree in research methodology in my early 30s which covered qualitative and quantitative methods – my research project was quantitative in nature. I moved into higher education in my late 30s as a senior lecturer – I will pick up this part of the story later on.

My upbringing instilled strict notions of right and wrong and my physiotherapy background was very concerned with issues of consent, honesty and professionalism. These factors probably influenced my concern with acting in an ethical manner throughout the conduct of this research. I took all such matters very seriously – whether formally via the Ethics Committee processes – or less formally, when working with my participants when, even if I knew someone very well, I went through all the prescribed processes for gaining informed consent and so on. I believe that I properly ‘donned the hat’ of a professional researcher during the interviews.

My background as a physiotherapist is relevant in several ways. Firstly, I worked extensively with people and was comfortable interviewing the participants. My training (in the 1980s) stressed the importance and the ‘professionalism’ of working without scripts or prompts. Having a script for my semi-structured interviews felt very uncomfortable and on many occasions I did not use it, falling back on my training to talk without notes. This had an upside and possible downside. I think the interviews were inevitably more relaxed and free flowing – more like natural conversations than the box ticking exercises they might have become. However, I was aware that I didn’t always pursue every point with every participant. But this is often the case in qualitative research – points of interest are pursued, sometimes at the expense of other things.

Another important influence of physiotherapy was its multidisciplinary knowledge base, involving Hard and Soft areas such as biology, chemistry, physics, pharmacology, psychology and sociology. This inevitably exposed me to the qualitative versus quantitative research debate. Despite my earlier ‘A’ level experiences of Hard subjects, I soon discovered that it was necessary to be pragmatic and look to both paradigms for answers to my questions. If I had once felt anxious about accepting research that wasn’t backed by, say, ‘scientific’ randomised controlled trials, I had worked through such anxiety even before studying for my Masters degree. Some of the findings of my research are objective and some are open to (your) interpretation – if you can be comfortable with both paradigms and their respective strengths and limitations, you will be the richer for it.

The second part of this reflexive account hinges on my career in Higher Education. I joined UH in 1995 as a senior lecturer in physiotherapy. By 2003 I had become a

principal lecturer and had moved into educational development where I had a particular responsibility for StudyNet. Since then, the research has been intrinsically linked with a series of career opportunities which, at the same time have served to confound the progress of the research!

I chose this topic because it was directly relevant to my work – in fact for the past four years my work and this research have been inextricably linked. As soon as I had completed the data collection phase, however, I assumed responsibility for leading the university's bid for a CETL because StudyNet and its implementation was a key plank in the bid. This was a time consuming process, during which I drew on insights developed on the EdD to inform the bid documents. The successful outcome led to the formation of the BLU. This in turn led to a new role for me in the unit with plenty of exciting challenges... but ensuring the success of the unit took priority over (writing up) the research. Nevertheless, I drew on the emergent findings during the next two years. The work informed operational thinking – e.g. disseminating pedagogic messages to staff at UH and via conferences (Alltree 2007); and strategic thinking – e.g. ascertaining the demand for more flexible study routes (Alltree and Quadri 2007).

My wish to work on something of direct relevance to my working life had other implications – it was insider research. As part of the risk analysis in the research proposal, I wrote 'There is a danger of being too close to the research and the participants that could influence my interaction with them and theirs with me.' (EdD Coursework 6).

In order to minimise any unwanted effects of insider research, I did several things. Firstly, I tried to minimise any perceived power differentials between me and the participants – for example, several were relatively new to teaching. I always suggested they choose the venue and suggested the time for the interview.

Secondly, because I was aware that my role in educational development was that of a change agent and that I was generally perceived as an enthusiast for technology, I did three things to try and enable the participants to express their views truthfully:

1. I took great pains to reassure the participants that I would protect their confidentiality.

2. I stressed that negative observations could be very useful and used to bring about improvements. In fact, this acknowledged that I did have two hats on – the researcher (first) and the StudyNet educational developer (second). I do not have a problem with this - providing that confidentiality or express wishes to the contrary were not breached, I argue that it would be unethical to listen to valuable criticism of StudyNet or UH and not try and effect improvements outside of the research environment.
3. Aware of my tendency to judge (see Myers Briggs reference above), I had to be particularly careful to receive all views – positive or negative - in a non-judgemental manner.

Another aspect of this being insider research is that it had an auto-ethnographic component to it. As well as studying the participants' setting, I was living in that setting and working through the challenges myself. Ethnographers are apt to pursue a grounded approach and minimise the theoretical baggage they bring to a setting. I was keen to do this and deliberately elected to collect the data prior to undertaking the bulk of the literature review. I wanted to have an open mind and did not want existing frameworks to shape the data.

5.3.3 Summary of 'Critique of the study'

I have reviewed my research method in order to enable readers to decide whether it has value in its own right and also to enable them to decide whether the research might be relevant to another setting - particularly one that they might be interested in.

In order to do this I argued that the research was conducted ethically and in a manner such that its findings could be considered trustworthy – that they were credible, dependable, confirmable and transferable. I believe that the measures taken and the detailed description of the setting ensure that these criteria of trustworthiness have been met.

One aspect of my argument for confirmability was the need to provide a reflexive statement. To do this was important because my values have inevitably influenced this research – consciously or subconsciously – and it important for the reader to be aware of such potential influences. It was also an important process for me to go through – raising my awareness of potential influences upon the research and helping me take appropriate actions where possible.

CHAPTER 6 – CONCLUSION

6.1 The key findings of this research

The central theme to emerge is that learning is ongoing in every setting: the teachers are learning about how to integrate new technology into the learning environments they create for their students; the institution is learning about a major ICT implementation and how to manage the associated change; and the sector is also learning how best to promote and support the drive to embed technology more firmly in the student learning experience.

At the microsetting level, it was clear that much of these teachers' practice was aligned with constructivist approaches. In general, they valued social interaction between students, drew on authentic scenarios and processes and, even when they were lecturing, emphasised interactivity and engagement rather than more didactic approaches. They all identified areas of their subjects which were more subjective than others – typically associated with the application of theory, evaluation or matters involving human beings – and often chose to deal with the associated material in smaller, highly interactive settings. Arguably the more certain information could be learned through more instructional means and the more complex uncertain information best suited to socially based techniques.

From a pedagogic perspective however, most participants were not changing their pedagogic approach significantly – they were enhancing the student learning experience by offering improved and alternative communication opportunities and providing additional, supplementary resources, but the fundamental use of the classroom was unchanged. The students would still need to attend in the normal way and engage with the normal classroom practices. Although these certainly sounded like good, interactive sessions – most teachers had not critically examined them in the light of the opportunities StudyNet might afford and developed them accordingly. This practice was termed 'extending the classroom'. Two teachers had made significant changes to teaching practice, using the technology to deliberately enhance their students' face-to-face learning experience. One had used interactive multimedia resources to prepare the students for the lecture time which had been reworked into a participatory workshop (I termed this 'doing things differently'). The other was using technology to drive student learning and give feedback on performance outside of class – but then drew on this understanding of

student performance to inform remedial and development work in class ('doing different things').

