# A CASE STUDY INVESTIGATION INTO THE DIFFUSION OF E-MEDIATED LEARNING TECHNOLOGY IN UK HIGHER EDUCATION

A thesis submitted for the degree of
Doctor of Philosophy

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January 2006

# ABSTRACT

This thesis addresses the following research paradox: Despite continual investment in e-mediated learning technology by higher education institutions, why has technological diffusion within UK universities been a slow process? It will be argued that the level of investment in e-mediated learning technology by UK universities and the impact of this technology across higher education as a whole, makes this subject area an appropriate setting in which to study this phenomenon. An interpretivist case study investigation of the adaptation process of e-mediated learning technology by academic staff is analysed through the development of a grounded theory approach.

The investigation will show that the majority of academic staff in the School of Management at the Case Study University are adopting e-mediated learning technology at a basic level. Various factors can combine to influence technological adoption. These include conflicting priorities for academic staff, IT skills levels and the potential for the technology to transform the social relation between the academic member of staff and student leading towards a heightened culture of expectation. In addition, the study will show that e-mediated learning technology has the ability to place the expertise of the academic member of staff in a vulnerable position. Together these factors can combine to affect the successful diffusion of e-mediated learning technologies in UK universities.

At a more critical level, the research identifies that using models of critical mass in isolation to indicate the take-up of multi-functional e-mediated learning technologies are misleading. As such, models that incorporate the levels and stages, as well as the pace of adoption provide a more detailed perspective of the successful diffusion of e-mediated learning technology.

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# ACKNOWLEDGEMENTS

I would like to dedicate this thesis to the One and his Disciple. Thank you for showing me the way, I shall be indebted to you for all eternity.

I would like to express my sincere thanks to my supervisor Dr. Lisa Harris for her encouragement, guidance, patience and invaluable support throughout this project. I would also like to thank my second supervisor Dr. Patricia Lewis for her advice in helping to shape my PhD.

Without the love, support, help and perseverance of my family, I truly believe I would not have been able to achieve all that I have at this point in time. I would like to thank my esteemed parents, Balbir Singh and Herjinder Kaur for bringing me into this world, and giving me a chance to experience all that life has to offer. In addition, I would also like to convey my heartfelt gratitude to my father for supporting me and giving me the wings to embark on this journey. I would like to thank my mother for her unconditional love and faith in me. I would like to sincerely thank my son IkOnkar, my nieces Ranjodh and Jagjeet, and my nephew Kamalpreet for giving me the inspiration and hope to go on. I would like to thank my brother Sandip and sister-in law, Herjyot who together have been a tower of strength for me.

Thank you all, I truly feel very honoured and privileged to have you in my life.

# CHAPTER 1- INTRODUCTION

## THE THESIS

This thesis sets out to explore the following research paradox: Despite continual investment in e-mediated learning technologies by higher education institutions, why has technological diffusion within UK universities been a slow process? The literature presents examples of earlier research from the higher education sector and other industries to illustrate this paradox. It will be argued that the level of investment in e-mediated learning technology by UK universities and the impact of this technology across higher education as a whole, makes this subject area an appropriate setting in which to study this phenomenon.

In particular, the thesis addresses the following research questions:

1. **What are the factors that influence the pace at which academic staff in a campus based UK university adopt e-mediated learning technology?**
2. **What are the barriers to take-up of e-mediated learning technology by academic staff in a campus-based UK University?**
3. **How does e-mediated learning technology influence the social relations between academic staff and students?**

The investigation will show that the majority of academic staff in the School of Management at the Case Study University are adopting e-mediated learning technology at a basic level. Various factors can combine to influence technological adoption. These include conflicting priorities for academic staff, IT skills levels and the potential for the technology to transform the social relation between the academic member of staff and student leading towards a heightened culture of expectation. In addition, the study will show that e-mediated learning technology has the ability to place the expertise of the academic member of staff in a vulnerable position. Together these factors can combine to affect the successful diffusion of e-mediated learning technologies in UK universities.

At a more critical level, the research identifies that using models of critical mass in isolation to indicate the take-up of multi-functional e-mediated learning technologies are misleading. As such, models that incorporate the levels and stages, as well as the pace of adoption provide a more detailed perspective of the successful diffusion of e-mediated learning technology. At the start of the project, the particular factors affecting the diffusion of e-mediated learning technology at the Case Study University were unclear. However, these factors become more distinct as the research progressed. A grounded theory approach to analysis of the case study material suggests that a lack of technological integration is adding to the slow diffusion of e-mediated learning technology in UK universities.

## INTRODUCTION

This introductory chapter begins by presenting the thesis in so far that the paradox at the heart of the study under investigation is introduced to the reader. Namely, despite continual investment in e-mediated learning technology by higher education institutions, why has technological diffusion within UK universities been a slow process? A macro focus is taken by introducing the reader to the subject area of the research and the project rationale, which is then followed by a conceptualisation of the factors driving e-mediated learning into higher education. Given that a considerable number of higher education institutions are adopting some form of e-mediated learning, one side of the paradox is presented, the continual investment in e-mediated learning by higher education institutions.

As a large number of universities are introducing some form of e-mediated learning technology, the chapter then goes on to present a brief history of the use of educational technologies. This introduces the reader to the second part of the paradox, that the diffusion of educational technology has been a slow process. This argument is supported further in chapters 2, 5, 6 and 7 of the thesis. In order to begin to understand why universities continue to invest in e-mediated learning, the latter part of chapter 1 explores the history of UK higher education. This chapter highlights how macro changes in this sector are driving universities to search for efficiency gains. The chapter concludes by discussing the wider relevance of this study.

## STRUCTURE OF THE THESIS

This introductory chapter opens with an account of the various definitions of e-mediated learning. As there is no universal definition of e-mediated learning several terms are presented to explain how the definitions are used interchangeably. The chapter then goes on to explain the background of the study, which leads to the project rationale. In this section, the current e-mediated learning environment is presented to demonstrate the various e-mediated learning initiatives currently being pursued within the public and private sector. In doing so the focus of the thesis is justified. The chapter then goes on to encompass a review of the history of educational technologies. This review demonstrates that the use of e-mediated learning technologies within an educational environment is not a radical concept, whilst at the same time highlighting why the diffusion of these technologies have been a slow process. Finally, the chapter explores the history of UK higher education to provide an overview of the current state of this sector and to justify why this sector was chosen as the focus of the thesis.

Having introduced the research focus, chapter 2 begins by discussing the key debates on the implementation of e-mediated learning technology in higher education. In chapter 1, an evaluation of the factors that are driving the introduction of e-mediated learning technology in higher education in the context of continual development and efficiency are presented. In chapter 2, this rather idealist theme is then contrasted with a counter-perspective on the implementation of these systems in practice. As such, the discussion introduces the issue at the core of this thesis. The paradoxical impact that e-mediated learning technologies are having in higher education, despite extensive investment at the institutional level. The aim is to present a theoretical setting that will lead to further investigation of the adaptation process of e-mediated learning technology by academic staff within a campus based UK University.

The second part of chapter 2 discusses the first theoretical framework [Rogers, 1995 diffusion of innovations] guiding this study. This literature generally suggests that individuals adopt innovations at different periods of time, and the decision to adopt the innovation is largely determined by a number of social and organisational factors These factors include individual personality traits, the way the individual perceives the benefits of the innovation and the way the innovation is communicated to the individual. Consequently, these factors can influence the diffusion process of an innovation.

The final part of chapter 2 discusses the second conceptual framework also guiding this study. Giddens (1996) sociological concepts of expert systems and time-space distanciation provides an intrinsic set of concepts that help to explain how through a process of time-space distanciation, expert systems have the potential to change social relations. This literature provides a much richer series of concepts than can be found in the diffusion of innovations literature, which improves our understanding of diffusion of e-mediated learning technology in UK higher education. The chapter concludes by summarising the theories and concepts discussed, and presents the identified research questions that emerged from the literature review to be addressed in this study.

Chapter 3 discusses how a single case study design and a grounded theoretical approach to analysis of data was adopted to analyse the material collected. Full details of the methodological argument are discussed in chapter 3. In chapter 4 the reader is introduced to the Case Study University under investigation and the e-mediated learning system implemented, from which the empirical research material was gathered. The dominant categories to emerge from the grounded theoretical approach to analysis of data forms the themes of chapters 5- Diffusion of Innovations and chapter 6- WebCT as an Expert System. Chapter 7 discusses the findings to emanate from further analysis of chapters 5 and 6 and compares and contrasts the research findings against existing research. This chapter also discusses the substantive findings to emerge from the research study and highlights how this research has built on existing research, particularly models of critical mass that can be found in the diffusion of innovations literature.

Chapter 8 reviews the research study and discusses the contributions this study has made to new knowledge and notes the limitations of the study. Finally, the chapter draws to a close by discussing the management implications of e-mediated learning technologies in the UK higher education sector in light of this empirical study. In the final chapter of this thesis [chapter 9] pragmatic guidelines based on the findings from the empirical research and previous research are put forward to facilitate the integration of e-mediated learning technology in the UK higher education sector.

## DEFINITIONS

E-mediated learning can be described as the utilisation of web based information or communications technologies to help support teaching and learning. However, many writers choose to use the term interchangeably as either:

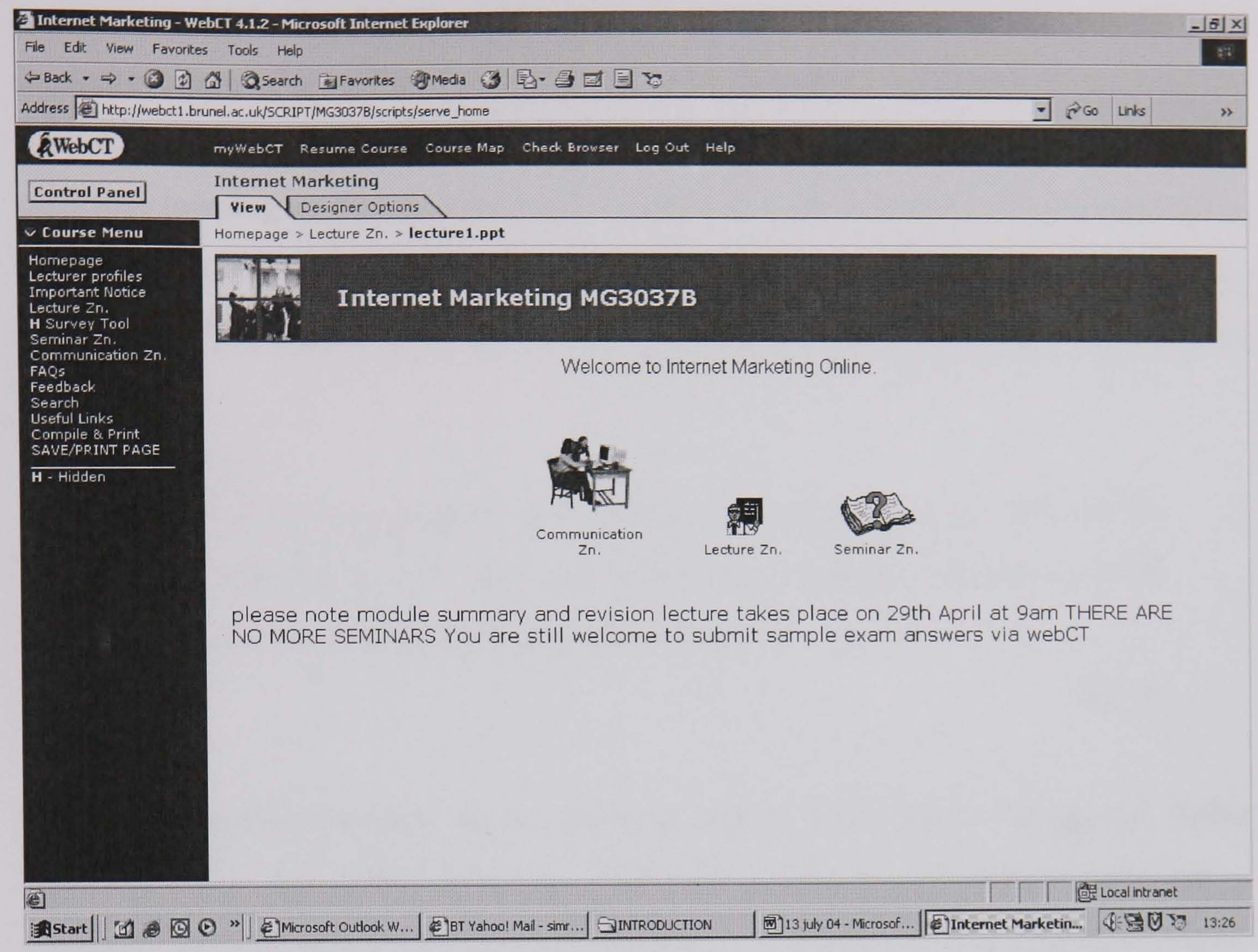
- **E-mediated Learning:** Grewal (2004).
- **E-learning:** Olka (2005); Garzotto and Torrebruno (2005); Webb, Barker, VanShaik and Jones (2005); Salmon (2005); Bonk (2004); Ask and Haugen (2004); Orsini-Jones (1999).
- **Online learning**: Agostinho and Herrington (2004); Baltes and Waligorski (2004); Goodyear (1999); Salmon (2004); Laurillard (2004).
- **Information and communications technology (ICT):** Dennis and Maguire (2005); Aidah (2004); Beumer, Wiethoff, Attema and Akar (2004); Stainfield (1997).
- **Educational technology**: Rosenberg (2001); Cornford and Pollock (2003); Fetherston (2001).
- **Learning technology:** Timms, Crompton, Booth and Allen (1997); Sosabowski, Herson and Lloyd (1998); Miller (1999).
- **Web Based learning:** Jackson (2002).

It is perhaps for this very reason that there is no universal definition of e-mediated learning. For the purpose of this study, the author has decided to use the term e-mediated learning as the technology serves as a facilitator of course material to be utilised. E-mediated learning technologies can encompass a wide and varied range of tools to aid the teaching and learning process. These can include bulletin boards, chat rooms, e-mail and web pages. These tools can be integrated on a stand-alone basis, or incorporated into flexible settings such as virtual learning environments (VLE). A snapshot image of a virtual learning environment is illustrated in Diagram 1.

Within the virtual learning environment, academic staff members have the option of blending module content into customised learning environments. Additionally, self-test and assessment tools can be incorporated to determine the students understanding of the module. This tool can enable student progress to be monitored and weaknesses to be identified and it is claimed that the relay of this information back to the student may enhance the learning process. The flexibility of the system allows academic staff members to determine the extent to which they choose to integrate these tools. These environments provide staff with the option of building a customised learning environment with the following main features:

- **Resources**: supplementary material such as references, links and lecture notes.
- **Communication tools**: chat rooms, mail and bulletin boards.
- **Assessments:** assignments can be submitted and graded online, quizzes and tests can also be created.
- **Monitoring**: academic staff members have the ability to track online student activity.

## DIAGRAM 1: VIRTUAL LEARNING ENVIRONMENT: WEBCT




## BACKGROUND

The last decade has witnessed substantial technological advances. This has lead to an increase in the use of technology within the business world for cost savings, transactional and informational exchanges. Likewise, the education sector has not been exempt from the introduction of electronic technologies such as CD-ROMs, the Internet, Information and Communications Technology (ICT) and E-mediated learning technology. These technologies have often been introduced for pedagogical, cost-savings, administrative and competitive purposes within both traditional campus based classroom and distance learning settings. In particular, many higher education institutions are considering the implementation of e-mediated learning technologies. The private online based Phoenix University in the USA and the Open University in the UK are two classic examples, together with traditional campus based institutions such as Brunel University and the University of Central England. (Please refer to Appendix 1, for a table of e-mediated learning initiatives at other universities)

The e-mediated learning initiatives as outlined in Appendix 1 makes it clear of the extent to which the higher education sector is taking an active role in the implementation of e-mediated learning. However, similar to the hype surrounding the rise of the dotcoms, the beneficial gains to be accumulated by implementing e-mediated learning in theory sound very promising. Nevertheless, counter-arguments often paint a different picture. For example, Laurillard (2001) with regards to the Open University argues that faculty staff can make great timesavings by using this technology.

> *"Some of our calculations have shown that changing just 20% of the course material to ICT materials increases academic staff time by 40% and more than doubles production staff time."*
>
> (Pg. 6)

Yet, contradictory research shows (Grewal, 2002; 2003; 2004; Abrahams, 2004; Souleles, 2004; Agre, 2000; Jacobsen, 2000) that academic staff members that use e-mediated learning technology find the adoption, continual updating and maintenance of the technology to be extremely time consuming. The environments in which e-mediated learning technologies are used may produce varied outcomes. These are dependent on the type of technology used, the content and the students, subject area and the objectives that the academic staff members have of using the technology. Therefore, it should not be assumed that e-mediated learning technologies are alike and will have similar outcomes. Furthermore, the wider social and organisational setting together with adequate supporting infrastructure play a pivotal role in the successful diffusion of e-mediated learning. Budd (2004) adds further weight to this paradox by making the following observation in relation to the rhetoric or reality of the new e-Economy:

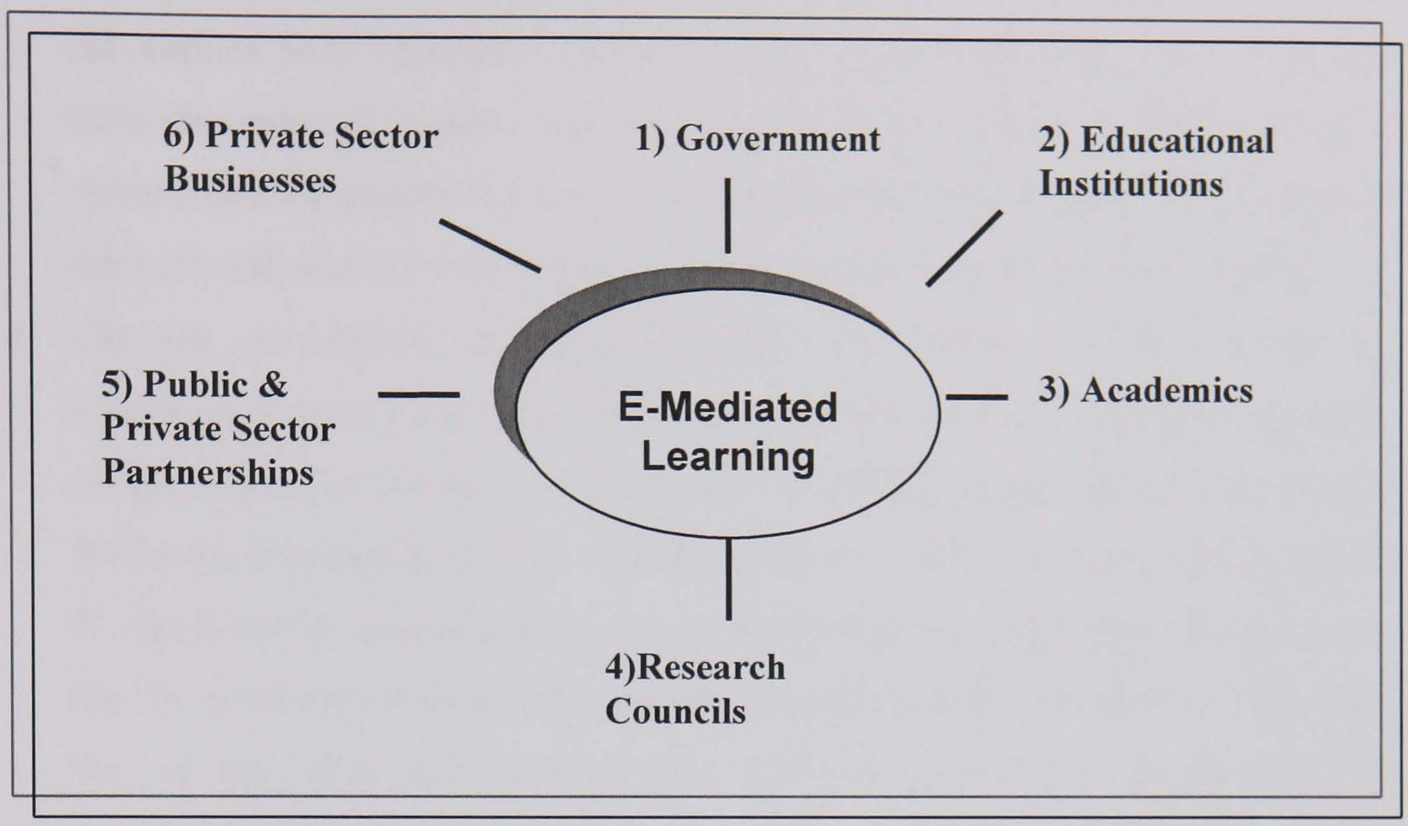
> *"The claims for the existence of a new e-Economy and its weightlessness are excessive."*
>
> (Pg. 1)

Budd (2004) suggests that what has changed is the deeper or wider use of ICT's, but these changes have to be understood in a wider organisational context. In support of the argument put forward by Budd (2004), the lack of research that addresses the wider organisational issues of implementing e-mediated learning technology in higher education suggests that this is an area of research that is often overlooked. The gap in the literature that fails to address the social and organisational dynamics of integrating e-mediated learning into traditional university settings is indeed an important area. This is because a growing number of higher education institutions are currently in the process of using e-mediated learning technology, either as support systems to enhance current teaching and learning, or for distance learning. Therefore, it is imperative to understand the issues that the technology brings with it.

## PROJECT RATIONALE

The literature within this field attests that e-mediated learning is prevalent within both the public and private sectors (Grewal, 2004; 2003; 2002; Laurillard, 2004; 2002; 2001; Salmon 2004; 2002; 2001; Goodyear, 1999; Cornford and Pollock, 2003; Rosenberg, 2001; Drucker, 2000). Diagram 2, identifies the central agencies involved with e-mediated learning. In order to put e-mediated learning into context the key aspects of each of these agencies will be summarised, and explanation of why the focus was chosen will be presented.

## DIAGRAM 2: CONCEPTUALISATION OF E-MEDIATED LEARNING INITIATIVES




(Source: Grewal, 2004, Pg. 108)

1. **The Government.**
   - Policy to increase access: In 1962 approximately 6 percent of the UK population under 21 participated in higher education. The government proposes to increase student participation to 50 percent of those aged between 18-30 by 2010 (DfES, 2003). The current student intake for the academic year 2004/2005 stands at 44 percent (DfES, 2004).
   - Policy to widen access: To make higher education accessible to people from more diverse backgrounds. The number of part-time students in UK higher education studying for an undergraduate first degree increased by 82 percent in 2003 compared to 2002, from 103,545 to 188,360. Part-timers constitute approximately a quarter of all undergraduates and 41.7 percent of the total number of students in higher education (http://www.bbc.co.uk, 2005a). In 2003 the government set a target of attracting a further 50,000 international students to the UK (exclusive of the EU) by 2005 (DfES, 2003). In the academic year beginning 2003/4 there were 213,000 international students in UK higher education institutions (http://www.bbc.co.uk, 2005b). This number

increased to 300,055 in the academic year beginning 2004/5. The numbers of international students entering the UK higher education sector is forecast to increase by 20% over the next 3 years. However, a number of British universities have reported a decline in the number of applications received from international students and approximately half of British universities have missed their international recruitment targets. The reason cited for the drop in international student numbers was a problem with visas (MacLeod, 2005a).

- The UK government initiative 'University for Industry's Learn Direct' is investing resources and time into information technology and communication centres. Since its inception in 2000, over 1 million people from England and Wales have enrolled on over 3 million courses. These include management, IT, skills for life and languages. Learn Direct was developed with a remit from the UK government to provide learning opportunities to post 16 year olds with few or no skills and qualifications, and for those who are unlikely to participate in traditional forms of learning (http://www.learndirect.co.uk, 2005).
- UKeU (UK eUniversities) backed by the UK government with £62m of funding. It was launched in January 2003 with the aim of bringing UK universities together to deliver university education online at a global level. However, the project was scrapped in 2004 as it faced a number of problems. Firstly, the project failed to attract any private investment. Funding of approximately £120 million was required. Secondly, UKeU only signed up 900 students against a target of over 5000 in the second year. Thirdly, the Open University and London University's external degree program pulled back from involvement. It was estimated that these two institutions would bring in 100,000 students between them and the success of the UK's Open University could be emulated online. Fourthly, developing the platform from scratch meant that it was custom built, inherently riskier and more expensive, since the platform would require constant updating and improvement in order to keep up with competition. Over a third of the total funds, £20 million was spent on developing this platform. Fifth, according to UKeU staff, out of the 900 students recruited, only 215 were actually using the platform, the majority stayed with the systems used by their universities. Finally, staff felt that the

project may have still been viable had it been properly managed. Some of the issues raised were a lack of marketing focus, a lack of documented business strategy and an autocratic management style (MacLeod, 2004a).

- The residual grant originally allocated for the UKeU project has been transferred to the UK government and the Higher Education Funding Council for England's (HEFCE) 10-year strategy for e-learning project announced in March 2005 (http://www.dfes.gov.uk/elearningstrategy). The details of this strategy will be discussed further on.

**2. Educational Institutions.**

- Educational Institutions that are currently exploring how e-mediated learning technologies can aid their current teaching and learning practices. For example, the introduction of a campus wide Virtual Learning Environment at Brunel University and other higher education institutions as outlined in Appendix 1.

**3. Academics.**

- Individual research interests in e-mediated learning (Salmon, 2005; 2004; 2002; 2001; 2000) whose work involves creating models for enhancing active and participative online learning by individuals and groups. Laurillard (2004; 2002; 2001, 2000) whose work explores e learning within university settings, and how universities have to rethink their teaching strategies. Laurillard (2004; 2002; 2001, 2000) has written extensively on creating frameworks for the effective use of learning technologies. Cornford and Pollock (2003; 2000) who have written about the challenges of e learning implementation in higher education. All of these key writers work will be explored further in chapter 2.

**4. Research Councils.**

- Higher Education Funding Council for England (HEFCE). Provide funding for special initiatives to support learning and teaching, such as the UKeU. This project began in February 2000 as a collaborative scheme to establish a new way of providing higher education programmes through web-based learning. The project was designed to give UK higher education the capacity to compete globally with the major virtual and corporate universities being developed in the United States and elsewhere, with the UK government committing £62 million to the project for 2001-2004 (http://www.hefce.ac.uk). However, in March 2004, HEFCE announced that UK e Universities would be scrapped as the organisation was facing problems (MacLeod, 2004b).

- In 2005 in collaboration with the Joint Information Systems Committee (JISC), Higher Education Academy (HEA) and the UK Government, HEFCE introduced their 10-year e-learning strategy: HEFCE strategy for e-learning. This strategy was developed in direct response to the government white paper 'The Future of Higher Education'. The preliminary stage of the e-learning strategy was via a consultation on a national e-learning strategy. This was developed by DfeS and was titled 'Towards a Unified e-Learning Strategy'. The results of this consultation were published in April 2004. The aim of the e-learning strategy is to enable all universities and colleges to make the best use of information and communications technologies in their learning and teaching (http://www.dfes.gov.uk/elearningstrategy, 2005). The UK government has given in the region of £41 million to HEFCE to provide support for individual higher education institutions to invest in e-learning.

5. **Public and Private Sector Partnerships.**
   - In 2002, the education secretary Charles Clarke announced that primary and secondary schools in the UK would be given £280 million worth of e-learning credits to purchase certified digital learning resource material from the private sector, until 2006. The intention was to create a public-private partnership to improve education standards through the injection of public cash (Leader, 2003). However, millions of pounds worth of e-learning credits still went unclaimed in 2004 (Curtis, 2004). Teachers complained that there was a limit to the amount that could be spent on software and this dissuaded them from using the credits. Curtis, (2004) suggests that a report carried out by Ofsted into ICT in schools maintains that many schools have been too slow in embedding ICT across curriculum. The report outlines that there is still a significant amount of work required to ensure that all teachers get the adequate support to successfully embed ICT in all aspects of education.

- From the academic year 2004/5 the UK government gave a cash boost of £25 million to schools to invest in interactive white board technology (Curtis, 2004).
- The collaboration between UK Universities and Sun Microsystems to build a global university in a project worth £400m (Kelly, 2001). There is substantial recognition of the need to collaborate and establish a partnership. However, there are evident problems of partnerships between the universities and the private sector in terms of differing cultures, expectations, and time-scales, but as highlighted above this venture is facing problems.
- The Digital Academy was launched in 1999, with substantial private sector and UK government backing. The intention was to provide small and medium sized enterprises (SMEs) with the benefits of cost savings and flexibility to up-skill their employees by introducing e-mediated learning into the workplace.
- In 2005 the digital academy announced a new range of courses available to students, in collaboration with their partners, the Guilford College of Further and Higher Education and the Reading College and School of Art and Design, AGFA and Hewlett and Packard (http://www.digitalacademy.com, 2005).

**6. Private Sector Businesses.**

- A substantial amount of activity exists in corporate education. Some of the catalysts for this are technological developments, enhanced interest in life-long learning in work and huge increases in international demand for higher education. A larger number of corporate universities exist in the USA, than the UK or Europe. The University of Phoenix Online and DeVry University are two such examples. The Phoenix University has 150,000 students online and focuses on courses that can be delivered at a profit, e.g. IT, business and health. Furthermore, these universities have carried out their marketing research and are aware of what their customers' wants and needs are. In fact, the university has a very strict admissions policy. The university enrols only those students over the age of 23 who are employed, aiming the university at an adult market, who mainly attend evening and weekend courses (MacLeod, 2004a).

- New York University invested £10.9 million into NYU online, a for-profit e learning company (MacLeod, 2004a).
- Temple University in the USA closed its for-profit company without offering a single course (MacLeod, 2004a).

By reviewing the various e-mediated learning initiatives currently taking place, the first conclusion that resulted was that private sector organisations implementing e-mediated learning technologies had very different motivations than public sector organisations. Therefore, a distinction needs to be made between the private sector and higher education institutions implementing e-mediated learning. Most evidently that corporate institutions are far more tactical in their aims, for example training an employee on how to construct a budget forecast. As such their motivations are largely governed by their desire to maximise on profits whilst reducing costs, whereas the aim of higher education institutions is to educate. Therefore, these institutes should be learning centred, aiming to facilitate life-long learning skills. Furthermore, they have more of an obligation to their government and citizens, so their motivations are more likely to be determined by these responsibilities.

So the key distinction here is education versus training. Nevertheless, academia is now faced with increasing competition at a global level. This is in addition to pressure from the state to introduce private sector practices, such as providing more of a customer focus. Moreover, the funding these institutions receive from the government has decreased. As such, UK higher education is being forced to adopt private sector practices. Therefore, a gap exists in attempting to understand how e-mediated learning technology develops in UK higher education, as there are many barriers this sector may face. In particular, reviewing various articles (Finger and Burgin-Brand 1999; Edmondson and Moingeon, 1999; Antonacopoulou, 1999) reinforced the decision to focus within the public sector. This is because these writers confirmed that although similar in many ways, public and private sector organisations are disparate entities. The main difference is that the public sector environment makes it inherently difficult to manage, partly because these organisations are often historically entrenched within a bureaucratic structure. Other barriers faced are as follows:

- *Environmental Constraints:* Public sector organisations operate simultaneously in a political and public arena, this makes them part of a larger system because of their responsibilities.
- *Public Sector Constraints:* Unions hold a powerful position within the public sector.

Initially e-mediated learning was conceptualised as being central to the various aforementioned organisations, as illustrated in Diagram 2. However, conceptualising e-mediated learning in this way has its limitations. Mainly, that e-mediated learning is not central at this stage to any of the organisations' activities, and within the public sector the implementation of e-mediated learning initiatives may be determined by a hierarchical structure as follows in Diagram 3:

## DIAGRAM 3: CONCEPTUALISATION OF E-MEDIATED LEARNING INITIATIVES IN HIGHER EDUCATION

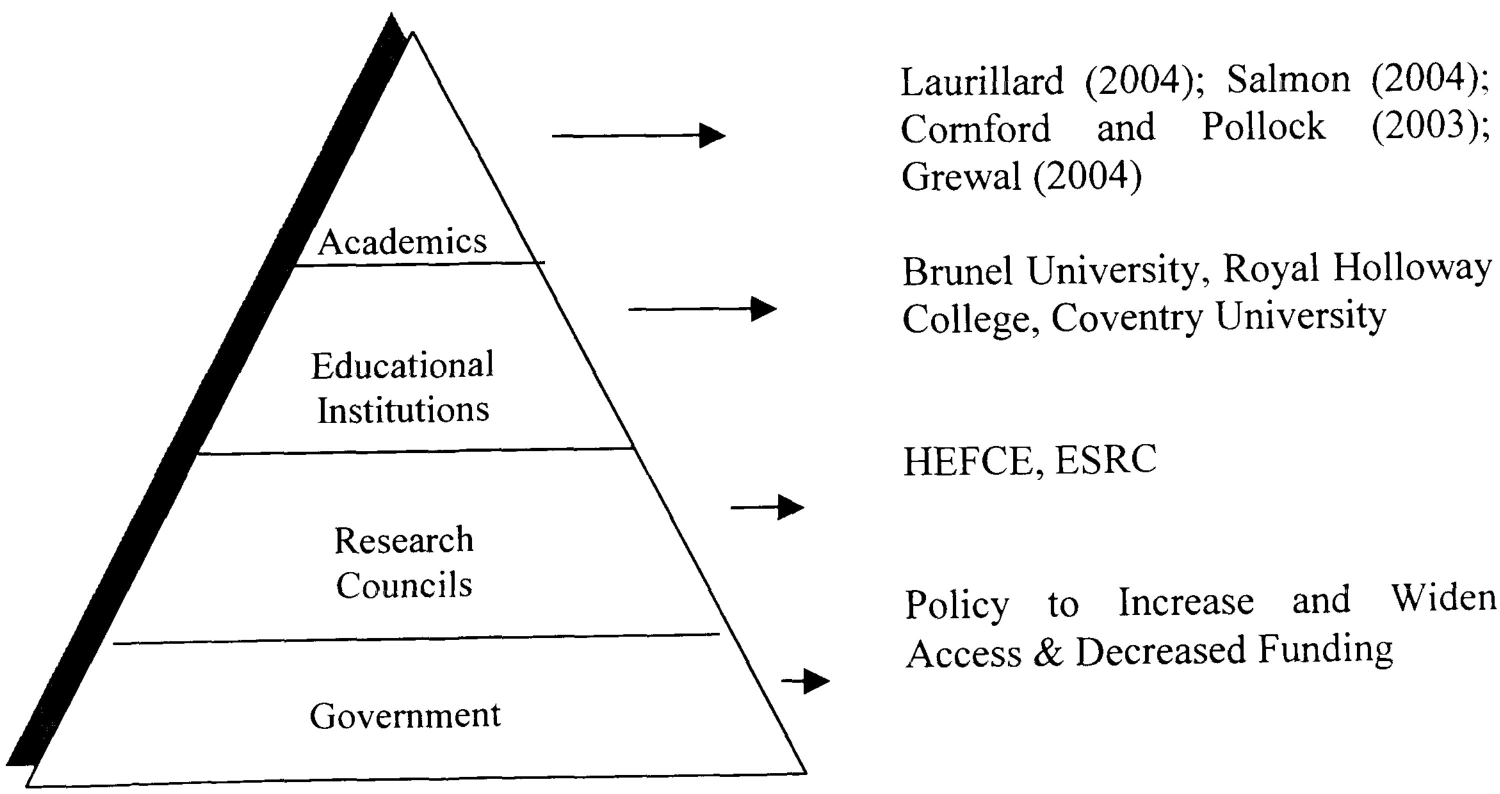



Diagram 3 conceptualises the government as holding a fundamental role from which subsequent e-mediated learning initiatives have, and are currently taking place in UK higher education. The influence of government reform on UK higher education will be discussed further in the chapter. Having justified the project rationale and the focus of the thesis, the chapter now explores the forces driving e-mediated learning technology into UK higher education.

## FACTORS DRIVING E-MEDIATED LEARNING INTO UK HIGHER EDUCATION

Grewal (2004) suggests that social, technical, political and economic pressures and competition from both a national and international level, coupled with an increasing number of students entering into higher education and decreased government funding dictate that the UK higher education sector consider the implementation of e-mediated learning technology as illustrated in Diagram 4. At a macro level, other countries all invest more in their higher education institutions than the UK. For instance, France, Germany, the Netherlands and the USA all contribute 1 percent of their GDP in public funding to their higher education institutions, compared to 0.8 percent in the UK (DfES, 2003). It is clear that other countries see that developing the knowledge economy requires better-trained people in the workforce. Furthermore, higher education is turning into a global business and other institutions are considering selling higher education overseas into those markets, which have traditionally belonged to the UK. At a micro level many of the students arriving in higher education have a considerable level of ICT skills and knowledge.

The World Wide Web has lifted the barriers to accessing resources on a global scale in a more efficient and effective way. No longer do students have to rely upon the physical library as their sole means of retrieving information, and a high proportion of students are familiar with using electronic communication tools, such as email. In many courses, particularly within social sciences, electronic materials form important components of curriculum and at the very least students are expected to present assignments in word-processed format. As such, both staff and students are becoming increasingly reliant on information systems and the Internet, for communications and research purposes. However, the issue faced by universities is that they are trying to introduce online elements within the boundaries of the traditional university. So do they try and fit online courses into existing concepts, arrangements and infrastructures or create new and different ones? At a deeper level a wider question emerges, are we being locked in to a technological system by creating dependency on ICT and the Internet?

Technological lock-in occurs when agents continue to make use of an existing technology despite there potentially being more productive technologies available (Redding, 2002). Abernathy and Utterback (1978) created a model of innovation that built on the shifting emphasis of technological development as a major new product innovation becomes established in the market place. Harris (1999) suggests that the model of innovation demonstrated how the focus of development shifts over time, from process innovation to minor product improvements. As the technology develops, advantage can be taken of economies of scale to improve efficiency. Hence, the entire system becomes less flexible and increasingly centres upon the dominant design, rather than further innovative activity. Furthermore, by this stage the level of human and financial investment is likely to be considerable, and the level of cultural change required to carry out organisational change is significantly increased.

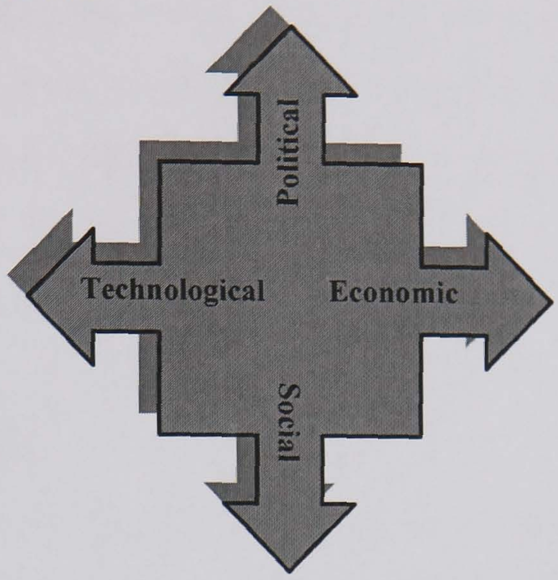
A second explanation for technological lock-in stems from the idea of increasing return to adoption. According to Perkins (2003) these are positive feedback mechanisms that function to increase the attractiveness of adopting a particular technology the more it is adopted. David (1985) and Arthur (1994) have outlined that where two or more technologies are competing for market share, the existence of increasing returns means that the option, which secures a primary lead in adoption, may ultimately go on to dominate the market. Perkins (2003) suggests that early adoption has the potential of generating a snowball effect, whereby the chosen technology benefits from greater improvements than its competitors. This drives further adoption, improvements and eventual leadership. Furthermore, under such conditions technologies unsuccessful in early adoption success, may inevitably be in a position where they are locked-out from the market. This makes them incapable of competing with the improved technology.

A classic example of how technological lock-in occurs is the QWERTY keyboard (David, 1985). What this example demonstrates is how the configuration of a keyboard design became the dominant standard. This was despite other superior keyboards being available on the market, such as the Dvorak Simplified Keyboard. Furthermore, this example illustrates how the keyboard was part of a larger human-technology inter-related system, which meant that use of the keyboard involved skills training in using typewriters through a variety of public and private sector organisations. Therefore, as more and more typists invested their human resources into learning typing skills through the QWERTY keyboard, QWERTY became locked-in as the dominant keyboard arrangement. This was through technical interrelatedness, economies of scale and quasi-irreversibility of investment. More recently, Microsoft attempted to adopt a similar strategy of technological lock-in by making their Internet Explorer browser the dominant standard on PC's. This was until the US government labelled their actions as anti-competitive. Although technological lock-in is a key issue, it is beyond the scope of the study to address this question at this stage. However, this issue will be taken forward and addressed in future research.

More recently an upsurge in the number of students entering higher education from both traditional and non-traditional backgrounds calls for emphasis to be placed on meeting individual needs and learning styles. Subsequently, upon graduation an increasing number of employers expect their new recruits to have ICT skills. It may be argued for the above reasons that e-mediated learning is becoming a critical ingredient in teaching and learning at a higher education level.

## DIAGRAM 4: FACTORS DRIVING E-MEDIATED LEARNING INTO UK HIGHER EDUCATION

- Government Initiatives e.g. Learn Direct
- Research Councils e.g. HEFCE & ESRC
- Government Policy to Increase and Widen Access to Students




- Students Highly Skilled in IT
- Rate of Technological Progression.
- Technology provides scalability.

- Increased competition at national & international levels
- Decreased government funding.
- Cost- Efficiency afforded by technology.

- Drive towards Life-Long Learning
- Heterogeneous groups of students entering HE.

(Source: Grewal, 2004, Pg. 109)

Diagram 4 illustrates how social, technical, economic and political factors create both an opportunity and a threat for UK higher education. Globally, universities and companies are developing ventures to tap into the emerging market for e-mediated learning. If UK higher education does not respond as efficiently it will lose not just the potential to develop new markets, but also its share of existing markets. Nevertheless, many students in the UK will continue to want the full-time, campus based experience of higher education, because of its wider educational and social benefits (Bjarnason, Davies, Farrington, Fielden, Garrett, Lund, Middlehurst and Schofield, 2000). However, both the overseas and part time markets for adult life long learning are amenable to e-delivery and offer the capacity for rapid growth (Bjarnason *et al*, 2000). If UK higher education does not keep adapting to meet these needs then others will. However, securing and sustaining such a position demands a considerable investment of funds, time and skills.

Like other sectors of society, higher education is undergoing changes. At the same time the global market for e-mediated learning is also expanding, owing to the knowledge-based nature of modern businesses, demographic change, and an increasing demand for life-long learning. The higher education sector is currently placing greater emphasis on promoting and developing high quality learning and teaching. This suggests that the sector recognises the potential contribution of e-mediated learning in this area. Furthermore, within UK higher education there are many e-related learning and teaching initiatives, at both institutional and national levels as discussed earlier.

## INTERIM SUMMARY

So far the chapter has put the current e-mediated learning environment into context with the six central agencies involved with e-mediated learning being identified. The key initiatives in each of these agencies were summarised. This led to the identification of critical distinctions in the motivations for corporate sector organisations to implement e-mediated learning versus higher education institutions, namely training versus education. Additionally, because higher education institutions operate simultaneously in a public and private arena, there are significant barriers this sector faces, for instance bureaucratic management practices. As such, the focus of the thesis was justified. Moreover, the key paradox at the core of this thesis arises. Despite the considerable resources invested in e-mediated learning technologies by higher education institutions, why has technological diffusion within UK universities been a slow process? In order to begin addressing this paradox the chapter then went on to explore the factors driving the implementation of e-mediated learning technology into higher education. What becomes clear is that higher education institutions in the UK are being driven to implement e-mediated learning technology by both external and internal factors.

Through investigating the role of e-mediated learning technology in UK higher education, the chapter began to focus on the rationale for the study. As the study centres on the topical issue of e-mediated learning technology in UK higher education, it is important to understand what impact the technology is having on UK higher education and vice versa. Therefore, the following section presents a history of how learning technologies are being used for educational purposes. The discussion highlights that the use of electronic technologies to aid the teaching and learning process is not a revolutionary but an evolutionary process, with many of the technologies being slow to take off. As discussed earlier, this forms a critical part of the thesis, why is UK higher education investing considerable resources into e-mediated learning technologies if technological diffusion has been slow? This paradox will be revisited throughout the thesis. The chapter then goes on to investigate the changes that the UK higher education sector has been going through. Why these changes are influencing this sector to implement e-mediated learning technology and what challenges exist in the UK higher education sector through the adoption of e-mediated learning technology as a result of these issues.

## BRIEF HISTORY OF LEARNING TECHNOLOGIES

The use of electronic technologies to aid the teaching and learning process is not an entirely new concept. These technologies have been in existence since World War II, but have been slow to take off. One of the reasons for this has been a lack of interactivity and a high emphasis on passivity. The use of film is a classic example of a highly passive medium of delivering training, which was widely used within a military setting. U.S. military trainers conveyed instruction from personal hygiene to weapons maintenance in the form of videos. This method of deploying important information to the mass of soldiers dispersed at various geographical locations was highly successful and the military continued research on the use of film and later television for learning purposes through collaborations with leading universities. Despite this early success, educational film and television did not flourish into a learning utopia. Many had predicted this was largely due to issues of feasibility.

> *"At a time when the nation was still amazed at the entertainment and informational capabilities of TV, most students found instructional shows too boring to watch."*
>
> (Rosenberg, 2001, Pg. 22)

A fundamental reason why television failed to become an effective vehicle for delivering learning was its inability to provide an interactive platform, where content could be adjusted according to the learners needs via feedback. The need for interactivity provided a catalyst for computer based training during the 1970s and 1980s, but numerous technical barriers such as incompatible hardware systems and software programmes and programming languages made the universal applicability a tall order. Problems were still evident in the early 1990s where computer based training programmes had slow computer speeds and poor graphics. In addition, the rate at which technology changed meant that many computer based training packages failed to break out of neatly packaged boxes and became rapidly obsolete. Generally, computer based training was used when extensive numbers of individuals required training in a limited space of time, or when content was to remain static. During this period substantial development was being made in an attempt to understand how individuals learn, and fundamentals of learning were being incorporated into the design of e-mediated learning technology. Hence, the advent of e-mediated learning technologies.

Earlier work on theories of learning illustrates how this process of e-mediated learning technology development has taken place (Miller, 1956; Newell, 1987; Gagne, 1987; Merrill, 1983; Li and Merrill, 1991; Merrill, Li and Jones, 1991). For instance, some of the fundamental cognitive concepts of learning such as 'chunking' as proposed by Miller (1956) have been further developed to incorporate the design of e-mediated learning technology, such as the theory of 'Soar' as presented by Newell (1987).

Generally, cognitive theories on learning move away from behavioural concepts of learning, which claim that learning can only assumed to have occurred if the result is displayed in the form of an action. Such theories intentionally refrain from drawing any conclusions about either the thinking process involved with learning or the emotional response of learners. Behavioural theories are more concerned with the links between a stimulus and response in learning. In contrast, the limited and strictly operational approach of behaviourism contradicted those ideas presented by cognitive theorists. Such theorists argued that learning is a complex process involving skills such as mental mapping, the use of intuition, imagination and problem solving.

Furthermore, cognitive theories on learning are based on the notion that learning also incorporates individual perceptions and motivations and can therefore, be stored until required. In other words, overt measurable behaviour is not the only evidence for learning.

The theory of 'SOAR' as developed by Newell (1987) builds on the functional components of chunking to develop software architecture for technological systems. Miller (1956) suggests that short-term memory is limited to holding between five and nine chunks of information. Newell (1987) argues that chunking is the primary mechanism for learning and represents the conversion of problem solving into long-term memory. The theory emerged from research in problem solving and learning spanning computer science and cognitive psychology. Building on this foundation in the last 10 years, SOAR research has focused on building intelligent systems that interact autonomously with complex environments that are inhabited by other entities. These include other intelligent agents and human agents. SOAR is capable of simulating responses and response times. Newell's (1987) work on the theory of SOAR clearly demonstrate how fundamental principles of cognitive learning theories have developed and been applied to form intelligent computing systems.

The conditions of leaning theory as proposed by Gagne (1987) provides another useful example to illustrate how learning theories have developed to incorporate the design of e-mediated learning technology. The conditions of learning theory built upon behavioural and cognitive theories to recommend approaches for instructional technology. Central to Gagne's (1987) theory is that instruction must be designed specifically in the context of learners' needs. Instruction should be designed to include a variety of instructional methods in order to meet the needs of different learners. He conceptualised the events of learning and instruction as a series of phases using the cognitive steps of coding, storing, retrieving and transferring information. He asserts that there are various types and levels of learning, and that each type demands a different type of instruction. Gagne (1987) presents five fundamental groups of learning as follows: verbal information, intellectual skills, cognitive strategies, motor skills, and attitudes. Distinct internal and external conditions are required for individual types of learning. According to the theory, learning tasks for intellectual skills can be structured in a hierarchy determined by the complexity of the skills. The objective of the hierarchy is to identify prerequisites that need to be completed to facilitate learning at each level. The preliminary application of this theory was in a military training setting, however, Gagne (1987) has moved on to address the role of instructional technology in learning.

Based on cognitive theories of learning, Merrill (1983) proposes the theory of Component Display (CDT). This theory classifies learning across two dimensions, content and performance. The critical aspect of CDT is learner control, the idea that learners can select their own instructional strategies in terms of content and presentation components. In other words, instructional design using CDT provides a high degree of individualisation, since students can adapt learning to meet their own preferences and styles.

Recently, Merrill, Li and Jones (1991) have proposed a new version of CDT, named Component Design Theory. This adapted version has more of a macro focus than its predecessor does, with emphasis placed on course strategies rather than presentation forms. Additionally, advisor strategies have replaced learner control strategies. Development of the updated version of CDT has been closely linked to the work on expert systems and authoring tools for instructional design (Li, Merrill, 1991; Merrill, Li, Jones, 1991). CDT specifies how to design instruction for any cognitive domain and provides the basis for the design of computer based learning systems.

What these examples have demonstrated is how fundamentals of cognitive learning have been applied to the development of e-mediated learning technologies. At the same time, the literature review also highlights the gradual development of learning technologies. Today e-mediated learning is predicted to be more effective than other tried and tested methods such as television, films, and computer based training. It is predicted that e-mediated learning may lower costs, has a wide reach, the programmes can be customised according to learners' needs. It is also suggested that content can be updated accordingly, has a universal reach, builds communities and is highly scalable. Many writers in this field believe that e-mediated learning enables an interactive dialogue to occur and this may account for its ability to enhance learning (Rosenberg, 2001; Laurillard, 2001; Salmon, 2002).

In order to demonstrate the evolutionary succession of learning technologies that led to the development of e-mediated learning technology within the education sector, a history of the use of learning technologies within an educational environment was introduced. Having arrived at this stage, the following section sets the scene for the study by exploring the history of UK higher education.

## UK HIGHER EDUCATION HISTORY

This section begins by exploring the UK higher education system prior to the 1980s. It then goes on to illustrate the impact of the introduction of market forces from the 1980s. In addition, the section discusses the various strategies that the government introduced to get a fundamental understanding of the types of pressures UK higher education is facing. The chapter then goes on to discuss how these macro influences are directly impacting UK higher education institutions at a micro level, which leads to an account of the current situation of UK higher education.

Cornford and Pollock (2003) unequivocally state that the *'university is in crisis'*. Readings (1996) has further described the university as a *'ruined institution'*. What these extreme views demonstrate is the sentiment towards the changes that higher education is currently experiencing. Although these views come across as being radical, it is transparent that UK higher education is currently in a period of transition. One common underlying theme that contributes to the changing university is information technology (IT). However, information technology is not the sole contributor to these changes. Government policy and social changes have equally contributed to the current state of the university system. The British University system has to be viewed in a more holistic way. Not simply as the exchanging of information, or the convergence of students and staff within a concrete setting, but as a system of people, machines and objects that work together to make the institution what it is. In the 1980s many changes took place in UK higher education, but in order to put these changes into perspective, it is important to understand the evolution of the university. Therefore, what follows is an account of UK higher education pre 1980s.

## UK HIGHER EDUCATION PRE 1980s

It is argued by Scott (1984) that the connection between higher education, the intellectual system and modern society are relatively recent. As such, the university in an institutional form as we recognise it today is not particularly ancient. He argues that the 'liberal university' thrived from the mid-nineteenth to the mid-twentieth century. During this period the role of the university was to teach students, rather than unearth knowledge. For example, formal research was often undertaken in institutions other than universities. Scott (1984) suggests that during this era the progression of the university had three main roles. Firstly, the encouragement of cultural knowledge rather than scientific knowledge, which encouraged philistinism by underestimating scientific rigour and interest for new breakthroughs. Hence, people as opposed to ideas were placed at the centre of higher education. Secondly, traditional professions were replicated and characterised by customary, rather than technological requirements. For instance, evolving professions were often excluded from higher education's first division, if these professions lacked social influence. Thirdly, the creation of cultural capital led to the legitimisation of political and administrative elites.

During the thirty years after the end of World War II, the 'modern university' developed. Despite the fact that the origins of modern university could be placed in the nineteenth century and particularly in the emergence of the natural sciences, the development of the modern university was at its pinnacle during the Robbins expansion and diversification of university systems. The development of natural sciences became as fundamental to the modern university as philosophy and history had been to the liberal university. According to Scott (1984), the rapid expansion in the theoretical foundations of the natural sciences have had a destabilising effect, in the sense that it will be impossible to frame natural sciences within a fundamentally cultural classification of the intellectual tradition. Furthermore, he argues that the modern university's links with technology and industrial society endangered the traditional university's ideology of knowledge and a privileged social order. Moreover, priority was placed on the discovery and codification of theoretical knowledge, as opposed to the intellectual needs of the students.

The main difference between the liberal university and the modern university is the modern university placed importance on academicism as a method for intellectual questions, whereas the liberal university could be characterised by its emphasis on humanism and social privilege. The outcome of this change was twofold, firstly, intellectual culture was fragmented and secondly, the community of academics became more diverse in their values. As such, the university became more of a shared bureaucratic environment. These micro changes were a direct result of macro events. For instance, the functional values of industrial society, which had been slowly fusing into the university for over a century steamed in after 1945. This was in part by the influx of student numbers, which meant that it was unrealistic to assume that the majority of graduates would take up elite positions once classified. It was also partly due to the integration of technology (Colleges of Advanced Technology, CAT) within the wide university tradition. During the 1960s, traditions of the university had to become flexible to give importance to the service values of the post-war welfare state and their intellectual and vocational preoccupations. In the 1970s, growth in student numbers was most evident in polytechnics and colleges, during this period over sixty colleges of higher education were formed (Scott, 1984).

Kogan and Hanney (2000) summarise the changes from World War II as follows:

- 1945-1963- a period of growth in demand and provision, but essentially continuing a pattern in which research-led universities were divided from non-university and teacher training institutions, all within a highly selective system. The non-university sector itself other than teacher training was somewhat undifferentiated. They included technical and further education colleges, which offered courses of advanced studying at the same time as they offered craft and technician training.
- 1963-until 1981- a period beginning with the legitimisation of expansion, but under roughly continuing conditions, by the Robbins Report (1967). During this time the non-university sector grew in parallel with the universities and a public sector of higher education was formally defined with the creation of 30 polytechnics. Numbers continued to rise but the participation rates levelled off and there was increasing financial stringency following the oil crisis in 1973.

## POST 1980s: THE INTRODUCTION OF MARKET FORCES

The 1980s signified a period of enormous change for UK higher education. This was partly to do with the ideology of the government at that time with its emphasis on introducing market forces wherever possible into the public sector. Williams (1991) states:

> *"There is no doubt that the higher education of the 1990s is much more consumer orientated than the 1970s."* He goes on to say: *"British Higher Educational Institutions are now operating largely as market orientated service enterprises."*
>
> (Pp. 25 and 26)

Although market forces may not necessarily be damaging, it is important to be aware that changes taking place in UK higher education since the 1980s may have significant consequences on the nature of academic institutions.

### Increase and Widen Access

At the beginning of the 1980s there was concern that some universities may have to close due to a lack of students, but government policy to increase and widen access led to large numbers of 18-30 year olds entering UK higher education. For instance, full-time home student numbers rose from 470,000 in 1979 to 560,000 in 1988 (Williams, 1991). Government reform to increase and widen access resulted in a growth in student numbers by 40 percent and this number is set to increase to 50 percent by 2010 (DfES, 2003). The number of students in full-time higher education currently stands at approximately 406,000, up by 12,000 in 2003/2004 (http://www.Ucas.co.uk, 2005).

This signifies a transition from an elite system where in 1962 approximately 6 percent of the UK population under 21 participated in higher education, to a mass system today where 43 percent of the population aged between 18 and 30 go to university (DfES, 2003). The current percentage of 18-30 year olds of the UK population in higher education is still 43 percent where it has remained for the last 3 years. The

Higher Education Policy Institute (HEPI) suggests that university participation by 18-30 year olds in the UK is likely to remain below the government target of 50% by 2010 (http://www.bbc.co.uk, 2005b). HEPI are forecasting that changes in a-levels and the gender gap evident in schools are major factors that will contribute towards student participation in UK higher education failing to meet the 50 percent target.

Williams (1991) argues that the transition from elite to mass higher education requires a reshaping of the system, with emphasis placed on increased access. Nevertheless, increased access may be accompanied by a dismantling of the structures needed to give effective support for that role. The expansion is aimed at meeting the demands of employers and the needs of the economy and students. The argument for increased and wider access was proposed in view of the declining numbers of 18 year olds entering into this sector, and to make these institutions accessible to people from a more diverse background. Growth has become a central aim of universities and the financial incentives attached to growth are becoming more transparent.

Moreover, with university income tied directly to student numbers, students are being actively recruited rather than passively selected. Widening access has meant that a more diverse body of students is being targeted. This is leading to different demands, such as part-time study, or e-delivery types of study. Government policy towards widening access in UK universities has meant that e-mediated learning technology may have the potential of meeting these needs. Therefore, it is envisioned that e-mediated learning technology can offer heterogeneous social groups the opportunity to easily engage in life-long learning. This is because new forms of higher education maybe more suited to the needs of non-traditional students.

**Decreased Funding**

Despite government policy to increase student numbers, the initiative has not been matched by a rise in government funding. This has led to a decrease in the level of resources per student. The restriction of public expenditure (a 20 percent cut in 1981) has been a major factor underpinning the changes in higher education (Williams, 1991). These cuts were the largest reductions in income ever forced on UK higher education. Albeit these cuts the numbers of students entering into full-time higher education has continued to increase since the 1980s. As such, higher education institutions have been searching for efficiency gains. Many higher education institutions view e-mediated learning systems as a solution to achieving these gains. This is because the technology allows lecturers, administrators and researchers to reach a large and diverse body of students, such as mature and overseas students in a cost-effective way. Nevertheless, research has shown that there is limited evidence of significant cost savings associated with the introduction of e-mediated learning technology in higher education (HEFCE 1999; Gladieux and Swail 1999; Bjarnason *et al* 2000). Students and teaching staff are also at the receiving end. Student to staff ratios have fallen from just over 1:10 in 1983 to 1:18 in 1999. This results in students having less face-to-face contact with academic staff and as a consequence, academic staff having to deal with large class sizes (Evidence in Independent Review of Higher Education Pay and Conditions, 1999).

**Increasing Accountability**

Expansion has brought about its own set of stresses for universities, one of which is the call for more accountability for public funds by the state. This has led to the development of the research assessment exercise (RAE) and the quality assurance assessment (QAA) to systematically evaluate research and teaching. The RAE was introduced in the UK in 1986 as a means of selectively funding research according to defined quality standards. The RAE directly determines the amount of funding the university receives and the best research performers are rewarded with appropriate incentives. Therefore, academics are under significant pressure to research in order to secure funding. As universities are under pressure to obtain funding for research activities in order to attract extra funding, tension exists between research and teaching activities. As a result, promotion for academics is based largely on research excellence rather than teaching ability.

Furthermore, members of teaching staff are being actively encouraged to join the Institute for Teaching and Learning as the growing professionalisation of university teaching represents a response to the demands for accountability. Internationally, universities are seeking to compete for non-EU high fee students and an international labour market. Universities are also in a much more competitive environment, competing for international research grants and contracts such as those from the European Commission. The connection between the objectives of the RAE and the adoption of e-mediated learning is quite important. This is because the technology is often seen as a way of shifting the routine work of academic members of staff onto the technology. Thus, freeing up staff time for interaction with students and research work in order to meet RAE objectives. This key issue will be discussed further in chapter 5.

**Tuition Fees**

The introduction of tuition fees means that from 2006 each university in the UK will have the ability to set its own fees of up to £3000. As a result this has made the relationship between the university and the student far more consumer like and direct. This relationship is set to intensify from 2006. This may be driving students to expect more efficiency within the university system as a whole. The relationship between the student and the university has transgressed over a period of time, from one where the student was simply a passive receiver of information to one where Silver and Silver (1997) have termed 'customer' or 'consumers' of higher education. Increased student expectations, due to tuition fees are prompting a move to a more service based culture. Parallels are beginning to emerge with a culture of expectation that is typical of the American higher education system since the 1970s, which began to emerge in the UK from the late 1990s. This heightened culture of expectation is a critical issue that will be discussed in detail in chapter 6.

The literature has demonstrated that a number of changes in UK higher education have consequently led to a number of challenges that may affect the adoption of e-mediated learning in UK higher education. Yet, on the other hand, the development of e-mediated learning technology is seen as a solution to some of the external changes that are affecting higher education. For instance, the development of e-mediated learning technology is often seen as a way of shifting the routine work onto the technology, which will theoretically leave academic staff with more time to research.

## CONCLUSION

The chapter opened with an account of the various definitions of e-mediated learning. As there is no universal definition of e-mediated learning, various terms were presented to explain how the definitions are used interchangeably, and to highlight the contemporary nature of this subject area. The review then outlined how these technologies are being utilised and presented some of the issues of introducing these technologies in order to set the scene for this exploration.

The chapter then explained the project rationale of the thesis. In doing so six central agencies involved with e-mediated learning initiatives from the public and private sector were identified. A critical distinction was highlighted in the motivations for corporate sector organisations to implement e-mediated learning versus higher education institutions. Namely training versus education, and because higher education institutions operate simultaneously in a public and private arena, there are significant barriers this sector faces, for instance bureaucratic management practices. The chapter then went on to explore the macro factors driving the implementation of e-mediated learning technology in higher education. What became clear is that higher education institutions in the UK are being driven to implement e-mediated learning technology by both external and internal factors.

The chapter then presented a history of how learning technologies are being used for educational purposes. This review highlighted that the use of electronic technologies to aid the teaching and learning process is not a revolutionary but an evolutionary process, with many of the technologies being slow to take off. This forms a critical part of the thesis, that despite higher education institutions investing considerable resources into implementing e-mediated learning, why has technological diffusion in UK universities been a slow process? Nevertheless, what is clear is that the British higher education system is in a period of transition and traditional universities in the UK are not exempt from introducing some form of e-mediated learning. Therefore, a major issue emerges, how are academic staff from traditional campus based institutions coping with the introduction of e-mediated learning technology? This question is taken forward and addressed in the primary research. The findings from the research study are presented in chapters 5 and 6.

In order to understand why these changes are taking place and to set the context for this exploration, a holistic view of UK higher education was presented. The subsection opened by summarising the changes in the history of UK universities leading up to the 1980s. The most significant change was the transformation in the ideological assumption of the university as an institution. This was from an elitist society based on cultural knowledge to the emergence of natural sciences and the expansion and diversity of university systems, post World War II. Post 1980s, the introduction of market forces had a destabilising effect on UK higher education with the strategies introduced. The strategy for increasing and widening access for students resulted in UK higher education being accessible to a wider and diverse group of students. Yet, the increase in student numbers has not been matched by a rise in government funding. E-mediated learning technology may have the potential of meeting the needs of the diverse social groups that are currently in higher education. Nevertheless, research carried out demonstrates that there is limited evidence of significant cost savings associated with the introduction of e-mediated learning technology in UK higher education.

Having introduced the subject of the thesis, discussed the project rationale of the study and set the scene for the research, the following chapter reviews the relevant theoretical debates that directly inform the research questions to be addressed.

# CHAPTER 2-LITERATURE REVIEW

## INTRODUCTION

The previous chapter introduced the reader to the topic of investigation by justifying the project rationale, and through setting the scene of the study. Advocates of e-mediated learning technology suggest that the technology has the potential to address the changes currently taking place in higher education, whilst facilitating the process by which teaching and learning is delivered (Shimabukaro, 2005; Jones, 2005: O'Neill, Singh and O'Donoghue, 2004; Bartley and Golek, 2004; Harley, Henke and Maher, 2004; Twigg, 2003; Omewenga, 2002; Liber, Holyfield, Richardson and Smart, 2002; Katz, 2001; Moore, 2000; Davies, 1998; Drucker, 1997; Albury, 1996; Massy and Zemsky, 1995; Noam, 1995). To a certain extent, this helps us to understand why a significant number of higher education institutions are implementing the technology. Yet, this view appears rather incomplete and does not help to answer the following paradox: If e-mediated learning technology provides a solution to the changes taking place in higher education, then why has the diffusion of this technology been a slow process in UK universities?

The intention of this chapter is to discuss the key debates on the implementation of e-mediated learning technology in higher education, and to discuss relevant theories and concepts in the general literature on the diffusion of innovations, and expert systems. Discussing these theories helps to inform the empirical investigation [research question and methodology adopted in this study]. The chapter is set out in three sections as follows: The first section presents the key debates around the implementation of e-mediated learning technology in higher education. Earlier research is reviewed which sets the context for the study and discusses the arguments in favour of the implementation of e-mediated learning technology. The chapter then goes on to discuss the issues arising as a result of this implementation of this technology, at both an organisational and social level. From this new research on e-mediated learning technology in higher education can be taken forward.

The second section discusses the first theoretical framework [Rogers, 1995 diffusion of innovations] guiding this study. The diffusion of innovations literature broadly indicates that individuals or social units adopt innovations at different periods of time, and the decision to adopt the innovation is largely determined by a number of factors. These include the way that the individual or social unit perceives the benefits of the innovation, the way the innovation is marketed and communicated to the individual or social unit, and individual personality traits. Consequently, these factors can influence the adoption and diffusion process of an innovation.

The third section outlines the second conceptual framework also guiding this study. Giddens (1996) sociological concepts of expert systems and time-space distanciation provides an intrinsic set of concepts that help to explain how through a process of time-space distanciation, expert systems have the potential to change social relations. This literature provides a much richer series of concepts than can be found in the diffusion of innovations literature, which improves our understanding of diffusion of e-mediated learning technology in UK higher education. The chapter concludes by summarising the theories and concepts discussed, and presents the identified research questions that emerged from the literature review to be addressed in this study.

## E-MEDIATED LEARNING TECHNOLOGY IN HIGHER EDUCATION: KEY DEBATES

### E-Mediated Learning Technology in Higher Education: The Catalysts

#### *Meeting the Changing Demands*

According to Goddard (1998), the demand for higher education is increasing at a significant rate throughout the world, and by 2025, approximately 150 million people will pursue higher education. Katz (2001) notes that this increase in demand is a result of the changing culture of employment, where a job for life is no longer guaranteed. This is in addition to the emergence of the so-called knowledge society. Davies (1998) comments that employers are demanding higher levels of skills and qualifications then ever before. The drive to implement e-mediated learning technology in the UK higher education sector can be partly attributed to the technology acting as a tool to satisfying this growing demand. Other catalysts for this change consist of a synthesis of factors. These include continuous external pressures, the attractive prospect of improvements in flexibility of teaching and learning, increased opportunities for lifelong learning, widening access to a diverse study body, the scope for cost-efficiency and participation in the global knowledge economy. Littlejohn and Higgison (2003) add:

> *"E-learning is seen as offering solutions to several challenges currently facing HE... the move towards lifelong learning... and the drive to widening participation."*
>
> (Pg. 8)

O'Neill, Singh and O'Donoghue (2004) comment that as the government acknowledge the beneficial influence on the growth and sustainability of modern economies, higher education will be required to accommodate a more diverse student body. O'Neill *et al* (2004) suggest that in particular, e-mediated learning will meet the demands of the exponential growth in the mature student market. A report by the National Committee of Enquiry into Higher Education (2001) highlighted that in 2001 over 50 percent of students in higher education could be classified as mature (aged over 21). O'Neill *et al* (2004) foresee that numbers of mature students in higher education is set to further increase as online learning and virtual universities enable education to be customised to the needs of individuals or groups of individuals. They further maintain that it is not just the mature student group that can benefit from e-mediated learning. In addition, the technology can also serve to facilitate the educational experience for a heterogeneous group of students, including those from remote locations, those with family commitments and those with disabilities.

Technological progression was also seen as a catalyst towards the introduction of e-mediated learning technology in higher education. In 1997, the Dearing Report declared that information technology would drive improvements in UK higher education. A key vision of the report was the emergence of increasingly active partnerships between academia and industry and expansion in global markets. More recently, the government allocated over £41 million in capital funds to HEFCE for the development of a national e-learning strategy (http://www.dfes.co.uk/elearningstrategy 2005). The details of this strategy were described in chapter 1. Souleles (2004) suggests that an outcome of the Dearing

Report is the proliferation of virtual learning environments with numerous higher education institutions implementing some form of e-mediated learning technology. The literature predicts that e-mediated learning can meet the increasing problems in higher education, but to what extent can the issue of meeting the changing demands in higher education through the implementation of e-mediated learning technology provide a panacea for the change process? For instance, Cooper (1999) contests the view that e-mediated learning can adequately provide life-long learning for everyone. This is because many of the students that enrol in a virtual university may have inadequate skills to learn autonomously, and consequently, Cooper (1999) argues that it is unlikely that these students will be successful in an e-mediated learning environment. Therefore, these students should have the choice of attending face-to-face foundation courses if need be. O'Neill *et al* (2004) categorically state that:

> *"The implementation of e Learning by traditional universities will not be the answer to the problem of changing demand."*
>
> (Pg. 315)

Nevertheless, O'Neill *et al* (2004) are also aware that the majority of higher education institutions can embrace the opportunities that arise from the progression of technology. Therefore, these institutions can offer students the scope to engage in the process of life-long learning, thus meeting the needs of a heterogeneous student body.

***Freedom from Time and Spatial Barriers***

Early advocates of e-mediated learning, such as Noam (1995) present the future of universities in such as way that make us think:

> *"That the end of campus-based education is fast becoming a reality."*
>
> (Pg. 247)

The vision of the university is portrayed as being free from time and spatial barriers. In this concept, the university's stakeholders can readily access all institutional resources from a distance. Another commentator predicted that universities would transform themselves into brokering organisations with no academic staff (Albury, 1996). At an extreme level, Drucker (1997) claims that universities will cease to exist:

> *"Thirty years from now the big university campuses will be relics. Universities won't survive... It took more than 200 years for the printed book to create the modern school. It won't take nearly that long for the big change... Already we are beginning to deliver more lectures and classes off campus via satellite or two-way video at a fraction of the cost... Today's buildings are hopelessly unsuited and totally unneeded."*
>
> (Pg. 122)

More recently, theorists such as Liber *et al* (2002) and Shimabukaro (2005) continue to predict that in the future, higher education will break free from the constraints of the campus. Liber *et al* (2002) argue that e-mediated learning will transform the landscape of higher education and that change will become inevitable if universities are to remain viable. This optimistic view is further supported by Shimabukaro (2005) who states that:

> *"A critical outcome of computers and the Internet is the removal of time and space barriers to learning. We are beginning to realise that location is an arbitrary barrier and that education can be far more dynamic when liberated from the walls and gates of educational institutes and allowed to flourish in real-world environments."*
>
> (Pg. 1)

Shimabukaro (2005) argues that as human beings we continuously strive to rid ourselves from the constraints imposed by older technology. This is because as more choices are offered to us, we have a greater sense of freedom. Thus, as a natural part of progression we will get rid of the old and embrace the new. Shimabukaro (2005) provides an example of the progression of technology to illustrate his argument. He suggests that the desire for freedom stimulate the development of innovative technologies. Subsequently, these technologies lead to the freedom of choice. For instance, the remote control allows individuals to access numerous television channels, and shopping malls give consumers the choice to shop in a number of different outlets. In addition, the creation of computers have led to the development of the Internet, which has enabled instant interaction with other individuals and access to information at a global level.

Shimabukaro (2005) believes that campus based universities will be tolerable so long as no other technology can replace this traditional model. He acknowledges that traditional campus based institutions with their campuses, classrooms and rigid timetable of classes is a form of technology that has facilitated the efficient education of large numbers of students. He draws parallels with this traditional campus model against Fordist models of production:

> *" It is based on the factory model, which places raw materials (students) on conveyer belts (universities) and passes them through assembly lines (classes) in which workers (teachers) add their part (knowledge). When all the pieces are bolted and welded together, we have the finished products (graduates). "*
>
> (Shimabukaro, 2005, Pg. 2)

In his opinion, Shimabukaro (2005) predicts that multiple alternatives to traditional campus models of education will soon become available. These alternative models will offer flexible timetabling and virtual learning opportunities and transcend time and spatial barriers, rendering traditional campus based models obsolete. In his radical view, Shimabukaro (2005) foresees:

> *"That day is now dawning, we are on the brink of a new era. I predict that in the foreseeable future we will look back to the year 2005 and wonder how learning could have ever taken place in the jail cells that passed for classrooms. Universities in the coming decades will be characterised by a new sense of freedom that will make today's campuses seem like medieval dungeons. "*
>
> (Pg. 2)

As a direct result of this freedom from time and spatial barriers, Shimabukaro (2005) believes that academic staff and students will become empowered to *'redefine the* *contexts for teaching and learning'*. This process of empowerment will be led by lecturers and students, motivating them to break out the traditional classroom model. He predicts that the new classroom will be radically different from the old, because as *'free learning environments'* new classrooms will be characterised by function, purpose and membership instead of temporal, physical or geographical boundaries. The functionality offered by broadband will allow diverse multimedia options. Therefore, lectures will be defined by *'live meetings with audio-video feeds'* involving all participants from diverse locations. This freedom will enable participants of the teaching and learning experience to transcend time and spatial barriers. In Shimabukaro's (2005) opinion, lecturers and students will partake in this learning experience from diverse locations such as shopping centres and whilst on holiday at their own chosen time.

In his vision of the future, Shimabukaro (2005) foresees the vast majority of traditional campus based universities demolished and replaced with community, recreational and educational centres. Such educational centres will consist of a melting pot of electronic zones and community complexes that seek to combine shopping, entertainment, dining and educational facilities. These public-private sector partnerships will aim to turn shopping complexes into centres for life-long learning. Adding to his revolutionary vision, Shimabukaro (2005) claims that the distinction between educational levels (elementary, secondary, university) will become increasingly blurred and characterised into flexible categories such as interest and social needs, rather than age or ability.

He adds that the traditional role of an academic member of staff will expand to accommodate the predicted shift towards innovative learning environments. As well as providing subject specific expertise, academic members of staff will take on the additional role of a learning advisor. In such a capacity, the academic member of staff will be skilled in working with students to identify the learning styles of the student and goals that are suited to their individual needs. These academic staff members will be highly skilled in using innovative technologies in a dynamic way to present information via the Internet. Furthermore, the traditional textbook will be replaced by broadband and multimedia sources. In his view, Shimabukaro (2005) sees traditional education as transforming into an enterprise. Of course, as revolutionary as this view may appear in this first instance, the University of Hawaii in the USA is partly materialising this innovative vision. According to Creamer (2004) the community will include:

> *"A new café, a 24-hour computer lab, a study centre, a town square, a park with barbecue grills, a local shop, a central post office, a sustainable garden, a tea house, a fitness centre. Also in the plans are a 24 hour library with multiple services including wireless computing, seating, conversation nooks, and dining outlets."*
>
> (Pg. 3)

It would be interesting to follow the implementation process of this vision to see the extent of this development. This is because even for those universities that are renowned for being pioneers in the e-mediated learning concept such as the Open University in the UK, the Open University continues to operate from an extensive campus in Milton Keynes. This is for their staff, researchers and postgraduate students. In addition, the Open University makes considerable use of other universities resources for its summer schools. This example highlights how the campus continues to play a dominant role in UK University education, despite advocates of the technology suggesting otherwise. In addition, the futile outcome of the major UK government initiative 'UK eU' as highlighted in chapter 1, (Lambert, 2002) which was supposed to deliver world-class university education via e-mediated learning provides further support that the extinction of campus based education has yet to be translated into reality.

To conclude this sub-section, Shimabukaro (2005) provides a useful quote to sum up the claims that campus based education will become free from time and spatial barriers:

> *"One of the signals that we should hear loud and clear is that the world is changing very rapidly and yet we are still bogged down in a tired and broken system that is becoming increasingly alienated from the rest of the world."*
>
> (Pg. 4)

***Time Savings***

As discussed in chapter 1, it is often claimed that e-mediated learning technologies can offer time saving benefits. To reiterate the quote in chapter 1, Laurillard (2001) writing with regard to the Open University claims that faculty staff can make great time savings by adopting such technologies:

> *"Some of our calculations have shown that changing just 20% of the course material to ICT materials increases academic staff time by 40% and more than doubles production staff time."*
>
> (Pg. 6)

In support of Laurillard (2001), an earlier study carried out by Massy and Zemsky (1995) found that the strategic use of e-mediated learning technologies could result in time savings for academic staff. Their study explored how information technology had the potential to increase academic productivity. Massy and Zemsky (1995) used a hypothetical case to detail how the substitution of technology for human capital leads to time savings for academic staff. In their research they argue that the traditional method of teaching an undergraduate micro-economics course consisting of 228 students and 3 academic members of staff meeting twice a week requires 180 hours of contact time during the academic term. In addition to the contact hours, academic staff spent in the region of 20 hours each on course related duties. They also spend an additional 30 hours each course preparation before term, 38 hours each on marking, and 4 hours each week on office hours.

In contrast, Massy and Zemsky (1995) claim that by substituting academic staff contact with information technology, significant time can be saved. In the first instance, they suggest replacing the standard 30 one-hour lecturers per term with 7 two-hour lab based sessions. In their view, students will be required to learn independently with academic staff providing a 1 hour lab session each week assisting those students who are experiencing difficulties. This is in addition to academic staff providing support via email and office hours. Massy and Zemsky (1995) argue that using information technology relives the repetitive labour tasks of preparing lectures. They suggest that using courseware allows academic staff to cumulatively improve lecture material, *'faculty do not have to reinvent the wheel for each weeks lectures.'*

This results in a reduction of these weekly tasks from 4 to 2.5 hours per week and a reduction in office hours from 4 to 2 hours per week.

More recently, Moore (2000); Twigg (2003); Bartley and Golek (2004) and Harley, Henke and Maher (2004) further support that time savings are a significant benefit to be derived when implementing e-mediated learning technology. Moore (2000) found that the time taken to teach a course online compared with teaching the course in a classroom based environment is significantly reduced. The empirical study found that online lecturers experienced a reduced workload equating to 2.7 hours per student. This was in comparison to 3.2 hours per student in a traditional classroom setting.

Twigg (2003) carried out an empirical investigation in ten higher education institutions in the USA that were implementing e-mediated learning technology as a means for redesigning their instructional approach. Her study found that all ten institutions studied were able to reduce academic time spent on work tasks in the following ways. Firstly, through the adoption of an online course management system such as WebCT, the amount of time academic staff spent on non-academic tasks such as recording, calculating and storing marks was reduced. This is in addition to a reduction in the amount of time spent on photocopying course materials, and informing students of any course changes. Secondly, the results showed that five of the ten institutions utilised online automated assessment tools. In these five institutions, academic staff noticed a reduction in the amount of time spent on preparing quizzes, marking, recording and posting the results. Finally, in one of the institutions that were studied, the academic staff members recycled and shared their resources with other academic staff. Assignments, quizzes, exams and other course materials were made available on a community website, and the study found that a significant amount of instructional time was saved in developing, revising and duplicating course materials.

Bartley and Golek (2004) suggest that the one of the benefits of online learning is that it has great time saving benefits for both students and academic staff. They argue that participating in online learning reduces the need to travel to campus based environments. Harley *et al* (2004) further support the time savings argument. They carried out a 2-year study at the University of California on an introductory course in chemistry. The empirical research set out to explore whether the utilisation of e-mediated learning technologies resulted in significant time savings for academic staff members. Harley *et al* (2004) found that after e-mediated learning technology was implemented, academic staff spent less time preparing course materials and answering routine questions.

> *"More than 60% of the students reported that a least some of the time they went to the Website rather than to the teaching staff (during office hours) to get answers to their questions."*
>
> (Harley *et al,* 2004, Pg. 2)

The study also found that teaching assistants spent less time on administrative duties. This was because the online method of assessment enabled automatic marking, as such less time was spent on marking. Harley *et al* (2004) suggest that the re-use and sharing of teaching materials by academic staff offers the potential for saving time. However, they caution that customising the shared or re-cycled materials to individual courses may require a significant amount of time. Nevertheless, they suggest that by replacing some face-to-face lectures with video web casts would free academic staff to reallocate their time for other purposes.