At the level of the mesosetting, there are two developments that are important for the university to address. The first is to encourage more teachers to deliberately set out to question the content of their face-to-face sessions and decide whether there are opportunities to use it more effectively by exploiting the affordances offered by the MLE. This will need support, both to facilitate the questioning and developing any necessary skills that are needed to effect the ideas that flow from their deliberations. The second is for the university to decide on how seriously it wishes to address the notion of giving students greater flexibility in where and when they study. Electronic resources and communication systems can offer greater opportunities for flexible study, but as long as students need to attend classes for the added value that classroom activity undoubtedly confers, they are tied to a geographical location at a particular time. Virtual classroom software can enable students to engage in a very good approximation of a classroom and could introduce a whole new dimension of flexibility in terms of where they study. But this does have significant cost implications, implementation implications and also has considerable implications for how the learning experience at the university is conceived. Following the model proposed in the results would still give students the choice between physical and virtual attendance – it would not be a distance only model and this reduces the risk associated with such an implementation.

If the university decided to increase the availability of virtual classroom software to a significant extent, it could draw on the successful manner in which it has implemented StudyNet as a model for another transformational change. It could set up a champion network and provide staff development opportunities in order to support staff and encourage its use. It could also set targets for use, recognising that student pressure could prove influential in take up. However, before doing this it would be wise to undertake further studies to see whether significant proportions of the general student population would want to pursue this option – or whether it would be of interest to particular groups of learners.

At the level of the macrossetting HEFCE is clearly enjoying a two way learning relationship with universities – consulting on the way forward, then giving direction and providing support. Its JISC programme also draws upon the expertise out in the sector and funds developments accordingly. In this way the sector is doing much to

mirror what goes on in a learning institution – taking the best work of the innovators and supporting roll out to a wider audience. UH has been a partner in this learning, in terms of contributing to consultations, providing examples of successful practice and enjoying benefits such as the CETL funding – a benefit for itself and for the others in the sector that it engages with. The direction given by the Dearing report (NCIHE 1997) is being played out and the interconnectedness between the each university and the sector as a whole is helping this happen.

6.2 Further work

Further work is needed on understanding the best synergies between the face-to-face and online learning environments. How can the precious resource of face-to-face time be used to best effect? Are there disciplinary differences in this? Are there differences in the best use of online learning opportunities between the campus based students and those involved in work-based learning?

JISC has recently highlighted the need to explore the barriers to reusing or adapting materials already in existence and to explore the impact of technology on staff and institutions. It has also called for a greater understanding of the impact of technology upon staff.

From an institutional perspective, UH needs further pilot work on the use of virtual classroom technology. Can it satisfactorily replicate classroom attendance? To what sorts of learning is it best suited? Would students find such an option of interest? Furthermore, the university needs to conduct research to help it decide whether this is an avenue it wishes to pursue. What is the likely demand? How would it be best implemented? What are the connotations for academic culture and learning? What are the estate implications?

These are just some of the questions that have arisen during the conduct of this work. They have a pragmatic feel to them and have immediate implications for practice.

6.3 Trustworthiness

I have argued that the research should be considered trustworthy. I have done this by arguing for its credibility on the basis of measures such as: the thoroughness of the description of the setting - the university, the MLE and the participants; my prolonged engagement with the participants and the data; the member check; the

use of multiple sources of data; and the dialogue with my supervisor, work and conference colleagues.

Dependability has been argued for on the basis of: the use of multiple perspectives in the case; the detailed description of the research method and analysis given in the method section of this report; and the review of a selection of the transcripts by another.

The confirmability of the findings is argued for on the basis of: the detailed account of the research process; the ongoing dialogue with others about the research, for example the conference presentations and the involvement of a peer in the analysis; and the reflexive account of my involvement with the research and the wider agenda within which the research is set.

Having made a case that the findings are trustworthy in terms of its credibility, dependability and confirmability, the final issue is its transferability. Can these findings be applied elsewhere? I believe that it is the responsibility of the reader to make a judgement about how relevant the work is to any setting that they may wish to transfer it. Accordingly, it is the quality and detail of the description of this case that its potential for transferability rests upon. The following factors should help inform that transfer: the university was well described – a large post-92 university with a management structure shifting from bureaucratic to innovative and enterprising; the participants were well described from a demographic perspective and they were largely early adopters rather than innovators; the implementation was well described, particularly in terms of the support structures and policy (e.g. engagement targets) that were in place; and the outcomes in terms of teaching practice and associated drivers were described in considerable detail.

I therefore suggest that the findings are sufficiently trustworthy and the setting sufficiently well described for an interested reader to make reasoned and sound judgements about its relevance to another setting.

6.4 Original contribution

Doctoral work should make an original contribution. This case study has given unique insights into the implementation of an MLE at the University of Hertfordshire. It has developed new insights into the practice of a group of early adopters at this institution. In particular it has classified the teachers' implementations in three ways

– extending the classroom, enhancing face-to-face teaching and evolving the curriculum and discussed the implications of these categories.

It has demonstrated that the implementations by these teachers have not in the main been radical – enhancing the student learning experience mainly by supplementing existing learning and teaching approaches. Two individuals in particular demonstrated a more radical approach and made more substantive changes to the learning experience.

It has also shown that although disciplinary differences clearly exist, these participants demonstrated some commonalities that will be important when trying to design newer, more radical approaches. These commonalities relate to the more subjective aspects that were found to a greater or lesser degree in all subjects, the variable shelf life of knowledge and the desire to incorporate realistic or authentic learning activities into the curriculum.

It was particularly valuable to explore the case from the three settings that were adapted from Bronfenbrenner's ecological model. This has enabled each of the components of the study – the personal, the institutional and that of the sector to be compartmentalised - with key issues focussed upon - yet at the same time the connections between the settings have also made explicit the interdependence between each setting. Without such a framework, that might have been missed – or at least not articulated so explicitly.

From a personal perspective it has been impossible to disentangle my work in the university from the ongoing research process and the insights I have developed have informed my working life as the project has progressed. In that respect the research has already contributed, in some measure, to the learning and teaching agenda at the university. It has also helped identify future needs.

6.5 Summary of the concluding chapter

This chapter has summarised some of the key messages to emerge from the research: how the participant teachers went about their teaching and how their use of StudyNet can be classified from a pedagogic perspective. In fact, the majority of teachers were doing useful things for their students, but not radically changing their pedagogy. At an institutional level, more thought needs to be given to facilitating staff to consider more fully whether there are further opportunities to enhance the

learning experience. It was also argued that all concerned in the roll out of MLEs in the sector – from individuals to other universities to the funding council - were learning.