However, O'Neill, Singh and O'Donoghue (2004) and Grewal (2004; 2003) point towards mixed findings. They argue that empirical research into time savings when adopting e-mediated learning technology is contradictory. For instance, O'Neill *et al* (2004) discuss empirical research where lecturers needed nearly twice as much time to teach an online course compared to a traditional face-to-face course. Grewal (2004; 2003) found that the work task of the academic member of staff was not reduced but restructured. This does not equate to time savings. Indeed, it might help to explain this contradiction in terms of differences between the studies. These include the type of e-mediated learning technology adopted, the subject, students, educational background and the countries where the empirical research was carried out. For instance, most of the research which argues that e-mediated learning technology can reduce academic staff time originates from North America. Whereas, contradictory studies have emerged from the UK.

***Cost Savings***

Cost savings have often been cited as a major incentive driving higher education institutions to implement e-mediated learning technology (Massy and Zemsky, 1995; Omewenga, (2002); Williams, 2003; Twigg, 2003; Bartley and Golek, 2004; Harley, Henke and Maher, 2004; Shimabukaro, 2005; and Jones, 2005). Just over a decade ago, Massy and Zemsky (1995) recognised the potential that e-mediated learning technologies had to reduce costs, because information technology can offer economies of scale. They comment that the technology offers scalability, since after an initial investment in the technology, the cost of usage per student gradually decreases because course content can be delivered with consistency. This allows information to be disseminated quickly across the course, with real time updates and access to information:

> *"This allows large number of students to be accommodated at a lower cost."*
>
> (Massy and Zemsky, 1995, Pg. 6)

More recently, a study carried out by Omewenga (2002) into e-mediated learning systems in higher education revealed that the technology provided a pedagogically sound mode of instruction that was logistically feasible. Moreover, advanced and introductory students were enthusiastic about using the technology. The study consisted of gathering student responses of using the e-mediated learning system, through input from a self-learning subsystem within the e-mediated learning system. This system captured data from cookies and learner variables such as the pace of learning, duration of continuous use, post test scores and static variables such as learner entry behaviour. Williams (2003) also comments on the cost savings benefits of e-mediated learning technology by making reference to the UKeU project. Williams (2003) states that:

> *"E-Learning was seen as an opportunity to cut costs by automating a recognised process (learning), cutting out the middlemen (lecturers and administrative staff), reducing inventory (books) and minimising real estate (classrooms)."*
>
> (Pg. 1)

In 2003, Twigg carried out a study titled 'Improving Learning and Reducing Costs' in ten higher education institutions in the USA. Some of the findings of the study were discussed in the previous sub-section. The study found that seven of the ten institutions studied, managed to maintain student numbers whilst reducing the instructional resources set-aside for the courses. One of the institutions, which reported cost savings, attributed this reduction in costs to an increase in the number of modules an academic member of staff could teach. This one member of staff traditionally taught on one module but was able to teach on four modules as a result of the technology, and the help of a teaching assistant. Twigg (2003) argues that major costs savings can be achieved by:

> *"Reducing personnel, reducing the time faculty and other instructional personnel spend and transferring some tasks to technology-assisted activities."*
>
> (Pg. 4)

Her study found that adopting online content management systems, recycling, sharing course content and resources and reducing space requirements resulted in cost savings for the institutions studied. In addition, Twigg (2003) found that two of the institutions studied which substituted academic staff for undergraduate learning assistants in lieu of graduate teaching assistants was a key cost saving tool. She argues that by replacing *expensive labour* (faculty and graduate students) with relatively *inexpensive labour* (undergraduate learning assistants) the contact hours devoted to the course were increased whilst cutting costs. For instance, she describes how one of the institutions employed a course assistant to answer non-math related queries (these made up 90 percent of all interactions with students) and to track student progress. Subsequently, this allowed the lecturer to take on larger student numbers, and to focus on academic as opposed to logistical interactions with students.

In another institution, undergraduate learning assistants were used to mark assignments and assist with lab sessions. This relieved graduate teaching assistants of this task, whilst cutting the number of graduate teaching assistants required for the course. Twigg (2003) quotes that on average, these institutions reduced costs by 33 percent, this equated to an aggregate saving of $1,006,506 for ten courses. Bartley and Golek (2004) go on to note that e-mediated learning removes the need to travel and this can result in significant costs savings for both students and faculty staff.

Harley *et al* (2004) in their 2-year study on the implementation of e-mediated learning technology on 2 undergraduate chemistry courses at the University of California, Berkley, found that overall cost savings could be achieved by adopting this technology. The empirical research found that in the first year of adopting the technology, the costs per student increased by 1.7 percent more than the traditional course. However, in year 2 the costs decreased by 7.8 percent less per student than the traditional course. Harley *et al* (2004) predict that the development costs for teaching and learning materials, such as websites, lecture slides and online quizzes will decrease in the future if academic staff recycled or shared existing course material with other academic staff. In addition, Shimabukaro (2005) in his radical vision of the future of higher education argues that cost savings will be a major factor leading to the end of campus based education, as we know it today. He comments that cost savings can be made by transferring the huge sums of capital spent on building and maintaining campuses, and collaborating with private sector organisations to supply educational facilities. He states:

> *"Theoretically, an entire university could be reduced to an administration office and a computer room. All business and communication with students and faculty could be managed electronically or via mail. A large portion of the costs associated with support staff, classrooms, labs, libraries, car parks, cafeterias, auxiliary services, maintenance, faculty offices and the like would be eliminated. Multipurpose meeting rooms in the community could be shared among educational institutions and the costs for renting and maintaining them could be shared by the government, city and nearby businesses. The point is that in this scenario education becomes a community rather than a university effort, one that is relevant to all members of the population, not just university students. We also begin to think of learning as an anywhere anytime activity and a lifelong experience."*
>
> (Shimabukaro, 2005, Pg. 4)

Jones (2005) also acknowledges that universities adopting e-mediated learning technologies can make cost savings. She suggests that greater accessibility and anytime, anywhere access provides flexibility to universities. This flexibility enables universities to further develop the use of this technology to carry out university activities at the same time as passing over significant cost savings and productivity benefits to both lecturers and students.

Whilst the literature suggests that cost savings can be achieved by adopting this technology. It would appear that other expenses offset several of these cost savings. For instance, it is argued that e-mediated learning technology provides scalability. However, in order for the technology to work optimally, the system will require continual updating, maintenance, and adequate staff training, notwithstanding significant change at an organisational and cultural level. O'Neill *et al* (2004) point out that:

> *"It seems appropriate to assume that not all students respond well to an e learning environment."*
>
> (Pg. 317)

In a similar vein, Williams (2003) comments that expectations of e-mediated learning are mismanaged. He uses an example of the unsuccessful UKeU project to demonstrate his point. Williams (2003) suggests that a significant driving force behind e-mediated learning technology was commercial. However, the course providers were largely focused on cost-cutting aspects of e-mediated learning that they failed to invest in the technology and content design. Moreover, the over enterprising predictions are largely based on the assumption that campus based undergraduate students and academic staff want to, and are willing to partake in this type of teaching and learning process.

To summarise this sub-section, the literature suggests that the number of higher education institutions implementing some form of e-mediated learning technology indicates that these institutions may envision e-mediated learning as a seamless solution to the demanding economic, social and globalisation problems that they are facing. However, to complicate matters even further, there are often a number of different motivations and conflicting views as to the extent to which e-mediated learning technology can meet the demands of higher education. Therefore, it is still too early to outline the efficiency of e-mediated learning technology. Furthermore, the implementation and integration of an e-mediated learning platform is a complex process that is largely dependent upon the social and organisational environment in which it exists. Yet, the lack of literature addressing these issues outlines that this is an area that is often overlooked. This is with the exception of Agre (2000), Cornford and Pollock (2003) and Goddard, Webster, Robbins and Charles (1999) who have taken a deeper look at the issues surrounding the implementation process of e-mediated learning technology. The work of these writers is critical as it directly informs the focus of the thesis and is subsequently presented.

## Implementing E-Mediated Learning In Higher Education: The Issues

The literature within this field is limited in the sense that it places emphasis on the advantages and disadvantages of information and communications technology (ICT) in a university setting or online versus offline issues. Recent research centres on the importance of new managerial approaches and the need for organisational and cultural change (Souleles, 2004; Kenny, 2002; Uys, 2002). Similarly, Uys (2002) argues that there has been a clear and constant request from leading writers on management and organisational change that the functions of management are to be practised in an entirely radical way. This is in the context of the emerging global information and knowledge society. Laurillard (2002) suggests that pressures for change and the rapid implementation of e-mediated learning technologies have delayed research into theory and practice of online learning.

However, little is written about the social and organisational dynamics that influence the diffusion process of e-mediated learning technologies in higher education. This is with the exception of Agre (2000); Cornford and Pollock (2003) and Goddard *et al* (1999). Agre (2000) argues that ICT brings forward incentives to standardise the university, but at the same time maintains that the extent to which ICT can be standardised within a university environment is debatable. Cornford and Pollock (2003) claim that the theory of the virtual university does not work in practice. This is because the university becomes so bound up by standards and procedures that it takes on characteristics that are synonymous with a concrete university. Goddard *et al's* (1999) study shows that introducing e-mediated learning technology into existing teaching methods are extremely problematic. The work of these writers is critical as it directly addresses some of the issues that inform the focus of the thesis. These issues will be revisited in detail further on.

***Campus Based Universities: The End?***

The dotcom boom led advocates of computing technology to make over-ambitious claims. Comparable to these claims made during the dotcom era, within higher education Drucker (1997) predicted the imminent demise of campus based universities, in favour of e-mediated learning made imaginable by advances in technology. Akin to the dotcom era, in hindsight it becomes clear that like the claims made that the Internet would revolutionise the business world rendering existing business practices obsolete, radical change in higher education has yet to occur. Budd (2004) further suggests:

> *"The rhetoric of the transformative power of ICT is powerful but has to be read in a wider firm, industry and organisational context."*
>
> (Budd, 2004, Pg. 19)

In a similar vein, a study carried out by Bjarnason, Davies, Farrington, Fielden, Garrett, Lund, Middlehurst, and Schofield for the Committee for Vice Chancellors and Principles (CVCP) in 2000 highlights:

> *"We do not believe that borderless developments of themselves will bring about (for good or ill) the more radical predictions about the collapse of the university system. Rather, although existing institutions will engage in extensive innovation in relation to a range of new forms of delivery, most developments in the borderless domain are likely to be focused on the priorities of enhancing access, lifelong learning and so on."*
>
> (Pg.33)

Hara and Kling (2000) further support this argument by maintaining:

> *"It is unlikely that there will be an absolute transformation of the university. Its core roles and functions cannot simply be shifted online overnight, physical places like campuses are increasingly relevant and there is little evidence to suggest that learners find fully online courses or electronic resources fully appropriate to their needs."*
>
> (Pg. 547)

In a more recent study, Garrett (2004) analyses the issues leading to the demise of the United Kingdom e-University project (UKeU). The UKeU project was a consortium of 20 UK universities and private sector organisations, which offered online degrees. The project was backed by £62 million of UK government funding, and was touted as an innovative response to the perceived opportunities and threats of online higher education. However, four years after its launch in 2000, and despite an investment of considerable resources and a lengthy development period, the project failed to meet recruiting targets. Recruitment figures stood at 900 students in 2003 against a target of 5,600. Consequently, the project ceased in February 2004. Garrett (2004) comments:

> *"The dot-com boom presented online delivery as an alternative to the conventional campus rather than as a supplement, as has more often turned out to be the case. UKeU's business model centred on wholly online provision, with very little evidence of a secure market. Wholly online education took off in the United States, but elsewhere growth appears to be limited. This is partly because online delivery outside the United States has yet to attain sufficient status, scale and sophistication to succeed."*
>
> (Pg. 4)

Garret (2004) suggests that online universities in the USA have been more successful than UK online universities. This is because US online universities such as the University of Phoenix focus on delivering education as a supplement, rather than an alternative for face-to-face teaching as was the case with UKeU. He suggests that UKeU's business model focused on a wholly online provision with limited evidence of a secure market. Garret (2004) further adds that the University of Phoenix was in a better position than UKeU. This was partly due to a strong alignment that existed amongst the convenience branding of the parent body (the University of Phoenix itself) and the convenience branding of online learning. Yet, convenience does not account for a critical part of the image of UK higher education at an international level, as the UK brand of higher education tends to emphasise tradition, place and quality, rather than convenience.

Noble (1998) views the virtual university as a '*digital diploma mill*', coerced by corporate greed and Winner (1998) mocks the entire process by defining the virtual university as an '*Automatic Professor Machine*'. Additionally, Mason (1999) argues that students who enrol on online courses already have some form of university education and focuses on narrow, vocationally based courses, rather than attracting new students to higher education.

> *"Although the rhetoric of virtual education is that it will extend to the disadvantaged, the remote, the housebound and the unemployed. Those who are signing up for virtual education are the advantaged, the upwardly mobile, the "over-employed" ... and the well educated"*
>
> (Mason, 1999 pg. 77)

Mason (1999) goes on to highlight a key issue regarding the underlying social divide that the technology may be creating. Amiel (2004) adds that as new technologies become accessible the pattern of adoption and diffusion creates disparities in access and ownership. His study looks at the efforts of Brazil and the USA to close this divide, through the deployment of significant resources to promote computer literacy through institutionalised education. The study shows that massive computer deployment is not the answer to the digital divide. Instead, he suggests that an approach, which focuses on technology literacy, have the potential of attacking the roof of the digital divide, leading to passive and uninformed technological acceptance.

***Paradoxical Impact of E-Mediated Learning Technologies***

In spite of the growing interest in the technology, the claims that e-mediated learning will revolutionise the existing higher education sector appear ambitious. For example, Cornford and Pollock (2003) and Brown and Duguid (1995) maintain that the notion of the virtual university overestimates the capability of e-mediated learning technology and underestimates how universities as institutions work. Similarly, Souleles (2004) states that historically evolved and determined hierarchical structures within higher education institutions cannot effectively embed new learning technologies, without major organisational change.

Bates (2000) rejects the present organisational structure of the majority of universities based on mostly historical explanations, as unsuitable to new forms of technological delivery. He adds that there are relatively few examples of earlier traditional higher education institutions that have substantially restructured and made the successful transition to the extensive use of e-mediated learning technologies. He suggests that lessons can be learnt from organisations that are achieving their objectives in the most effective and economical manner. As such, he compares and contrasts 'Fordist' and 'Post-Fordist' organisational structures. In his view, he argues that the former with its focus on hierarchical management, economies of scale, standardisation of products and high volume production are unsuitable for the knowledge-based global economy of the present day.

Hall (1996) suggests that Fordism can be viewed as a system of mass production involving the standardisation of products, large-scale use of dedicated machinery suitable only for a particular product and the 'scientific management' of labour and assembly line production. As such, Fordism was characterised by mass production and mass consumption. This model worked until the beginning of the 1970s, when Post-Fordism began to emerge. Given that Fordism was production led, Post-Fordism is consumer-led. Therefore, technology based distribution systems have allowed mass markets to be split up into specific groups. Targeting specific groups of consumers has meant that design has become a major selling point. In addition to this, new technology based on computerised systems allows flexibility, smaller plant size and a smaller multi-skilled workforce, which are capable of participating actively in the labour process. Bates (2000) adds that Post Fordist models place emphasis on ICT's, focus on tailored and customised services and decentralised employees.

Kenny (2002) suggests that implementing e-mediated learning technologies into higher education institutions is a high-risk strategy. This strategy necessitates ongoing development through the revision of plans, looser project management approaches and the action research process of the reflective practitioner at all institutional levels. In addition, Cornford and Pollock (2003) add that:

> *"Virtual institutions represent only a tiny fraction of the higher education provision with the majority of e-learning activity taking place in traditional universities."*
>
> (Pg. 25)

In support of Goddard *et al* (1999), Cornford and Pollock (2003) argue that ironically the virtual university becomes so bound up by structures and procedures that it takes on the characteristics that are evident within a concrete university.

> *"It is becoming increasingly clear that the pursuit of the virtual university is having a major, perhaps paradoxical impact on the institutional form and sense of identity of the university as it has developed in the twentieth century. Specifically the application of the new technologies is generating a myriad of demands for re-institutionalisation of the university as a far more 'corporate', one might even say concrete kind of organisation."*
>
> (Pg.2)

It appears that building the virtual university requires the construction of a structure capable of co-ordinated action with formalised roles and standardised practices. For example, at the Open University the increasing use of ICT to mark assignments is generating new demands on the university. Electronic feedback from tutors makes the comments comparable. This pressurises the university into making the marking schema and comments standardised, which formalises procedures to a far greater extent. The pressures for a more standardised and corporate kind of university are not only happening as a result of the cumulative consequences of the move to a more computer mediated institution, but are also quite consciously planned. Attempting to build the virtual university from the bottom up, course by course, without reconstructing the basic structures of the university appears to be very laborious, slow and labour intensive and highly prone to failure.

> *"Initiatives were confounded by difficulties in co-ordinating a wide range of actors across a large organisation made up of diverse and disparate entities (i.e. departments and service units). It seems that the very institution of the university is at the heart of the problem."*
>
> (Cornford and Pollock, 2003, Pg.34)

Because of their research, Cornford and Pollock (2003) unequivocally state that the theory of the virtual university does not work in practice. The study demonstrates that adequate social, organisational and technical infrastructures are required to make the virtual university a success. Cornford and Pollock (2003) add that it is the system that conceptualises the virtual university through complex databases and sets of procedures. Yet, within a traditional university setting, it is the individuals with complex identities that are at the heart of the institution, and not the system.

The research carried out by Cornford and Pollock (2003) tease out a number of key issues that have manifested as a result of higher education institutions attempt at becoming virtual. The most significant and perhaps ironic discovery is there are more procedures and policies in creating a virtual university than a traditional university. Other challenges faced are infrastructure issues, re-institutionalisation, the majority of e-mediated learning activity taking place in traditional universities and the issue of creating standards, which will be further addressed through the work of Agre (2000). Additionally, Rosenberg (2001) supports that the integration of technology is often prone to failure due to factors such as high costs and persuading staff and students of the benefits of the technology.

***Quality Assurance Exercises***

Within the UK higher education sector, additional obstacles influencing the implementation of e-mediated learning technology incorporate the dominating influence of the RAE. Assessment results directly influence the performance indicators on which institutions and departments are judged. This determines the allocation of future resources. Due to the importance being placed on quality assurance in higher education, institutions have to reassess methods of generating feedback on courses. Regular reviews from peers, external examiners and students help to safeguard quality and to meet calls for greater accountability. Moreover, evaluating excessively may take the emphasis away from providing good quality teaching to merely focusing on the area that is being assessed. The underlying objectives of the RAE were discussed in chapter 1. This means that academic members of staff are under increasing pressure to research.

***Work Organisation and Design***

A recent study commissioned by the CVCP and undertaken by Bjarnason *et al* (2000) focuses on the challenges faced by UK higher education by implementing e-mediated learning technologies. The study illustrates the main concerns about importing e-mediated learning programmes were the need for clear quality assurance arrangements to maintain standards. This is in addition to funding, development, and infrastructure costs and staffing issues, such as the ability, skills and willingness of staff to use e-mediated learning technology. The study further highlighted a certain amount of scepticism on the extent to which e-mediated learning can be introduced into existing academic structures. In many cases, the desire for change does not actually materialise. The literature outlines that problems exist in the areas of recruitment, the responsibilities of academic staff, reward systems, and staffing structures.

Again, this illustrates the importance of an adequate social and organisational infrastructure to support e-mediated learning. The higher education sector is currently placing greater emphasis on promoting and developing high quality learning and teaching, recognising the potential contribution of e-mediated learning in this area. Within higher education, there are many e-mediated learning related learning and teaching initiatives, at both institutional and national levels. Yet, no systematic picture has developed on how widely e-mediated learning materials are being developed, or how well they are being disseminated for wider use.

Souleles (2004) argues that because higher education institutions and their organisational structures are historically entrenched, there is unlikely to be a radical transformation overnight. Time will be required to determine which model of organisational change is appropriate for the successful diffusion of e-mediated learning. Nonetheless, it is still likely that a number of models will surface. This will lead to hybrid and transitional forms of management This highlights the importance of central vision, the communication of institutional policies to all stakeholders and a inclusive program of staff development and incentives.

An earlier study commissioned by the UK higher education funding body and the University for Industry (Ufi) (1999) revealed that outside the Teaching and Learning Technology Programme (TLTP) and some Computers in Teaching Initiative (CTI) centres in higher education, there is limited evidence of e-mediated learning courseware that is designed to be transferable. Academic members of staff undertake most development work for their own teaching. [Ufi is a government initiative, which works as a public-private partnership in England, Wales and Northern Ireland, to put individuals in a better position to get jobs, improve their career prospects and boost business competitiveness. Ufi's learning services are delivered through learndirect, which provides access to courses, of which 80 percent are on-line. The Universities Funding Council (UFC) launched TLTP in 1992. It is currently funded by HEFCE and the Department for Employment and Learning (DEL). The aim of the programme is to encourage the higher education sector to work collaboratively and explore how new technologies can be exploited to improve and maintain quality within teaching and learning]

In the institutions where significant e-mediated learning activity is taking place [often through the development of virtual learning environments and distance learning programmes] this is being undertaken for specific purposes and with little intention to transfer materials. The report highlights a key point in the take up rate of staff adopting this technology, with much of the activity occurring at an experimental level. The report revisits the issue of organisational and social readiness to embrace e-mediated learning. In a wide range of institutions, multiple barriers were identified. These included uncertain cost commitments, internal resource allocation strategies, a lack of a reliable and adequate infrastructure network, and a lack of technical support to deliver courseware. This was in addition to a lack of leadership and senior management support for e-mediated learning initiatives both at senior levels and

among deans or heads of departments. Other barriers identified included heavy workloads, and difficulties in the use of e-mediated learning by the large numbers of part-time staff within the sector.
Likewise, Bates (2000) states that the engagement of faculty and teaching staff is an essential factor for the successful implementation of e-mediated learning. He goes on to add that faculty development strategies appear to work at optimum levels when they are assisted by a variety of strategies. These include staff incentives, staff support and professional development. In addition, Kenny (2002) states that there is some evidence that support required for staff to adopt e-mediated learning technology can be under-estimated and under-resourced. Kaur (2002) recommends that a needs analysis is crucial to an online learning environment. Moreover, the e-mediated learning model adopted should reflect the needs of the learners, facilitators and the institution. Furthermore, student to facilitator ratio should be limited to manageable numbers.

Voigtlander (2002) argues that because teaching and learning are individual processes influenced by personal habits and different motivations to learn not all stakeholders within an organisation support the implementation of e-mediated learning. E-mediated learning requires careful and detailed planning aside from the implementation of a purely technical solution. It appears from this case that the technology adopted by the university in question was adopted as a stand-alone tool rather than making it an integral and central part of their organisation. This highlights a key point of staff resistance, which will be taken forward and addressed in the primary research.

Dutta (2002) provides a possible explanation of why there are significant differences in opinion about the implementation of e-mediated learning technology in higher education. He suggests that e-mediated learning technology has developed and is at a mature stage. However, the processes surround the technology seem to lag behind and therefore, need to be developed. Dutta's (2002) work highlights a key issue in that it is not the technology creating the barriers, but it is the lack of understanding of people and why they are resisting change. As such, it is this area which requires further investigation, so that these issues can be addressed and taken into consideration when designing the technology and developing strategies for introducing the technology into the first instance. Gonzalez's (2002) study into interaction and communication in a virtual learning environment highlights the importance of communication in an e-mediated learning environment. She outlines that in distance education the main method of communication is via writing. This adds complexity to the communication and interaction process, as there is a greater risk of the intended message being miss-communicated. This is because there is a lack of facial or body language to support what is being written. This in turn can affect the social interaction between the facilitator and the learner.

> *"Highly skilled facilitators play a key role in contributing to build a positive, constructive, sharing and motivating e learning atmosphere among learners."*
>
> (Pg.211)

This highlights the question about the readiness of academic staff to act as effective facilitators in virtual learning environments, without receiving the appropriate training and support. This key issue is taken forward and addressed in the primary research.

In a similar vein, a study carried out by Nathan, Carpenter, Roberts, Ferguson and Knox (2003), for the Work Foundation titled 'Getting By Not Getting On' revealed that despite computing technology being widely used in British workplaces, the technology is only being used at a sub-optimal level. The authors of the study outline that within the eight workplaces studied, senior managers were oversold technological systems that they believed would solve their problems. Yet, the computing technology in British workplaces like e-mediated learning technology in higher education requires a carefully planned strategy and extensive deliberation in order for the technology to be successfully integrated.

***Achieving Critical Mass***

Inevitably, universities may experience problems in both technology and governance when attempting to network universities. Shapiro and Varian (1998) claim that several possible innovations remain unrealistic until a critical mass of campuses are using them. Once critical mass is accomplished, the advantages of joining the mass are probable to overwhelm any reasons to establish another direction. What Shapiro and Varian (1998) highlight is that the options made by early adopters can be critical for others. Hence, the pioneering universities that implement e-mediated learning technology will have a huge responsibility to other institutions. For instance, the example Agre (2000) uses to demonstrate the issue of network effects as proposed by Shapiro and Varian (1998) is as follows. If experimental physicists initially develop innovative technologies of research management then those technologies may be tailored to the characteristics of research in that particular field. Not all disciplines fit into this model. Nevertheless, network effects may result in technical and process standards from high-energy physics to diffuse to other fields. This is regardless of their appropriateness to that field.

***Standardisation***

As mentioned earlier, networked ICT brings forward incentives to standardise universities, but the extent to which the university can be standardised is debatable. According to Agre (2000), the traditional university campus consists of a diverse grouping of places with general administrative systems and physical spaces. However, networked ICT encourages the places within the university to standardise on two levels. Firstly, so that consistent activity occurs and secondly to connect those places so that ultimately they merge into a distinct location of social practice. He goes on to add that this process is not revolutionary, and opposition may avert the standardisation from occurring in the first instance.

At a university teaching level there are many subjects that require classes to be taught within a physical setting. These encompass fields such as theatre and dance, and other subject areas require laboratory access to physical apparatus and equipment. Therefore, simplistic ideas that e-mediated learning technology can be used to conduct classes over the Internet are found wanting. As such, e-mediated learning technology is not suited to all subject areas. At an institutional level, Agre (2000) maintains that standards will be required to advertise courses, exchange money, perform accreditation, record qualifications and grades, exchange and store the diverse range of data, and clear copyrights rules and regulations. Furthermore, a uniform technical application runs the risk of superficially homogenising the diverse nature of universities. For instance, Agre (2000) suggests:

> *"If instruction is conceived as a homogenous data-stuff to be delivered to couch potatoes then the central pedagogical opportunity of the technology will be altogether missed. On the other hand, another danger is that teaching, like research, will be pulled in a hundred directions as technologies are developed that respond to the diverse inherent properties of the various subject matters, and that the university will be torn to pieces as a result."*
>
> (Pg. 502)

Building on the same argument as Cornford and Pollock (2003) and Goddard *et al* (1999), Agre (2000) outlines that decentralisation necessitates the construction of standards and ironically, standards require a centre. Therefore, centralisation can be an unintended result. For instance, decisions regarding desktop software can explode into debates about management over the future progress of the places of learning and teaching. At a deeper level, Agre (2000) highlights the importance of designing technology and governance concurrently, and the danger of introducing learning technologies that may ultimately lead to standardisation.

***Re-Institutionalisation***

Goddard *et al* (1999) argue that new virtual institutions represent only a small percentage of the higher education provisions. Nevertheless, the true significance of virtual institutions rests in the way that these organisations influence campus-based universities to adapt some of their existing tools and methods in line with building e-mediated learning into their current curriculum. Goddard *et al* (1999) suggests that the virtual university can be generally defined as a network of interrelated stakeholders and resources. These include students, administrators, educational policy makers, researchers, management and library systems etc. These inter-related stakeholders and resources are bound together by ICT in a fluid higher education environment, which are free from time and spatial barriers. The virtual university extends across the whole university and is not limited to just distance or flexible teaching and learning.

In Goddard *et al's* (1999) study into the process of change at four higher educational institutions in the UK, the principles of Actor Network Theory (Callon, 1997) were used. Actor network theory argues that the entities, which form the organisations' environment, consist of a number of actors. These actors (human or non-human) influence the actions that are carried out within the organisation. All of the actors are interconnected in some way to form a social and technical network that represents the environment. Determined by these principles, Goddard *et al* (1999) suggest that for a virtual university to work the designers are expected to engage with all aspects of the university. They maintain that the deployment of ICT projects is the outcome of a heterogeneous network of actors, artefacts, and systems negotiating the process.

The research revealed that the four case study institutions believed they could move seamlessly towards virtuality. However, practice often showed that the introduction of new ICTs in conjunction with providing traditional teaching and learning was extremely problematic. For example, three projects had stalled shortly after they started as the aspects that were crucial for the success of the project, such as guidelines, standards and validating bodies were non-existent and had to be created. Consequently, the implications of introducing e-mediated learning are fragmenting the university and pressurising the organisation into re-institutionalising into a more corporate or concrete organisation. The rollout of the ICT system generates a demand for more policy. This ends in the tightening up of roles and procedures, but also policy applied locally and across the university. The study carried out by Goddard *et al* (1999) illustrates the issues of implementing e-mediated learning technology in higher education. This is because the practice of implementing technological systems into a historically entrenched organisation is more complex than the theory would suggest.

***Infrastructure***

A main challenge that the UK higher education sector faces in the development of e-mediated learning is the issue of infrastructure. Such issues involve space implications, internal and external networks, access offered to those within and outside the campus, and issues such as security. Data collected in higher education from a 1998 survey of Computer Centre Directors indicated a sector average of one workstation per 11.4 students. Clearly, this indicates a resource issue, particularly since an increasing number of universities are considering the implementation of e-mediated learning technology. As such these institutions need to ensure that, they at the very least have the resources to support the e-mediated learning initiatives. It may be argued that access to computers may not be such a critical issue if students are accessing the web bases remotely. However, as Cornford and Pollock (2003) highlight, most e-mediated learning activity at this stage is taking place in traditional campus based universities. Therefore, not all students have access to the Internet due to telecommunications costs and lack of network service in the areas they are residing in. For instance, if a lecturer decides to incorporate a multi-media presentation consisting of video-clips and audio, the student will require access to adequate bandwidth to download the lecture. As mentioned earlier, this may pose a challenge at this stage due to high telecommunications costs and lack of Internet Service Providers (ISP) available in certain geographical locations for remote access. As such, students are still reliant on computing facilities provided by traditional campus based universities.

***Intellectual Property***

Scott, (1998) raises the issue of intellectual property and suggests that the upsurge of multimedia courseware has resulted in some university administrators putting forward proposals to fuse academics' traditional copyrights in their own teaching materials. Hence, if universities make significant investments in multimedia courseware development, they then believe that universities should own the results. This highlights the key issue of intellectual property ownership that will be taken forward and addressed in the primary research.

***Effective Teaching and Learning Practices***

Entwistle, Thompson, and Tait (1992) have highlighted the types of questions that may need to be raised in order to understand some of the factors influencing e-mediated learning within UK higher education. Their study on effective learning practices within higher education indicates that one of the greatest influences on effective learning is the quality of teaching that is provided.

> *"The teaching students receive makes an important contribution to the quality of learning achieved."*
>
> (Entwistle *et al*. 1992 Pg. 89)

Entwistle *et al's* (1992) findings revealed that many students find it difficult to keep up with new concepts introduced into courses which generally steps up pace after the first few weeks. Yet, the lecturers often do not have the time to explain difficult to learn concepts in detail, as they have to cover a large amount of content to meet the syllabus requirements. Therefore, the introduction of e-mediated learning technology into an already pressurised environment may place additional time constraints on the student and the lecturer. This may place an additional burden on those students and lecturers who already have an increasing workload and are unfamiliar with e-mediated learning technology. Students and lecturers' previous knowledge, skills and experience of using ICT will need to be considered.

***Pedagogy***

In the literature another area, which raises concern regarding the implementation of e-mediated learning into higher education, is pedagogy. Fetherston (2001) explores the Internet as one of the latest technological mediums used for teaching and learning at universities. He postulates that the use of the web as an educational technology medium possesses pedagogical challenges. He argues that the pedagogical challenges faced are not novel but has remained prevalent in universities for a length of time. He recommends that the use of the Internet in university teaching should focus on pedagogical, rather than technological issues. Fetherston (2001) suggests that a combination of the web and constructivist views have placed increased demands on students and lecturers and the methods with which they transform this specific type of extra-somatic knowledge (Sagan, 1977). According to Sagan (1977), extra-somatic knowledge is information, which is stored outside our bodies of which writing is the most notable example. Fetherston (2001) claims that these demands are pedagogical challenges and suggests that the preliminary challenge is to re-conceptualise the use of the Internet from a technological medium to a pedagogical tool.

The pedagogical challenges of implementing e-mediated learning technology into universities as raised by Fetherston (2001) further illustrate the importance of the social and organisational readiness to adopt such systems. Yet, traditionally learning materials are delivered via lectures and seminars with an assumption that the student has learned through this medium. However, the use of the web for this purpose is a transmissive and delivery mode of learning [A transmissive approach places the user in the position of being a passive receiver of knowledge]. It does not necessarily guarantee effective learning any more than traditional modes of delivering learning materials, as a study by Gunstone (1998) demonstrated. The study revealed that students' own ideas are rarely addressed and the systematic use of concepts taught through using transmissive approaches is debatable. The study by Fetherston (2001) raises a key point. The development of e-mediated learning technology means that academic staff now have a choice between delivering their material via the lecture (traditional) mode and e-mediated learning. Therefore, e-mediated learning may have the potential to build on the strengths of the traditional mode of teaching.

The study raises the challenge of equipping students with the critical thinking skills in order for them to use the information confidently for learning purposes. Fetherston (2001) suggests that lecturers will have to change their current ways of teaching to incorporate e-mediated learning technologies, which again seems logical. However, this process will require an overhaul of the existing ways of teaching and central support. Fetherston (2001) seems to have aptly presented some challenges evident. Nevertheless, despite recognition of the social constructivist paradigm, has failed to take into account any political activity that occurs within organisations and what a complex task it will be to implement an e-mediated learning system within an inherently political domain.

## INTERIM SUMMARY

In summary, this section has presented the relevant literature, which discussed the key debates on the implementation of e-mediated learning technology in higher education. By contrasting the rather idealist theme of the catalysts driving e-mediated learning technology in higher education, in the context of continual development and efficiency, with the actuality of the implementation of these systems in practice. It became clear that higher education institutions in the UK are being driven to implement e-mediated learning technology by both external and internal factors. These factors include the need to meet changing demands of higher education, technological progression, and the potential for increasing efficiency via time and cost savings.

However, contrasting empirical studies raise several questions, which highlight the issues of implementing e-mediated learning technology. These issues include the potential of the technology to re-institutionalise the university, creating more structures and procedures, intellectual property issues and work organisation and design. These conflicting views on the pace of technological change in higher education seem to muddy the water even further. Yet, what is clear is that the British higher education system is in a period of transition, and traditional universities in the UK are not exempt from introducing some form of e-mediated learning technology. Although the literature addresses the wider issues surrounding this debate, it is surprising that there is a lack of literature, which investigates the adaptation of e-mediated learning technology by academic staff. Particularly as academic staff members are central to the diffusion process of e-mediated learning technology in higher education. This is because they play a pivotal role in how the technology is used by the student, and the how successfully the technology is diffused across the university. Thus, the main objective of this empirical study is to investigate the adaptation process of e-mediated learning technology by academic staff in a campus based UK University.

**Empirical Research Objective: Investigate the adaptation process of e-mediated learning technology by academic staff, in a campus based UK University.**

Since the objective of the empirical study is to investigate the adaptation of e-mediated learning technology by academic staff, it is important to understand the wider literature on the diffusion of innovations, which will inform the empirical research. This literature is subsequently discussed.

## DIFFUSION OF INNOVATIONS THEORY

The theoretical rationale guiding this investigation is the idea that the pace of technological adoption by an individual is largely determined by social and organisational dynamics. These dynamics include characteristics of the individual, such as personality traits, and the way the individual perceives the benefits of the innovation. Organisational dynamics include the way in which the innovation is communicated to the individual and the norms and values of the organisation. This idea has been widely advocated by academics such as Rogers (1995); Jacobsen (2000); Hamilton and Thompson (1992); Geoghegan (1994); Abrahams (2004) and Berge and Muilenberg (2001).

Rogers (1995) defines an innovation as an idea, practice or object that is perceived as new by an individual. He goes on to explain diffusion as the process through which an innovation makes its way through a social system, and adoption as the process through which an innovation is selected or accepted by an individual, or an organisation. The first constructs for the theoretical framework for the diffusion and adoption of an innovation can be traced back to the work of Tarde (1903). In his work on diffusion research, Tarde (1903) identified that the adoption process starts when the decision-maker in an organisation or social unit takes the first steps (decision) to adopt an innovation. He observed that the adoption process began with a slow advance, followed by rapid and accelerated progress. This lead to a plateau until the adoption finally stopped in the form of an S shaped curve as illustrated in Diagram 7. He noted that the adoption or rejection of an innovation was based on a number of critical variables, such as the way that individuals perceive the attributes of an innovation and the characteristics of the decision-making unit. (The literature of the S shaped curve will be discussed later in the chapter)

Building on the work of Tarde (1903), Ryan and Gross (1943) took a sociological stance in examining the diffusion and adoption of hybrid corn seed in two farming communities based in the USA. The findings of the study revealed that over two hundred and fifty farmers adopted hybrid corn between 1928 and 1941, and when these results were plotted cumulatively over a period of time, the adoption rate formed an S shaped curve. Ryan and Gross (1943) indicated that the innovation-decision period averaged at nine years from initial knowledge to the adoption-decision stage.

Anthropologists such as Ogburn (1951) also carried out research into the diffusion and adoption process of innovations. In his study, Ogburn (1951) explored the influence of innovations on US culture by analysing the impact of the radio, automobile and aeroplane. His research showed that an outcome of the innovation of the radio was an increased interest in the field of sports. He noted that the impact of innovation on culture resulted in a set of chain effects, which had repercussions in other areas. Ramifications of the innovation of the radio resulted in exceptional athletes being given star status, and an increase in salaries for those involved in the field of sports. Consequently, smaller universities and those institutions that failed to support the athletic field were placed at a disadvantage in terms of competing for students (Barnett, 1953). Furthermore, Ogburn (1951) recognised that social change tended to lag behind technological change due to the uneven processes of social and cultural adoption to technological change, which he called 'cultural lag'. He argued that although cultural lags were unavoidable, there was the potential to lessen their periods of disruption. Therefore, it was possible to forecast the future and plan for certain eventualities. Ogburn (1951) suggests that the following three factors stimulate culture change:

1. **Invention:** the process of developing novel cultural elements.
2. **Discovery:** the identification and grasp of an idea not previously understood.
3. **Diffusion:** the expansion of cultural traits from one cultural system to another.

The early work developed by Tarde (1903) and Ogburn (1951) on the diffusion of innovations created some of the initial models that helped to explain the factors influencing the thoughts and actions of individuals, and the various stages of adopting a technology or an idea. The major findings of their work can be summarised as follows:

- The decision to adopt an innovation by an individual or institution is not instantaneous.
- Individuals within a social system adopt an innovation at different rates over a period of time.

Rogers (1995) suggests that a turning point for research into the diffusion of innovation was a study carried out in the 1960s called the Saucio study (Deutschman and Fals Borda, 1961). Deutschman and Fals Borda (1961) noted that before the 1960s, research into the diffusion of innovations process was carried out in North America and Europe. However, the study conducted by Deutschman and Fals Borda (1961) was based in a developing country. At the time of carrying out the research in Columbia, Latin America it was unknown to the researchers whether the diffusion of innovation findings conducted in Latin America would share similarities with the existing research. However, Deutschman and Fals Borda (1961) discovered that novel ideas spread in a relatively similar pattern to the earlier studies carried out in the USA and Europe. Therefore, the diffusion process appeared to represent a general pattern of human behaviour (Rogers, 1995). Earlier studies on the diffusion of innovation process (Tarde, 1903; Ogburn, 1951; Ryan and Gross, 1943; Barnett, 1953; Deutschman and Fals Borda, 1961) provided Rogers (1995) with a foundation that conceptualised the diffusion of innovation process. This led Rogers (1995) to delve deeper into the decision-making processes that influence an individual or social unit to adopt an innovation. This decision-making process is subsequently discussed.