Future directions were outlined, including the need for a better understanding of the best ways to use technology to enhance learning, the usefulness of exploring ways to encourage the reuse of materials and the general ramifications of technology upon staff. It has also highlighted the need for UH to explore the issues around greater flexibility of delivery.

The case for the trustworthiness of the research was outlined, including the measures taken to ensure credibility, dependability and confirmability. I also suggested that the detailed description of the case should enable readers to decide whether the findings are of relevance to other settings – that is to say, the findings are transferable.

I concluded by arguing that the work has made an original contribution. In particular it has been a detailed investigation of the particular case – the implementation of an MLE at the University of Hertfordshire. Of particular value was the adaptation of Bronfenbrenner's ecological model that explored the case at the level of the microsetting, the mesosetting and the macrossetting and made explicit the interconnections between these settings. I also referred to the personal journey that has been inextricably intertwined with this research, noting that this interconnection itself has resulted in changes in me, my circumstances and the various settings within which I operate.

REFERENCES

- Ackerman L (1997) Development, transition or transformation: the question of change in organisations. In Van Eynde D, Hoy J and Van Eynde D (Eds.) *Organisation Development Classics*. San Francisco. Josey Bass.
- Adams M and Buckland R (1999) An experiment in teaching computer science by borrowing teaching techniques from other disciplines In: Rust C (Ed.) *Improving student learning through the disciplines. Proceedings of the 1999 7th International Symposium*. Oxford. OCSLD 410-419
- Alltree J (2007) The impact of a Managed Learning Environment upon curriculum design. *Proceedings of the 2nd International Blended Learning Conference*. University of Hertfordshire
- Alltree J and Quadri N (2007) Flexible study: What students do and what they want. *Proceedings of the 2nd International Blended Learning Conference*. University of Hertfordshire
- Anagnosopoulo K (2002) *Designing to learn and learning to design: An overview of instructional design models*. LTSN (Learning and Teaching Support Network) Generic Centre
- Argyris C (1999) *On organizational learning*. 2nd ed. Malden. Blackwell
- Armstrong F (1996) Teaching and learning at a distance: Refining the role of the teacher. In: Hedge N (Ed.) *Going the Distance. Teaching learning and researching in distance education*. Sheffield. University of Sheffield Division of Education
- Bangert AW (2004) The seven principles of good practice: A framework for evaluating on-line teaching. *Internet and Higher Education*. Vol 7, 217–232
- Barnett R, Parry G and Coate K (2001) Conceptualising curriculum change. *Teaching in Higher Education*. Vol 6, 4, 435-449
- Bassey M (1999) *Case study research in educational settings*. Buckingham. Open University Press
- Becher T (1989) *Academic Tribes and Territories. Intellectual Enquiry and the Cultures of Disciplines*. Buckingham. The Society for Research into Higher Education and Open University Press
- Bekhradnia B, Whitnall C and Sastry T (2006) *The academic experience of students in English universities*. Higher Education Policy Institute
- Bell M and Bell W (2005) It's installed.... Now get on with it! Looking beyond the software to the cultural change. *British Journal of Educational Technology*. Vol 36, 4, 643-656
- Bell M, Bush D, Nicholson P, O'Brien D and Tran T (2002) *Universities Online: A survey of online education and services in Australia*. Commonwealth Department of Education, Science and Training
- Biggs J (2003) *Teaching for quality learning at University: what the student does*. 2nd ed. Buckingham. SRHE and Open University Press

Biglan A (1973) Relationships between subject matter characteristics and the structure and outputs of university departments. *Journal of Applied Psychology*. Vol 57, 204-213

Blair T (1997) Forward by the Prime Minister. Connecting the Learning Society. Retrieved from <http://www.dfes.gov.uk/grid/consult/foreword.htm> Accessed 14.2.04

Blended Learning Unit (2007) Blended Learning Unit Centre for Excellence in Teaching and Learning Two Year Evaluation Report to HEFCE 1st April 2005 – 31st March 2007. University of Hertfordshire

Bligh D (1998) *What's the Use of Lectures?* 5th ed. Exeter. Intellect

Bligh D (2000) *What's the Point in Discussion?* Exeter. Intellect

Blumhof J and Morgan J (2007) *The University of Hertfordshire's personal development planning system – An Evaluation*. University of Hertfordshire Learning and Teaching Institute report

Boyce M (2003) Organizational Learning is essential to achieving and sustaining change in Higher Education. *Innovative Higher Education*. Vol 28, 2 119-136

Boyd WL (2000) Editorial: What counts as educational research? *British Journal of Educational Studies*. Vol 48, 347–351

Boys J (2002) Managed Learning Environments, joined up systems and the problems of organisational change. JISC. Retrieved from www.jiscinfonet.ac.uk/Resources/external-resources/mle-joined-up-systems/view accessed 14/7/03

Bridges D (1998) The construction and organisation of knowledge in the university curriculum. *British Educational Research Association Annual Conference*. Education line. Retrieved from: <http://www.leeds.ac.uk/educol/documents/000000773.htm> accessed 3/7/03

Bridges P, Cooper A, Evanson P, Haines C, Jenkins D, Scurry D, Woolf H and Yorke M (2002) Coursework marks high, examination marks low: Discuss. *Assessment and Evaluation in Higher Education*. Vol 27, 1, 35-48

Britain S and Liber O (1999). A framework for pedagogical evaluation of Virtual Learning Environments (JTAP, Report No. 41). Retrieved from http://www.jisc.ac.uk/uploaded_documents/jtap-041.doc accessed 20/12/07

Bronfenbrenner U (1979) *The ecology of human development. Experiments by nature and design*. Cambridge, Massachusetts. Harvard University Press

Browne T and Jenkins M (2003) *VLE Surveys. A longitudinal perspective between March 2001 and March 2003 for Higher Education in the United Kingdom*. UCISA

Browne T, Jenkins M and Walker R (2006) A longitudinal perspective regarding the use of VLEs by Higher Education Institutions in the United Kingdom. *Interactive Learning Environments*. Vol 14, 2, 177-192

- Carpenter B and Tait G (2001) The rhetoric and reality of good teaching: A case study across three faculties at the Queensland University of Technology. *Higher Education*. Vol 42, 191-203
- Carusetta E and Cranton P (2005) Nurturing authenticity: a conversation with teachers. *Teaching in Higher Education*. Vol 10, 3, 285-297
- Charmaz K (2000) Grounded Theory: objectivist and constructivist methods. In: Denzin N and Lincoln Y (Eds.) *Handbook of qualitative research*. 2nd ed. London, Sage Publications
- Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39, 7, 3-7
- Cohen L, Manion L and Morrison K (2000) *Research Methods in Education*. London, Routledge Falmer
- Collis B and Moonen J (2001) *Flexible learning in a digital world*. Abingdon. Routledge Falmer
- Conole G (undated) Understanding your organisation. In JISC infonet 'Creating an MLE' Retrieved from <http://www.jiscinfonet.ac.uk/InfoKits/creating-an-ml/understanding-your-organisation/types-of-organisation> accessed 21/1/07
- Craige BJ (1999) The Humanities in the era of cooperation: Beyond C.P. Snow's "Two Cultures". *Innovative Higher Education*. Vol 23, 4, 295-301
- Creanor L (2002) A tale of two courses: A comparative study of tutoring online. *Open Learning*. Vol 17, 1, 57-68
- Davis A (1998) Transfer, ability and rules. *Journal of Philosophy of Education*. Vol 32, 1, 75-106
- Delgarno B (2001) Interpretations of constructivism and consequences for Computer Assisted Learning. *British Journal of Educational Technology*. Vol 32, 2, 183-194
- DfES (2003) *Towards a Unified e-learning Strategy: Consultation Document July 2003*. Department for Education and Skills. Retrieved from http://www.dfes.gov.uk/elearningstrategy/downloads/e-learningstrategy_pdf_final.pdf accessed 2/8/03
- Denscombe M (2004) *The Good Research Guide*. Maidenhead. Open University Press
- Denzin N and Lincoln Y (2000) The discipline and practice of qualitative research. In: Denzin N and Lincoln Y (Eds.) *Handbook of qualitative research*. 2nd ed. London. Sage publications
- Dochy F, Segers M, Van Den Bossche P and Struyven K (2005) Students' Perceptions of a Problem-Based Learning Environment. *Learning Environments Research*. Vol 8, 41-66
- Donald JG (1986) 'Knowledge and the university curriculum.' *Higher Education*. Vol 15, 267-282

- Downing K (2001) Information Technology, education and healthcare: Constructivism in the 21st century. *Educational Studies*. Vol 27, 3, 229-235
- Eckel P, Green M, Hill B and Mallon W (1999) *On change III*. Washington, American Council on Education
- Foster S (2000) Australian undergraduate Internet usage: Self-taught, self-directed and self-limiting? *Education and Information Technologies*. Vol 5, 3, 165-175
- Glenaffric Ltd (2004a) *Review of JISC funded Managed Learning Environment (MLE) activity*. JISC publications
- Glenaffric Ltd (2004b) Responses to consultation on the HEFCE e-learning strategy A report to HEFCE. Retrieved from http://www.hefce.ac.uk/pubs/rdreports/2004/rd04_04/ accessed 20/12/07
- Gibbs G (2000) Are the pedagogies of the discipline really different? In: Rust C (Ed) *Improving Student Learning. Improving student learning through the disciplines. Proceedings of the 1999 7th International Symposium*. Oxford. OCSLD
- Gibbs G (2004) Assessment. *Institute of Learning and Teaching in Higher Education Conference*. University of Hertfordshire
- Gravett S and Petersen N (2002) Structuring dialogue with students via learning tasks. *Innovative Higher Education*. Vol 25, 4, 281-291
- Greenbank P (2003) The role of values in educational research: The case for reflexivity. *British Educational Research Journal*. Vol 29, 6, 791-801
- Hagoel L and Kalkekin-Fishman D (2002) Crossing borders: Toward a trans-disciplinary scientific identity. *Studies in Higher Education*. Vol 27, 3, 297-308
- Hammond M (1999) Issues associated with participation in on line forums – the case of the communicative learner. *Education and Information Technologies*. Vol 4, 4, 353-367
- Hand RJ (1999) Science education: Consensus versus critique. *Teaching in Higher Education*. Vol 4, 4, 501-510
- Hannan A (2005) Innovating in Higher Education: Contexts for change in learning technology. *British Journal of Educational Technology* Vol 36, 6, 975-985
- Hanrahan M, Ryan M and Duncan M (2001) The professional engagement model of academic induction into on-line teaching. *The International Journal for Academic Development*, Vol 6, 2, 130-142
- Hanson J (2003) Perspectives on the strategic implementation of e-learning in Australian Universities. In Boezeroy P (Ed.) *Keeping up with your neighbours: ICT developments in Australian Higher Education*. LTSN Generic Centre, ALT, SURF 119-126
- Harasim L (2000) Shift happens: Online education as a new paradigm in learning. *The Internet in Higher Education*. Vol 3, 1-2, 41-61

HEFCE (2005) *HEFCE strategy for e-learning*. 2005/12. Higher Education Funding Council for England, Joint Information Systems Committee, Higher Education Academy

Holley D and Oliver M (2000) Pedagogy and new power relationships. *The International Journal of Management Education*. Vol 1, 1, 11-21 Retrieved from <http://www.heacademy.ac.uk/business/publications/ijme/vol1no1> accessed 20/12/07

Holloway I (1997) *Basic concepts for qualitative research*. Oxford, Blackwell Science

Hong K-S (2002) Relationships between students' and instructional variables with satisfaction and learning from a Web-based course. *Internet and Higher Education*. Vol 5, 267-281

Huang H-M (2002) Towards constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, Vol 33, 1, 27-37

Huff AS and Huff JO (2000) *When firms change direction*. Oxford. Oxford University Press

Inhelder B (1976) Introduction. In: Inhelder B and Chipman H (Eds.) *Piaget and his School. A reader in developmental psychology*. New York. Springer-Verlag

Jara M and Mohamad F (2007) *Pedagogical templates for e-learning. Occasional papers in Work-based learning 2*. London. Work-based learning for Education professionals Centre

Jefferies A, Thornton M, Alltree J and Jones I (2004) Introducing web based learning: An investigation into its impact on university lecturers and their pedagogy. *Journal of Information Technology Impact*. Vol 4, 2, 91-98

Jefferies P (2003) ICT in supporting collaborative learning: Pedagogy and practice. *Journal of Educational Media*. Vol 28, 1, 36-48

Jennings S, Dunne R, McShea J (1997) Designing a telematic learning environment in a social constructivist environment. *Education and Information Technologies*, Vol 2, 307-3

John-Steiner V and Soubberman E (1978) Afterword. In: Cole M, John-Steiner V, Scribner S and Soubberman E (Eds.) *Mind in society. The development of higher psychological processes*. Cambridge, Massachusetts. Harvard University Press

JISC (2000) JISC Circular 7/00: *Managed Learning Environments in Further Education: Progress Report*. Retrieved from http://www.jisc.sc.uk/pub00/c07_00.html accessed 3/4/02

JISC/Social Informatics Research Unit (2003a) *Study of environments to support e-learning in UK Further and Higher Education*. JISC publications

JISC/Social Informatics Research Unit (2003b) *Managed Learning Environment activity in Further and Higher Education in the UK*. JISC publications

Kaidan R (2002) A review of WebCT. *The Internet and Higher Education*. Vol 5, 399-404

Kanuka H and Anderson T (1999) Using constructivism in technology-mediated learning: Constructing order out of the chaos in the literature. *Radical Pedagogy*. Retrieved from:

http://radicalpedagogy.icaap.org/content/issue1_2/02kanuka1_2.html accessed 20/12/07

Kirkwood A (2003) Understanding independent learners' use of media technologies. *Open Learning*. Vol 18, 2, 155-175

Knipe D and Lee M (2002) The quality of teaching and learning via videoconferencing. *British Journal of Educational Technology*. Vol 33, 3, 310-311

Kornbrot DE, Jefferies A, Alltree J and Bullen P (2006). *Embedding e-Learning at the University of Hertfordshire*. Blended Learning Unit Benchmarking report, University of Hertfordshire.