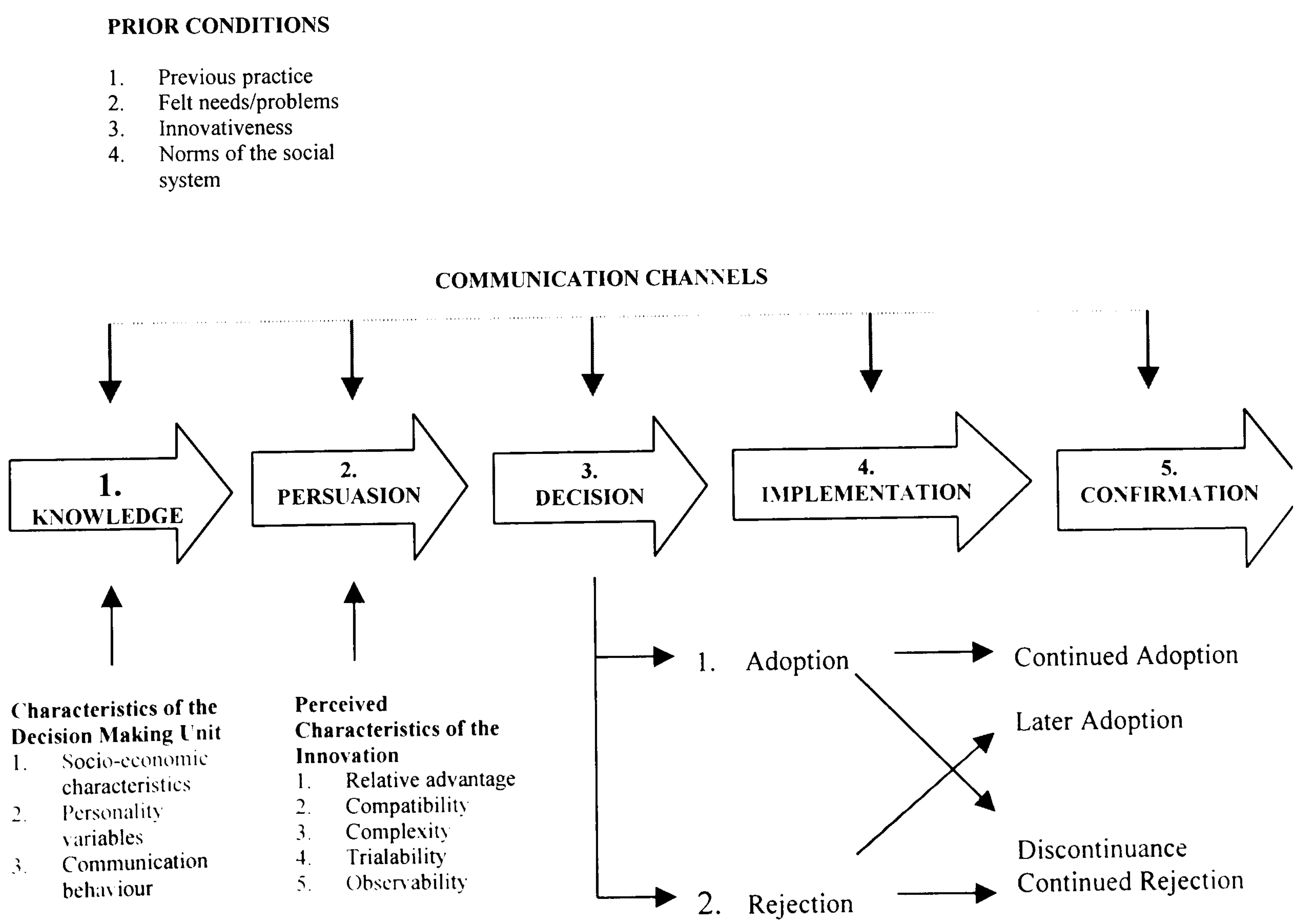
## THE INNOVATION DECISION PROCESS

> *"The innovation decision process is the process through which an individual or other decision making unit passes from first knowledge of an innovatio, to forming an attitude toward the innovation to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision."*
>
> (Rogers, 1995, pg. 63)

According to Rogers (1995), an individual's decision to adopt an innovation is a process that consists of a series of actions and decisions that take place over a period of time, rather than an instantaneous act. He conceptualises the innovation-decision process as a sequence of five stages as depicted in Diagram 5. The model illustrates how the innovation-decision process comprises of an information seeking and information processing activity. During this process the individual is persuaded to decrease his or her uncertainty regarding the advantages and disadvantages of an innovation (Rogers, 1995).

**Knowledge** is the stage where an individual or the decision-making unit becomes aware of the innovation and generates some basic understanding of how the innovation functions. Forms of knowledge encompass exposure to the innovation, learning how to use the innovation and the technicalities of how the innovation works. Certain biases such as previous exposure and pre-conceived ideas have the potential to influence the individual or decision making units' reaction to the communication about the innovation and potential consequences of such messages.

## DIAGRAM 5: A MODEL OF THE STAGES IN THE INNOVATION-DECISION PROCESS (Rogers, 1995)



Hassinger (1959) notes that even if individuals are exposed to innovation messages, such exposure will result in minimal effect. This is unless the innovation is perceived to be relevant to the individual's needs and consistent with the attitudes and beliefs of the individual. The next stage in the innovation-decision process is **Persuasion**. This stage occurs when an individual or decision-making unit creates a positive or negative opinion or attitude towards the innovation. Such opinions emerge from the way that the individual or decision making unit views the attributes of the innovation. These include comparative advantage and the complexity of the innovation. Rogers (1995) argues that the subjective opinions gathered from near-peers influence the persuasion stage, and Jacobsen (2000) suggests that when peers share positive evaluations of the innovation, like-minded individuals become motivated to adopt the innovation.

An earlier study by Hamilton and Thompson (1992) present a useful summary of personality characteristics displayed by early adopters, in their research on the adoption of an electronic network for educators (Early adopters refer to individuals that adopt an innovation at a relatively early stage of the diffusion process. This classification of adopters will be discussed further on in the chapter). Hamilton and Thompson's (1992) study revealed that the development of an electronic communications network allowed a link to be created between students and faculty members. The aim was to decrease isolation often experienced by students, to increase the availability of faculty expertise and to raise faculty awareness of any problems in the field. The early adopters in this research possessed similar levels of education, social status and social participation. They had a cosmopolitan view, accessed data from mass media channels, were part of broad interpersonal communications networks, exhibited a high level of innovation, held a positive view towards risk and change and had impartial attitudes towards failure. In this diffusion process, the role of the early adopters was critical as they made their adoption visible to potential adopters, and therefore, influenced subsequent adoption. Hamilton and Thompson (1992) recommend that it would be beneficial for network developers to identify early adopters who will enhance the diffusion process.

The **Decision** stage involves the individual or decision making unit taking part in activities that will lead to the choice of whether to adopt, or reject the innovation. Active rejection occurs when the individual or decision making unit contemplates and tests the innovation on a restricted basis and takes the decision not to adopt. Whereas passive rejection, also known as non-adoption occurs when the individual or decision-making unit contemplates the use of the innovation at a minimal level. Up until this stage the innovation-decision process has been a mental activity. However, at the **Implementation** stage the individual or decision-making unit materialises the innovation. The implementation stage may continue for a lengthy period of time until the period where the innovation no longer possesses its hallmark as a novel idea. During the implementation stage there is also a possibility of reinvention, where the innovation is changed or modified by the user.

The **Confirmation** stage is the final stage in the innovation-decision process. Here the individual or decision-making unit looks for support about a previous innovation, or alternatively goes back on a decision previously made to adopt or reject an innovation if faced with contrasting messages about the innovation. Nevertheless, at each stage of the innovation-decision process lies the potential of rejection. Jacobsen (2000) comments that an individual can gain exposure to an innovation during the knowledge stage and then simply forget about it. Furthermore, rejection can also occur prior to the decision to adopt. This is known as discontinuance.

According to Rogers (1995) the perceived attributes of an innovation and the communication channels that are used to convey information about the innovation are two variables that play a fundamental role in influencing the adoption rate of the innovation. He goes on to list five characteristics that influence an individual's perception of an innovation, as follows:

1. **Relative Advantage**: The degree to which an innovation is perceived as better than the one it supersedes. This characteristic may be evaluated in terms of usefulness in carrying out work tasks, the quality of work produced, added convenience and social prestige.
2. **Compatibility**: This is the degree to which an innovation is perceived to be consistent with existing values, past experiences and needs of the potential adopter at the individual, group and organisational level.

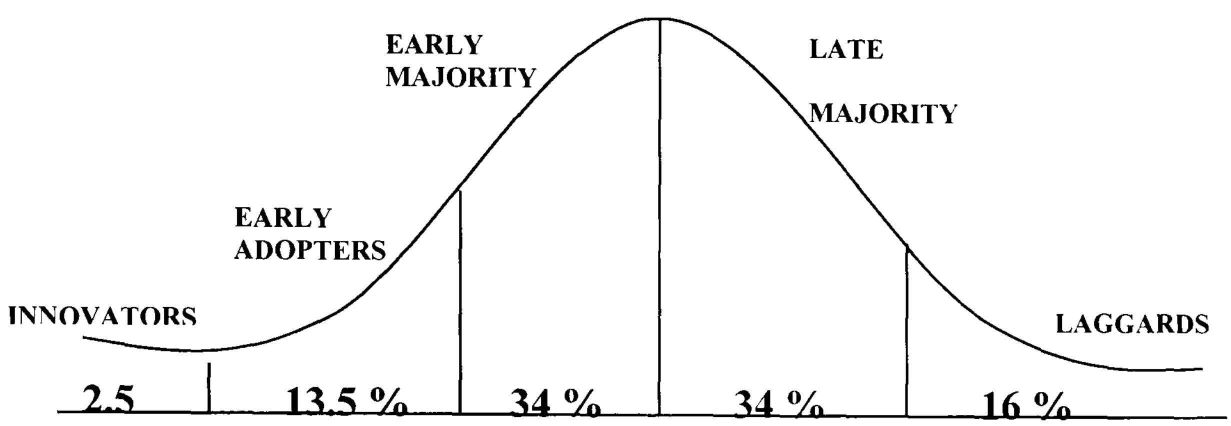
3. **Complexity:** is the degree to which an innovation is perceived as difficult to understand or use. The innovation runs the risk of not being adopted if the individual considers the innovation as difficult to understand, learn and use.
4. **Trialability:** Whether the innovation may be tried out on a limited basis. Ryan and Gross (1943) suggest that early adopters of an innovation perceive trialibility as more important than late adopters.
5. **Observability:** The degree to which the outcomes of the innovation are made transparent to others. Adopters need to make the innovation visible to other adopters so that potential adopters can develop a clear understanding of the technology, before they will adopt.

Rogers (1995) suggests that information about an innovation is diffused through communication channels. These channels also influence the rate at which the innovation is adopted. He suggests that the process of adoption can be speeded up by effectively and rapidly communicating information about an innovation to a greater number of individuals at an early stage of the diffusion process. Information can be communicated through mass media channels such as the radio, television, newspapers and the Internet, and through interpersonal networks, which involves communicating face-to-face with other individuals.

## ROGERS (1995) ADOPTER CATEGORIES

As discussed earlier, individuals in a social unit or an organisation do not adopt innovations at the same time. The time factor of the diffusion process enables diffusion curves to be illustrated and the classification of adopters into specific categories. The diffusion of innovation theory (Rogers, 1995) provides a conceptual framework for analysing the rate of technological adoption in an organisation, or social unit. Rogers (1995) suggests that individuals adopt technologies at different rates, and these individuals can be classified into the following adoption categories as illustrated in Diagram 6. Abrahams (2004); Jacobsen (2000); Groves and Zemel (2000); and Mahajan, Muller and Srivastava (1990) advocate the use of Roger's (1995) classification model of adopter categories, in that the model is easy to use and it provides mutually exclusive and extensive standardised categories through which results can be compared and contrasted. Diagram 6 illustrates how the continuum forms a curve when plotted over a period of time, with the innovators and laggards at bottom ends of the curve, and the majorities representing the middle part of the curve.

## DIAGRAM 6: THE ADOPTION DIFFUSION CURVE (Rogers, 1995)




**Innovators**: According to Rogers (1995), these individuals are the first 2.5 percent of the unit to adopt the innovation. Generally, they are considered to be risk takers and venturesome, with an interest in innovation. These individuals have the potential to understand and apply detailed technical knowledge and at the time of adoption, they possess the ability to cope with the uncertain future of the innovation. The innovators play a crucial role in the diffusion process, as they provide a catalyst for the process of adoption in their unit. Despite this category representing the smallest percentage of users.

**Early Adopters**: Rogers (1995) suggests that the early adopters make up the following 13.5 percent of individuals to adopt the innovation. This category of adopters represents an essential constituent of the adoption process within the unit because of their willingness to adopt an innovation. Potential adopters look to early adopters for information and advice regarding the innovation. Therefore, these individuals act as role models for others in the unit. The early adopters decrease uncertainty about the adoption of the innovation.

**Early Majority:** Rogers (1995) states that this category makes up the next 34 percent of individuals in the unit to adopt the innovation. The early majority adopts the innovation before the late majority, and they provide an element of interconnectedness amongst the unit's interpersonal networks.

**Late Majority:** According to Rogers (1995), the late majority of adopters represent the next 34 percent of adopters in the unit to embrace the innovation. Typically, the late majority of adopters are followers and approach innovation with a certain level of scepticism and caution. These individuals adopt the innovation once the majority of others in the unit have done so. Peer pressure is often cited as a key incentive to adopt an innovation. Rogers (1995) suggests that these individuals require the system to be established and adequate support should be provided. In other words, uncertainty about the innovation should be removed before the late majority decides to adopt.

**Laggards:** This category accounts for the remaining 16 percent of individuals in the unit to adopt an innovation. Laggards are often suspicious of change agents and innovations. The outcome of past innovations determine whether they are going to adopt an innovation. These individuals have to be confident of the success of the innovation before they can adopt the innovation.

Ram and Jung's (1994) study on adopter characteristics builds on the work of Rogers (1995). Their research involved identifying 'use innovativeness' with personal computers. They define use innovativeness as the degree to which an adopter uses a previously adopted product to solve a new problem. Ram and Jung's (1994) study found that early adopters have greater levels of involvement with the innovation, and have higher usage variety than late adopters. Similar to innovator computer users, early adopters used more features, options and software than early and late majority adopters did. Jacobsen (2000) suggests that early adopters tend to be use innovative and exploit the diverse variety of uses to which a computer can be put. Jacobsen (2000) classifies this group of users as 'enthusiastic beginners' and her research found that an increasing number of academic staff members that used computers were not necessarily highly skilled, but were nevertheless enthusiastic to use the technology. Jacobsen (2000) comments that despite the development of graphical user interfaces, numerous barriers exist that have the ability to restrict adoption by enthusiastic beginners, and they still face a steep learning curve before integration becomes effortless. The issue of barriers to adoption and integration will be returned to later in the chapter.

Rogers (1995) classification of adopter categories provides a useful way to simplify the complexity of adoption patterns in an organisation or social unit by informing the various groups of adopter categories, and to explain broad group dynamics and trends. However, classifying group attributes in this way has its limitations, given that there is the potential to overlook the uniqueness of the individual academic member of staff. Jacobsen (2000) notes that early adopters may hold certain traits that differentiate them from other early adopters. These include distinct views and opinions about the value of the technology, particular character traits, different degrees of skills and ability, varied motivations to learn about the technology and distinct progress levels.

From a behavioural perspective, the Technology Acceptance Model (TAM) (Davis, 1989) explains the process that users go through to accept and use computing technology. Davis (1989) suggests that when a user is presented with new computer technology (hardware or software) two main factors determine whether and when the individual will use the technology.

1. **Perceived Usefulness** is the degree to which an individual believes that using a particular system would enhance his or her job performance.
2. **Perceived Ease of Use** is the degree to which an individual believes that using a particular system would be free from effort.

The theoretical basis for TAM emerged from Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA), which is a widely used model focusing on the determinants of consciously intended behaviours. Both models have strong behavioural elements, which presuppose that when an individual makes a decision to act, they will be free to act without restriction. On the other hand, Bagozzi, Davis and Warshaw (1992) argue that many restrictions exist that will hinder an individual's freedom to act. These include limited ability, time constraints, environmental or organisational limits, or unconscious habits. Bagozzi *et al* (1992) suggest:

> *"Because new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision-makers with respect to the successful adoption of them, people form attitudes and intentions towards trying to learn to use the new technology prior to initiating efforts directed at using. Attitudes towards usage and intentions to use may be ill formed or lacking conviction or else may occur only after preliminary strivings to learn to use the technology evolve. This, actual usage may not be a direct or immediate consequence of such attitudes and intentions."*
>
> (Pg. 73)

Influential studies carried out by Venkatesh and Shih (2004); Venkatesh, Morris, Davis and Davis (2003) and Venkatesh and Davis (2000) extend the original TAM model to describe perceived usefulness and usage intentions based on social influence [subjective norm, voluntariness, and image] and cognitive instrumental processes [job relevance, output quality result demonstrability and perceived ease of use]. Out of the four longitudinal studies conducted by Venkatesh and Davis (2000), two were based on the voluntary use of a new system and two were based on mandatory use. The findings revealed that social influence significantly affected perceived usefulness, with cognitive factors also playing an important role. Venkatesh and Davis (2000) observe that the greater the perceived job relevance [the degree to which the individual perceives the technology to be applicable to his or her job] of a new system the more important output quality becomes [deliberation of how the technology successfully performs those tasks]. They recommend that in order for the technology to be accepted by an individual or a social unit, the effectiveness of the system should be demonstrated to potential users. Preferably by those people that the potential users consider important.

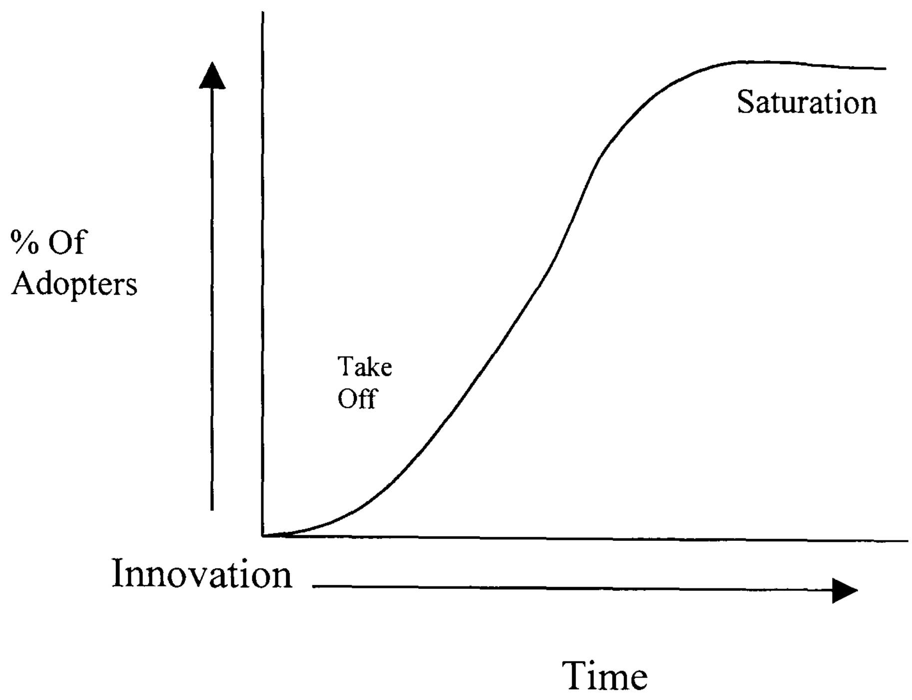
A number of studies have been conducted replicating the original work of Davis (1989). Studies have been carried out on the relationship between usefulness, ease of use and system use, with particular emphasis placed on the validity and reliability of the research design (Adams, Nelson and Todd, 1992; Bagozzi *et al*, 1989; Hendrickson, Masssey and Cronan, 1993; Segars and Grover, 1993; Subramanian, 1994; Szajna, 1994). A number of competing models exist, and in an attempt to blend the key competing user acceptance models, Venkatesh *et al* (2003) formed the Unified Theory of Acceptance and Use of Technology (UTAUT). Furthermore, Venkatesh and Shih (2004) develop an extended model of the use diffusion process, which in their opinion is more complete than any of the individual models.

However, the model is focused on behaviour traits and hence, the theoretical basis for TAM stems from a social psychology background. Nevertheless, what these theories highlight is that the differing circumstances of individual adopters of technology need to be taken into account when developing integration strategies. The adoption of e-mediated learning technology at different levels by academic staff members is a key finding that will be discussed further in the chapter. Norman (1993) adds further light to this issue in his differentiation between logical facts and the power of personal stories in the decision making process. He observes that in an attempt to isolate the relevant from the irrelevant, the process of logical analysis has the tendency to oversimplify data that can be easily measured. However, what can be measured and what is important are not necessarily related. Personal concepts such as values and moral good cannot be measured in the same way as types of teaching strategies. The difficulty with subjective concepts is that although the individuals in a particular adopter category may typically agree that values and morality are important, there is no clear way to decipher these concepts logically without the risk of misconstruing their content.

## RATE OF ADOPTION

The diffusion of innovations literature described the adoption process of an innovation and highlighted that certain innovations are adopted at different rates. The S shaped curve (Rogers, 1995) illustrates the diffusion of an innovation over a period of time. The percentage of adopters is plotted on the vertical axis against time on the horizontal axis, as shown in Diagram 7.

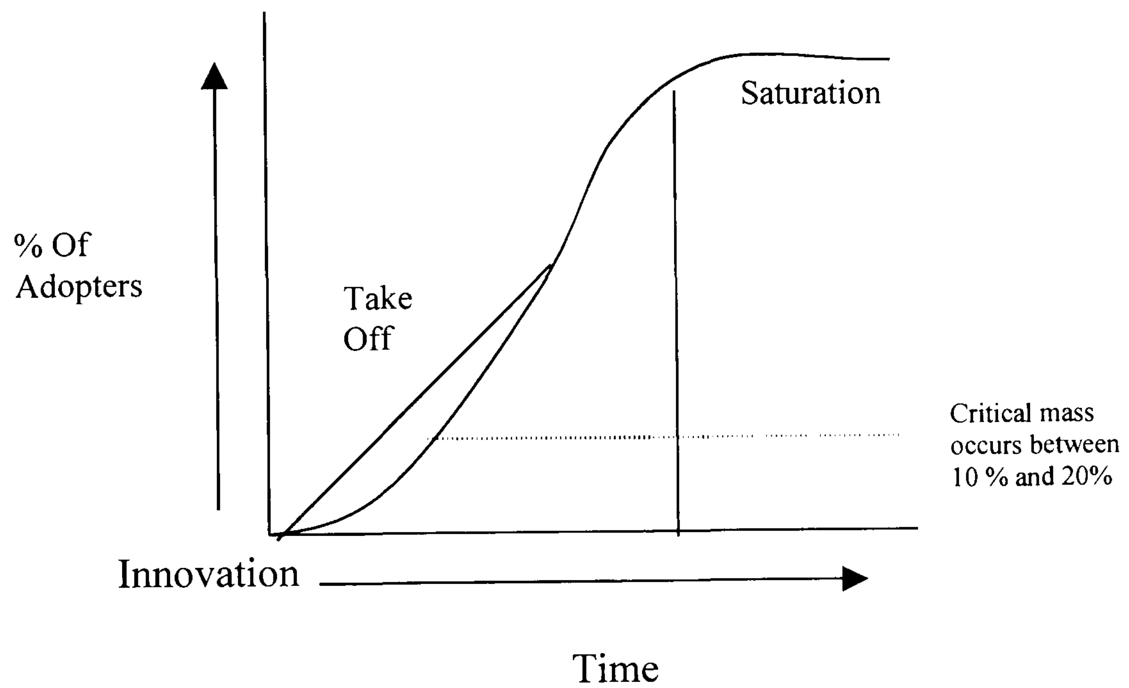
## DIAGRAM 7: THE S SHAPED CURVE OF ADOPTION (Rogers, 1995)




Based on the S shaped curve of adoption, innovators and early adopters represent the lower end of the S curve. The early majority represents the take-off point of an innovation, and the late majority and laggards are displayed at the top end of the S curve. Although the majority of innovations generally tend to follow an S shaped rate of adoption, the rates of adoption differ with various innovations. This is because certain innovations are adopted with relative speed resulting in a steep S shaped curve. Whereas, the rate of adoption of other innovations can be comparatively slower, resulting in a more gradual S shaped curve. Rogers (1995) suggests that the adoption of a new idea emerges from the exchange of information via interpersonal networks. The first adopter of an innovation shares information about the innovation with other individuals of the social unit or organisation and then each of these adopters convey the idea to other peers.

The diffusion curve starts to even out when approximately half of the individuals in a social system have adopted. This is because every new adopter finds it increasingly difficult to convey the idea to a peer that has yet to adopt, as individuals that are unaware of the innovation become increasingly scarce. Rogers (1995) defines this stage as critical mass. He suggests it is a key factor in helping to understand the S shaped rate of adoption. Critical mass takes place when a certain number of individuals adopt the innovation, so that subsequent adoption of the innovation becomes self-sustaining in the social unit or organisation. Geoghegan (1994) explains the concept of critical mass as the gap between the early adopters and mainstream users of a technology. It typically occurs when between 10 –20 percent of users adopt the innovation and represents the transition from the early adopters to the early majority as illustrated in Diagram 8.

**DIAGRAM 8: CRITICAL MASS OF ADOPTION** (Rogers, 1995)




A recent study into the adoption of learning technology in a campus based institution (Green, 2003) found that the adoption of learning technology increased campus wide. Email usage rose to 20 percent, the use of presentation software also increased to over 25 percent, and the use of multimedia had risen to just below 10 percent. At this time, Green (2003) maintained that the use of information technology was approaching the critical mass level. Green's (2003) findings also revealed that individual academic staff members highlighted user support and training as the most crucial issues that facilitate the adoption of technology for teaching and learning purposes. He argues that despite campuses taking steps to replace obsolete technology and provide access to multimedia facilities, technical help and user support remain important drivers for the adoption and integration of e-mediated learning technology.

However, an influential study carried out by Geoghegan (1994) on academic staff participation and involvement with instructional technology indicates that critical mass alone is insufficient to sustain the diffusion of technology to the mainstream group of users. In his research, he categorised academic staff members into five groups according to the adopter categories illustrated in Diagram 6. According to Geoghegan (1994) the widest gap in the distribution from innovators to laggards is the transition from the early adopters to the early majority.

> *"Passage from the visionary group (the early adopters) to the mainstream is where the most significant potential for failure lies... This gap is so significant in the case of instructional technology that it has so far stymied almost all efforts to bridge it... What is it about instructional technology as an innovation or about the way it has been supported and marketed by its proponents, that has prevented its bridging the gap?"*
>
> (Geoghegan, 1994, Pg. 9)

It appears that the gap identified by Geoghegan (1994) is representative of the position where many universities are finding themselves at this moment in time. He suggests that the key to successful adoption require bridging this gap. Strategies to bridge the gap include identifying that the gap actually exists in the first instance. This can be done by opening up the technologists alliance (early adopters and IT staff) to ease the dissemination of information and providing peer support for the early majority. He also argues that it necessary for organisations to avoid the alienation of the majority with nonsensical claims about the ability of technology to solve pedagogical challenges. Finally, Geoghegan (1994) argues that universities need to provide a convincing argument as to why it is in the interest of academic staff to buy into the new instructional technologies. He comments:

> *"If the application is successful in accomplishing a noticeable improvement in some important area of teaching or student learning and if it does so in a manner highly visible and attractive to the early adopters mainstream peers, then it has a chance of being adopted into the mainstream population. This will not occur, however, until the costs of adoption (time, money, disruption to normal activity etc) are perceived by*

> *the mainstream to be significantly less than the positive value to be gained from adoption."*
>
> (Geoghegan, 1994, Pg.8)

In a similar vein, Spotts (1999) also notes that universities are rapidly implementing e-mediated learning technology. Yet, academic staff members are slow to adopt the technology into their existing teaching and learning practices. Ultimately the barriers that determine the decision of academic staff members to adopt carry the greatest risk to the successful utilisation of e-mediated learning technology across the campus. Therefore, in order to inform the empirical investigation it is important to understand the literature on barriers to technological adoption. This literature is subsequently discussed.

In summary, the broader literature on the diffusion of innovations reviewed in this section suggests that individuals in a social unit or organisation adopt innovations at different periods of time. Their decision to adopt an innovation is largely based on a number of social and organisational dynamics, which influence this decision-making process. These dynamics include, the way the individual perceives the benefits of the innovation, previous skills levels, the way the innovation is communicated to the individual and support levels. It is also generally acknowledged when between 10-20% of individuals in an organisation adopt an innovation, the adoption process has reached 'critical mass levels' and from here on in the innovation will become self-sustaining.

However, while some scholars argue that traditional models of 'critical mass' indicate the rate at which an innovation can become self-sustaining, others maintain that critical mass alone is insufficient to sustain the diffusion of technology to mainstream groups of users. In this growing debate about the successful diffusion of technology, there is a plethora of qualitative, empirical studies that attempt to understand adopter characteristics. Yet, it is relatively striking that very little research has been carried out in seeking to understand how academic staff in UK universities adopt e-mediated learning technology, despite considerable investments in e-mediated learning technology across higher education as a whole.

Moreover, despite the rapid pace of technological progression, indicators of the diffusion of innovations have remained essentially static, albeit technological systems currently providing multi-functional capabilities. Due to the lack of literature in this area, it is important to understand the dynamics that influence the adaptation of e-mediated learning technology by academic staff, in the context of UK universities. Therefore, one of the aims of this study is to identify the factors that influence the pace at which academic staff adopt e-mediated learning technology.

**Research question 1: What are the factors that influence the pace at which academic staff in a campus based UK university adopt e-mediated learning technology?**

## BARRIERS TO TECHNOLOGICAL ADOPTION

It is widely acknowledged within the diffusion of innovations literature that individuals often resist the adaptation of a new technology (Abrahams (2004); Berge and Muilenberg (2001); Jacobsen (2000); Massy and Zemsky (1995) and Rogers (2000). Resistance to change theories such as those presented by Barnett (1953) suggests that resistance is a natural process when individuals and social units are introduced to an innovation. Resistance provides a protective shield to filter out unwanted change. As a result it is only the innovations that endure the acts of resistance which then go on to be deliberated as potential innovations to be adopted by the individuals or social units.

Ultimately, if the innovation survives the innovation-decision process it then becomes a part of the social system waiting for the individual to adopt it. This then determines the rate of adoption for that innovation. During the course of time, innovations have always initially been faced with a certain amount of apprehension. Chen and Crowston (1998) provide a useful argument to illustrate this point. They suggest that despite its glory the telephone was initially met with resistance. They comment that a contraption that possessed the ability to transmit voice was an entirely radical concept. People were scared, puzzled and in awe, and Watson (1926) remarked:

> *"I don't believe any new invention today could stir the public so deeply as the telephone did, surfeited as we have been with many wonderful things that have since been invented."*
>
> (Pg.1)

Like the telephone, the automobile also faced resistance when it was created in 1890. Conflicting opinions about the success of the automobile emerged. The experts insisted that it would never be able to replace the horse, with Chaplain claiming that it was a creation of the devil. The automobile was described as a 'horse-less carriage' and it was compared and contrasted with the bicycle, in that the automobile was un-aesthetic, noisy and pretentious. Whereas, the bicycle embraced gentlemanly qualities, such as being elegant, unpretentious, quiet and well behaved. Throughout history, individuals and social groups have sought, resisted or rejected change, with resistance often being used as a tool to maintain the social systems core values and traditions.

Resistance to innovation is viewed as an internal barrier that prevents individuals and social units from adopting an innovation. The innovation may be perceived as being too complicated, or demanding to use. As highlighted earlier in the chapter, the sceptical response to an innovation by a social group or individual can manifest in two ways, actively or passively. Individuals or social groups that passively resist an innovation are the most difficult units to change. According to Rogers (1995), communicating effectively through mass media and interpersonal channels can influence resistance or apathy to change to a certain degree. The latter channel proving to be the most effective medium of the two. Bennis (1976) asserts that for those seeking change it is paramount to take into account the costs of ignoring, overriding or dismissing those who manifest as their rivals. As such, the dynamics of the change process may subsequently transform into a conflict situation in which social units encounter opposition, and where efforts are placed on winning as opposed to resolving the initial problem.

In relation to the adoption of e-mediated learning technology in higher education, Abrahams (2004); Berge and Muilenberg (2001); Jacobsen (2000); Massy and Zemsky (1995) and Rogers (2000) suggest that a barrier to technological adoption can comprise of any factor that affects the adoption, and, or implementation of computing technology for teaching and learning purposes. Nevertheless, Reid (1991) alerts us to the fact that most UK higher education institutions display traditional norms and values. Consequently, this partly contributes to academic staff members resisting change. As mentioned earlier, barriers affect the rate at which an individual or social unit adopts an innovation. However, the rate at which the technology is adopted can be lessened by carefully planning and managing the change process, and through the identification and elimination of these barriers.

Barriers to adopting e-mediated learning technology can emerge at both an external and internal level. External barriers to change are typically beyond the control of the academic staff members, and require intervention from an external source in order for change to occur. Access to hardware and software and technical and administrative support are examples of external barriers to adoption.

At an internal level, barriers to adopting e-mediated learning technology by academic staff members are multi-dimensional and involve numerous factors. A distinct series of barriers exist for each set of adoption issues, which together define an adoption problem. For instance, the issues adding to the academic staff members pessimistic view about using e-mediated learning technology may be the outcome of the academic staff members view that there is 'a lack of technological support' which adversely reinforces the barrier 'resistance to change' (Abrahams, 2004). At a more intrinsic level, barriers can act as guards to prohibit the adverse effects that may upset the social systems core traditions and values. As such, they are within the control of the academic staff members. Furthermore, Rogers (2000) adds that the adoption of e-mediated learning technology by academic staff members is prone to failure when there is a mismatch in academic staff members levels of technological adoption and potential internal and external barriers.

Studies by Jacobsen (2000) and Abrahams (2004) further support the importance of explicit rewards and incentives structures. They suggest that academic staff members are less likely to adopt e-mediated learning technologies if they believe that they will not be rewarded for their efforts. Furthermore, Berge and Muilenburg (2001) suggest that individuals who have adopted learning technology in a university environment have often received minimal or no external, or explicit recognition, or incentive for excellent teaching or technology implementation. Laurillard (2004) goes on to note that the annual review process often ignores innovative teaching as part of the merit system, and academic staff members often depend on colleague support and self teaching. Ronkowski (2000) warns that academic staff members frequently feel anxiety or fear when exposed to new technology. Rogers (2000) found that academic staff felt anxiety towards using e-mediated learning technologies when personal frustrations about their IT skills levels emerged. Abrahams (2004) suggests that one-to-one or small group training at the academic staff members own convenience, and in the privacy of their own offices may be more cost-effective for the university as a result of permanent gain for expenditure.

Jacobsen (2000) argues that individual effort and initiatives alone are lacking the potential to fully develop e-mediated learning for teaching and learning. Early adopters may display keenness and commitment in developing e-mediated learning technology. Yet, to diffuse this effort, incentives, training, support and reward structures from senior management are crucial in formulating a strong human infrastructure. Geoghegan (1994) further maintains that the success of early adopters will not be diffused into the mainstream without extensive institutional support. Yet, senior management often presuppose that once academic staff have access to technology all members will readily, instinctively and rapidly modify their teaching methods and course materials to take advantage of e-mediated learning technology. However, the mainstream requires direction.

In summary, the literature and empirical studies reviewed in this section suggest that resistance is a common outcome when individuals are faced with the prospect of change. In the context of the barriers to the take-up of e-mediated learning technology by academic staff across higher education, the empirical studies suggest that levels of IT skills, senior management support, incentives and rewards structures influence technological adoption. Although these studies provide an insight into the nature of the barriers to the adoption of e-mediated learning technology, the majority of these studies have been carried out in North America. There is an evident lack of research that identifies the barriers to the adoption of e-mediated learning technology by academic staff in UK universities. Hence, second aim of this study is to identify the barriers to take-up of e-mediated learning technology by academic staff in the context of UK universities.

**Research Question 2: What are the barriers to take-up of e-mediated learning technology by academic staff in a campus based UK university?**

## EXPERT SYSTEMS

The conceptual framework also guiding this study is that technological systems are part of expert systems. Together these systems combine the knowledge of individuals and technological systems. Expert systems act as disembedding mechanisms, which remove immediate social relations and then restructure these relations across time and space. The conceptual framework of expert systems provides a richer insight that helps to explain the intrinsic implications of technological systems on social relations. This is something, which the diffusion of innovations theory cannot provide.

Giddens (1996) generally suggests that expert systems are based on the expert knowledge of individuals, which are integrated into systems over a period of time. These expert systems rely on a network of people and processes. Such expert systems act as disembedding mechanisms as they remove immediate social relationships, and then restructure these relationships across time and space. Expert systems as defined by Giddens (1996) refers to:

> *'Systems of technical accomplishment or professional expertise that organise large areas of the material and social environments in which we live today.'*
>
> (Pg. 27)

Giddens (1996) suggests that individuals consult experts such as doctors and lawyers on an as needed, or on an irregular basis. The systems through which the knowledge of such experts is integrated continually influences the nature of what individuals do. The tacit roles of trust and faith provide the foundation of expert systems as individuals have limited knowledge of how expert systems work. Giddens (1996) provides a good example of the car to demonstrate this point. There is a certain element of risk attached to driving a car, for instance, the possibility of an accident. but in deciding to drive the car the individual accepts that risk. Nevertheless, the individual relies upon the expertise of the designers and constructors of cars, roads. traffic lights and intersections etc. to guarantee that risk is minimised as far as possible. Many individuals will have bounded knowledge of the technicalities of road building, the maintenance of roads or the computing systems, which facilitate the movement of traffic. Together, these systems and processes make up expert systems which in turn the individual will place faith or trust in. According to Giddens (1996) trust refers to:

> *"Confidence in the reliability of a person or system, regarding a given set of outcomes or events, where that confidence expresses a faith in the probity or love of another, or in the correctness of abstract principles (technical knowledge)."*
>
> (Pg.34)

Trust involves a sense of faith and assumes there maybe an element of risk involved. Whereas, confidence may refer to an attitude that familiar things will maintain their status quo. An individual that refrains from considering options engages in a situation of confidence, whereas one that is aware of alternatives and attempts to avert the risk engages in trust. Luhmann (1988) also adds that trust should be understood distinctively in relation to risk. Giddens (1996) argues that trust is related to absence in time and space. This is because there would not be any reason to trust an individual whose activities were constantly visible, and whose thought processes were transparent, or any system whose functions were entirely known and understood. For instance, trust in symbolic tokens such as money, or expert systems such as e-mediated learning technologies are dependent upon the faith in the accuracy of principles of which an individual is oblivious to, not faith in the good intentions of others.

## EXPERT SYSTEMS AS DISEMBEDDING MECHANISMS

Expert systems act as disembedding mechanisms as they remove social relations from the context of immediacy by facilitating the separation of time and space as the requisite for time-space distanciation, which such mechanisms encourage. Giddens (1996) theory of time-space distanciation is concerned with how the absent other interacts with the present locale. In other words, disembedding is the process by which social relations are taken from local contexts of interaction and then re-structured across indefinite periods of time and space. Giddens (1996) suggests that expert systems remove social relations by promising guarantees of expectations across the distanciation of time and space in a similar way to symbolic systems, such as money. He defines money in terms of credit and debt and suggests that this form of transaction is a means for time-space distanciation. Giddens (1996) asserts that money enables transactions to be carried out between agents broadly separated in time and space and adds:

> *"Symbolic Systems are a method of interchange which can be passed around without regard to the specific characteristics of individuals or groups that handle them at any particular point in time."*
>
> (Giddens, 1996, Pg.22)

Giddens (1996) argues that the dynamism of expert systems stems from the detachment of the factors of time and space, and then the reattachment of the two factors in models that allow specific time-space zoning of social life, the detachment of social systems and reflexive ordering and re-ordering of social relations. He provides a useful example of the calendar to demonstrate this concept. In pre-modern cultures, calendars linked time with space until the clock was widely used across the globe. The invention of the clock resulted in a uniform dimension of time; i.e. zones of the day could be designated. A classic example of this is the 9 a.m. to 5 p.m. working day. Time continued to be connected with space until the world-wide standardisation of calendars and time across regions. Furthermore, the creation of the global map linked space with time. A good illustration of a time-space ordering device is the train timetable. The timetable lists when and where trains arrive and enables the co-ordination of trains and passengers and freight across time and space.