Koszalka TA and Ganeson R (2004) Designing online courses: A taxonomy to guide the strategic use of features available in course management systems (CMS) in distance education. *Distance Education*. Vol 25, 2, 243-256

Laurillard D (1993) *Rethinking University Teaching A Framework for the Effective Use of Educational Technology*. London. Routledge

Lave J and Wenger E (1991) *Situated Learning. Legitimate peripheral participation*. Cambridge. Cambridge University Press

Lazonder AW (2003) Principles for Designing Web Searching Instruction. *Education and Information Technologies*. Vol 8, 2, 179-193

Leidner ED and Javernpaa SI (1995) The use of IT to enhance management school education: A theoretical view. *MIS Quarterly*. Vol 19, 265-291

Leitch S (2006) *The Leitch Review of Skills. Prosperity for all in the Global Economy – world class skills*. HMSO

Liewski B (2004) Implementing a learning technology strategy: Top-down strategy meets bottom-up culture. *ALT-J Research in Learning Technology*. Vol 12, 2 175-188

Lincoln Y and Guba E (2000) Paradigmatic controversies, contradictions and emerging confluences. In: Denzin N and Lincoln Y (Eds.) *Handbook of Qualitative Research*. 2nd ed. London. Sage publications

Lindblom-Ylännea S, Trigwell K, Nevgia A and Ashwin P (2006) How approaches to teaching are affected by discipline and teaching context. *Studies in Higher Education*. Vol. 31, 3, 285-298

Löfström E and Nevgi A (2007) From strategic planning to meaningful learning: diverse perspectives on the development of web-based teaching and learning in higher education. *British Journal of Educational Technology*. Vol 38, 2, 312-324

- McDonald J and Twining P (2002) Assessing activity based learning for a networked course. *British Journal of Educational Technology*. Vol 33, 5, 603-618
- McDonald J, Heap N and Mason R (2001) "Have I learnt it?" Evaluating skills for resource-based study using electronic resources. *British Journal of Educational Technology*. Vol 32, 4, 419-433
- McDowell L (2002) Electronic information resources in undergraduate education: and exploratory study of opportunities for student learning and independence. *British Journal of Educational Technology*. Vol 33, 3, 255-266
- McLoughlin C and Luca J (2002) A learner centred approach to developing team skills through web-based learning and assessment. *British Journal of Educational Technology*. Vol 33, 5, 571-582
- Merriam SB and Caffarella RS (1991) *Learning in adulthood. A comprehensive guide*. San Francisco. Josey-Bass
- Miller W and Crabtree B (1999) Clinical research: A multimethod typology and qualitative roadmap. In: Miller W and Crabtree B (Eds.) *Doing Qualitative Research*. 2nd ed. London. Sage publications
- Monteith M and Smith J (2001) Learning in a virtual campus: The pedagogical implications of students' experiences. *Innovations in Education and Teaching International*. Vol 38, 2, 119-132
- Motiwalla L and Tello S (2000) Distance learning on the internet: An exploratory study. *The Internet and Higher Education*. Vol 2, 4, 253-264
- NCIHE (National Committee of Inquiry into Higher Education) (1997) *Higher Education in the Learning Society*. London, HMSO
- Neumann R, Parry S and Becher T (2002) Teaching and Learning in their disciplinary contexts: A conceptual analysis. *Studies in Higher Education*. Vol 27, 4, 405-417
- Newton J (2003) Implementing an Institutions-wide Learning and Teaching strategy: Lessons in managing change. *Studies in Higher Education* Vol 28, 4, 427-441
- Newton DP, Newton LD and Oberski I (1998) Learning and conceptions of understanding in history and science: Lecturers and new graduates compared. *Studies in Higher Education*. Vol 23, 1, 43- 58
- North S (2005) Different values, different skills? A comparison of essay writing by students from arts and science backgrounds. *Studies in Higher Education*. Vol. 30, 5, 517-533
- NSS (2007) The results of the 2007 National Student Survey. UCAS. Available at <http://www.unistats.com/>
- O'Donghue J, Singh G and Dorward L (2001) Virtual education in universities: a technological imperative. *British Journal of Educational Technology*. Vol 32, 5, 511-523

- O'Hear A (1989) *An introduction to the philosophy of science*. Oxford. Clarendon Press.
- Oliver M (undated) *Supporting academics through institutional change: What will the impact of sustainable e-learning be on staff roles?* Learning and Teaching Support Network Generic Centre
- Perry WG (1970). *Forms of intellectual and ethical development in the college years: a scheme*. New York. Holt, Rinehart and Winston
- Piaget J (1976) Piaget's theory. In: Inhelder B and Chipman H (Eds.) *Piaget and his School. A reader in developmental psychology*. New York. Springer-Verlag
- Piper D and Bullen P (2005) *StudyNet: The University of Hertfordshire's Managed Learning Environment*. Unpublished University of Hertfordshire report
- Quinsee S and Sumner N (2005) How to manage the big bang: Evolution or revolution in the introduction of an MLE. *Aslib Proceedings New Information Perspectives* Vol 57, 2 146-156
- Ramsden P (1992) *Learning to teach in Higher Education*. London. Routledge
- Richards T and Richards L (1998) Using computers in qualitative research. In Denzin N and Lincoln Y (Eds.) *Collecting and Interpreting Qualitative Methods*. London. Sage Publications
- Robson C (1993) *Real world research. A resource for Social Scientists and Practitioner-Researchers*. Oxford. Blackwell
- Romiszowski AJ (1988) *The selection and use of instructional media for improved classroom teaching and improved individualized instruction*. 2nd ed. London. Kogan Page
- Roscoe J (2002) *E-Learning in higher education*. The Institute for Learning and Teaching in Higher Education. Retrieved from <http://www.ilt.ac.uk/> accessed 3.4.02
- Salmon G (2000) *e-Moderating. The key to teaching and learning online*. London. Kogan Page.
- Salmon G (2003) *etivities. The key to active online learning*. Abingdon. Routledge Falmer
- Salmon G (2005) Flying not flapping: A strategic framework for e-learning and pedagogical innovation in higher education institutions. *ALT-J, Research in Learning Technology*. Vol 13, 3, 201-218
- Sanders M (2001) New paradigm or old wine? The status of technology education practice in the United States. *Journal of Technology Education*. Vol 12, 2, 35-55
- Savin-Baden M (2004) Understanding the impact of assessment on students in problem-based learning. *Innovations in Education and Teaching International*. Vol 4, 2, 223-233

SEEC (2003) *Credit Level Descriptors for Further and Higher Education*. Southern England Consortium for Credit Accumulation and Transfer. Retrieved from www.seec-office.org.uk/SEEC%20FE-HECLDs-mar03def-1.doc accessed 20.12.07

Selwyn N (2002) Learning to love the Micro: the discursive construction of 'educational' computing in the UK, 1979-89. *British Journal of Sociology of Education*. Vol 23, 3, 427-443

Sim J and Wright C (2000) *Research in Health Care. Concepts, Designs and Methods*. Salisbury. Stanley Thorne (Publishers) Ltd

Skelton A (2004) Understanding 'teaching excellence' in higher education: a critical evaluation of the National Teaching Fellowships Scheme. *Studies in Higher Education*. Vol 29, 4, 451-468

Smeby J-C (2000) Disciplinary differences in Norwegian graduate education. *Studies in Higher Education*. Vol 25, 1, 53-67

Smith J (2005) From flowers to palms: 40 years of policy for online learning. *ALT-J, Research in Learning Technology*. Vol 13, 2, 93-108

Somekh B (2000) New technology and learning: Policy and practice in the UK, 1980-2010. *Education and Information Technologies*. Vol 5, 1, 19-37

Stake RE (1995) *The art of case study research*. Thousand Oaks. Sage Publications

Stake RE (2000) Case Studies. In: Denzin NK and Lincoln YS (Eds) *Handbook of qualitative research*. 2nd ed. Thousand Oaks. Sage Publications

Standing K (1998) Writing the voices of the less powerful. In: Ribbens J and Edwards R (Eds.) *Feminist dilemmas in qualitative research*. London. Sage Publications

Stanton NA, Porter LJ and Stroud R (2001) Bored with point and click? Theoretical perspectives on designing learning environments. *Innovations in Education and Teaching International*. Vol 38, 2, 175-182

Steel J and Hudson A (2001) Educational technology in Learning and Teaching: the perceptions and experiences of teaching staff. *Innovations in Education and Teaching International*. Vol 38, 2, 103-111

Stein SJ, Isaacs G and Andrews G (2004) Incorporating authentic learning experiences within a university course. *Studies in Higher Education*. Vol 29, 2, 239-258

Summers JJ, Waigandt A and Whittaker TA (2005) A comparison of Student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education*. Vol 29, 3, 233-250

Surry DW and Land SM (2000) Strategies for motivation Higher Education faculty to use technology. *Innovations in Education and Teaching International*. Vol 37, 2, 145-153

Taylor PG (1998) Institutional change in uncertain times: Lone ranging is not enough. *Studies in Higher Education*. Vol 23, 3, 269-279

Tergan S-O, Gräber W and Neumann A (2006) Mapping and managing knowledge and information in resource-based learning. *Innovations in Education and Teaching International*. Vol. 43, 4, 327–336

Thornton M, Jefferies A, Jones I, Alltree J and Leinonen E (2003) *Evaluating the impact of a Managed Learning Environment (MLE) on lecturers and pedagogy*. Learning and Teaching Development Fund report. University of Hertfordshire

Thornton M, Jones I, Jefferies A, Alltree J, Doolan M and Parkhurst S (2005) Using a Managed Learning Environment in Higher Education: The students' views. *Proceedings of the Third Hawaii International Conference on Education*, Honolulu

Tynjälä P (1998) Traditional studying versus constructivist learning tasks: Do learning outcomes differ? *Studies in Higher Education*. Vol 23, 2, 173-189

Vygotsky LS (1978a) The interaction between learning and development. In: Cole M, John-Steiner V, Scribner S and Souberman E (Eds.) *Mind in society. The development of higher psychological processes*. Cambridge, Massachusetts. Harvard University Press

Vygotsky LS (1978b) Internalisation of higher psychological functions. In: Cole M, John-Steiner V, Scribner S and Souberman E (Eds.) *Mind in society. The development of higher psychological processes*. Cambridge, Massachusetts. Harvard University Press

Vygotsky LS (1978c) The prehistory of written language. In: Cole M, John-Steiner V, Scribner S and Souberman E (Eds.) *Mind in society. The development of higher psychological processes*. Cambridge, Massachusetts. Harvard University Press

Walker A (2007) *Results of the UHSU Survey of the Student Academic Experience 2007*. University of Hertfordshire Student Union

Watson DM (2001) Pedagogy before technology: Re-thinking the relationship between ICT and teaching. *Education and Information Technologies*. Vol 6, 4 251-266

Weeks P (2000) Benchmarking in Higher Education: An Australian story. *Innovations in Education and Training International*. Vol 37, 1, 59-67

Weisskirch RS and Milburn SS (2003) Virtual discussion: Understanding college students' electronic bulletin board use. *The Internet and Higher Education*. Vol 6, 215-225

Wellington J (2000) *Educational Research. Contemporary Issues and Practical Approaches*. London. Continuum.

Wheeler S, Kelly P and Gale K (2005) The influence of online problem-based learning on teachers' professional practice and identity. *ALT-J, Research in Learning Technology*. Vol 13, 2, 125–137

Wilson T (2001) *e-Education, Vice-Chancellor and Deans' discussion paper*. November 30th. University of Hertfordshire

Yin RK (1994) *Case Study Research: Design and Methods*. Thousand Oaks. Sage Publications

Yuen K-M and Hau K-T (2006) Constructivist teaching and teacher centred teaching: a comparison of students' learning in a university course. *Innovations in Education and Teaching International*. Vol 43, 3, 279-290

Appendix 1

The Initial Interview Schedule

The questions in bold will lead each area to be discussed. The annotations in italics indicate the nature of prompts that might be used if appropriate.

Introduction

This will reiterate some of the key information already supplied to the participant in writing - ie:

- The purpose of the research
- The assurance about confidentiality
- His/her right to withdraw from the interview at any time without prejudice

Can you tell me about your background in your academic discipline?

Eg years spent in that discipline, qualifications, particular subject interests, research interests?

Can you tell me about your lecturing background?

Eg years as a lecturer, educational qualifications, teaching and administrative responsibilities, educational research interests?

Could you tell me about the type(s) of the information or knowledge your students have to deal with in your subject area?

Eg is it very stable or has a short 'shelf life', it is objective or subjective, is the material contentious or not contentious?

Can you give me an overview of the way you go about your teaching?

Eg the use of particular methods (lectures, tutorials etc), whether the methods used are related to the type(s) of knowledge the students need to deal with? whether particular approaches to teaching are used (eg problem based learning)?

Which features of StudyNet do you usein what way(s)and with what intended purpose(s)?