The impact of technological innovations on social relations is indeed an important. but under-researched area of study, particularly with advances in global communications technology. In a recent study carried out by Williams and Williams (2005) on the impact of mobile phones on family social relations, the authors' address the ability of technological innovations to 'stretch' social relations between individuals across time and space. In their study, Williams and Williams (2005) with reference to the mobile phone note how:

> *"This new technology allows these relations to be stretched over distance and for negotiation to take place within a broader spatial framework."*
>
> (Pg. 319)

## TRUST IN EXPERT SYSTEMS

Giddens (1996) suggests that:

> *"The nature of modern institutions is deeply bound up with mechanisms of trust in abstract systems, especially trust in expert systems. In conditions of modernity, the future is always open, not just in terms of the ordinary contingency of things, but in terms of the reflexivity of knowledge in relation to which social practices are organised."*
>
> (Pp. 83 and 84)

Giddens (1996) notes that expert systems act as disembedding mechanisms as they remove social relations from the immediacy of context by providing guarantees of expectations across time and space. He adds that every disembedding mechanism; both symbolic tokens and expert systems are dependent upon trust. Trust plays a fundamental role within institutions of modernity and is vested not in individuals, but abstract capacities. Giddens (1996) argues that in abstract systems trustworthiness is two-fold. Firstly, it is established between individuals who have been acquainted over a period of time and have authenticated the credentials, which make them reliable to one another. Secondly, trustworthiness in abstract systems is different. Reliability is still central, but in some instances trust in abstract systems may not presume any interaction with individuals who are responsible for them. Yet, in most cases individuals or group are involved. Giddens (1996) comments:

> *"... and I shall refer to encounters with them on the part of lay actors as the access points of abstract systems."*
>
> (Pg. 83)

The role of lay actors has developed from the pre-modern era. This is because they have to calculate the benefits and risks in instances where expert knowledge not only provides the calculus but also creates or reproduces universe of events, due to the continual reflexive implementation of that very knowledge. Giddens (1996) explains how the trust relations between the two interactions are different by using the following terms 'facework commitments' and 'faceless commitments'. He maintains that:

> *"Facework commitments refers to trust relations which are sustained by or expressed in social connections established in circumstances of co-presence... faceless commitments concerns the development of faith in symbolic tokens or expert systems."*
>
> (Pg. 80)

Giddens (1996) highlights the importance of trustworthiness and notes how trustworthiness differs between individuals and disembedding mechanisms. He argues that trustworthiness between individuals is a process that has been established over a period of time, because each individual has justified the requisites that make them dependable. Unlike trustworthiness in individuals, trustworthiness in disembedding mechanisms does not require any meetings with the individuals or groups responsible for the system. Nevertheless, he suggests that in most circumstances individuals are involved and refers to these individuals as 'lay actors'.

> *"I shall refer to encounters with them [individuals] on the part of lay actors at the access points of abstract systems. The access points of abstract systems are the meeting ground of face-work and faceless commitments."*
>
> (Giddens, 1996, Pg. 83)

The access point becomes a source of vulnerability for the expert system, because the trust relations in the expert system are dependent upon the lay actor's experiences at the outset of the system. Consequently, a bad experience with the expert system can lead to cynicism, which can ultimately lead to the lay actor opting out of the expert system. Giddens (1996) maintains that:

> *"Access points are points of connection between lay individuals or collectives and the representatives. They are places of vulnerability for abstract systems. The fact that access points are places of tension between lay scepticism and professional expertise makes them acknowledged sources of vulnerability for abstract systems. In some cases a person who has unfortunate experiences at a given access point where the technical skills in question are relatively low, may decide to opt out of the client-layperson relationship."*
>
> (Pg. 88-91)

Giddens (1996) usefully notes that at access points, the possibility exists for experts to make mistakes by misconstruing or being unacquainted with the expertise they are believed to hold. He suggests that:

> *"It is virtually always the case that at access points a strict division is made, to use two more of Goffman's concepts, between "front stage" and "backstage" performances...The clear distinction of front and backstage reinforces demeanour as a means of reducing the impact of imperfect skills and human fallibility."*
>
> (Pg. 86)

To add further light to the issue of the vulnerable nature of expertise, Giddens (1996) usefully highlights:

> *"There is a difference between expertise and the expert, which those who work at access points ordinarily wish to minimise as far as possible.*

*Experts can get things wrong, by misinterpreting or being ignorant of expertise they are presumed to possess."*

(Pg. 86)

## RESTRUCTURING OF WORK TASKS

Giddens (1996) argues that modernity is a double-edged phenomenon and although modernity has created greater opportunities than before, there is a dark side to these opportunities. Giddens (1996) suggests that the development of modern institutions incorporates the use of expert systems. As discussed throughout this section, these expert systems act as disembedding instruments by removing social relations from local contexts of interaction and then re-structure these relationships across indefinite periods of time and space.

Using Giddens (1996) concepts of expert systems in the context of e- mediated learning technology in higher education; we can see how the technology destabilises the existing structure around which the university has developed. This process leads to the creation of additional structures and processes. Building on Giddens (1996) argument, the introduction of e-mediated learning systems into UK universities is often seen as a panacea for the changes that higher education institutions are experiencing.

However, earlier research carried out by Grewal (2003, 2004) and Quinsee and Hurst (2005) suggests that academic staff find the integration of e-mediated learning technologies into their existing modules to be extremely time consuming. Grewal (2003; 2004) criticises the notion that e-mediated learning technologies have the potential to reduce the workload of academic staff. This is because the Grewal's (2003; 2004) findings show that on many occasions the work task of the academic member of staff does not lessen, rather the nature of the work task is restructured. Hence, using e-mediated learning technologies creates new types of work tasks.

Quinsee and Hurst (2005) build on the work of Grewal (2003; 2004) by suggesting that e-mediated learning technologies are extremely time consuming to develop and maintain.

> *"There is the perception, sometimes among students and management, that e-learning can take less time. However, as anyone involved with online learning will testify production of materials and adequate support of students using the online materials can take a phenomenal amount of time. Indeed, communication tools can be used to encourage peer interaction and perhaps circumvent the role of the tutor in certain circumstances but this does not necessarily result in a reduction of time. Rather it is often a necessity required to deal with the increased volume of information flow."*
>
> (Pg. 3)

Going back to Giddens (1996) argument about modernity being a double-edged sword, we can see how on one hand, e-mediated learning technologies enable work to be transferred between the stakeholders of the university. This process allows the work tasks to be redistributed, transferring divisions of labour. For instance, the arduous task of photocopying course materials can be transferred from the academic staff to students by making material available online. Hence, the onus is placed on the students to download and print course material, saving academic staff time, in theory.

However, on the other hand transferring the work task does not necessarily mean that time can be saved, or that the academic staff member is relived of a certain task. Rather the method with which the task is carried out changes, the lecturer is now faced with formatting existing course materials to place online, the setting up and maintenance of the site, which will have to be continually updated. In many cases the lecturer will have to learn a whole new set of skills in order to use the system in the first instance, and when the system is upgraded then the lecturer will have to invest additional time into updating their current IT skills.

To put this argument into perspective, a simple analogy can be made with the theory of classic labour saving technology (Barrett and McIntosh, 1991). Busy lives permit that labour saving devices, such as dishwashers are adopted into many modern households. However, dishwashers do not necessarily reduce labour in any way, but redistribute the work task. The dishes still have to be rinsed and loaded into the dishwasher, detergent added to the machine and then unloaded. Thus, the work task is not reduced but reformed.

The influential study carried out by Cowan (1983) also provides a good example of how the time saved by the mechanisation of laundry work was in fact spent on striving for higher standards. This offset the advantage created by the technology. Before the 1920s, the majority of middle-class laundry would be carried out by commercial laundries or by hired laundresses. The emergence of the washing machine rendered the laundry business and laundresses' jobs obsolete. The task of laundry was redistributed to the housewife, to be carried out within the home. Because laundry became relatively easier, it was carried out more often. Furthermore, expectations were raised and individuals were expected to wear cleaner clothes. More recently, Silva (2002) notes that studies carried out on household technologies suggest a continual paradox in that the amount of time spent on housework appears unaffected by technological change. Indeed, this classic example demonstrates how technological advances do not reduce work tasks, but redistribute them. Silva (2002) suggests:

> *"Thus it appeared as if technological modernisation created more housework."*
>
> (Pg. 332)

Cornford and Pollock (2003) further support this issue by suggesting that e-mediated learning technologies can be seen as threatening to academic members of staff as they destabilise the existing structure around which the university has been developed. They note that e-mediated learning technologies enable a new division of labour to be created between individuals and computers. Yet, as mentioned earlier this does not necessarily guarantee that time can be saved, as the work tasks need to be configured into a format that is compatible with the type of e-mediated learning technology in use. Cornford and Pollock (2003) further add that e-mediated learning technology enables work to be transferred between the stakeholders of the university, alleviating the need for co-presence. The technologies allow work tasks to be redistributed by transferring divisions of labour. A new division of labour emerges between people and machines as computers can handle arduous tasks, such as compilation, storage and distribution, making work mobile. However, the technology in isolation does not allow work to be made mobile, rather the work task needs to be configured into a format that is compatible with the other technologies in use.

> *"The work task must be untangled from its local constraints, stripped of its existing linkages and then translated into information."*
>
> (Cornford and Pollock, 2003, Pg. 28)

More recently, Quinsee and Hurst (2005) usefully highlight how the implementation of e-mediated learning technology restructures processes and procedures within the university system, and how all stakeholders need to be included the integration process from an early stage:

> *"Procedures concerning the submission of coursework may need to be addressed with the move to online learning. Should administrative staff be expected to print out coursework submitted online, or is that the responsibility of the lecturer? Will lecturers' post marks online, or will administrative staff distribute marks? Support and administrative staff should be included at an early stage in the discussions on implementing the online learning environment so that they can provide support to students."*
>
> (Quinsee and Hurst, 2005, Pg. 5)

In a similar vein to Giddens (1996) concept of expert systems, Quinsee and Hurst (2005) outline that the flexibility afforded by e-mediated learning systems can turn into negative experiences for academic staff members unless adequate support strategies are in place. They note that:

> *"For example, we had an instance of a student posting a discussion board item on a Friday afternoon and then posting two more over the following weekend complaining that her posting had not been responded to.*

> *Lecturing staff then felt obliged to explain what they had been doing over the weekend. We would not expect to answer house calls or phone calls from students over the weekend, so why discuss postings?"*
>
> (Pg. 5)

Quinsee and Hurst (2005) usefully illustrate how the boundaries between students and academic staff become blurred without explicit boundary lines being drawn between students and academic staff. They further add:

> *"Students may expect support through discussion boards, chat, email and face to face. This can place a huge and often unanticipated burden on academic staff. This workload is often seen as invisible, many lecturers in the UK are contracted out to teach dependent upon face to face contact, not online teaching."*
>
> (Pg. 3)

In summary, this section reviewed Giddens (1996) conceptual framework of expert systems and time-space distanciation. The literature argues that expert systems act as disembedding mechanisms by removing immediate social relations and restructuring these social relations across time and space. Consequently, these systems have the potential to affect the nature of the social relations between individuals. Furthermore, expert systems have the ability to restructure work tasks. Empirical studies showed how e-mediated learning technology restructures the work tasks of academic staff, creating an additional type of work tasks.

The results of these studies are contrary to current claims regarding the ability of e-mediated learning technology to reduce academic staff time by transferring certain tasks, such as photocopying on to the technology. Although, some empirical research has been carried out which explores how e-mediated learning technology restructures work tasks, by analysing the claims that e-mediated learning technology can save academic staff time. Surprisingly, there is a lack of research, which explores the impact, that e-mediated learning technology may have on the social relations between academic staff and students. Thus, informed by Giddens (1996) concepts of expert systems and time-space distanciation, the third aim of this study is to specifically explore how e-mediated learning technology influences the social relations between academic staff and students.

**Research Question 3: How does e-mediated learning technology influence the social relations between academic staff and students?**

## SUMMARY

This chapter discussed the key debates from the general literature on the implementation of e-mediated learning technology in higher education and the relevant theories and concepts in the diffusion of innovations literature and expert systems. This literature was reviewed to add to our understanding of the diffusion of innovations, particularly the diffusion of e-mediated learning technology in higher education. A summary of the critical issues to emerge from the review is presented below:

- E-mediated learning technology is being implemented in higher education in order to meet the changing demands of these institutions.

- There is conflicting evidence on the extent to which e-mediated learning technology can serve as panacea for the changes currently being experienced in higher education.

- The literature on the diffusion of innovations suggests that individuals in a social unit or organisation adopt innovations at different periods of time. Their decision to adopt an innovation is generally based on a number of social and organisational dynamics. These dynamics include, the way the individual perceives the benefits of the innovation, previous skill levels, the way the innovation is communicated to the individual and support levels.

- The reviewed literature suggests when between 10-20% of individuals in an organisation adopt an innovation, the adoption process has reached 'critical mass levels' and at this stage the innovation will become self-sustaining. While some academics argue that 'critical mass' models are indicative of the stage at which an innovation can become self-sustaining, others maintain that critical mass alone is insufficient to sustain the diffusion of technology to mainstream groups of users. Surprisingly, despite the rapid pace of technological progression, models on the diffusion of innovations have remained stagnant, albeit technological systems providing multi-functionality. Thus, one of the aims of this study is to identify the factors that influence the pace at which academic staff adopt e-mediated learning technology, and in doing so to compare and contrast the findings against the existing models of diffusion of innovations (Rogers, 1995).

- The literature reviewed also indicates that individuals often resist the adoption of an innovation when faced with the prospect of change. These studies also show that levels of IT skills, senior management support, incentives and rewards structures influence technological adoption. Although these studies provide an insight into the nature of the barriers to the adoption of e-mediated learning technology, the majority of these studies have been carried out in North America. There is an evident lack of research that identifies the barriers to the adoption of e-mediated learning technology by academic staff in UK universities. Hence, another aim of this study is to identify the barriers to take-up of e-mediated learning technology by academic staff in the context of UK universities.

- The reviewed literature further suggests that expert systems act as disembedding mechanisms by removing immediate social relations and restructuring these social relations across time and space. Consequently, these systems have the potential to transform the nature of the social relations between individuals. Furthermore, expert systems have the ability to restructure work tasks. Thus, this study will draw on Giddens (1996) concepts of expert systems to explore how e-mediated learning technology has the potential to restructure work tasks and the social relations between academic staff and students in a UK University.

- Altogether, the literature review helped to inform both the research questions to be addressed and the methods embraced in this study. Further references to the key debates on e-mediated learning technology, the diffusion of innovations literature and expert systems will be presented in the findings and discussion chapters of this thesis. This is to compare and contrast against the empirical findings of this study.

A number of questions arise from the literature review, which are taken forward and developed in the empirical study. They are as follows:

## RESEARCH QUESTIONS TO BE TAKEN FORWARD

1. **What are the factors that influence the pace at which academic staff in a campus based UK university adopt e-mediated learning technology?**
2. **What are the barriers to take-up of e-mediated learning technology by academic staff in a campus based UK university?**
3. **How does e-mediated learning technology influence the social relations between academic staff and students?**

The following chapter discusses the proposed methodology and methods adopted in the empirical study.

# CHAPTER 3-METHODOLOGY

## INTRODUCTION

The objective of this chapter is to present the methodological approach that has guided this study. In order to do this, it will be necessary to outline the underlying research philosophy, adopted research approach, data collection and data analysis methods applied in meeting the objectives of this research study. As such, this chapter is structured as follows: the first section discusses phenomenology and then the interpretivist approach as the research philosophy guiding this study. The second section discusses the rationale as to why case study research is particularly suited for research in the higher education sector. The third section provides a detailed discussion of the data collection methods adopted. The final section of the chapter discusses the data analysis techniques used in the study. This section explains how a grounded theory approach (Glaser and Strauss, 1967), and the computer software QSR NUD*IST 5 was used to analyse the case study material. As this field of study is relatively contemporary and undiscovered it is hoped that this epistemological study will lead to an understanding of the complex social and organisational dynamics influencing the diffusion of e-mediated learning technology into UK higher education, subsequently leading to further research. Appendices B and C, at the end of this thesis are provided to support the research design. Appendix B is a sample letter requesting interviews and Appendix C is a sample interview transcript.

## THE RESEARCH PHILOSOPHY

To begin with, this section attempts to introduce the philosophical stance of the researcher. Although there is significant blurring, it is widely acknowledged within methodological literature that there are two main research paradigms, namely positivism and phenomenology (Hussey and Hussey, 1997; Easterby-Smith, Thorpe and Lowe, 1999; Saunders, Lewis and Thornhill, 2003). In order to justify the approach taken in designing and carrying out this research it will be necessary to discuss these philosophies. The positivist philosophy in the social sciences is based on the approach used in natural sciences, such as botany, physics and biology. This approach searches for the facts or causes of social phenomena, with minimal concern to the subjective situation of the individual. As such, logic reasoning is applied to the research so that precision, objectivity and rigour supersede intuition, hunches and experience as the mode of exploring research questions (Hussey *et al.* 1999). Positivism implies that the researcher is objective in their analysis and can make *"law-like generalisations"* (Remenyi, Williams, Money and Swartz. 1998) becoming exclusive from the research being conducted.

> *"The assumption is that the researcher is independent of and neither affects nor is affected by the subject of the research."*
>
> (Remenyi *et al*, 1998, Pg. 23)

The positivist philosophy is generally associated with a quantitative research approach. Burrell and Morgan (1979) suggest that quantitative research

> *"Seeks to explain and predict what happens is the social world by searching for regularities and casual relationships between its constituent elements."*
>
> (Pg. 5)

The quantitative approach is concerned with testing hypotheses that emerge from theory and/or being able to forecast the extent of a phenomenon under investigation. Hence, this methodology is more suited when the objective of the research is to gather data related to the frequency of occurrence of phenomena. Further, this approach is also useful when measuring the existence of relationships between variables of interest based on hypothesis derived from theory, or making inferences about the quantity of particular characteristics in a population.

At the opposite end of the spectrum, phenomenology centres on the belief that *"the world and reality are not objective but they are socially constructed and given meaning by people"* (Husserl, 1946). This philosophy attempts to understand human behaviour from the participants' personal frame of reference. Therefore, particular attention is given to the subjective state of the individual. Giving credence to the meaning that research participants attach to social phenomena is a key characteristic of the phenomenological philosophy. Central to this philosophy is the attempt by the researcher to understand how, and why certain phenomena occur. In contrast to the positivist philosophy, the phenomenological philosophy rejects the main assumptions of positivism. This is that constant laws subsist in social systems and that these laws can be drawn out and examined in isolation from the social system itself. The crux of the phenomenological philosophy is that behaviour and attitudes are governed by their social setting, or they are 'socially constructed'. Therefore, the researcher should attempt to understand and explain phenomena in a specific setting, rather than seek ubiquitous laws that attempt to explain phenomena exempt of any context. The phenomenological philosophy is generally associated with qualitative research. The qualitative approach attempts to investigate and reflect on perceptions in order to gain an understanding of social and human activities (Hussey *et al*, 1997).

In a similar vein, Van Maanen (1983) in Easterby-Smith *et al* (1999) defines the qualitative approach as

> *"An array of interpretative techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world."*
>
> (Pg. 71)

Hence, for the purposes of this study adopting the positivist stance would contradict the aims of the research in a number of ways as follows:

- The researcher is a part of the organisation being studied therefore; this limits the ability of the researcher to be objective.
- The research does not intend to seek associations or causality, but to understand what and how certain phenomena occur.
- In adopting a positivist approach a highly structured research design may demand specific constraints on the results and may ignore deep underlying findings.

As mentioned previously, the probability of the research ideology as being exclusively positivist or phenomenology is questionable. This issue can further be highlighted in the research approach taken. The labelling of the research approach as either inductive or deductive would realistically be a tall order. The objective of the research is to gain a rich insight into the diffusion of e-mediated learning technology in a UK University As such, in developing the research questions a coherent research focus was attained through manipulating the deductive approach. However, this was not adhered to in the intended manner, as a measurable hypothesis was not created. Therefore, a combination of both a hybrid deductive and inductive approach provided a more flexible framework to allow for unanticipated changes that have may emerged from the collection of primary data (Saunders *et al*, 2000).

It is important to note that neither the positivist nor the phenomenological approach can be categorised as being more superior to the other. However, the validity of the approach will be dependent upon the objectives of the research question. Moreover, it would be unrealistic to imply that a fine divide exists between a management researcher adopting a positivist or phenomenological approach. Hussey *et al* (1999) note that some scholars prefer to use the term 'interpretivist' rather than phenomenology to minimise confusion between research philosophy and methodological approach. For the purpose of this study, the term 'interpretivist' will be used because it suggests a wider philosophical perspective rather than phenomenology, which is also a methodological approach. This is so that confusion between the underlying philosophical stance guiding this study and methodological approach adopted are minimised as far as possible.

## INTERPRETIVIST APPROACH

The philosophical orientation guiding this study is the interpretivist approach. In adopting this approach, the social world is seen to be produced and reproduced in a dynamic environment by individuals. Hence, certain phenomena, which appear to represent reality at this moment in time and in a particular social context, may not necessarily hold true in another social context, or may change in the future. In this regard, the 'social world' lacks 'external features' or 'social structures' as understood within a positivist paradigm, and the way in which individuals view the social world is determined by forces external to them.

Thus, the social world can be considered to be an individual's interpretation of the way in which they explain and justify their behaviour to themselves and others. Because, individuals dynamically create their world (not necessarily consciously or intentionally) this means that any attempt to establish a cause and effect relationship is theoretically misguided. As such, if an individual's behaviour is determined by the way in which they interpret their world, it appears logical that causal relationships will be difficult to establish empirically. This is because the conditions under which a relationship is theoretically established will have transformed by the time such a relationship has been established. In this sense, the social world is interpreted by diverse people in different situations and in diverse ways.

For instance, the literature presented in chapter 2 shows how there are different perspectives on the successful diffusion of e-mediated learning technology across higher education institutions. Whilst, at an institutional level it is argued that e-mediated learning technology can provide a panacea for the changes currently experienced in UK universities by increasing efficiency and reducing the work tasks of academic staff. At a grass roots level, it is argued that the technology does not meet the changing demands, because the technology does not reduce work tasks, but restructures these tasks. Hence, phenomena in a social context are seen to be relative to other phenomena, as phenomena cannot be absolutely true or absolutely false. Guided by an interpretivist approach, in order to make sense of and explain phenomena, the researcher attempts to understand how individuals experience and interpret their social world and reflect on the fact that individuals consciously and unconsciously construct their own individual sense of 'social reality'.

The over-riding concern when deciding which methodological approach to adopt was that the research undertaken should be both relevant to the research questions as set out in chapter 2, and should reflect the phenomenological ideology adopted in this study. Overall, it is believed that an interpretivist approach is required for this purpose, i.e. the understanding of how academic staff members adopt and adapt to e-mediated learning systems. This epistemological approach was adopted because it was deemed most plausible in attempting to meet the research objectives in the following ways. This is because an interpretivist approach reflects the need of the researcher to move aside and interpret the academic staff perspective of adopting e-mediated learning technology as best as possible. Further, this epistemological approach enables the researcher to

> *"Set aside all previous habits of thoughts, see through and break down mental barriers which these habits have set along the horizons of our thinking...to learn to see what stands before our eyes."*
>
> (Husserl, 1946 quoted in Crotty, 1998, Pg. 80)

Moustakas (2004) quoted in DeMarrais (2004) provides a useful justification for adopting an interpretivist approach:

> *"Is to determine what an experience means for the persons who have had the experience and are able to provide a comprehensive description of it. From the individual descriptions general or universal meanings are derived, in other words the essences or structures of the experiences."*
>
> (Pg. 57)

Since the purpose of the research is to gain a deeper understanding of the diffusion process of e-mediated learning technology in a UK university not to beget *'law like generalisations'* (Saunders *et al*, 2000), the interpretivist approach was deemed most plausible in achieving the objectives of the research questions. This is because in adopting the interpretivist approach, knowledge that has been identified as key to the research study, i.e. the adaptation of e-mediated learning technology by academic staff and how the certain barriers influence this adaptation process, and how e-mediated learning technology has the potential to alter the social relations between academic staff an students, can be collected by holding conversations with individuals and listening to their descriptions about factors that influence the adaptation process and social relations and by interpreting these descriptions through a process of analysis.

Because the researcher sought to understand the academic staff's experience of e-mediated learning technology, it is considered that the adaptation process of e-mediated learning technology can be expressed and made sense of via face to face interaction between the researcher and participants in an the context of an interview environment. Alvesson and Deetz (2000) suggest that the interview process can be a joint experience amongst the researcher and participants. Thus, for the purposes of this research study, it is considered that the perceptions and experiences of research participants make up valid knowledge that can be understood and interpreted by the researcher.

Furthermore, because of the emphasis of this study on understanding and making sense of situations, adopting an interpretivist approach allows the objectives of this study to be achieved. This is because the research sets out to understand the way in which academic staff make sense of their experiences with e-mediated learning technology and subsequently, how the processes and practice of the adaptation of this technology may influence academic staff experiences. Blaikie (2000) suggests

> *"Interpretivists are concerned with understanding the social world people have produced and which they reproduce through their continuing activities."*
>
> (Pg. 115)

Therefore, adopting the interpretivist approach to guide this study allows the researcher to understand how research participants make sense of their perceptions of e-mediated learning technology and their experiences of using the technology.

Hussey *et al* (1997) suggest that epistemology is concerned with the study of knowledge and what we accept as valid knowledge. Thus, in adopting the interpretivist approach the epistemological assumption is that the researcher interacts with that being researched (Hussey et al, 1997). Furthermore, this approach allows the use of a case study methodology, it enables close collaboration between the researcher and participants, and it allows the complexities of the diffusion of e-mediated learning technologies by academic staff to be acknowledged and explored. Therefore, this epistemological approach aims to be more subjective in nature and intends to focus on extracting meanings as to why certain phenomena occur and how they occur as opposed to the frequency with which they occur. Hence, the researcher becomes a part of the research process and the actions, interpretations, and surroundings affect the outcome of the research.

## SINGLE CASE STUDY RESEARCH APPROACH

According to Yin (2003):

> *"A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used."*
>
> (Pg.77)

Feagin, Orum and Sjoberg (1991) further state that the case study is an ideal methodology to adopt when a holistic in-depth investigation is needed. Through the analysis of both historical and current issues within an organisation, this method enables conclusions to be drawn and recommendations to be made regarding future strategies.

This study has focused on a single case design. Yin (2003) argues that:

> *"A rationale for a single case is the representative or typical case. Here, the objective is to capture the circumstances and conditions of an everyday or commonplace situation. The case may represent a typical 'project' among many other different projects. The lessons learned from these cases are assumed to be informative about the experiences of the average person or institution."*
>
> (Pg. 41)

This study draws on empirical data obtained from a traditional campus based university within the UK higher education sector. The material was gathered from an investigation of written documents, semi-structured interviews with members of faculty, senior management and technicians, emails, steering group meetings and the observation of organisational settings and context. The organisation studied was typical of other higher education institutions in the UK, in terms of being a campus-based university offering undergraduate and postgraduate degrees. The institution also faced the same external pressures such as funding issues, monitoring and evaluation issues, and government policies that directly influenced the method with which the university delivered education, as discussed in chapter 1. Government reform to increase and widen participation means that UK higher education institutions are expected to actively recruit and retain under-represented and diverse groups of students. In other words, UK higher education institutions will have to adapt in order to meet the needs of this heterogeneous group of students. These needs can affect both the structure of the university, such as providing wheelchair access, as well methods of delivery, such as providing open and flexible modes of study for part-time students. As mentioned before, the case study organisation typically represents other universities in the UK, this allowed the key issues raised in the literature review to be tested.

The literature reviewed in chapter 1 explored the changes taking place in the UK higher education sector over the last hundred years. From a wider perspective, this helped to focus the empirical study. For instance, the academic culture that remains prevalent can be understood against the historical context and changes occurring within this sector that were outlined earlier. Subsequently, the questions raised by the review steered the issues that were explored during the interview process.

A frequent criticism of adopting a single case study approach is that its dependence on a single case renders it incapable of providing a generalising conclusion. However, as discussed earlier, the researcher had significant access privileges to the case study organisation and therefore, was able to generate multiple sources of rich data, which perhaps would not have been possible to collect from other institutions. Furthermore, the university studied, typically represented numerous other universities in the UK in terms of being a campus-based institution offering undergraduate and postgraduate degrees, albeit different subject areas. The Case Study University also faced the same external pressures for reform and similar internal tensions met by universities whose strategies are geared towards becoming research-led institutions. It was therefore, considered that the development of a single case study would be especially suitable for this research study, as the aim of the research is not to test an established theory. Rather, the objective is firstly to generate a deeper understanding of the adaptation of e-mediated learning technology by academic staff in a UK university, through an analysis of the implementation process of the technology within the case study organisation. Secondly, to raise awareness of the social issues that emerges as a direct result of the technology. As the issues are complicated, they necessitate analysis at a number of different levels. At the higher education level, organisational strategy level, the management and grass roots level.

Saunders, Lewis and Thornhill (2003) further advocate the use of a single case. They suggest that by studying a single case, a more detailed and in-ground intense knowledge can be acquired than carrying out an investigation over an industry sector. Likewise, Hussey and Hussey (1997) argue that because the aim of the research is to generate in-depth findings, this is possible with a sample of one. The case study is a commonly used research strategy in educational settings (Winston, 1997; Pyecha, 1998; Carney, 1995; Boisjoly and DeMichiell, 1994; Gumport, 1997).

Pyecha (1998) used a case study design to study special education using a pattern-matching procedure. Pattern-matching is where various pieces of data from the same case may be connected to some theoretical proposition. In this study, several states in the USA were studied and a comparative analysis was carried out using the data from the states activities against idealised theoretical patterns. Boisjoly and De Michiell (1994) from the Harvard Business School have advocated the use of case based learning within their business school, and Gumport (1997) has successfully applied the case study method to her research on 'the reshaping of academic programs and practices in the higher education sector'. She suggests that the research question became apparent having observed a contradiction that the forces external to higher education was dramatically reshaping it. Yet, higher education's organisational inertia meant that it had remained essentially the same. The research involved analysing institutional archives and conducting interviews with two hundred administrative and faculty members. Related to the use of information technology at Fairfield University in the USA, Winston (1997) adopted a single case study design to investigate the aspects of information technology relevant to client/server computing and the Internet. Levy (1998) also adopted a single case design to research the use of instructional and research computing at the University of Arizona. Yin (2003) and Bennett (1986) have usefully summarised the stages involved in case study research as follows:

<u>Design the Case Study:</u>

- Determining the current situation.
- Collecting information about the background to the current situation
- Identifying the case study issues.
- Outlining the objectives of the research.

<u>Conducting the Case Study:</u>

- Collecting more specific data to test alternative hypothesis about the important factors in the current situation.

<u>Analysing the Case Study Evidence:</u>

- Examining the evidence to address the initial propositions of the study.

<u>Developing the Conclusions and Recommendations:</u>

- Presenting recommendations for action.

The advantage of using the case study in this way is that a significant and diverse range of data can be gathered and analysed in comparison to quantitative research methods. The case study is designed to extract the details from the viewpoint of the participants by using multiple sources of data. Feagin, *et al* (1991) champion the use of case studies, as they *'give a voice to the powerless and the voiceless'*. However, case study research is often considered to be unscientific in nature, because replication is not possible and this method is therefore, open to criticism. As such, the validity and reliability of using such methods are open to question.

Nevertheless, Yin (2003), Stake (1995) and Feagin *et al* (1991) assert that the reliability of the process can be confirmed by using multiple sources of data. Denzin (1984) suggests that this type of triangulation is known as 'data source triangulation'. As mentioned earlier, the data was gathered from interviews, attending steering group meetings, documents and emails. The rationale for using multiple sources of data is the triangulation of evidence. Triangulation increases the reliability of the data and validity of the process of gathering information. In the context of data collection, triangulation serves to corroborate the data gathered from other sources. However, the reliability of using case studies is often questioned because of the extent to which the findings from a particular case study can be generalised to a wider population. Yin (2003) and Winston (1997) have refuted that criticism by explaining the difference between statistical and analytical generalisation:

> *"In analytical generalisation, previously developed theory is used as a template against which to compare the empirical results of the case study."*
>
> (Yin, 2003, Pg. 33 and 33)

Winston (1997) adds that the grey manner of generalising assumes that some sample of cases have been drawn from a larger universe of cases. As such, the terminology is misleading. For instance, Winston (1997) suggests that *"a small sample emerges as if a single case study were a single respondent."* To conclude this section, Harris (1999) provides a useful quote to summarise the argument:

> *"While statistical analysis allows a researcher to infer that characteristics of the sample may be expected in a wider population, conclusions drawn from an informed case study based upon a thorough and logical analysis can be equally valid."*
>
> (Pg.81)

## ACCESS

It was unanticipated that issues of access would arise within the case study institution for data collection purposes, because at the time of carrying out the study the researcher had significant access privileges to the Case Study University. This meant that the researcher could directly contact potential interviewees. Furthermore, the researcher was invited to become a member of the e Learning steering group at the Case Study University. It was expected that as the study was conducted within an academic institution, where research is one of the key strategic aims. In addition to the implementation of e-mediated learning technology directly impacting the way in which teaching and learning material is delivered, that organisational members would have a vested interest in the research findings. Hence, the opportunity to voice their opinions about the technology. Admittedly, the author was surprised that only 65 percent of the potential interview participants that were approached agreed to take part in the research. This was despite several attempts to contact the potential participants. It was expected that a larger percentage would respond. It could be argued that the topic under research is sensitive in that the study aimed to extract rich data about academic staff members' opinions on the implementation of e-mediated learning technology. At that time the university was going through a restructuring exercise and due to the uncertainty that this created, certain members of staff did not want their opinions aired.

Nevertheless, a high level of co-operation was experienced from the participants that agreed to be interviewed. This can be partly attributed to the fact that focus was placed on the experiences as perceived by the actors and the methodology required that the researcher listen actively. Fernandez (2004) notes that research, which centres on the viewpoint of the actors, enables the actors to articulate their thoughts about issues they consider to be important. As a result, this vocalisation enables participants to reflect on empirically significant events (to them), gaining further understanding of past actions and acquiring new insights. Furthermore, the attendance at the steering group meetings provided an abundance of rich data at a number of different levels, which are illustrated in Table A. Additionally, the ethical protocol as recommended by Hussey and Hussey (1997) was followed. In the initial letter requesting an interview, confidentiality was assured in that the names of the individuals would remain anonymous and that the data collected would be stored in a secure environment and not used for any purpose, other than the research study.

## DATA COLLECTION PROCESS

To maintain the confidentiality of the Case Study University under investigation, pseudonyms were used to maintain the anonymity of the university, the schools, departments, functions and the participants involved in the empirical investigation. The university will be referred to as the South Eastern University. The School will be referred to as the School of Management. The centralised teaching and learning department will be referred to as the Unit for Learning and Teaching and the School's technological systems will be referred to as the Intranet and the F drive.

The empirical research attempted to address the following research questions:

1. **What are the factors that influence the pace at which academic staff in UK universities adopt e-mediated learning technology?**
2. **What are the barriers to the take-up of e-mediated learning technology by academic staff in UK universities?**
3. **How does e-mediated learning technology influence the social relations between academic staff and students?**

So that these research questions could be explored, it was considered pertinent to carry out an exploratory investigation into the nature of the adoption of e-mediated learning technology by academic staff. As well as research into the barriers to the take-up of this technology by academic staff in UK universities, and also how the technology influences on the social relations between academic staff and students. This is because in the first instance there is a lack of research that addresses the adoption of e-mediated learning technology by academic staff in the context of UK universities. Similar studies have been conducted within North America. Hence, there is little understanding of the adoption process of e-mediated learning technology by academic staff in UK universities. Secondly, there is a lack of research that addresses the impact of e-mediated learning technology on the social relations between academic staff and students. Thirdly, an interpretivist approach was adopted because the aim of the research was to carry out an in-depth exploration of how and why academic staff adopt e-mediated learning technology. Whilst exploring how the technology influences the social relations between academic staff and students, rather than test the frequency with which academic staff adopt e-mediated learning technology, or a measured hypothesis. The in-depth primary data was gathered via a number of different data sources as follows:

1. **A series of semi-structured interviews with faculty members that were aware of the e-mediated learning developments taking place at the Case Study University.**
2. **E Learning Steering Group Meetings**
3. **School E-mails**

During the early stages of the research, a pilot study was carried out to narrow down the research focus. The pilot study was carried out in two stages. Stage 1 focused on gathering student responses about their use of e-mediated learning technology. Two questionnaires were distributed to students that were using WebCT (The implementation of WebCT into the Case Study University is discussed in the following chapter). The first questionnaire was distributed at the start of the term to determine student IT skills levels and how students perceive WebCT. The second questionnaire was distributed at the end of the term to ascertain student experiences of using the technology, and whether WebCT met their initial expectations. An account of the pilot study is provided in Appendix D. The second stage consisted of carrying out interviews with faculty members. These early interviews brought out additional information that required further and more detailed inquiry. Therefore, it was decided that although student experiences of using e-mediated learning technology is an important area, it is a saturated field. Most of the literature within this field focuses on student centred learning and how the technology can be enhanced to facilitate student learning experiences (Banziger, 2004; Uskov, 2004; Brinkley, 2003). How academic staff in UK universities adopt e-mediated learning technology is a relatively unexplored area that required detailed exploration at the formal interview stage.

The interview stage took place over a period of eight months, this allowed key comments to be cross referenced against earlier interview material. The comments were used to inform the later questioning. The interview data was gathered via in-depth semi-structured face-to-face interviews with the following individuals at the Case Study University:

- 30 faculty members.
- The Head of Department from the School of Management.
- The Pro-Vice Chancellor.
- The e- Learning development administrator.
- 1 technician.

Table 1 provides a summary of the data collection details, and Table 2 provides a profile of the interviewees. As mentioned earlier, other data was collected from written documents, steering group meetings and emails. At the time of carrying out the empirical investigation the university went through a period of restructuring. The restructuring process is discussed in the following chapter.

**Interview Process**

Guided by the theoretical framework of diffusion of innovations (Rogers, 1995) and the conceptual framework of expert systems (Rogers, 1995) the interview data was collected through formal, semi-structured in-depth interviews with faculty members of staff. The majority of questions were designed to be open-ended. This allowed the participants to fully express their own perceptions and views. The use of structured questions as an interviewing method was deemed inappropriate as this technique pre-determines hypotheses which can be tested by specific questioning and would therefore, have been inappropriate for addressing the research aims of this study. On the other hand, conducting unstructured interviews where theoretically the interviewer is to provide no guidance is realistically a tall order. This is because the very presence of the interviewer and description of the aims and objectives of the research will influence the rationale and type of answers given. Watson (1994) suggests that within an interview setting it becomes difficult to remain entirely objective, as there is a probability that the researcher will influence the responses given and attitudes revealed by the interviewees. Yet, Hussey and Hussey (1997) argue that the strength of semi-structured interviews lies in the process of open discovery of data as issues discussed, questions raised and matters explored and new topics that emerge vary at each interview.

The interviews were all tape-recorded and transcribed so that a complete record of the conversation could be obtained. Additionally, notes were made during the interview process to highlight key points made during the interview. However, Glaser (1998) discourages the use of tape recording. He argues that recording is unnecessary as the goal of the researcher is to identify key concepts and patterns and not precise accounts. Thus, for purposes of conceptualisation the words are not as significant as they belong to one of many possible units in a process. Nevertheless, it would be too riskier a strategy to follow not to record the interview data. By recording and transcribing the interviews, the researcher was able to revisit and re-code text as more evidence emerged and patterns become clear.

This distinct advantage of having complete transcriptions and the ability to replay the interviews at any time enabled the researcher to constantly compare and contrast concepts with previously collected data. This enabled the data to be re-interpreted as issues and concepts were continually developed over the period of the research. This data collection technique is common in business and management research (Easterby-Smith, Thorpe, and Lowe, 1999; Yin, 2003; Hussey and Hussey, 1997), and the author has previous experience of using this technique, where it was found to be highly effective in making clear the key concepts raised by the participants.

**E Learning Steering Group Meetings**

The author was invited by the E Learning Steering Group of the Case Study University to become a postgraduate member. At the meetings, various departmental representatives from across the university including academic staff, technicians, library and administrative staff discussed the direction of the e-mediated learning strategy. The group was formed in 2002 and met on average of 2 times a year. The author joined the group in 2002 and attended 6 meetings. This allowed the author to gain an understanding of the overall strategic direction of e-mediated learning, and an insight into how various departments were using the technology. Minutes from the meetings were collected and notes were made during the meetings, which allowed the data to be triangulated against the interview and email data.

**Group Email**

Yin (2003) maintains that in case study research, data can be collected from a number of different sources such as documents. During the research process a number of departmental emails within the School of Management were circulated between staff that discussed their use of WebCT. The researcher was also a recipient of the staff emails and found this data to be extremely useful to compare and contrast against the other data collected. These interactions enabled the literature that was reviewed in chapter 2 to be built upon.

# TABLE 1: DATA COLLECTION DETAILS

| DATA COLLECTION SOURCE | ROLE OF THE PARTICIPANTS | ANALYSIS LEVEL |
|---|---|---|
| **Interviews** | • Pro-vice chancellor<br>• Head of the School of Management<br>• E Learning development administrator<br>• 30 Academic staff<br>• WebCT technician | • Strategic<br>• Management<br>• Strategy<br>• Grass roots<br>• Technical |
| **Steering Group Meetings** | • E Learning development managers.<br>• E Learning Technicians<br>• Registry Officers<br>• Media Services Representatives<br>• Computing Services Representatives<br>• Staff development Officer<br>• Library Support Staff<br>• Academic Staff ( Computing Dept., Mathematical Sciences, Mechanical Engineering, Design and Systems Analysis, Biological Sciences, Education, Health and Social Care, Sports Sciences, School of Management) | • Strategic level<br>• Management<br>• Technical<br>• Grass roots |
| **E Mails** | • Academic staff (School of Management and E Learning technologists) | • Grass roots<br>• Technical |

# TABLE 2: PROFILE OF INTERVIEWEES

| Age | Gender | Job Title | Education Level | E-Mediated Learning Technology Used |
|---|---|---|---|---|
| 56-65 | Male | Senior Management | Masters | Intranet/WebCT |
| 26-35 | Male | Lecturer | PhD | WebCT |
| 46-55 | Female | Lecturer | MBA | Intranet/WebCT |
| 36-45 | Male | Lecturer | Masters | Intranet |
| 46-55 | Female | Lecturer | Masters | Intranet/WebCT |
| 36-45 | Female | Research Fellow | PhD | WebCT |
| 56-65 | Male | Senior Lecturer | PhD | WebCT |
| 56-65 | Male | Senior Management | PhD | Intranet/WebCT |
| 36-45 | Female | Senior Lecturer | PhD | WebCT |
| 25-36 | Female | Lecturer | PhD | Intranet/WebCT |
| 25-36 | Male | Lecturer | PhD | Intranet/WebCT |
| 25-36 | Male | Lecturer | PhD | Intranet/WebCT |
| 56-65 | Male | Lecturer | Masters | Intranet/WebCT |
| 36-45 | Female | Senior Lecturer | PhD | Intranet/WebCT |
| 36-45 | Male | Senior Lecturer | PhD | Intranet |
| 46-55 | Female | Professor | PhD | Intranet/WebCT |
| 36-45 | Female | Lecturer | PhD | Intranet |
| 56-65 | Male | Professor | PhD | WebCT/Intranet |
| 56-65 | Female | Pro-Vice Chancellor | PhD | WebCT |
| 56-65 | Male | Professor | PhD | WebCT |
| 46-55 | Female | Lecturer | PhD | Intranet/WebCT |
| 25-35 | Male | WebCT technician | BSc | WebCT |
| 56-65 | Male | Lecturer | Masters | WebCT |
| 46-55 | Female | Lecturer | PhD | Intranet |
| 56-65 | Male | Lecturer | Masters | Personal WebPages/Intranet/WebCT |
| 46-55 | Male | e-learning administrator | PhD | WebCT |
| 56-65 | Male | Lecturer | PhD | Intranet/WebCT |
| 46-55 | Male | Lecturer | Masters | Intranet |
| 56-65 | Male | Lecturer | Masters | Personal Webpage /Intranet |
| 46-55 | Male | Lecturer | PhD | Intranet |
| 25-35 | Female | Lecturer | Masters | WebCT/Personal WebPages |
| 36-45 | Male | Lecturer | PhD | Intranet/WebCT |
| 46-55 | Male | Lecturer | PhD | Intranet/WebCT |
| 36-45 | Male | Lecturer | PhD | Intranet/WebCT |

## LIMITATIONS OF USING THE PROPOSED DATA COLLECTION METHODS

Although the interview technique was considered an appropriate data collection method to meet the objectives of the study, there are still various limitations of using this approach. These include capturing responses, curtailing the spectrum of topics being discussed and analysing the data. Watson (1994) questions the interview technique by indicating that within an interview setting it becomes difficult to remain completely objective. This is because there is the probability that the researcher will influence the responses given.

It is important to note that many of the limitations mentioned were controlled to a certain extent. However, there may have been various issues such as class, racial or gender bias, which were out of the control of the researcher and consequently may have affected the outcome of the research findings. Rosenthal (1966) argues that male and female researchers sometimes obtain significantly different data from their participants. The measurement or prediction of potential bias was problematic, but because the researcher was aware that these factors might distort the findings, the awareness may help to make the study more valid. Despite the shortfalls of the interview as a qualitative data technique, the strength of the method rested in the ability of the researcher to ask intricate and detailed follow up questions. Hence, further information was generated, which would not have been possible if a questionnaire was used. Easterby-Smith *et al* (1999) maintain that semi-structured interviews are an appropriate research method when:

> *"It is necessary to understand the construct that the interviewee used as a basis for his or her opinions about a particular matter or situation."*
>
> (Pg.74)

The objective of the research was to develop a conceptual theory about the social and organisational dynamics influencing the diffusion of e-mediated learning technology in UK higher education and not to test existing theories. Therefore, the in-depth semi-structured interview process, attendance at the E Learning steering group meetings and access to staff emails enabled deep and rich data to be gathered.

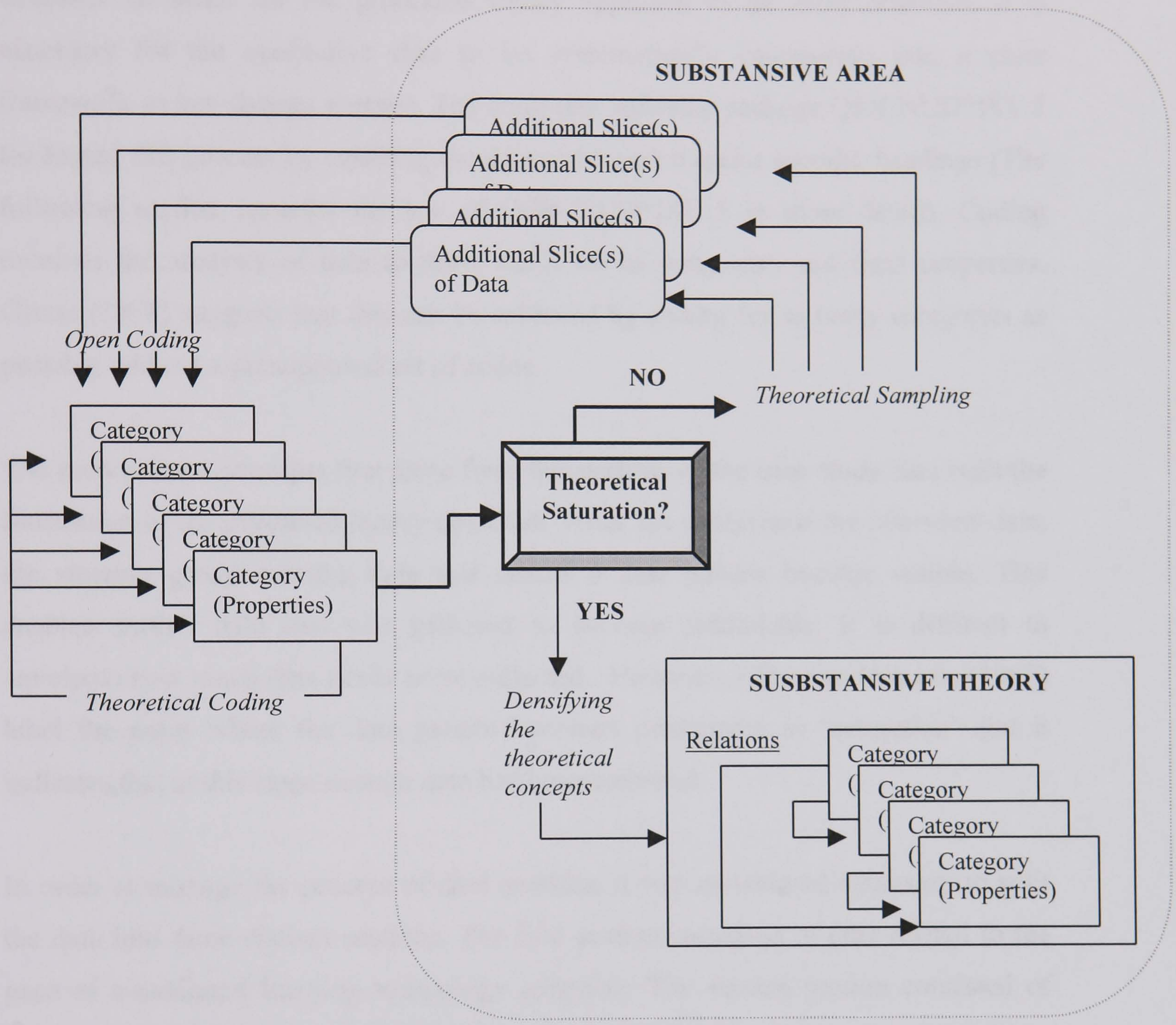
## OTHER DATA COLLECTION METHODS CONSIDERED

An alternative data collection method of having a focus group within the Case Study University was initially considered, but dismissed because the researcher had access privileges to the organisation being studied. This meant that the researcher had both, formal and informal access to respondents and case study material. The topical nature of the study generated an interest from members of the organisation. Therefore, the plethora of rich data collected was drawn upon in this regard. Ethnography was also considered, as the researcher becomes a working member of the group being studied. However, this method was rejected because the researcher did not have any previous experience of using this methodological approach.

## THE DATA ANALYSIS METHOD: GROUNDED THEORY APPROACH

A useful way to begin this section is by illustrating the concept of the grounded theory approach as illustrated in Diagram 9. Lehmann's (2001) model interprets the grounded theory process, as a spiral that starts by gathering slices of data in an essential field of enquiry. This data is codified and categorised in a recurring process that advances towards saturation. This results in the theoretical grounding of concepts depicted by a substantive theory. Glaser and Strauss (1967) first formulated grounded theory, but since then the theory has developed in two main directions (Glaser, 1992; Strauss and Corbin, 1998). Glasser (1992) emphasised the need for the researcher to maintain his or her creativity and be less systematic in his or her methodological approach. Conversely, Strauss and Corbin (1998) advocated a more linear process. Thus, the two developed approaches to grounded theory are often called 'Straussian' and 'Glaserain' (Stern, 1994).

**DIAGRAM 9: THE PROCESS OF BUILDING GROUNDED THEORY** (Lehmann, 2001)




The grounded theory approach aims to avoid tainting established theoretical frameworks by discovering theories and concepts that are grounded in the gathered primary data. Importance is placed on developing theory, rather than corroborating it and more specifically developing theory that will be pertinent to the research being undertaken. In its purest form the grounded theory approach is used for analysing data where there is no established theoretical framework, and requires the research to be conducted without any preconceived ideas of the data findings. This is to ensure that any viewpoints only emerge as a result of the analysis of the data. Harris (1999) notes that realistically this level of objectivity is difficult to achieve as the researcher is bound to reflect upon his or her past experiences to make sense of and explain a new situation. In order for the grounded theory approach to be most effective, it is necessary for the qualitative data to be systematically categorised into a clear framework as key themes emerge. The computer software package QSR NUD*IST 5 facilitated this process by enabling the data to be coded under specific headings (The following section explains the use of QSR NUD*IST 5 in more detail). Coding involves the analysis of data to draw out a set of categories and their properties. Glaser (1978) suggests that this can be achieved by coding for as many categories as possible without a presupposed set of codes.

The predominant concepts that arose from the analysis of the case study data built the foundation of the grounded theory approach. After the analysis of the interview data, the steering group meeting data and emails a data pattern become visible. This enabled further data that was gathered to become predictable. It is difficult to anticipate how much data needs to be collected. However, Glaser and Strauss (1967) label the point where the data pattern becomes predictable as 'saturation' and it indicates that at this stage enough data has been collected.

In order to manage the process of data analysis, it was considered necessary to split the data into three distinct sections. The first section consisted of data related to the pace of e-mediated learning technology adoption. The second section consisted of data related to factors that influenced the take-up of e-mediated learning technology. The third section consisted of data that related to the influence of e-mediated learning technology on social relations. Dividing the data into three sections allowed the data to be organised when the data was initially read. Data related to the pace of technological adoption reflected individual decisions made to adopt technology at a particular point in time and at a specific level. Subsequently, data related to barriers of adoption, related to factors influencing the pace and level of e-mediated learning technology adoption. In addition, data related to social relations, reflected the influence of e-mediated learning technology on the social relations between academic staff and students. Hence, analysis of the case study data incorporated the separation of sections of interview and e-mail transcripts and steering group meeting notes. which were then coded, categorised and listed under specific headings.

The application of the grounded theory approach developed through four distinct stages as follows:

1. **Highlighting Critical Citations:** This stage involved the interview, e-mail and steering group transcripts to be read and re-read to enable initial thoughts to emerge. This stage also involved the highlighting of key passages of transcripts and documents.

2. **Open Coding:** This phase involved the identification, preliminary coding, categorisation and summary of phenomena that emerged in the transcripts. Caution was taken during this stage to separate the data into meaningful categories. These categories were based on a key theme or variable that segregated information provided by the interviewee and information found in the email/steering group documents. The units of coding emerged from distinct statements made by the interviewees and from key information found in the e learning steering group meeting notes and email transcripts. This information concerned the individual pace of technological adoption, the barriers to technology adoption and the impact of the technology on social relations. Each statement made by the interviewees and key information identified in the email and steering group meeting data was individually coded and developed into key themes. For example, if at the very least two instances were discovered that had similarities with one another that did not fit into the existing categories, then further categories were created. At this stage, the discovery of patterns began to emerge comprising both commonalties and differences in pace and levels of technological adoption. Whilst the pace of technological adoption was interesting in its own right. The level of technological adoption became striking when it was considered in isolation. For example, during this stage it became increasingly apparent that academic staff adopt e-mediated learning technology at different rates, dependent on a number of different variables. As such, a typology was developed and academic staff were classified into distinct adopter categories as follows based on the time of adoption and their levels of WebCT adoption.

- ***Drivers:*** This group adopted the technology during the pilot stage of the implementation of the e-mediated learning system, namely WebCT. This was between 2001-2002. This group made up the first 2.9% of academic staff to adopt WebCT, and they adopted the technology at an advanced level.

- ***Eager Beavers:*** This group of adopters adopted the technology when WebCT was implemented campus wide. This was between July 2002 and June 2003. This group made up the following 11.76% of academic staff to adopt WebCT. The eager beavers adopted the technology at a basic level.

- ***Piggy Backers:*** This group adopted WebCT between July 2003 and June 2004. This group made up the following 26.4% of academic staff to adopt WebCT. The piggy backers adopted the technology at a basic level.

- ***Coerced Sceptics:*** This group adopted WebCT when the technology became the dominant e-mediated learning system campus wide and existing systems were superseded by WebCT. This was between July 2004- June 2005. This group made up the following 38% of academic staff to adopt the technology. The coerced sceptics adopted the technology at a basic level.

- ***Vigilantes:*** This group made up the remaining 20.5% of academic staff to adopt WebCT.

This typology of academic staff members' adopter characteristics of WebCT is discussed in further detail in chapter 5 of the findings.

3. **Axial Coding:** During this stage, the preliminary index of categories were distilled, by fusing certain categories with others and by omitting others. It was necessary to make links amongst categories and to outline their attributes. In doing so, certain categories appeared with higher frequency. In turn, these were linked to several of the other emanating categories. For example, the sub-category 're-definition of academic staff roles' was initially linked to the key category 'barriers to adoption', because interviewees indicated that using e-mediated learning technology creates additional work tasks, and this may influence their decision to

adopt. Therefore, it was considered that this sub-category acted as a barrier to the adoption of the technology. Yet, upon further analysis, this sub-category was removed and re-linked to the key category 'social relations'. Because, this sub-category illustrates how e-mediated learning technology has the potential to change social relations between academic staff and students. Thus, the technology not only acts as a barrier to the adoption of the technology by academic staff but critically it illustrates the influence of this technology on the nature of social relations between academic staff and students. The following quote illustrates this process of axial coding. Re-definition of Academic Staff Roles. *"The issue for me at this point if I'm perfectly honest I don't see it as the role of the lecturer to have to be doing these things. That's where the school needs to get involved. There has to be a debate about what is the appropriate and proper role of a lecturer? There's no reason why it shouldn't change over time, but if we're going to require that kind of facility and input then they'll probably have to be trade-off's. We can't keep expecting even more diverse skills from people. Do you know what I mean? Being able to use WebCT and design the site and manipulate the technology is an integral part of what is expected as a lecturer, then it should be in the job description. It should be an integral consideration when you interview people. There should be sensitive training for people. When I started lecturing it was considered sophisticated even if you had OHPs' that were typed, it was far more conventional to just write things on, and look where we are now."*

4. **Selective Coding:** In this final phase, a few select categories were identified as key categories. Subsequently, the remaining categories were linked to the key ones. By doing so, the critical idea was to develop a framework from which the empirical research could be put into context. Lehmann (2001) refers to this process as the generation of substantive theory. For instance during this stage, three key categories were identified. These were the pace of adoption, level of adoption and barriers to adoption. Upon further analysis, it was considered necessary to consolidate pace and level of adoption into one framework. This was because the level of adoption only emerged as a category when analysing the pace of adoption. Hence, three key frameworks were developed. The first framework encompassed the pace and level of e-mediated learning technology adoption by

academic staff. The second framework encompassed the factors that influenced their decision to adopt e-mediated learning technology. The third framework encompassed the factors that influenced social relations between academic staff and students.

## LIMITATIONS OF USING GROUNDED THEORY APPROACH

As with other systematic methodologies, the grounded theory approach is often criticised because the necessity to 'provide rigour for academic peer assessment' leads to a reductionist approach (Easterby-Smith *et al*, 1999). Fernandez (2004) and Allan (2003) note that the drawbacks of using this approach are mainly related to coding and reaching saturation through conceptual emergence. Strauss and Corbin (1998) recommended a 'microanalysis' process of coding, which consists of analysing data word-by-word and coding the meaning found in words or groups of words. However, this method of coding is very time-consuming and often leads to confusion, as separating individual words may cause the analysis to become lost within the minutia of data. Glaser (1992) argued that this micro-approach leads to over-conceptualisation. Instead, he recommends that the identification of key points, rather than individual words would be a better way of allowing key concepts to emerge and would guard against data overload. It should be noted that careful attention needs to be paid throughout the data analysis process to avoid this problem. Finally, grounded theory emerges through a process of extensive interaction with the data gathered. Urquhart (2001) notes that whilst this interaction may be highly rewarding and satisfying, at the same time the process is extremely intensive, time consuming and all-absorbing. Therefore, he suggests that the researcher must be persistent.

## DATA ANALYSIS TOOL

The computer software package QSR NUD*IST 5 was used as a tool to aid the process of data analysis. This software is a useful tool to facilitate the coding of large quantities of unstructured text. Various software such as NUD*IST and ATLAS.ti are increasingly being used to analyse qualitative data within the fields of management research (Fernandez, 2004; Gahan and Hannibal, 1999; Fielding and Lee, 1998).

Yin (2003) notes the advantage of using such a tool is when the text represents a verbatim record of an interviewee's remarks. Nevertheless, Easterby-Smith *et al* (1999) alert researchers against using such packages. They argue that although the packages can lessen the clerical tasks of sorting words, concepts and passages contained in transcripts. The identification of significant themes, patterns and categories still has to be carried out by the researcher. Furthermore, Glaser (1998) warns the researcher against the 'technological traps' of using such tools as they restrain the researchers development of skills, and impose time consuming learning curves.

It becomes clear from Easterby-Smith *et al's* (1999) and Glaser's (1998) comments that they view computing software as a barrier rather than an aid to creativity. However, from the researchers experience, QSR NUD*IST facilitated the process of coding. The technology enabled an efficient method of comparing and contrasting incidents. Conversely, it must be noted that QSR NUD*IST as a data analysis tool was not used in isolation. The researcher went back to using traditional tools such as paper and pencils to draw box diagrams and illustrate the interrelation of emerging concepts. This was in addition to using traditional tools to identify key themes and categorisation, as well as organising and visualising ideas. As such, Easterby-Smith *et al* (1999) and Glaser's (1998) comments are well justified to a certain extent. For instance, the identification of key themes and categories was creative work. Yet, the assumption that technology hinders creativity was invalid in the experience of the researcher. This is because individuals that enjoy working with computers can use the technology to work creatively in and around them. Furthermore, QSR NUD*IST did not command a significant learning curve. It took two days to go through the tutorials and manuals were provided with the software. These manuals were referred to as and when needed. Using QSR NUD*IST was similar to working on paper, yet retrieving and connecting concepts was efficient. Although QSR NUD*IST provides an automated coding tool, all coding was done manually. In this regard, Easterby-Smith *et al* (1999) and Glaser's (1998) reservations are fully justified and their advice was followed. This is because automatic coding is disadvantageous to the grounded theory approach, as it blocks the discovery of what is happening in the text.

## OTHER DATA ANALYSIS METHODS CONSIDERED

Content analysis as a data analysis method was initially considered as it provides a useful formal method of analysing qualitative data. It involves the quantification of qualitative data through a process of data reduction, which often occurs at an early stage in the research process. Consequently, this may lead to rich data being eliminated. In other words, the data that may help understand phenomena at a deeper level may be discarded. As the underlying objective of the study was to obtain a deep and holistic understanding of the social and organisational dynamics influencing the diffusion of e-mediated learning technology in universities in the UK, this method was deemed inappropriate. The repertory grid technique based on Kelly's (1955) personal construct theory was also considered as a potential data analysis technique. This is because the method is similar to content analysis, in that it provides a formal method of quantifying qualitative data, but it can also be used for statistical analysis. Nevertheless, this method was deemed unsuitable as the method may have risked the rich data being lost through the quantifying stages. Therefore, this method contradicts the aim of the study, which was to develop a better understanding of the adaptation of e-mediated learning technology by academic staff in UK universities.

## THE EXPERIENCE OF DATA COLLECTION

As touched upon earlier, the quality of rich data collected can be attributed to the fact that the researcher had significant access privileges at the university where the research was carried out. Therefore, the researcher was known to the organisation and had a distinct advantage in terms of access. As such, of those people that agreed to participate some were prepared to give more of their time and gave thorough and open accounts that perhaps a stranger would have omitted or not talked so freely about. For instance, one interviewee had so much to say that the interview lasted for 3 hours. This one interview alone provided significant detail which has been thoroughly applied in various categories throughout the entire research project. On the other hand, the data collected from the steering group meetings provided more scope than depth (than the interview and email data). Most of the discussions were based around the 'theory' of what the university should be and is doing in order to meet the university's strategic objectives. These views were presented through rose tinted spectacles. The issues emerging from the implementation of e-mediated learning technology in practice were seldom discussed. Nevertheless, these meetings turned out to be more valuable than initially expected, as this data provided an entirely different perspective on the diffusion process of e-mediated learning, than the interviewee and email data provided. As such, the data could be compared and contrasted with each other.

As with the interview data, the email data was rich and provided accounts of issues that academic staff within the School of Management encountered when using WebCT. Table A, displayed the various participants that took part in the research project, at a number of different levels. The objective of the research is to explore the adaptation process of e-mediated learning technology by academic staff in UK universities. The general course of the questioning can be outlined as follows:

- What forms of electronic resources are used to support your teaching practices?
- How have you implemented WebCT into your modules?
- Can you discuss your reasons for not using WebCT?
- Can you talk about your experiences of using WebCT?
- What are your concerns about using WebCT?
- How do you see your role as a lecturer developing, due to the universities strategic plan to encourage and promote e-mediated learning?
- How do you think e- mediated learning technology will shape future teaching in universities?

## THE EXPERIENCE OF DATA ANALYSIS

As the process of data collection advanced the core of the questions asked at the interviews became more defined as the key categories emerged. Nevertheless, this does not imply that the value of interviews increased as the data collection progressed. Rather, the process was more erratic in the sense that some of the interviews conducted at an earlier stage provided more substance than the later ones. Furthermore, the data that was gathered from the steering group meetings and emails allowed the data to be triangulated against the interview data. As such, the interviews conducted at a later stage could be verified against the previous data.

About half way through the data collection process, concepts began to emerge in the reoccurrence of certain issues raised by academic staff. The data collection process took place over a number of months and the researcher had easy access to the case study organisation. This enabled the researcher to go back to issues that had been previously discussed and to make sense of the data collected in the presence of the subsequent findings from the other data collected. At an early stage of analysing the data it became increasingly apparent that various faculty members had very distinct attitudes towards technological adoption and change. Hence, different sections of the case study displayed particular organisational cultures. The adoption of the grounded theory approach to analysis resulted in the direct formation of data within chapter headings. Some of the most significant categories to emerge from the analysis of the material was the heightened culture of expectation, conflicting priorities and adequate support. The following chapter introduces the reader to the case study under investigation, before an analysis of these findings are presented.

# CHAPTER 4- CASE STUDY

## INTRODUCTION

Chapter 1 presented an account of the history of UK higher education. The chapter described how a number of external and internal pressures for reform were driving the implementation of e-mediated learning technology within UK universities. As such, an increasing number of universities in the UK have implemented some form of e-mediated learning technology. In doing so, Chapter 1 provided the required broad historical context for detailed analysis of a specific implementation project at South Eastern University. This chapter introduces the empirical case study under investigation. It begins by providing a background to South Eastern University and goes on to discuss the developments that have taken place at the university, which have resulted in the implementation of WebCT. Next, the chapter discusses the use of WebCT within the School of Management. The critical issues raised by this case study are then outlined in the context of the main aims of the thesis.

## BRIEF HISTORY OF THE CASE STUDY UNIVERSITY

South Eastern University is a campus-based institution located in the South East of the UK. The beginnings of the university can be traced back to the 1920s. At that time it was a college and the purpose of the institution was to provide recruits for local industry, particularly within the fields of engineering and building. During this period the institution grew rapidly in size. After the war, the college continued to expand and began to focus on the development of more advanced courses, in particular degree programmes. This was directly in line with the strategy of the government at that time, which was to radically restructure further education to improve the skills of the nation, and to increase the efficiency of British industry.

The large number of courses being offered meant that the college had to provide adequate facilities to cope with the growth. A building programme began and in the 1950s, a decision was taken to divide the institution into two. One establishment retained its existing name, here the institution continued to offer the Ordinary

National Certificate and craft courses for technicians and craftsmen. The second building was given an alternative name, and the aim of this college was to focus on becoming an innovative leader in technological education. The college was a pioneer in the field of sandwich courses and the programmes offered led to a Diploma of Technology. During this time the institution developed their courses in line with the needs of the local employers and an outcome of this was the development of close links with industry. However, the continued growth of the institution, but lack of facilities to accommodate student needs meant that the college missed out on being nominated as a 'College of Advanced Technology'. This was in spite of the Ministry of Education recommending that the institution had made a distinguished contribution towards the development of advanced technological education. This was in addition to recognising the high quality of staff the institution held, and the high standard of work the college was producing. This outcome became a major catalyst towards the development of South Eastern University.

Rather than develop the existing site, a decision was made to build a brand new site. The building was to take place in four stages, with the first stage to be completed by the mid 1960s. However, an outcome of the Robbins Report in 1967, meant further change for the college and from the mid 1960s the college was to become a technological university, with the capacity to award both first and higher degrees. Consequently, the governing body and the academic board at the college faced a number of challenges in order to facilitate the transition of the institution from college to university status. These issues ranged from financial, to infrastructure, to pedagogical. Nevertheless, the challenges were overcome and during the mid 1960s, the college was awarded a University Charter. From here on in the South Eastern University began to operate. The university continued to function on both sites until early 1970s, when one of the sites was vacated. South Eastern University continued to grow and diversify into other subject areas and in 1980 another technical college merged with the Case Study University. The college was a leading teacher training institution in the areas of craft, design and technology. This became the second campus at South Eastern University. The established strengths of the Case Study University traditionally lay in the fields of engineering, science, technology, social sciences, education and management. Yet, in the mid 1990s, the university chose to expand into new subject areas and innovative modes of study by incorporating another institute of higher education. This coalition introduced the subject areas of business, geography, earth sciences, health and social work, performing arts, sports sciences and humanities into the portfolio of South Eastern University. This resulted in the university expanding on to two more campuses, giving the Case Study University the following student and staff population spread out over four campuses:

- 9000 full-time and 6000 part-time undergraduate students.
- 700 full-time and 1000 part-time postgraduate students.
- 200 hundred full-time and 150 part-time research students.
- 1600 international students from 110 countries.
- 800 academic staff members.
- 150 research staff.

## THE CASE STUDY UNIVERSITY TODAY

The unprecedented growth of South Eastern University has continued and over the last decade, the institution has trebled in size. In Chapter 1, the reader was introduced to the changes taking place in the UK higher education sector. Government policy to increase and widen participation, together with the influence of the research assessment exercise and the quality assurance assessment were identified as significant drivers of this change. Consequently, these external pressures have significantly influenced the way in which South Eastern University currently operates. Furthermore, Chapter 1 noted that universities in the UK were largely dependant on councils such as the Higher Education Funding Council for England (HEFCE) for funding. Yet, government policy has led to a decrease in UK universities' dependency on government funding by giving these institutions more autonomy to become self-sufficient. Therefore, like other universities in the UK, the Case Study University is also undergoing significant change. Particularly within the areas of research, learning and teaching, widening participation and in strengthening its external links with businesses and the community. One of the first steps towards facilitating the transition of these changes at South Eastern University was the appointment of a new vice chancellor. The new vice chancellor arrived at the Case Study University in the early 2000s and since his arrival strategies have been put in place for major reform.

At an external level, the entrepreneurial vision of the new vice chancellor led to the sale of three of the sites. This will make one site the sole and main campus. The merging of all campuses onto one single site has meant that the site will have to provide adequate facilities to cope with this merger. New halls of residence are in the process of being built to accommodate students and staff. The main lecture centre has been modernised, providing state of the art lecture theatres with multimedia capabilities. A brand new building has been erected next to the library, which has also been extended and modernised, and the grounds are in the process of being landscaped. This is in addition to the enhancement of the present social facilities.

In the academic year of 1998/1999, South Eastern University stood 46th nationally in terms of total research funding and 47th in terms of income from research grants and contracts. Furthermore, the percentage of research active academic staff was quite low, with only 65 percent of academic staff being submitted to the research assessment exercise in 2001. This was only a marginal improvement from 1996. For the long-term sustainability of South Eastern University, the vice-chancellor decided to re-position the Case Study University as a research-led university. The institution's key strategic objectives for the period of 2002-2007 can be summarised as follows:

- Develop the research profile of the university at both a national and an international level.
- Recruit and retain fully funded international and home/EU students, with a specific emphasis on postgraduate students.
- Widen participation of students at the university from diverse backgrounds.
- Build on South Eastern University's links with regional businesses and the local community, to generate substantial income for the university.

It can be argued that these changes, akin to other UK universities are leading South Eastern University towards adopting private sector practices, in that the university has to prove excellence in research and teaching in order to secure funding through grants. At the same time, South Eastern University understands that significant income can be generated through the intake of fee-paying students. These include home, EU and international students that will pay tuition fees. Therefore, the university is under pressure to compete with other institutions at both, a national and an international level. Recruiting and retaining students has become one of South Eastern University's key strategic objectives, particularly fee paying international students. For instance, the numbers of international students at the Case Study University are predicted to rise from 12 percent to 20 percent by 2008.

Striving towards South Eastern University's mission of becoming research-led, all academic schools are expected to provide high quality teaching that is focused on student learning. This goal ties in directly to the quality assurance assessment, in that all departments are expected to maintain and achieve higher ratings. The learning and teaching strategy aims to enhance the quality of the teaching and learning culture within the university and to that effect the Unit for Learning and Teaching was set up in 2002. The Unit for Learning and Teaching is a central department within South Eastern University and the main aim of this department is to foster innovative teaching and learning. The unit runs the PostGraduate Certificate in Higher Education (PGCert) which is an accredited qualification that was developed as a result of the government white paper entitled 'The Future of Higher Education' (DfeS, 2003), which outlined:

> *"From 2006 all new teaching staff should obtain a teaching qualification that incorporates agreed national standards."*
>
> (Pg.1)

Additionally, the Unit for Learning and Teaching runs a number of staff development programmes. The Unit is currently in the process of developing a Masters programme which is an advanced level of the Post Graduate Certificate in Higher Education, and currently discussing with senior management the possibility of making the programme mandatory for all existing staff. The Unit for Learning and Teaching's other major work involves the implementation of e-mediated learning technology. Additional activities include education for employability and disability.

Internally, there has been a re-organisation of the faculties, departments and administration at South Eastern University, as well as the changes to the school semesters from two to three academic terms. In the autumn term of 2004, the four main faculties consisting of seventeen academic departments were merged into seven academic schools and given new titles as show in Table 3.

## TABLE 3: RE-ORGANISATION OF ACADEMIC DEPARTMENTS

| NEW ACADEMIC SCHOOLS | OLD DEPARTMENTS |
|---|---|
| **School of Arts** | • American Studies<br>• Drama Studies<br>• English<br>• Film and TV<br>• Music |
| **School of Management** | • Business and Management<br>• Economics and Finance<br>• Politics and History |
| **School of Engineering and Design** | • Mechanical Engineering<br>• Design and Systems Engineering<br>• Electronic and Computing Engineering |
| **School of Health Sciences and Social Care** | • Biological Sciences<br>• Health and Social Care |
| **School of Information Systems, Computing and Mathematics** | • Information Systems and Computing<br>• Mathematical Sciences |
| **School of Social Sciences and Law** | • Human Sciences (Social Anthropology, Sociology, Psychology Communications and Media Studies.)<br>• Law |
| **School of Sport and Education** | • Education<br>• Sports Sciences |

Typically, with any type of organisational restructuring the theoretical aim is to increase efficiency and reduce costs. Yet, an outcome of these changes is often a loss of jobs and consequently, a loss of morale within the organisation. For instance, within the School of Management there was significant unrest amongst the faculty staff during the period of carrying out this research. Particularly since the objective of the university is to become research-led. As such, non-research active teaching staff felt that their jobs were at risk. This fear was confirmed in autumn 2004 with the announcement from the director of human resources that there were to be up to sixty redundancies amongst academic staff. The university chose to adopt a change management policy. This meant that staff would be re-deployed and voluntary redundancies and early retirement would be offered to those affected by the restructure. Only as a last resort would compulsory redundancies be considered. Within the School of Management, this information was relayed to staff through a union representative rather than management. This was despite reassurance from senior management that all staff would be consulted and informed about the changes taking place. The cited reasons for the proposed redundancies are as follows:

- To further the strategy of becoming a research-led university.
- To increase the number of academic staff with appropriate research profiles who can contribute to South Eastern University attaining a superior rating in the next RAE in 2008.
- To reduce the number of academic staff who are not research active.

The restructuring programme is a particularly interesting issue and the significance of this issue to the outcome of working practices at the School of Management will be analysed in Chapter 6.

Here in lies a major paradox, on one hand South Eastern University is attempting to increase student numbers, by improving the quality and diverse forms of teaching it provides. At the same time, the strategic objective of the university is to become research-led. Hence, academic staff members are expected to actively research. However, the university plans to reduce the number of non-research active teaching staff, whose strength lie in teaching. Therefore, academic staff members are expected to provide both high quality teaching and produce high quality research against increasing student numbers. As such, the implementation of e-mediated learning technology is seen as a way of easing this pressure on staff. Or in other words, e-mediated learning technology is seen as a panacea for change. The tension that exists between research and teaching responsibilities is a contentious issue that will be discussed in Chapter 5.

## TECHNOLOGICAL CHANGES

Prior to the implementation of WebCT at the Case Study University, each PC on campus was upgraded to a Windows 2000 environment in 2003, and the email system was replaced with Outlook Express. This development allowed staff and students registered at South Eastern University to access their email at a global level, which was previously restricted to the campus network. WebCT was introduced campus wide into the Case Study University in 2002. During the summer of 2002, a number of staff training programmes were provided by the Unit for Learning and Teaching for academic staff who wanted to introduce WebCT into their modules.

At the start of the academic year in September 2002, four WebCT based modules were under development. Out of those, two were distance learning and entirely web based, and the other two modules were using e-mediated learning as support mechanism for face-to-face teaching. One year on, the number of WebCT based modules increased to over one hundred in twelve academic departments. In 2004, the figure rose to over three hundred modules, with numbers continuously rising. Nevertheless, the level of activity varied by department. Some academic staff members were using only the very basic features of WebCT, mainly as a document repository, whilst others were using the technology more actively by incorporating some of the more advanced tools, such as the online assignment submission feature, quizzes and tests. However, judging the success of the technology on simply an increase in usage is extremely misleading. If the technology is only being used as a document repository, then the serious question arises of the cost-efficiency of the e-mediated learning system. As such, it is the extent of the integration, and the level at which the technology is being used which provides a more complete understanding of how the technology is being diffused. Table 4 provides a breakdown of WebCT usage across each department in 2004, which was provided by the Unit for Learning and Teaching. However, these statistics are misleading in that they only reveal the numbers of web bases that are live, or under development, rather than indicating how the web bases are being used. Furthermore, there only had to be five or more students using a WebCT based module for the web base to be considered live.

## TABLE 4: WEBCT USAGE ACROSS DEPARTMENTS AT THE CASE STUDY UNIVERSITY (2004)

| DEPARTMENT | LIVE | IN DEVELOPMENT | SEATS |
|---|---|---|---|
| School of Management | 75 | 34 | 2492 |
| Electronic and Computer Engineering | 27 | 22 | 2253 |
| Sports Sciences | 19 | 19 | 2033 |
| Health and Social Care | 33 | 21 | 1303 |
| Design & Systems Engineering | 24 | 12 | 1012 |
| Education | 36 | 8 | 995 |
| Information and Systems Computing | 10 | 2 | 945 |
| Biological Sciences | 20 | 8 | 768 |
| English | 11 | 18 | 745 |
| Economics and Finance | 5 | 4 | 566 |
| Mechanical Engineering | 9 | 2 | 454 |
| Human Sciences | 4 | 6 | 302 |
| Mathematical Sciences | 6 | 0 | 267 |
| School of International Studies | 4 | 1 | 55 |
| Learning and Teaching Development Unit | 2 | 0 | 53 |
| Geography and Earth Sciences | 1 | 0 | 13 |
| Performing Arts | 0 | 1 | 0 |

The technology is used on a voluntary basis in all but one department, and it is within the School of Management that the Unit for Learning and Teaching suggest that development is most actively taking place. Nevertheless, at this stage the main function of WebCT is to support face-to-face teaching. In the school where the empirical research is drawn from, WebCT became the dominant e-mediated learning system from the academic year beginning 2004/5, replacing the Intranet and other systems being used. The technological adoption of WebCT at the Case Study University is a significant issue that will be analysed further in the next chapter.

## SCHOOL OF MANAGEMENT

As raised earlier in this chapter, the introduction of e-meditated learning technology is often seen as a panacea for change. At the School of Management, the technological systems implemented to support teaching have progressed since 1999 from the F drive on the main network, to the Intranet, to WebCT. This is in line with the major changes taking place across the university. The sole function of the F Drive was as a document repository. The Intranet system that was implemented in 2001/2002 moved a few steps further than the F drive. This allowed members of academic staff to upload teaching support material, and provide administrative information in an environment that could only be accessed by students via the university network. The Intranet was an enhanced version of the F drive in that the graphical user interface (GUI) used a combination of text and images, and was therefore, more aesthetic than the F drive. In addition, the Intranet provided more functionality than the F drive. During this period, certain members of academic staff within the school had created their own individual web pages where they provided details about the courses they ran, together with access to course materials. In the academic year beginning 2002/3 WebCT was implemented campus wide, and at this stage four different types of computing systems were being used simultaneously, but all on a voluntary basis.

During the course of the change programme, problems began to surface as the proliferation of systems caused notable confusion amongst students in terms of having to use a number of different systems in order to access course materials. This was in addition to creating unrest amongst academic staff members, as they had to make a decision about which technology to adopt if any. Subsequently, peer and student pressure played a large part in influencing academic staff members to adopt e-mediated learning technology. Increasingly, academic staff members were concerned about the large amounts of time they would have to spend learning to use an e-mediated learning system, with the possibility looming that that the system may then be replaced by another system or an updated version. This means that academic staff members would have to invest additional time into learning either a whole new system or a different set of features. This is when they are already faced with other competing pressures, such as researching and marking duties for large groups of students. The critical issue of time will be analysed further in Chapter 5. Upon use of WebCT, various academic staff members were concerned with the design and navigational features of the technology, particularly ease of use. Specific functions were outlined as being too detailed, which may have affected the academic staff members and students decision to use the technology.

Like other academic schools at South Eastern University, the School of Management has gone through significant changes over the last decade. Perhaps the most notable change has been in the numbers of students this school now attracts at both an undergraduate and postgraduate level. In 1997, approximately forty students graduated with an undergraduate degree in management. This figure is predicted to increase to three hundred in 2006, albeit different pathways. This increase in student numbers is placing extreme strain on the school. Consequently, the intake of undergraduate students is set to increase to approximately five hundred for the academic year beginning in 2005/6. This is due to the direct entry of an international cohort of students from a private organisation associated with South Eastern University. The private institution was set up in 2003 offering diploma courses in business and management, and information systems and computing. These courses provide international students with an alternative pathway into year 2 of South Eastern University's Business and Management undergraduate program. However, the international contingent of students at the School of Management has brought about a new set of issues. Particularly language barriers and cultural differences experienced at both, undergraduate and postgraduate levels. To alleviate this issue, from September 2005 all international students both at an undergraduate and postgraduate level will be required to attend a compulsory two-week English language induction course.