Eg discussion facilities might be used for students to raise queries and/or to support specific knowledge construction tasks. Lecture notes might be posted primarily for administrative purposes and/or to encourage advance preparation etc.

Has using StudyNet influenced what your students learn?

Eg IT skills, information management, other skills.

What factors have influenced how you use StudyNet?

Eg own enthusiasm/interests, colleagues' enthusiasm, student numbers, nature of particular topics, departmental policies, student feedback, own learning preferences, particular theoretical perspective(s) on teaching.

Does StudyNet have any limitations that affect how you can support your students' learning?

Eg types of media it supports, 5Mb filesize, Mac/PC issues.

Are there any other comments you would like to make or issues you would like to raise concerning StudyNet?

Is there anything else you would like to add?

Conclusion

The participant is thanked for their time and contribution and asked whether they are willing to read a transcript of the interview. The purpose of this is for them to confirm that it accurately reflects their views and is an opportunity to make any amendments or additions. If they decline this opportunity, they will be asked to confirm that they are willing for the transcript to be used unchecked.

Appendix 2

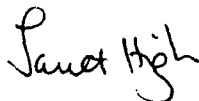
Ethical approval letter

**UNIVERSITY OF HERTFORDSHIRE
FACULTY OF HEALTH AND HUMAN SCIENCES
ETHICS COMMITTEE FOR RADIOGRAPHY AND PHYSIOTHERAPY**

Protocol Number: RPEC/12/03/69
Name of Investigator: Jon Alltree
Name of Supervisor: Professor Jerry Wellington
Programme: Doctor of Education (University of Sheffield)
Title of Study: The impact of the introduction of a Managed Learning Environment upon the pedagogic practices of different academic disciplines: A case study.
Dates of Study: Academic Year 2003/04
No. of Subjects: 25-35 interviews

I approve of the study, subject to the following pre conditions. Failure to comply with these conditions will invalidate approval.

- Please would you include your supervisor's details and the RPEC protocol number in both your letter and emails.
- The committee would like to see a separate line on the consent form referring to audio taping.



Janet High
Chair of Ethics Committee

Cc Professor Jerry Wellington

Date: 9th December 03

Appendix 3

Request for volunteers

Recruitment text for recruitment email:

Apologies to those of you that this does not apply to.

Are you a member of the academic staff who uses StudyNet to support your students' learning? If so, I would be interested in interviewing you as part of a research project investigating **the use of StudyNet by different academic disciplines**. This would not take a great deal of your time and would make a valuable contribution to our understanding of how StudyNet can support learning.

If you would like to find out more about participating, please email me at j.r.alltree@herts.ac.uk and I will send you details.

This study has been approved by the Radiography and Physiotherapy Ethics Committee (Protocol number RPEC/12/03/69). The Project is being supervised by Professor Jerry Wellington of the Department of Education, University of Sheffield (j.wellington@shef.ac.uk).

Thank you

Jon Alltree

Appendix 4

Individual follow up email

Comment: This was sent out as an email attachment

Jon Alltree
CELT
University of Hertfordshire
College Lane
Herts
AL10 9AB

01707 284975
j.r.alltree@herts.ac.uk

Dear

Re: The impact of the introduction of a Managed Learning Environment upon the pedagogic practices of different academic disciplines: A case study

Thank you for expressing an interest in participating in this study which is the research component of an Educational Doctorate that I am undertaking at the University of Sheffield. The study is being supervised by Professor Jerry Wellington, Department of Education, University of Sheffield (j.wellington@shef.ac.uk).

The aims of the study are to explore:

- how academic staff from different disciplines have incorporated StudyNet into their pedagogic practice
- why they have chosen to use StudyNet in the ways that they have

If you agree to participate in the study, it would involve you taking part in a semi-structured interview that would last approximately one hour. The interview would be tape recorded and then transcribed. You would be given an opportunity to read the transcript of your interview so that you could confirm that its content was accurate or make any amendments that you saw fit.

In order to protect confidentiality, no names will appear on the transcript. Once you had had the opportunity to read the transcript of your interview, the tape would be destroyed. Furthermore, I will take all reasonable steps to ensure that no participant can be identified in the thesis or any other form of publication resulting from the study.

If you do agree to participate, I will ask you to sign a consent form prior to the start of the interview. You would, however, be free to withdraw at any time without giving reason and this would not prove prejudicial to you in any way.

This study has been approved by the Radiography and Physiotherapy Ethics Committee (Protocol number RPEC/12/03/69).

If you want any further information about any aspect of the study, please ask. If you do wish to participate, please contact me to arrange a convenient time for the interview.

Thank you.

Yours sincerely,

Jon

Jon Alltree

Appendix 5

Consent form

	YES	NO
The purpose of this study has been explained to me	<input type="checkbox"/>	<input type="checkbox"/>
I have been informed of the details of my involvement in the study	<input type="checkbox"/>	<input type="checkbox"/>
My questions regarding this study have been answered to my satisfaction	<input type="checkbox"/>	<input type="checkbox"/>
I understand that I am not obliged to take part in this study and may withdraw at any time without the need to justify my decision and that this will not prove prejudicial in any way	<input type="checkbox"/>	<input type="checkbox"/>
I understand that the interview will be audio taped and that once I have had the opportunity to comment on the transcript, the tape will be destroyed	<input type="checkbox"/>	<input type="checkbox"/>
I understand that any personal information obtained as a result of my participation in this study will be treated as confidential and will not be made publicly available	<input type="checkbox"/>	<input type="checkbox"/>
I, the undersigned, agree to take part in this study	<input type="checkbox"/>	<input type="checkbox"/>

Signature of subject:.....

Name of subject:.....
(Please print)

Signature of investigator:.....

Name of investigator: JON ALLTREE

Status of investigator: Doctor of Education Student, University of Sheffield

Date:.....

Appendix 6

Final interview schedule

Comment: Compare with the Initial Interview Schedule in Appendix 1

Introduction

This will reiterate some of the key information already supplied to the participant in writing - ie:

- The purpose of the research
- The assurance about confidentiality
- His/her right to withdraw from the interview at any time without prejudice

Can you tell me about your background in your academic discipline? Eg

- *years spent in that discipline*
- *qualifications*
- *particular subject interests*
- *research interests.....*

Can you tell me about your lecturing background? Eg

- *years as a lecturer*
- *educational qualifications*
- *teaching and administrative responsibilities*
- *educational interests*
- *educational research interests.....*

Could you tell me about the type(s) of the information or knowledge your students have to deal with in your subject area? Eg

- *would you describe the sort of knowledge/material your students have to learn as subjective/objective... contentious or clear cut?... interpretivist, relativist...scientific...*
- *is it very stable or has a short 'shelf life'*
- *relate to Bloom's taxonomy.....*