Significant logistical difficulties are predicted for the coming academic year 2005/6 due to this increase in student numbers. For instance, the current intake of year 1 students stands at four hundred. However, the largest lecture theatre at the Case Study University has a maximum capacity that can seat four hundred students. Furthermore, the number of first year students is projected to increase to over five hundred in the academic year 2005/6. It is suggested that lectures and seminars will have to be repeated several times a week to cater for such large numbers. Certain academic staff members have suggested that an alternative more integrated approach using WebCT as an environment to hold online discussion seminars and using web based assessment could provide a solution. This is in addition to the technology alleviating the problems of marking, but this type of assessment would be unsuitable for essay based questions.

Indeed, this increase in large student numbers will require greater levels of support for academic staff members who are already juggling a number of different responsibilities, in an already pressurised environment. As such, there is an air of uncertainty and low morale within the school. For instance, significant numbers of non-research active teaching staff from within the school have applied for voluntary redundancy. These staff members have traditionally carried the burden of teaching the large groups of level 1 students. Uncertainty about the future has led to speculation that teaching duties will be delegated to research-active staff and graduate teaching assistants, who will be encouraged to use WebCT to facilitate their teaching. However, this will require a significant level of support at both a managerial and technical level. (This issue of increasing numbers of international students is particularly interesting, and the ramifications of this issue will be discussed in Chapter 5) The irony of the situation means that if this is the case, the university will be moving away from becoming a research-led institution, as simply academic staff members will have less time to research. These academic staff members had been used to a stable-working environment, in effect the familiar working environment and culture at the Case Study University was overthrown in a relatively short space of time.

# CONCLUSION

This chapter introduced the empirical case study under investigation, and discussed how the institution has been coerced into implementing e-mediated learning technology in line with government policy and internal reform. The following chapters analyse the issues that have emerged in the case study to address the paradox at the heart of this thesis: Despite continual investment in e-mediated learning technology by higher educational institutions, why is technological diffusion within UK universities a slow process?

# CHAPTER 5-RESEARCH FINDINGS DIFFUSION OF E-MEDIATED LEARNING TECHNOLOGY

## INTRODUCTION

The thesis now moves on to present the empirical research data collected from the Case Study University. The findings from this chapter directly inform the first two questions presented in chapter 2. By firstly identifying the pace and level of e-mediated learning technology adoption, and secondly by analysing the factors that influence the adoption of WebCT by academic staff members. This data was drawn from a grounded theory approach by analysing the interview transcripts, together with the email data and minutes and notes from the steering group meetings.

The most significant finding to emerge from the grounded theory analysis of the case study data was that academic staff adopted WebCT at both different rates and different levels. Other key categories to emerge from the findings that influenced the diffusion of WebCT at the Case Study University included conflicting priorities for academic staff, adequate support, the perceived benefits of the technology and IT skills levels. By identifying the varied implementation levels and barriers to WebCT adoption, this chapter contributes to our understanding of why the diffusion of e-mediated learning technology in UK Universities is slow, despite continual investment in the technology.

## THE PACE OF ADOPTION OF E-MEDIATED LEARNING TECHNOLOGY BY ACADEMIC STAFF

The Case Study University implemented WebCT campus wide in 2002, and the official statistics presented by the Unit for Learning and Teaching in 2005 suggest that WebCT is successfully being adopted. The statistics claim that over 400 hundred live web bases are currently in operation, out of which the majority are used for academic purposes, with an additional 150 in development. The statistics reveal that there are over 81,000 WebCT seats currently in use (WebCT seats refer to the number of users), although the same student may have several seats in different web bases. For instance, if the student is registered on four modules, then they will have four WebCT seats. The Unit for Learning and Teaching maintains that the use of WebCT has grown radically since 2002, and predicts that the growth rate will spread across all schools at South Eastern University. The School of Management has been cited as the most active user of WebCT and the school is at a surface level seen to champion the technology.

However, the findings from the empirical research tell quite a different story. Firstly, the statistics presented by the Unit for Learning and Teaching are misleading. This is because for the web base to be considered live only five or more students have to be using WebCT. Secondly, there are no details about the degree to which WebCT has been implemented into various modules. Certain academic staff members may only be using WebCT at a very basic level; i.e. they may have developed a web base using it only as a document repository, uploading course material sporadically during the course of the academic year. Alternatively, on the other side of the scale, some academic staff members may have implemented several tools and features within WebCT. Additionally, some students may log onto WebCT regularly over the academic year, whereas others may only log onto WebCT to download course materials at the beginning and end of the academic year. Yet, all academic staff and students are statistically presented to be users of WebCT with no distinction between the levels of usage. Therefore, the official statistics currently presented by the Unit for Learning and Teaching illustrate a quantitative perspective of how the technology is adopted. Furthermore, the statistics give the illusion that the technology is being widely diffused, rather than an accurate and detailed representation of how WebCT is being utilised at different stages and levels.

As presented in chapter 2, Rogers (1995) describes the innovation-decision process incorporating an information seeking and information processing activity. This process takes place in five stages as follows: knowledge, persuasion, decision, implementation and confirmation. Based on this model, in the School of Management, the findings reveal that academic staff believed they did not receive adequate **knowledge** about WebCT. When asked if the academic staff had attended any training sessions for WebCT the majority had not. Despite training sessions being regularly announced via email and held by the Unit for Learning and Teaching. A number of academic staff members mentioned that their first exposure to WebCT was at a departmental seminar presented by the author and her supervisor. A Professor that was interviewed commented *"Well the first time I heard about it [WebCT] since I have been at South Eastern University was at your presentation."* This highlights an issue with the way that the information is being communicated to academic staff. A recurring theme of the findings is that academic staff felt that the Intranet system made obsolete by WebCT was adequate for the purposes that they were using the technology for. This was primarily as a document repository and an environment where they could display notices for students, despite exposure to innovation messages.

The empirical research found that during the **persuasion** stage, the majority of academic staff members both those individuals who were using WebCT and those who were not questioned the benefits of using WebCT. This is because they felt WebCT was more complex to use than the Intranet. One interviewee suggested:

> *"I'd found it [WebCT] hard to learn and it's very complex. Its very involved putting files up. You need something like 20 keystrokes in order to put any file up, and that must be about 19 keystrokes more than you need to do on the Intranet. It does take longer to put things on. I can't see why you should have to update student view. I can't see why I should have to do most of the keystrokes to put anything on. I don't see why you can't just drag and drop which would make life easier."*
>
> Lecturer

The empirical findings also revealed that although academic staff members held similar levels of education, came from diverse backgrounds with cosmopolitan views and accessed data from mass media channels this process did not take place within the School of Management. This was partly because those academic staff members who were considered specialists and champions of e-mediated learning technology by the school explicitly rejected the WebCT system implemented by the university. Consequently, these actions had ramifications in terms of how the other academic staff members perceived the benefits of WebCT. To illustrate this point one of the specialists in e-mediated learning from the school made the following comment:

> *"E-meditated learning is my research area. I don't actually produce any e-mediated learning materials because it takes way too long to produce it and it's a tremendous effort to actually do something and then go through the evaluation process and then re do it. I'm not convinced WebCT aids learning, only if it's produced in the right format. Just presenting a book online doesn't necessarily give you an increased advantage. It helps as much as the Intranet helps in distributing materials. I think that's why people aren't convinced you get a great deal of benefit from using it."*
>
> Lecturer

During the **decision** stage for academic staff At the Case Study University, WebCT training opportunities were made available for academic staff members. Yet, the majority of academic staff members that were interviewed suggested that they had not been on the training courses. This was because they believed they had no reason to at that stage, and were perfectly happy to use the existing system [Intranet]. However, once the Intranet became obsolete those academic staff members that were using the Intranet switched to WebCT. What this indicates is that the decision made by the majority of academic staff to adopt WebCT was coerced, rather than academic staff members feeling that they should use WebCT because the technology superseded the Intranet. Further details about the characteristics of the adopters are presented later in the chapter.

The **implementation** stage, of WebCT for the majority of academic staff members took place when the Intranet was rendered obsolete. Therefore, the decision to adopt WebCT was made at an institutional level, and the majority of academic staff members followed pace. During the **confirmation** stage, the empirical research showed that certain members of academic staff postponed the adoption of WebCT after attending the training session. This was because the Intranet was operational. Therefore, academic staff members had no need to change systems up until the time when the implicit directive was put in place with the removal of Intranet, making WebCT the standard system.

As discussed in chapter 2, Rogers (1995) suggests there are five characteristics that influence an individual's perception of an innovation. Based on these characteristics the empirical research findings illustrate the following:

1. **Relative Advantage**: The findings from the case study show that in some ways WebCT had a relative advantage over the Intranet as academic staff members using WebCT believed that the technology was convenient for posting messages at short notice. One interviewee noted:

> *"I did a couple of times put notices on the front page to communicate information to students. Now I thought that was great, but I don't know if students really read it. Once was to cancel a lecture, because of a strike and once we decided to cancel it in between. So I put a big notice up in red letters, but a lot of them hadn't read it. They all said well where were you? The second time was when there was a fire on the train line and I couldn't get in. So I posted a note afterwards and I put a note on saying I'm really sorry I couldn't make it. So I thought it was quite good in terms of communicating directly with all the students given that there were kind of 150 on the course given that you can't easily get a hold of email addresses."*
>
> <u>Research Fellow</u>

The use of WebCT as a 'passive one-to-many' communications tool to put up notices was a theme that reoccurred during the interview process. This illustrates how academic staff members felt that this technology could be utilised to communicate with students in a more efficient way. Additionally, this also highlights culture change. This is due to the implicit way in which the technology transferred responsibility to the students. For instance, students were being made accountable for checking WebCT on a regular basis for notices or announcements. So in this sense students were not committed to being on campus to get information.

2. **Compatibility**: The compatibility of WebCT against the existing values of academic staff members was a contentious issue. Many academic staff members questioned the tacit motivations governing the implementation of WebCT. They suggested that the technology went against the traditional values of learning in higher education in the way that the technology has the ability to distance students from lecturers. This issue will be returned to in chapter 6. Although many respondents believed that WebCT offered more functionality than the Intranet, they also felt that because they only intended to use WebCT at a very basic level, it was not very different from the Intranet. Therefore, WebCT would not make a difference to the quality of work they produced. For the majority of academic staff members, their need to adopt WebCT was as a delivery tool. Hence, the technology was being used in a similar way to the Intranet.

3. **Complexity:** Ease of use was a significant issue that emerged from the empirical research. Academic staff members questioned the design of the technology, particularly since the majority of academic staff interviewed had previously used the Intranet. Therefore, they were comparing the two technologies. Academic staff members all found the Intranet very user friendly. However, WebCT was cited as being *"clunky, not very intuitive, idiosyncratic, and difficult to use."* As mentioned earlier, the majority of academic staff members were coerced into adopting WebCT because the Intranet was being made obsolete. Therefore, although academic staff members had issues with the design of the technology, they had no choice but to adopt WebCT. The academic staff members only other alternative was to refrain from using any form of e-mediated learning technology. Yet, they felt under pressure from students to make course material available, and were faced with peer pressure from colleagues that were using WebCT. Many respondents commented that students would hound them and insist that they make

their lecture notes available because the other lecturers were. Furthermore, WebCT was implemented campus wide by the university as the dominant e-mediated learning system. Thus, academic staff members were expected to use WebCT, rather than other systems. With regards to the implementation of WebCT as the standard system, one of the Pro Vice Chancellors stated:

> *"That's my policy. I mean I will tolerate other people using other methods at the moment and that's fine because they pre-visit WebCT and that's fine. But WebCT is the university's platform and I just don't think it's acceptable to be using other methods."*
>
> Pro-Vice Chancellor

The comment highlights that WebCT was implemented from a top down level, and this also points to the intrinsic bureaucratic culture that prevails within the Case Study University.

4. **Trialability:** The empirical research found that this stage occurred for some academic staff members. This was because they went to the training session, but then refrained from adopting WebCT at that stage because they felt that the existing system [Intranet] was adequate for the delivery and storage purposes they required the technology for.

5. **Observability:** Within the School of Management, two departmental seminars were held at the end of 2002 by early adopters of WebCT. The intention was to share experiences of using WebCT with other academic staff members. Additionally, the Unit for Learning and Teaching has held yearly symposiums since 2002 as a way of disseminating knowledge about experiences of e-mediated learning best practice across the University.

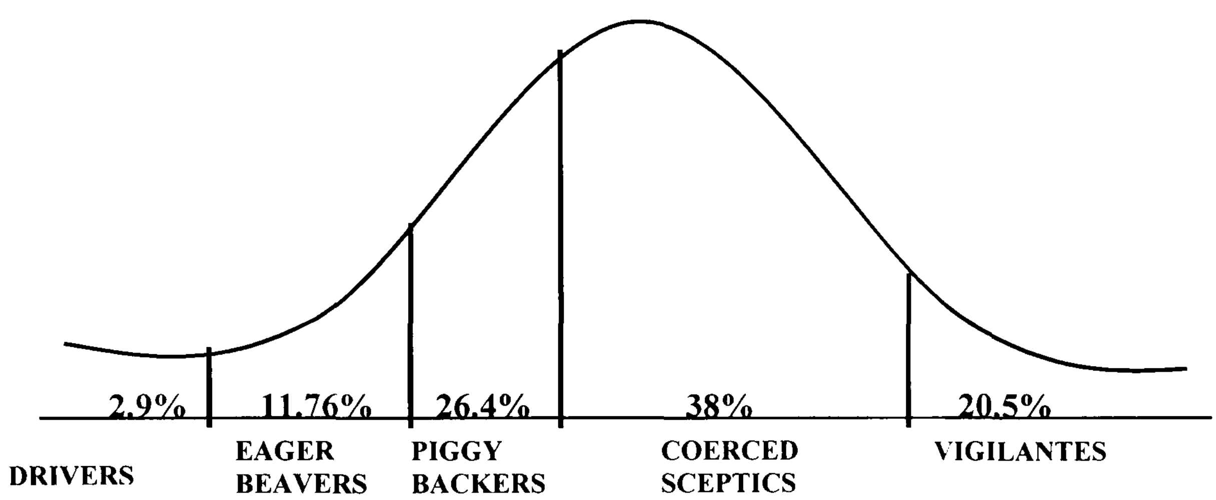
The findings from the empirical research showed that interpersonal networks were the most influential medium through which academic staff members communicated their opinions of WebCT to their peers. This was despite other channels, such as email and flyers regularly informing academic staff of the WebCT opportunities available to them. This affected the rates of WebCT adoption when there was proliferation of systems [Intranet, WebCT, F Drive, and Personal Web Pages]. Academic staff deliberated the comparative benefits of using WebCT over the Intranet with their peers. Many academic staff commented that they had heard that WebCT was too difficult to use and too time consuming from their colleagues and hence, decided not to use it at that stage for those reasons.

Furthermore, many academic staff members suggested that when they had adopted WebCT they learnt to use the system from their colleagues. This highlights the powerful influence of interpersonal networks over other forms of communication. A lecturer provides a useful illustration to demonstrate the positive influence of interpersonal networks: *"I learnt from another member of staff. I was sharing the module with them and they were using WebCT, and they showed me how to use it."* Whereas, another lecturer highlighted the negative influence of such networks. *"I know someone that did become very keen and very excited after attending the WebCT training course, but at the end of the day they said it was such hard work because they ended up creating so much more work for themselves."*

## SCHOOL OF MANAGEMENT ADOPTER CHARACTERISTICS

As discussed in chapter 2, individuals in a social unit or an organisation do not adopt innovations at the same time. The time factor of the diffusion process enables diffusion curves to be illustrated and the classification of adopters into specific categories. The adopter categories to emerge from the empirical research have been plotted on Rogers (1995) adoption diffusion curve. The classification of adoption categories is described in further detail together with the findings of the empirical research. However, it is important to note that there may be limitations with the categorisation of the empirical research findings into adopter categories. This is because classifying individuals into adopter categories would require detailed analysis over a long period of time in order to ensure accuracy, whereas the empirical research was gathered over a period of 2 years. Therefore, the intention of the research is not to explore the characteristics of adopters, as this is a widely researched area (Venkatesh and Shih, 2004; Abrahams, 2004; Venkatesh, Morris, Davis and Davis, 2003; Venkatesh and Davis, 2000; Jacobsen, 2000; Rogers, 1995; Mahajan *et al* 1990; Ryan and Gross, 1943) but to examine the factors influencing the diffusion of e-mediated learning technology. Therefore, the empirical findings in relation to adopter categories are presented in a general way. Future research will investigate changes in the adoption levels of WebCT by academic members of staff. This will allow the findings from this study to be built upon, adding a longitudinal dimension to the study.

## DIAGRAM 10: ADOPTER CATEGORIES AT THE CASE STUDY UNIVERSITY




Source: Adapted from Rogers (1995)

**DRIVERS:** The empirical research found that drivers of WebCT in the School of Management made up a small percentage of the overall adopter categories. The drivers of WebCT made up the first 2.9 percent of the school that were willing to explore the potential of WebCT. This group adopted the technology during the pilot stage of the implementation of WebCT between 2001-2002. The drivers of WebCT in the school were enthusiastic about the technical capabilities of the system and possessed technical knowledge.

**EAGER BEAVERS:** The empirical research found that the eager beavers within the School of Management made up the following 11.76 percent of the school to adopt WebCT. This group adopted the technology when WebCT was implemented campus wide. This was between 2002-2003. The eager beaver group of adopters were willing to take the time to explore the capabilities of the technology, and to experiment with the various tools and features. The outcome of this experimentation would then determine the subsequent use of WebCT. For instance, an eager beaver that used the technology for a virtual lecture stated:

> *"Well we did have the situation last year, where we did a virtual lecture, which wasn't really planned. I think that sort of demonstrated the potential of WebCT in quite an effective way, because in normal circumstances it [the lecture] would have just been cancelled. What I did was put up the notes so that they [students] had a version of the slides and detailed notes on WebCT, so it more closely replicated a face-to-face lecture."*
>
> Lecturer

A striking feature of the eager beaver group of adopters was that their research background and area of expertise were not IT related, but they were nevertheless interested in exploring the potential of the technology.

**PIGGY BACKERS:** The empirical research drawn from the case study found that the piggy back group of adopters made up the following 26.4 percent of individuals to take-up WebCT. This group adopted WebCT between July 2003 and June 2004. An interesting finding that categorises the piggy back adopters of WebCT was how they were encouraged to use the technology because they were sharing a module with a colleague that was already using WebCT. Alternatively, they were sharing a module with a colleague that had prior experience of using e-mediated learning technology. At the opposite end of the scale, a number of academics had commented that they were enthusiastic about using WebCT but they were sharing a module with colleagues that were not willing to use the technology. Therefore, they did not want to be left with the work of creating and maintaining the site.

**COERCED SCEPTICS:** This category of adopters was the following 38 percent of academic staff to take-up WebCT. This group adopted the technology when WebCT became the dominant e-mediated learning system campus wide. This was between

July 2004- June 2005. As highlighted earlier, an important finding of the empirical research was that academic staff members were coerced into adopting WebCT as the existing system [Intranet] was to become obsolete. The coerced sceptics of WebCT may not necessarily have adopted the technology because they felt that WebCT superseded the Intranet system. Instead, the findings show that the coerced sceptics were facing pressure to adopt WebCT at an institutional level. This is in addition to pressure from peers and students. Furthermore, because the Intranet system was made obsolete, the coerced sceptics had no other alternative but to adopt WebCT, other than to refrain from using any e-mediated learning technology.

**VIGILANTES:** The vigilantes make up the remaining 20.5 percent of academic staff to adopt WebCT. The empirical research revealed that the vigilantes were sceptical of the underlying motivations and wider social implications of using WebCT. This was because they believed the technology had the potential to change the culture of academia. The vigilantes were highly proficient in advances in technology but were concerned about the intentions of the institution of introducing the technology. For instance, some of this group believed that the technology would facilitate a culture of monitoring and surveillance. This interesting finding highlights a communication issue and a lack of open deliberation between the stakeholder groups about the future and consequences of e-mediated learning technology at the Case Study University. Other individuals in this group felt that WebCT could not facilitate the process of learning and teaching, in that the technology was far too time consuming to use. Therefore, adequate support would need to be provided, in order to encourage these individuals to adopt the technology. Furthermore, some academic staff members that fell into this category of adopters lacked confidence in using WebCT and questioned their IT skills levels. Therefore, they resisted adopting the technology despite showing an interest in WebCT.

The empirical study found that the eager beaver adopters of WebCT explored the diverse capabilities of the technology. The eager beaver group experimented with the assignment submission tool, multiple choice question tools and communication tools [discussion boards, chat rooms and email]. Subsequently, this group were more aware of the multiple features and capabilities of WebCT and they sought multiple uses for WebCT, rather than the piggy backers and coerced sceptics.

In contrast, the piggy backers and coerced sceptics of WebCT were more reluctant to experiment with the advanced tools and mainly used WebCT as a document repository and notice board. The empirical research highlighted that academic staff members that fell into the coerced sceptics category felt their IT skills levels were relatively elementary compared to the drivers, eager beavers and piggy backers groups that adopted WebCT. Hence, they lacked confidence and questioned their ability to use the advanced tools of WebCT. A striking feature emerged from the empirical findings that advanced training or user friendly manuals was not suffice to encourage the later adopters of WebCT to move beyond the use of WebCT as a document repository and notice board. Academic staff members that felt intimidated by the technology were reluctant to attend training sessions, or continuously ask for support out of fear of being labelled incompetent. One academic staff member commented:

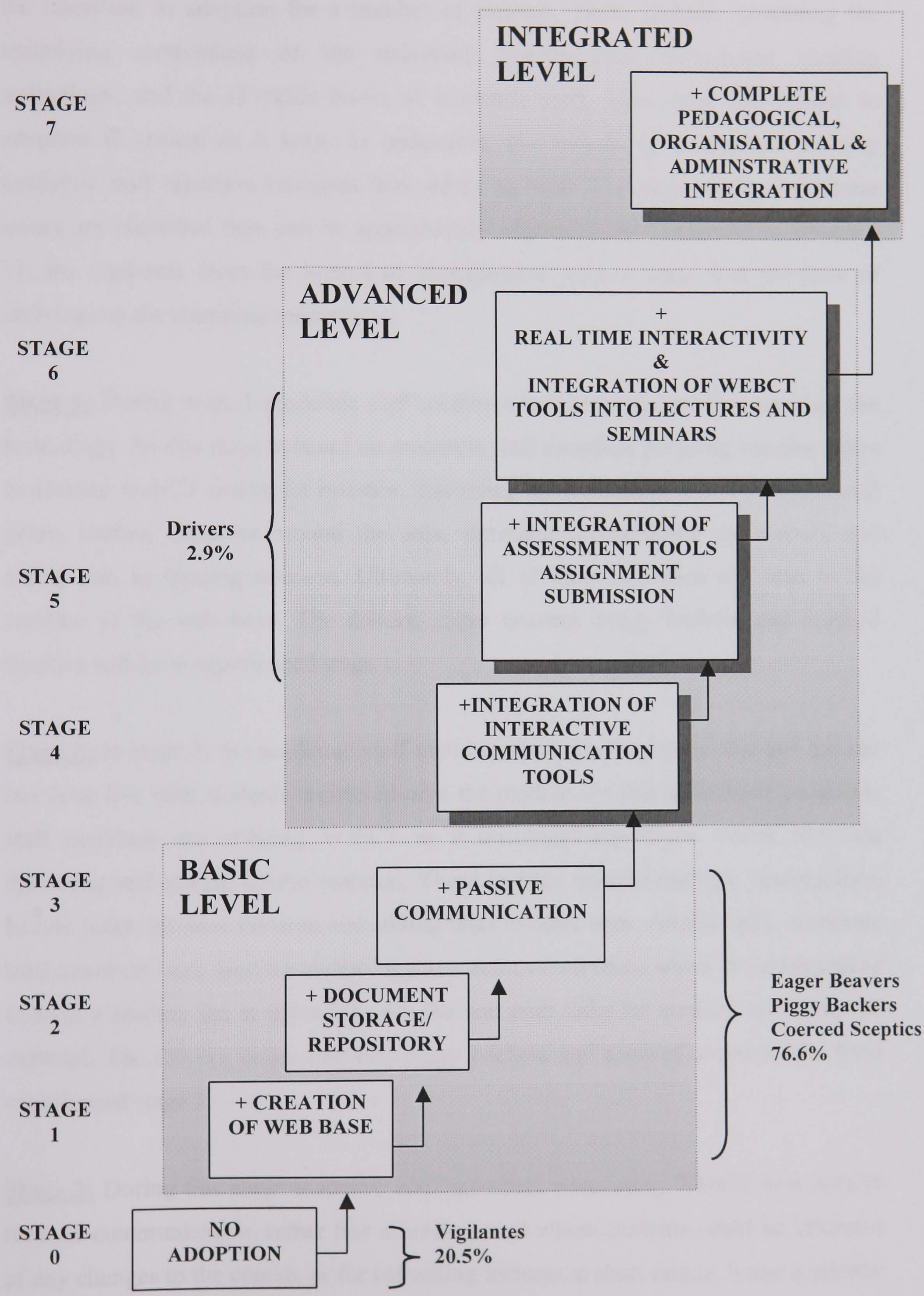
> *"Kind of like every one else I'd like a friendly face to see here, but it's obviously not efficient to have that and when you ring up the Unit for Learning and Teaching they do make an effort, I'll give them a tick in the box for that. I mean I went to see Miss X this morning I've talked to her a couple of times and I just got the impression she thinks I'm a complete idiot or something. I generally think they're trying to make an effort and they say if you can't do that look just ring back, but I don't ring back at all, I feel they're going to think you're a jerk if you keep ringing back."*
>
> Lecturer

A common misconception about individuals that are highly skilled in e-mediated learning technology is that they will tend to become early adopters of the technology. Yet, the empirical research found that eagerness to experience the technology played a large role in WebCT being adopted. Hence, academic staff that did not believe in the potential of WebCT despite being highly skilled in using forms of e-mediated learning technology were not early adopters of WebCT. In contrast, a number of academic staff members who did not consider their IT skills levels to be particularly advanced, but they were still eager to use WebCT. The empirical research revealed that adopters of WebCT were using the technology at different levels and for varied purposes with different motivations. Certain academic members of staff felt motivated to use WebCT because it took the pressure off them to photocopy materials and helped them to communicate with their students. Some academic staff members were genuinely interested in exploiting the full potential of WebCT, and implementing the more advanced tools into their modules. Whereas, others did not necessarily believe that WebCT had any benefits beyond a document repository, or notice board, but felt under pressure to adopt the technology. At a more intrinsic level, other respondents were concerned about the social and moral consequences of introducing WebCT into a learning environment. They argued that the technology changes the nature of higher education and their roles as lecturers. The re-defining of lecturer roles will be addressed in the following chapter.

## LEVELS AND STAGES OF WEBCT ADOPTION

At the Case Study University, the official statistics presented by the Unit for Learning and Teaching indicate that the adoption of WebCT by academic staff members has reached critical mass levels with over 300 hundred web bases currently live, and over 150 web bases in development. These figures have sharply increased from just over 35 live web bases, and 35 in development in 2002. As outlined at the beginning of the chapter, the School of Management was cited as being the most active adopters of WebCT. Yet, the statistics presented are misleading in that they fail to illustrate the different levels and stages that WebCT is being adopted. Instead, the statistics give the illusion that if the web base is live then activity will be taking place, rather than indicating the degree of WebCT activity. Therefore, this critical finding indicates that using models of critical mass in isolation can be misleading. Through a case study analysis of the data, it emerged that academic staff members were adopting WebCT at different stages and levels as well as at different rates. Diagram 11 conceptualises the findings by illustrating the different levels and stages that academic staff members at the School of Management adopted WebCT.

## DIAGRAM 11: THE 7 STAGES OF WEBCT ADOPTION



**Stage 0:** This stage is representative of those academic staff members that did not want to adopt the technology or were considering adopting WebCT, but did not make the transition to adoption for a number of reasons. These include, governing the underlying motivations of the university implementing e-mediated learning technology, and the IT skills levels of academic staff. Identifying the barriers to adoption is critical as it helps to understand the underlying motivations of why academic staff members refrained from adopting WebCT. Subsequently, once these issues are identified they can be appropriately addressed. As illustrated in Diagram 11, the vigilantes from the School of Management were at stage 0 at the time of carrying out the empirical research.

**Stage 1:** During stage 1 academic staff members had made the decision to adopt the technology. So this stage is based on academic staff members pursuing various routes to develop WebCT site(s), for instance, discussing the technology with colleagues and peers, reading literature around the area, attending presentations on WebCT and taking part in training sessions. Ultimately, all of these activities will lead to the creation of the web base. The drivers, eager beavers, piggy backers and coerced sceptics will have experienced stage 1.

**Stage 2:** In stage 2, the academic staff members have developed the site and the site has gone live with students registered onto the module. At this basic level, academic staff members are utilising WebCT as a document repository, where they are uploading and storing course material. These include module outlines, reading lists, lecture notes, seminar material and adding links to other sites. Additionally, academic staff members have used the technology as a point of reference where at the beginning of term a reading list is uploaded onto the site with links for students to obtain the material. The drivers, eager beavers, piggy backers and coerced sceptics may have experienced stage 2.

**Stage 3:** During this stage academic staff members were using WebCT as a passive form of communication, rather like a notice board where students could be informed of any changes to the course, or for cancelling lectures at short notice. Some academic staff members used the calendar in a similar way to inform students of important deadlines, or assignment submission dates etc. Nevertheless, at this basic level

WebCT is being utilised as a passive form of communication. The drivers, eager beavers, piggy backers and coerced sceptics may have experienced stage 2.

**Stage 4:** Academic staff members using WebCT at this stage have made the transition from a basic level to an advanced level of adoption. This is because the use of the technology has moved from delivering passive information to students, through to implementing an interactive element. During this stage, academic staff members incorporated the interactive communication tools, such as the email, and/or discussion board and/or the chat rooms. At the time of carrying out the empirical research, the driver group of adopters may have experienced this stage.

**Stage 5:** At this advanced level, academic staff experimented with the interactive assessment tools, such as the multiple-choice quizzes and the assignment submission. What was interesting about this level was that very few academic staff experimented with the assessment tools, and those that did found developing to the tools to be resource intensive. At the time of carrying out the empirical research, the driver group of adopters may have experienced this stage.

**Stage 6:** At this stage academic staff members have pedagogically integrated WebCT into their module. As such, they are using the technology interactively by incorporating the chat rooms and discussion boards into their seminars and lectures, and are using the tools on a live basis. Therefore, students will be interacting with their lecturers during real time at this stage. At the time of carrying out the empirical research, the driver group of adopters may have experienced this stage.

**Stage 7:** During this stage academic staff will have made the transition from the advanced to an integrated level. Stage 7 involves the academic staff member using WebCT for administrative functions, pedagogical functions and organisational functions to interact with their students with minimal face-to-face contact. This is in addition to interacting with other departments across the university, such as registry, library and the centralised marks department. At the time of carrying out the study, no member of academic staff from the School of Management had reached this stage.

It is also important to note that during any of the stages the decision to adopt WebCT at that particular level can cease. If the academic staff member progresses to a higher level of adoption, their experiences of using WebCT at that level, together with sharing experiences of best practice with their peers can influence them to make the transition back to a lower stage of adoption. The empirical research findings show that this occurred with the eager beaver group of adopters. They initially experimented with various advanced functions within WebCT, but their negative experiences with the technology led them to go back to using the technology at a basic level. Additionally, the categorisation of stages is not exclusive. For instance, at the basic level academic staff members may be using a combination of different tools in stages 1 and 2. Alternatively, they may be using a combination of tools from the basic and advanced levels, such as the document repository and email. Alternatively, they might have transcended stages 2 and 3 and be using WebCT at an advanced level. Furthermore, at each stage the academic staff member can obtain support from the Unit for Learning and Teaching. For instance, certain academic staff members send their files to the unit and ask them to upload, design and modify the site for them.

The findings from the case study research show that at the time of carrying out the investigation, a relatively small number of academic staff members are resisting the adoption of WebCT. This figure equates to 20.5 percent as illustrated in Diagram 11. The majority of academic staff members (76.6 percent) in the School of Management are adopting WebCT. Nevertheless, this adoption is occurring at a basic level. This is represented as occurring between stages 1 and 3. Another interesting finding to emerge from the research is that only 2.9 percent of academic staff members have adopted WebCT at an advanced level [stages 4-6]. This despite a number of academic staff in the School of Management that possess extensive background knowledge, and a research interest in e-mediated learning technology. At this stage, no members of academic staff in the School of Management are using the technology at an integrated level [stage 7]. A possible explanation for this is that as of yet, the technology has only been implemented as a stand-alone system. WebCT has yet to be fully integrated with other functions and departments across South Eastern University.

By exploring the stages of adoption at an intrinsic level, the empirical research has provided a more detailed and different insight from the perspective presented by the

Unit for Learning and Teaching as outlined earlier in the chapter. By identifying the different stages and levels of WebCT adoption, the empirical findings reveal that academic staff members utilised WebCT at various levels. With the majority of academic staff using WebCT at a very basic level for document storage and a notice board, similar to the way the respondents used Intranet, albeit WebCT being a more functional system.

At a more strategic level, it raises the issue of why WebCT is being adopted at such a basic level, and to a similar degree in which the Intranet was utilised. This raises the question of the cost-effectiveness of the technology if it is only being used at such an elementary level. The importance of this key finding is that by identifying the different levels that academic staff members implement WebCT into their modules, strategies can be put into place to encourage academic staff members to progress to more advanced levels of adoption. Thus, utilising the technology to its full potential. Therefore, the empirical research identifies that because WebCT is currently being adopted at a basic level, the main purpose of the technology is a passive one-way delivery vehicle of information. Furthermore, critical mass alone is a misleading indicator of the sustainability of WebCT, as it fails to identify the varied degrees of technological adoption. This significant findings is discussed further in chapter 7.

As mentioned in the introductory chapter of this study, universities in the UK are rapidly introducing e-mediated learning technology, but despite continual investment in e-mediated learning technological diffusion within UK universities has been a slow process. The case study findings further support this argument by establishing that members of academic staff are adopting WebCT, but there is limited adoption of the technology at an advanced level. Thus, it is dangerous to assume that campus-wide implementation plans of e-mediated learning technology can be developed on the basis that mainstream academic staff members will use the technology as freely at an advanced level, as the drivers and eager beaver groups of adopters have.

Therefore, the barriers that determine the decision of academic staff members to adopt carry the greatest risk to the successful utilisation of e-mediated learning technology across the campus. As such, in order to understand what prevents academic staff members from adopting e-mediated learning technology at an advanced level, it is important to analyse the barriers to WebCT adoption. A number of recurring factors emerged from the empirical research that influenced the levels at which academic staff adopted the technology.

## FACTORS INFLUENCING THE ADOPTION OF WEBCT IN THE SCHOOL OF MANAGEMENT

The findings of this study reveal that at this stage, for those academic members of staff that are using WebCT within the School of Management, the majority of academic staff are doing so at a basic level. Which begs the questions, what factors are influencing these levels of adoption? A number of key findings have emerged that influence the levels that WebCT is being adopted. These include resistance to change, conflicting priorities for academic staff, IT skills levels and technological support, which are subsequently addressed.

### Resistance to Change

Within the School of Management, it can be argued that resistance to change occurred at two levels. Firstly, at an explicit level where certain members of academic staff members unequivocally refused to adopt WebCT because they believed the technology went against their beliefs and principles of delivering education in a learning environment. For instance, an interviewee stated:

> *"First of all somewhere along the lines, the university experience needs to be re-evaluated. Is it about the traditional mentality of readers coming into a university to read upon a specific discourse, and we are here as academics guiding the readers and adding extra benefit through our own research within specific discourses. From that perspective alone, if we adopt a multimedia approach, and don't get me wrong I've got advanced skills in computing technology, I'm not a technophobe, but I will still not use WebCT because the technology goes against what we as lecturers are here to facilitate."*
>
> Lecturer

Secondly, the resistance occurred at a more tacit level because the findings show that although the majority of academic staff members did not explicitly resist WebCT, they were still only using the technology in the same way that they were using the Intranet. Therefore, from that perspective, it can be argued that academic staff adopted WebCT because it was introduced as a directive at an institutional level. Hence, academic staff members were coerced into adopting the technology, given that the Intranet was rendered obsolete. This made WebCT the standard system campus wide. Therefore, academic staff members were resisting the adoption of the advanced features of WebCT, because they chose to adopt the technology at a basic level in the same way they used the Intranet. The findings show that resistance may stem from the fact that WebCT is being introduced from a top-down level, without discussion with the key stakeholders of the technology.

Within the School of Management, WebCT was championed without a full discussion with academic staff members about the implications of the technology. A senior lecturer provides a useful quote to demonstrate this point. *"It's just another thing where you get an email saying you must now produce it on WebCT and that's it."* This highlights that bureaucratic management practices exist within the Case Study University, which are causing tension between the stakeholder groups.

**Conflicting Priorities**

The issue of time emerged as one of the most critical recurring barriers influencing both the adoption of WebCT, and the advanced implementation of the technology by academic staff members. The grounded theory approach to analysis found that academic staff were faced with conflicting priorities, which meant that tension existed between pressure to research, and teaching and administrative related duties. Thus, WebCT was seen as an added burden in an already pressurised environment. Furthermore, academic staff members found the design of technology complex and time consuming. This further influenced their decision to implement WebCT at a basic level, or to altogether resist adoption. Many academic staff members commented that WebCT was not very user friendly, and as highlighted earlier one interview respondent noted that it takes nineteen keystrokes to upload a file into WebCT. Whereas in a Microsoft environment copying and pasting files only requires a drag and drop action in a single keystroke. Furthermore, because the previous system [Intranet] was considered to be user friendly, it provided a benchmark with which WebCT was compared and contrasted against. The design of the technology and time restrictions due to conflicting priorities meant that even if academic staff members were enthusiastic about the capabilities of WebCT, and willing to exploit the potential of the technology at an advanced level, they faced significant barriers of time. For instance, an interview respondent made the following comment:

> *"The only reason I should hesitate to use it [WebCT] is the time it takes to do it and the difficulty it takes to learn. I have worried about putting up the multi-choice questions, they take so long to do."*
>
> <u>Lecturer</u>

Interestingly, a number of the eager beaver group of adopters of WebCT incorporated the email tool into their web base assuming that it would be easier to manage their student queries. This is because email was restricted to those staff and students registered on the module. However, they soon discovered that students would be emailing them at both their WebCT accounts, and official university account to ensure their email was received by the lecturer. This proved to be difficult for the eager beaver group of adopters of WebCT, given that they now were receiving repeat emails and had to service two email accounts. They found it easier to stick to just one account. This was the university's official email account which most of the eager beavers went back to using.

Based on the Case Study University's strategic priority to become a research-led university, and the influence of the research assessment exercise, academic staff members are expected to spend their time actively researching. The research assessment exercise was introduced in the UK in 1986 as a means of selectively funding research according to defined quality standards. The best research performers are rewarded with appropriate incentives. Therefore, academics are under significant pressure to research in order to secure funding as outlined in chapter 2. As a result, the research gives the university its reputation, and in an increasingly competitive environment it is the financial value that is attached to the academic researcher's reputation.

Up until the appointment of the Vice Chancellor in the early 2000s, individual departments and schools largely controlled research activity. However, the research control has now shifted to a centralised department. Previously, academic staff members had the autonomy to research at their own pace. Yet, the expectation of significant research activity has been made explicit by the Vice Chancellor announcing the possible redundancies of academic staff members that are not research active. The threat of potential job losses has created further tension between academic staff members and senior management, with a number of academic staff members threatening strike action. (The restructuring exercise has in effect opened up a whole new set of issues, such as conflict management, effects of restructuring and communication issues, which require further investigation. However, it is not possible at this stage to explore these issues for reasons of time and space, but these outcomes will be examined in further research.)

To put the situation into perspective, within research-led and teaching institutions, such as South Eastern University, for an academic his or her currency on the labour market equates to the amount and quality of research they have published. Their teaching ability is not given as much significance. Consequently, the looming threat of redundancies for non-research active staff provides further impetus to actively engage in research activities. Furthermore, promotion for academics is based largely on research excellence, rather than teaching ability. However, at the same time the Case Study University has announced targets of increasing the numbers of international and home/EU students, which is adding further pressure on academic staff members. This is in terms of teaching large groups of students, such as logistical issues, preparation and marking.