Can you give me an overview of the way you go about your teaching? Eg

- *the use of particular methods (lectures, tutorials etc)- what do you see as the purpose of lectures, tutorial etc*
- *whether the methods used are related to the type(s) of knowledge the students need to deal with*
- *do you have any particular theoretical underpinning...whether particular approaches to teaching are used (eg problem based learning)?*
- *what is your vision for your students?*
- *why do you teach as you do.....*

NB Trying to elicit if this is teacher focussed or student focused (Kember)

Which features of StudyNet do you usein what way(s)and with what intended purpose(s)? Eg

- *discussion facilities might be used for students to raise queries and/or to support specific knowledge construction tasks.*
- *Lecture notes might be posted primarily for administrative purposes and/or to encourage advance preparation etc.*
- *Any effect upon attendance*
- *Has it changed how you teach....*
- *Why don't you use some things.....*

Has using StudyNet (and other electronic resources) influenced what your students learn? Eg

- *IT skills*
- *information management*
- *other skills....*

What factors have influenced how you use StudyNet? Eg

own enthusiasm/interests
other pressures on time – research....admin etc
colleagues' enthusiasm
student numbers
nature of particular topics
departmental policies
student feedback
own learning preferences
particular theoretical perspective(s) on teaching
has it changed what you do.....

Does StudyNet have any limitations that affect how you can support your students' learning? Eg

types of media it supports
5Mb filesize
Mac/PC issues.....

Are there any other comments you would like to make or issues you would like to raise concerning StudyNet?

Is there anything else you would like to add?

Conclusion

The participant is thanked for their time and contribution and asked whether they are willing to read a transcript of the interview. The purpose of this is for them to confirm that it accurately reflects their views and is an opportunity to make any amendments or additions. If they decline this opportunity, they will be asked to confirm that they are willing for the transcript to be used unchecked.

Appendix 7

Interim node structure

KNOWLEDGE STRUCTURES

Most subjects have contentious parts – black, white and shades of grey

Where does contention creep in?

Application of K and skills

Policy

Ethics

Real world is complex

Cannons less likely to be contentious – but can be

Some disciplinary differences

Application often more subjective

Shelf life

All had some consistent K

Changing K due to:

New research

New equipment or work practices

Implications

Emphasis on skills

Update materials

Realism muddies the waters

Deciding what is valid

Analytical

Premises vs opinion

Value K even if no agreed answer

Exposure to contention increases

Protecting students

Guidelines and structure

Teaching according to the group

More or less prescription

Students struggle with contention

Want right answer for assessment

Or if pressed for time

Or real life dilemma

APPROACHES TO TEACHING

Formats and activities

What's in a name?

Lectures

Working with smaller groups

Seminars/tutorials

Numbers

(Relationship with lectures)

Workshops, laboratories and practicals

Interaction and engagement

Rational for/benefits of interaction

Checking understanding/giving direction

Gaining feedback

Facilitating student/student interaction

Real and current/Authenticity

As a trigger to make relevance clear

To illustrate real world practice

Using real world experts

Using real world case studies

Simulations and case studies have limitations

Interaction often unplanned

Curriculum design

Sequencing

Design can depend on level

Sundry

Spoonfeeding and bafflement

Students help staff with IT
Culture of passivity
Crowd control

STUDYNET AND LEARNING

Administration

Available 24/7 anyplace
Noticeboard
Housekeeping
Issues with structure
Travel info
Organisational stuff
Registration issues – only as good as genesis information
Providing handouts
Managing assessment

Communication

When/where
Purpose – learning or admin
 Students complaining
Motivation to engage
Responsibility of students
Managing expectations
Only part of their overall communication picture
Features used
 News
 broadcasting, updates, exercises
 Discussion sites
 Moderated
 Student led
 Failure
 Equitable
 Group areas
 Peer learning and support

Resource provision

Tutor generated resources
 Core/supplementary
 Before after teaching session
 Attend or not
 Value added
 Adapting for web
 Skeleton or full notes
 Videoclips
 Quizzes/interaction
 Weblinks
Students own work

Curricular issues

Sequencing materials
 Advance organisers
 Spontaneity
 Practical issues
Facilitate learning – not bucket filling
Importance of collaborative learning
Information management
Ease of access/convenience
New skills
Information mgt/evaluation searching
Teacher as filter
Keyboard

Too much information makes students feel incompetent
Able to observe students learning interactions

Student access and expectations

Health students access variable
Students more comp literate
Handouts help students prepare
Cost issues
Handouts deskill students
Students expect staff to use SN
Attendance linked to motivation

Engaging students

Creating the conditions
Anonymity
Access
Problem of taking notes
Peers presenting to one another
Critical mass
Compulsion
Tutee system a safety net
Modules are disc specific
Lectures bring material to life
Authentic tasks
Interaction provides feedback
Engaging with tasks, not machine

Unintended consequences

Too much info makes students feel incompetent
Web overall negative for research
Students attend for certificate
Copyright issues
Having to use SN was a good thing
Students working practices change
Students use SN to control classroom behaviour

Sundry StudyNet and learning
Impact on pedagogy

WHY USE STUDYNET

Internal drivers

Own enthusiasm
Predisposition to innovate
Enthusiasm for computers
Prior experience

Benefits for students

Benefits for the tutor

General benefits for staff

Part of a bigger picture of change

External drivers

UH policy

Student pressure

Sundries

Support from colleagues
Support from UH

Appendix 8

Evolution of the themes

Comment: Developed from the Interim Node Structure in Appendix 7

Results nodes structure - January 2006

KNOWLEDGE STRUCTURES

- Most subjects have contentious parts
- Application often more subjective
- Realism muddies the waters
- Deciding what is valid
- Exposure to contention increases
- Students struggle with contention

APPROACHES TO TEACHING

- Formats and activities
- Interaction and engagement
- Curriculum design
- Sundry

STUDYNET AND LEARNING

- Administration
- Communication
- Resource provision
- Curricular issues
- Student access and expectations
- Engaging students
- Unintended consequences
- Sundry StudyNet and learning
- Impact on pedagogy

WHY USE STUDYNET

- Internal drivers
- General benefits for staff
- Part of a bigger picture of change
- External drivers

Results node structure - October 2007

The nature of learning – knowledge, skills and the real world

Most subjects have contentious parts
Application and the real world muddies the waters
Exposure to contention increases with academic level
Struggling with, and coping with, contention
Shelf life

Supporting learning in physical and virtual environments

Face-to-face learning contexts and interactions
Lectures
Seminars/tutorials
Workshops, practicals and laboratory sessions
Interaction
Authenticity
StudyNet and learning
StudyNet and communication
StudyNet as a conduit for resources
StudyNet and learning management and administration
Pedagogic themes relating to the use of StudyNet
Extending the classroom
Enhancing face-to-face interaction
Evolving the curriculum

Change and the learning institution

Why use StudyNet?
Internal drivers
External drivers
The implementation at UH
The planning stage
The development stage
The early implementation stage
The maturing stage