Another major category to emerge from the case study findings was the differences in opinions about the benefits of WebCT between senior management and academic staff. At an institutional level, WebCT is often viewed as a panacea for change. The technology is seen as a cost-effective tool to meet the demands of increasing student numbers, and to free up academic staff members' time to research. Given that the strategic priority of the Case Study University is to become a research-led university in conjunction with promoting effective teaching and learning practices, the findings of the empirical research and earlier studies (Grewal, 2004; 2003; 2002; Cornford and

Pollock, 2003; Souleles, 2004; Bates, 2000;) show that the theory and practice of implementing e-mediated learning technology into the Case Study University paint two very different pictures.

In practice, it can be argued that these two strategies do not work in tandem, rather they contradict each other, given that the technology doesn't actually free up staff time, but it changes the nature of the work task. (The sociological concepts of expert systems and time-space distanciation will be drawn on in the following chapter to address this issue) Whereas in theory it is argued that the technology transfers the responsibility to the student to download and print course materials. In addition, various communication tools, such as chat rooms and discussion boards can be used to hold online seminars for large groups of students. Multiple choice quizzes can be devised for assessment purposes, relieving the burden of marking from academic staff. The following statement sums up the senior management perspective quite well:

> *" The benefits outweigh the negatives. We are dealing with large numbers of students. We are dealing with logistics and administrative issues that I can only believe that WebCT helps us overcome some of those large numbers of problems. It's just like driving another type of car really, it's faster it's better. It's got more gadgets. It's got more possibilities. Let's explore them. It doesn't take a wizard to work out that if you want to produce 100 copies of a handout (a) that's going to cost you more time, or cost the department more to produce these handouts in the conventional way of photocopying. Or you have option (b) to put it on WebCT. I can't believe that they can't see those advantages...I would think staff are actually ostriches not to see the advantages."*
>
> Senior Management

The findings reveal a stark contrast between the associated benefits of WebCT from an institutional and academic staff perspective. Firstly, the empirical research shows that academic staff members disagree with the claims that *'WebCT can free up academic staff time for research.'* Because of the internal and external emphasis on research coupled with teaching related duties little time is left for other duties. At a more pragmatic level, the way WebCT has been designed makes the technology complicated and time consuming to use. The web base will have to be continually updated and modified, despite the technology providing certain administrative advantages. To adopt WebCT at an advanced level requires considerable support as academic staff members are bound by other priorities and the following statement typifies the sentiments of the issue concerning conflicting priorities quite well:

> *"With the RAE coming up next year it's a crucial year and what are we lobbed with? WebCT, who cares? I don't want to spend all of my time doing this stuff. I want to research. I want to write. That's the end of the story."*
>
> Senior Lecturer

The issue governing conflicting priorities results in academic staff members giving precedence to their research activities. What this finding also highlights is that at the Case Study University there are no clear policies in place for rewards or incentives to encourage academic staff members to adopt WebCT at an advanced level. At an institutional level in the Case Study University it is argued that WebCT provides qualitative incentives in that the technology facilitates teaching by making the process more efficient and training is provided to aid the transition. Therefore, there is no need for any explicit incentives, and once staff become aware of the benefits of the technology, this will lead to self-interest.

Whereas, many academic staff members have suggested that their use of the technology needs to be made explicit, in that WebCT based activities whether developing and maintaining the site, or actively using the technology to hold online seminars needs to be time-tabled into existing schedules. Yet, the findings show that rewards and incentives decisions made by senior management have ramifications on how academic staff spends their time, and what they perceive to be of greatest value to them. Consequently, these factors can determine the amount of time and effort spent experimenting with e-mediated learning technology, particularly if efforts in this area go unrecognised in promotion and yearly performance reviews.

**Pedagogy**

A grounded theory approach to analysis of the case study material revealed that the pedagogic value of WebCT emerged as a contentious issue amongst academic staff members. At a deeper level, what this highlights is that there was a lack of clear guidelines concerning the role of WebCT in the School of Management. This is in addition to a lack of communication, and open deliberation between stakeholder groups about the strategic role of the technology. The findings reveal that academic staff members were confused about whether they were expected to adopt the technology at a pedagogic level, or whether the primary function of WebCT was as a delivery medium. Consequently, academic staff members were sceptical about the outcomes of using the technology at a pedagogic level, and the majority of academic staff members utilised the technology as a delivery tool, which occurred at a basic level.

Earlier in the thesis, the researcher outlined that senior management often view e-mediated learning technology as a panacea to the changes taking place in the UK higher education sector. It appears from the case study findings that South Eastern University has also followed suit, with the vision that WebCT can facilitate the university's strategy of becoming a research-led institution, by freeing up academic staff time for research. Theoretically, the technology should relieve the academic staff member of carrying out certain administrative duties, such as photocopying and answering student queries, whilst meeting the demands of increasing student numbers. Currently, the School of Management is deliberating methods of using WebCT to combat this problem. It has been suggested that the use of assessment tools available in WebCT can free academic staff members of marking duties, particularly if the multiple-choice quizzes are used. However, the current method of assessment within the school is essay based. It can be argued that WebCT has an essay submission tool, which can be used.

Yet, the case study findings revealed that some of the eager beaver group of adopters of WebCT within the school that used the technology for assignment submission found that their roles as lecturers were being redefined by using the assessment tool. They had to download and print in excess of one hundred and fifty assignments to mark them. Consequently, they were faced with certain restrictions, such as eyestrain when sitting in front of the computer for lengthy periods. Furthermore, they believed that marking work in this way impinged on their freedom, in the sense that they were tied to their computer. Whereas, with paper based submission, academic staff members are free to mark a pile of papers wherever they feel comfortable, and at any time. This experience led academic staff member to resort back to paper based assignment submission as the preferred method of marking essays. Although the assignment submission tool is still available, academic staff members believed that this tool was ineffective for essay based assessment, but perhaps multiple choice tests would be more suited.

The use of such tools for assessment purposes was a conflicting issue amongst academic staff members, with some suggesting that using the multiple choice tool could meet the demands of coping with the large cohort of students. Whereas others questioned the use of multiple choice tools for assessing business and management related disciplines. This is because these subject areas require students to demonstrate they have understood concepts through the application of theory and examples in an essay format. Hence, they suggested that multiple choice tools were limited in assessing a student's understanding of the subject at a deeper level, because such assessment methods force knowledge to be broken down.

A further area of contention amongst academic staff members when adopting e-mediated learning technology concerned the appropriate time to make notes available to students. The frequency with which academic staff maintained the WebCT site and uploaded materials varied with academic staff members. Some uploaded their lecture notes on a weekly basis, either before or after a lecture, others chose to upload their notes when students asked them to. Certain academic staff members felt that by uploading notes onto WebCT before a lecture, students could download the notes and this would facilitate the student learning experience, as they wouldn't then spend the entire lecture copying notes from the multimedia screens. Whereas others felt that by adopting this strategy they would run the risk of students not turning up for lectures. Therefore, they believed it was more appropriate to make the notes available to students after the lecture. This pedagogical issue about the appropriate time to make notes available to students is indeed an important issue that requires further investigation at a more intrinsic level. However, it was beyond the scope of the study to examine this issue at this stage, but it will be explored further at a later stage.

**Lack of Knowledge**

A lack of knowledge about WebCT was a significant category that emerged from the case study findings. The findings revealed that academic staff members were reluctant to move beyond the use of WebCT at a basic level. This is because they were sceptical of the benefits of using the technology at a higher level; as such they had negative opinions about the technology. It can be argued that a lack of knowledge about the technology led to negative attitudes and perceptions towards the use of WebCT at a more advanced level. For instance, one respondent suggested "*it's cheaper for the university in terms of paper and printing costs, but I'm not sure there are many other advantages.*" This highlights that significant gaps exist in the information about the use of the technology at an advanced level. The empirical research shows that only the drivers and eager beaver group of adopters of WebCT was willing to take risks to explore the potential of the technology.

However, the piggy backers, coerced sceptics and vigilante group of adopters required more persuasion about the benefits of the technology. This puts drivers and eager beavers of WebCT in a powerful position, as they can exploit the capabilities of the technology because they have higher use innovativeness, given that they have more experience of using the technology. At the same time, these groups can make the adoption process appear simplistic, because they camouflage the comprehensive knowledge and degree of skills that mainstream academic staff members will require to adopt the technology at an advanced level. Thus, knowledge sharing is essential for WebCT to be integrated at a higher level. As such, it is critical that academic staff members share their knowledge about experiences of using technology. This knowledge sharing process can be facilitated in a more widespread and efficient way through commitment at an institutional level and adequate support.

One respondent summed up the issue quite well, he suggested:

> *"The key thing for me and I think I was saying this to a colleague the other day when we talked about using it for the MBA, there's a world of difference between facility with the nuts and bolts of it and just making it work. It's not very straightforward to actually upload a file, which is essentially what I've been using it for. It's clunky. Well OK, if that's the way it is, I'm not about to redesign it. So there's an element of basic understanding that's needed. But I think more to the point is how we as a school can get much more use out of it. There has to be an intelligent discussion about that and perhaps some leadership. We need to appoint some steering group and actually explore what best practice is."*
>
> Senior Lecturer

**IT Skills Levels**

Part of the data collection process involved administering a brief computer skills survey to determine the way that academic staff members' view their skills levels of WebCT. It has to be noted that the use of a questionnaire may draw limitations to the study because the study is qualitative in nature and the validity of drawing conclusions from the quantitative survey can therefore, be questioned. However, the intention of using this survey was not as a major part of the findings. Instead, this survey was used to support the findings, as administering the survey as a major part of the study would require a different methodology. Therefore, this survey is being presented to generally illustrate how academic staff members viewed their WebCT skills levels. Additionally, the survey is being used to support the findings that WebCT is being adopted by the School of Management at a basic level, and because academic staff have different IT skills levels, they will therefore, require different levels of support. The results of the survey are subsequently presented.

# TABLE 5: HOW ACADEMIC STAFF VIEW THEIR WEBCT SKILLS

| Add Page or Tool | No Skills % | Some Skills % | Intermediate Skills % | Advanced Skills % |
|---|---|---|---|---|
| **Organiser page** | 20 | 74.2 | 2.9 | 2.9 |
| **Single page** | 20 | 74.2 | 2.9 | 2.9 |
| **URL** | 20.5 | 73.5 | 5.8 | |

| Course Content Tools | No Skills % | Some Skills % | Intermediate Skills % | Advanced Skills % |
|---|---|---|---|---|
| **Syllabus** | 18 | 75.4 | 5.8 | |
| **Content module** | 20 | 71.1 | 8.8 | |
| **Glossary** | 67.6 | 29.4 | 2.9 | |
| **Image database** | 94.1 | 2.8 | 2.9 | |
| **Index** | 91.1 | 5.8 | 2.9 | |

| Content Utilities | No Skills % | Some Skills % | Intermediate Skills % | Advanced Skills % |
|---|---|---|---|---|
| **Search** | 20.2 | 76.9 | 2.9 | |
| **Compile** | 20.7 | 73.5 | 5.8 | |
| **Resume course** | 94.1 | 2.9 | 2.9 | |
| **CD-ROM** | 94.1 | 5.8 | | |

| Communication Tools | No Skills % | Some Skills % | Intermediate Skills % | Advanced Skills % |
|---|---|---|---|---|
| **Discussions** | 61.7 | 32.3 | 5.8 | |
| **Mail** | 61.7 | 29.4 | 5.8 | 2.9 |
| **Chat** | 61.7 | 29.4 | 8.8 | |
| **Whiteboard** | 88.2 | 8.8 | 2.9 | |
| **Calendar** | 85.2 | 11.7 | 2.9 | |
| **Student tips** | 88.2 | 8.8 | 2.9 | |

| Evaluation & Activity Tools | No Skills % | Some Skills % | Intermediate Skills % | Advanced Skills % |
|---|---|---|---|---|
| **Quiz** | 67.1 | 30 | 2.9 | |
| **Self test** | 67.1 | 30 | 2.9 | |
| **Assignments** | 79.8 | 20.2 | | |
| **Student presentations** | 100 | | | |

| | | | | |
|---|---|---|---|---|
| **Student homepages** | 100 | | | |

| **Student Tools** | **No Skills %** | **Some Skills %** | **Intermediate Skills %** | **Advanced Skills %** |
|---|---|---|---|---|
| **My Progress** | 94.1 | 5.8 | | |
| **My Grades** | 91.1 | 8.8 | | |
| **Language Selector** | 94.1 | 2.9 | 2.9 | |

| **Manage Files** | **No Skills %** | **Some Skills %** | **Intermediate Skills %** | **Advanced Skills %** |
|---|---|---|---|---|
| **Upload files** | 20.6 | 70 | 9 | |
| **Create** | 20.6 | 70 | 8.8 | |
| **Edit** | 19 | 72 | 8.8 | |
| **Copy** | 44.1 | 47.1 | 8.8 | |
| **Move** | 26.4 | 64.8 | 8.8 | |
| **Rename** | 20.7 | 70.5 | 8.8 | |
| **Delete** | 20.7 | 70.5 | 8.8 | |
| **Zip** | 73.5 | 17.6 | 8.8 | |
| **Unzip** | 70.5 | 20.5 | 8.8 | |
| **Download** | 58.8 | 32.3 | 8.8 | |

| **Manage Course** | **No Skills %** | **Some Skills %** | **Intermediate Skills %** | **Advanced Skills %** |
|---|---|---|---|---|
| **Manage students** | 47 | 47 | 5.8 | |
| **Track students** | 29.4 | 64.7 | 5.8 | |
| **Manage presentation groups** | 100 | | | |
| **Manage teaching assistants** | 73.5 | 26.4 | | |
| **Track pages** | 94.1 | 5.8 | | |
| **Backup course** | 91.1 | 8.8 | | |
| **Reset course** | 94.1 | 5.8 | | |

| **Change Settings** | **No Skills %** | **Some Skills %** | **Intermediate Skills %** | **Advanced Skills %** |
|---|---|---|---|---|
| **Instructor name** | 20 | 74.2 | 2.9 | 2.9 |
| **Language Design View** | 94.1 | 5.8 | | |
| **Language Student View** | 94.1 | 5.8 | | |
| **Welcome page** | 20 | 74.2 | 2.9 | 2.9 |
| **Course menu** | 20 | 74.2 | 2.9 | 2.9 |
| **Page colours** | 20 | 74.2 | 2.9 | 2.9 |
| **Background image** | 20 | 74.2 | 2.9 | 2.9 |
| **Icon style** | 91.1 | 8.8 | | |
| **Replace icon** | 91.1 | 8.8 | | |

| | | | | |
|---|---|---|---|---|
| **Hide left navigation bar** | 58.8 | 41.1 | | |
| **Show left navigation bar** | 58.8 | 41.1 | | |
| **Hit counter** | 20 | 74.2 | 2.9 | 2.9 |
| **Course news** | 100 | | | |

The results of the survey show that 60 percent of academic staff members from the School of Management believed they had no skills in using WebCT. 30 percent of academic staff members felt that they had some WebCT skills. 6 percent of academic staff members believed they had intermediate skills, and only 3 percent of academic staff members felt they had advanced skills. Additionally, it can be inferred that academic staff members rated their skills levels higher where the skills required are similar to those used in previous e-mediated learning systems. For instance, 73.5 percent of academic staff felt they had some skills in the 'add page or tool' category. In addition, just over 50 percent of academic staff members believed they had some skills in the 'manage files' category. Whereas, 74.3 percent of academic staff believed they had no skills in the 'communication tools' category.

Upon further investigation the IT skills levels of academic staff members emerged as a barrier to technological adoption and advanced levels of WebCT adoption. Academic staff members that lacked the confidence in using computing software often experienced anxiety towards the technology and were reluctant to adopt WebCT. Interestingly, the empirical research identified that academic staff members that questioned their IT skills levels, were intimidated by the perceived skills levels of their peers. This fear intensified at the prospect of sharing modules with colleagues. One interviewee commented:

> *"At the moment I'm scared it would take me a very long time to put stuff up on there and if I did it may not work properly. I suppose other people's skills intimated me... I don't feel capable of using it but if they offered me the means of me feeling comfortable that I could use it properly. Yes I will happily use any tool I think if I can use it properly and particularly if that tool is going to make me more efficient, but without the support you tend*

*to think well I'm not confident enough to know how to use it and everything looks hugely complicated, but I think that's just me. "*

Lecturer

Certain members of the vigilante group of academic staff were reluctant to adopt the technology because they felt that their IT skills levels were insufficient. They attended the training courses but found the experience overwhelming. This indicates that the motivation to learn about the potential of WebCT existed. Therefore, these academic staff members require intense one-to-one training and support in order for them to adopt the technology. This is because attending the standard training sessions have proved to be ineffective in encouraging technological adoption. This finding further supports the argument being made by the researcher that through the identification of different levels of implementation, and by identifying the barriers to WebCT adoption, appropriate strategies can be put in place to facilitate the integration of WebCT. Chapter 7 builds on the issue of providing adequate support levels for academic staff members as part of the recommendations for the integration of e-mediated learning technology.

**Adequate Training and Support**

Earlier in the chapter, the researcher identified that although WebCT was presented as being successfully adopted by the Case Study University, the findings of the study illustrate that technological diffusion has been a slow process. This is because mainstream academic staff members are only adopting WebCT at basic level. By highlighting the various stages and levels that academic staff members adopt WebCT, a more detailed picture about the successful diffusion of the technology can be presented. At the same time, by identifying the factors influencing academic staff members decision to adopt the technology at a basic level, appropriate strategies can be developed, and put into place to encourage adoption at an advanced level. The identification of different levels of WebCT adoption was indeed an important finding. This is because academic staff members will require different levels of support depending on the level that they have implemented the technology. For instance, an academic staff member that is at stage 1 will require comparatively different type of training and support than an individual at stage 6. At stage 1, the academic staff member may require assistance with setting up the web base, and training on how to upload files and use the basic tools within WebCT. Whereas an individual at stage 6 may require support on managing chat room seminars in real time. Therefore, appropriate training will need to be provided to facilitate this process. In addition, academic staff members that were enthusiastic about the capabilities of WebCT used the technology at stage 6, which was an advanced level. However, the use of WebCT at that level proved to be unsuccessful as they had difficulty in managing students online. They often suggested that they were bombarded with questions from students and found it difficult to keep up and also type and think at the same time. Hence, they went back to a basic level of adoption in the following academic year due to their negative experience.

Although the Unit for Learning and Teaching provides support and training for WebCT development, the unit is a centralised department and therefore, the training and support provided is quite generic. What is required is detailed identification of the academic staff members adoption levels, and then individualised training and support to facilitate the advanced adoption of the technology. However, the research identifies that the crux of the problem is that academic staff members face conflicting priorities, and simply do not have the time to adopt the technology at a more advanced level. To encourage adoption at a higher level this major issue needs to be taken into account. Adopting a strategy of one-to-one, or small group peer training and support may facilitate the take-up of the technology at an advanced level.

The findings from the empirical research illustrate that using models of critical mass in isolation is an insufficient determinant of successful diffusion of e-mediated learning technology, and adequate user support is a paramount issue influencing the degree to which WebCT is being adopted. This is because WebCT is being adopted at different levels and therefore, requires a different degree of support at each stage. However, at an institutional level it may be argued that the Case Study University simply does not have the funding capability to support WebCT development at such an intrinsic level. Yet, the findings show that the cost-effectiveness of the technology is under question because it is being used at such a basic level. Therefore, the researcher recommends an alternative strategy of support. This strategy will provide academic staff members with one-to-one support to facilitate the adoption of the technology at an advanced level, whilst resolving the issue of a 'lack of time' as well as being cost-effective. This model for the integration of WebCT will be presented in chapter 9 of the thesis.

## CONCLUSION

This chapter has focused upon the technological adoption process within the Case Study University. Interestingly, the major finding to surface was the stark contrast in the differences in perception about the successful diffusion of e-mediated learning technology at an institutional and a grass roots level. The view presented by the university at an institutional level indicates that the technology is being widely adopted and has reached critical mass levels. However, at a grass roots level the findings reveal that academic staff members in the School of Management are adopting the technology at different levels and stages. The majority of academic staff members are adopting the technology at a basic level, in a similar way to the Intranet, the e-mediated learning system that WebCT replaced. This perspective provides a more complete picture of the diffusion of e-mediated learning technology at the Case Study University, than that currently being presented at an institutional level, and therefore argues that WebCT is not being successfully adopted. At a wider level, these findings raise the question of the suitability of models that focus solely on the pace of technological adoption as a determinant of the successful adoption of an innovation. At an intrinsic level, the findings raise the question of the cost-effectiveness and thus, long-term sustainability of the technology if WebCT is only being adopted at a basic level.

Consequently, the empirical research identified a number of barriers to adoption of WebCT. These included, the IT skills levels of academic staff, conflicting priorities for academic staff, a lack of knowledge about WebCT and adequate training and support. Hence, the findings reveal that the successful diffusion of innovations is a complex process that is dependent upon a number of social and organisational influences. These include, the way in which the individual perceives the benefits of the technology, ease of use, support levels and the norms of the social system. This study therefore, builds on the work of Rogers (1995) by focusing upon the transition period between the adoption and integration of technology that is not emphasised in his work. An alternative strategy of coupling the implementation of e-mediated learning technology with a reliable campus wide design for integration would be more dependable.

A sub-category of grounded theory analysis of the diffusion of innovations concerned the role of communication between senior management and academic staff, which has also been examined in this chapter. The case study data revealed that poor communication was a major contributor to the adoption levels of WebCT, with a top-down approach to technological implementation. At an institutional level, the infrastructure driven approach to technological implementation on campus needs to be reconsidered if mainstream academic members of staff are to be successfully convinced to adopt e-mediated learning technology at an advanced level.

The top-down method requires champion examples of technological implementation to warrant large-scale investments in technology. Furthermore, key change intermediaries across the university need to open up communication channels, and discuss implementation strategies and integration plans for the adoption of e-mediated learning technology at a campus wide level. These groups include, senior management (vice chancellor, heads of school, directors of service units), opinion leaders and mainstream academic staff.

The next chapter continues this theme by examining the adoption and integration process of e-mediated learning technology in more detail, but by drawing on sociological concepts of expert systems and time space to further address the paradox at the heart of this thesis: 'Despite continual investment in e-mediated learning technologies by higher education institutions, why has technological diffusion within UK universities been a slow process?'

# CHAPTER 6-RESEARCH FINDINGS E-MEDIATED LEARNING TECHNOLOGY AS AN EXPERT SYSTEM

## INTRODUCTION

The findings from the previous chapter drew on the diffusion of innovations theories to demonstrate that despite continual investment in e-mediated learning technology by higher education institutions, technological diffusion within UK universities is a slow process. The findings that emerged from the empirical research identified a paradox in the way that WebCT was portrayed as being successfully diffused across the campus. Upon detailed examination, the case study findings revealed that WebCT was only being adopted at a basic level by academic staff members, and in a fairly similar way to the Intranet system that WebCT superseded. This key finding raised a number of issues as to why the technology was being used at a basic level. Using a grounded theory approach to analyse the case study material helps to explain why members of academic staff from the School of Management were contesting WebCT.

The findings from this chapter address the third research question presented in chapter 2, by showing that WebCT is contested because of the impact that it has on the social relations between academic staff and students. This leads to a heightened culture of expectation. In addition, this chapter highlights how the technology has the potential to place the expertise of the academic member of staff in a vulnerable position. Therefore, this chapter builds on the issues raised in the previous chapter by drawing on sociological concepts based on Giddens (1996) theories of expert systems, and time space distanciation to explain how e-mediated learning technologies have the potential to change the nature of the academic staff and student relationship. These findings, therefore, contribute towards our understanding of why the diffusion of e-mediated learning technology in UK universities is slow, despite continual investment in the technology by higher education institutions.

The somewhat contradictory but nevertheless influential arguments made by advocates of e-mediated learning technology, such as Shimabukaro, 2005; Twigg, 2003; Bartley and Golek, 2004; Harley, Henke and Maher, 2004; Salmon, 2004; Liber *et al*, 2002; Omewenga, 2002; Laurillard, 2002; Drucker, 2000 and Albury, 1996, as discussed in chapter 2 suggest that e-mediated learning technologies have the potential to transform the landscape of higher education by enhancing and facilitating traditional learning and teaching practices. Some of the claims made centre on the notion that by deploying e-mediated learning technologies the work tasks of academic staff members can be significantly reduced. This in turn can free up academic staff time for other priorities such as research, in addition to meeting external demands, such as the increase in student numbers currently experienced by universities in the UK.

In an increasingly competitive environment, universities in the UK are under significant pressure to become cost-efficient, and the implementation of e-mediated learning technology is often seen as a panacea to the changes the university is experiencing. At an institutional level it is often claimed that e-mediated learning technology has the potential to meet the demands of increasing student numbers by providing the means for academic staff members to interact with students 24 hours a day, 7 days a week at a global level. It is also maintained that the technology has the ability to reduce the amount of time academic staff members spend on administrative tasks, such as photocopying course materials for students. The technology enables academic members of staff to upload course materials onto the e-mediated learning system for students to download.

Additionally, it is presupposed that communication tools, such as discussion boards inherent within the virtual learning environment allow students to interact independently of academic staff. Thus, relieving the burden on staff members. To put the situation into perspective, the case study findings have identified that at an intrinsic level these claims are not entirely justified. The empirical research shows that adopting WebCT does not necessarily reduce the work tasks of academic staff members, as managing discussion boards can be extremely time consuming. Furthermore, as discussed in chapter 5, course materials require formatting so the materials can be placed online. As such, the technology does not reduce either the time academic staff members spend on work tasks, nor relieve the burden.

Consequently, at a deeper level the technology in fact has the potential to change the nature of the relationship between the academic staff member and student, because the system encourages a heightened culture of expectation. This heightened culture of expectation paradoxically creates an increase in the workload of the academic members of staff, because they are expected to service a new set of demands. This is contrary to current claims suggesting that e-mediated learning technology has the ability to reduce the amount of time academic staff members spend on teaching related work tasks. Despite these generous claims made by advocates of e-mediated learning technology, the findings illustrated that WebCT is being adopted at a basic level by academic staff at the Case Study University based on a number of explicit and implicit issues. As outlined earlier, chapter 5 identified that WebCT was only being adopted at a basic level by the majority of academic staff in the School of Management. This chapter helps to explain the tacit reasons as to why the technology was being contested. Hence, this chapter addresses the tacit findings by drawing on sociological concepts of expert systems and time-space distanciation.

## THE IMPACT OF WEBCT AS AN EXPERT SYSTEM ON ACADEMIC STAFF

Drawing on Giddens (1996) concepts of expert systems as introduced in chapter 2, the case study findings identify how WebCT as an expert system has the ability to act as a disembedding mechanism that distances time from space. WebCT is physically detached from the university, but is then reattached through virtual space via the Internet. This enables students and staff to access the technology at a global level and access course materials without having to be physically present in a campus environment. WebCT as an expert system separates time from space by creating relations between absent others. In other words, WebCT has the ability to create geographical distances from face-to-face interaction. Consequently, this has a significant impact on the nature of the trust relationship between the student and the academic member of staff. This is because the social relationship is re-embedded or pinned down by WebCT as a means of time-space distanciation.

The impact of technological innovations on social relations is indeed an important area of study, particularly with advances in global communications technology. The findings from the empirical investigation revealed that the implementation of WebCT stretches the traditional social relation between the student and academic member of staff by creating an additional social relation. This has emerged as a result of WebCT disembedding the traditional social relation between the academic member of staff and student and then re-embedding the social relation across time and space in virtual space. The impact of this innovation on the social relationship between the academic member of staff and student means that they interact both face-to-face in a campus environment, and across virtual space. This process of disembedding and re-embedding as a means of time-space distanciation has the potential to significantly change the nature of the trust relationship between the student and academic member of staff. This is because the trust is transferred from the individual to the abstract system. Giddens (1996) concept of expert systems is a useful way to put WebCT into context, because it becomes clear how such systems connect a network of people, systems and processes, as illustrated in Diagram 12.

## DIAGRAM 12: WEBCT AS AN EXPERT SYSTEM

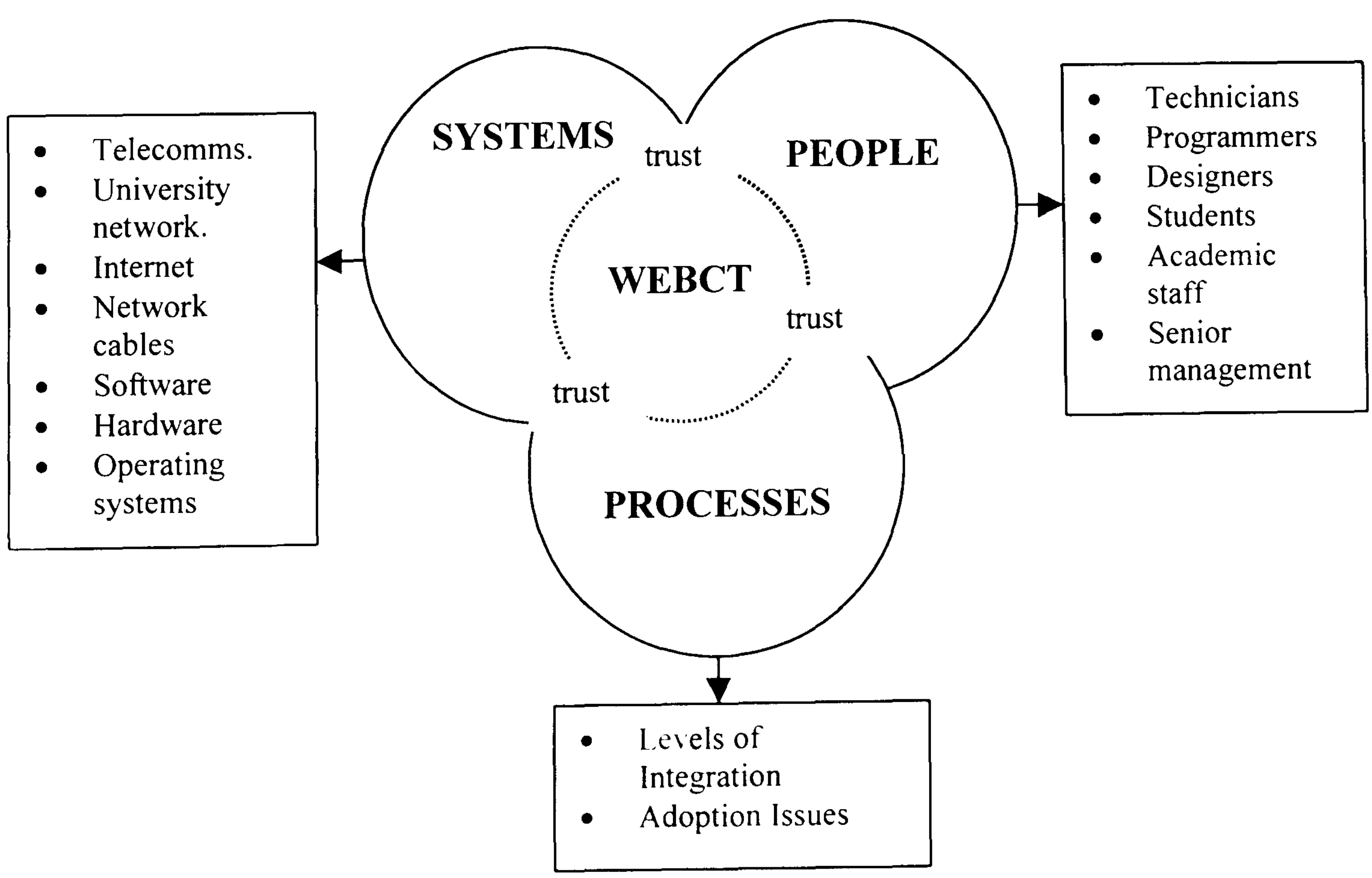


Diagram 12 illustrates the inter-relatedness and interdependency of WebCT on systems, processes and people. The diagram also shows how the foundation of such systems is built on trust, because the system removes the social relations and transfers the trust from the individuals to the expert system. For example, in order for WebCT to operate the technology required a team of technical experts consisting of software designers and programmers to develop the software package. The design of WebCT would have been based upon previous systems and research that had been carried out in the fields of learning and e-mediated learning. Therefore, academics would also have been involved in the process of design. The technology requires hardware operating systems upon which WebCT is downloaded hence; PC's also play a part in the expert system. In addition, the technology is dependent upon the Internet at a global level and the university's local network, which are dependent on technical infrastructure such as cables, servers, telecommunications and digital technology in order for WebCT to be available remotely.

In terms of processes and people, WebCT is dependent upon technical and academic staff members learning the skills to operate the technology. For instance, academic staff members that use the technology will have limited knowledge of how this expert system works, but will accept that there is a certain element of risk attached to adopting the technology, such as the system crashing and losing their work. Nevertheless, at a tacit level, academic members of staff will demonstrate their trust or faith in WebCT if they decide to adopt the technology. Therefore, the degree of faith or trust that they place in the system will have ramifications on the levels that academic staff members decide to adopt WebCT. The issue of trust in expert systems is a key finding that emerged from the case study data. The issue of trust is one of the key tacit issues that helped to explain why academic members of staff were contesting e-mediated learning technology, which affected the adoption levels of WebCT as discussed in chapter 5, and is subsequently addressed.

## THE ACCESS POINT OF WEBCT

Earlier in the chapter, it was noted that WebCT as an expert system alters the traditional social relation between academic staff members and students, and then pins down this relation creating a separate hybrid relationship across time and space. This virtual relationship co-exists with the traditional face-to-face teaching relationship. In adopting the role of a lay actor at the access point to the abstract system, not only is the system vulnerable, but also the individual. In particular the academic member of staff as they attempt to demonstrate their trust and faith in the abstract system. In the context of this case study, by adopting WebCT the traditional face-to-face relation between the academic member of staff and the student is changed as it is stretched across time and space. This is what Giddens (1996) refers to as time-space distanciation. WebCT then pins down the social relation between the academic member of staff and student across time and space. The process of time-space distanciation results in academic members of staff taking on the dual role of the academic as an 'expert' in the traditional sense, and a new virtual academic role as a 'lay actor' of WebCT.

However, this virtual academic role is not the same as the traditional academic role. In their virtual academic role, lecturers are not experts in the sense that they have technological as well as subject specific expertise. From a technological point of view, lecturers are simply operators or lay actors of WebCT, they are not experts in WebCT. This was illustrated in Diagram 11 in the previous chapter, as the majority of academic members of staff from the School of Management were only using WebCT at a basic level. At the time of carrying out the empirical research, no member of academic staff was using the WebCT at its highest level, and only 2.9 percent of academic staff had adopted WebCT at an advanced level. To illustrate the new virtual relationship between the academic member of staff and WebCT, comparisons will be made with the concepts of medicine and the car as expert systems.

When an individual wishes to access the medical expert system, this is done face-to-face through a doctor. This has similarities with the traditional relationship between the academic member of staff and the student, given that they interact face-to-face in a classroom or office based environment. With WebCT as an expert system, the relationship between the academic member of staff and student is akin to the expert system of the car. When we go to purchase a car we meet the salesperson that has extended information/knowledge of the car, but is not an expert like a designer of a car. The salesperson does not have the same level of expertise as a designer of a car.

Hence, we do not expect the salesperson to be an expert. With the academic staff and WebCT relationship, the lecturer is like the car salesperson, in that the lecturer is not an expert in WebCT, but may have extended information of WebCT. The difference between the expert system of WebCT and the car is the expectation that the academic member of staff will have expertise in WebCT, on the part of the student.

Because of the process of time-space distanciation, the academic staff member is at the access point of WebCT at two levels. Firstly, at an individual level in the role of the lay actor, and secondly with the student in the traditional role of the expert. The student can also be considered as a lay actor at the access point to WebCT. (The role of the student as a lay actor necessitates further investigation, which future research will address. However, it was beyond the scope of the study to address this issue at this stage.) At an individual level in adopting, developing and using WebCT to deliver their expertise, the academic member of staff adopts the role of the lay actor. This development work takes place in the background, out of the view of the student or as Giddens (1996) suggests *'backstage'*. When the academic member of staff uses WebCT to interact with students, their expertise is brought into public view of the student or *'front stage'*. In adopting WebCT, the traditional expertise of the academic member of staff is hidden behind WebCT, and consequently, their overall expertise becomes a potential source of vulnerability.

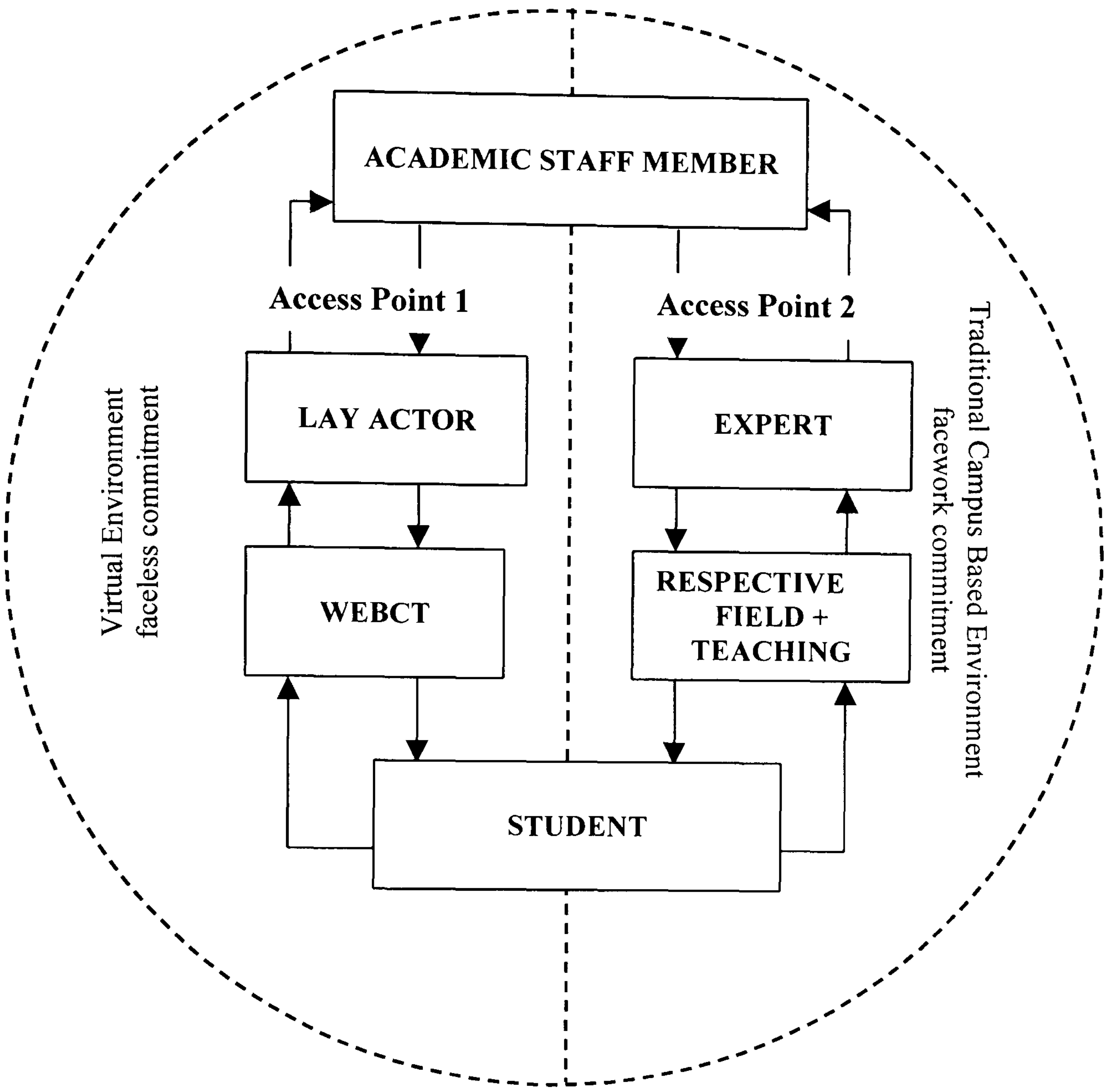
WebCT as an expert system creates an overlap between the dual role of the academic member of staff as an expert and as a lay actor. Maintaining this dual role as an expert and a lay actor at the access point to WebCT has the potential to place the traditional expertise of the academic member of staff in a vulnerable position. This is because the factors affecting the adoption of WebCT, such IT skills levels, pedagogical beliefs, time issues etc. as discussed in chapter 5, will ultimately influence the way in which WebCT is developed and used to deliver expertise in the academic member of staff's respective subject area.

As discussed in chapter 2, Giddens (1996) usefully notes that at access points, the possibility exists for experts to make mistakes by misconstruing or being unacquainted with the expertise they are believed to hold. Since the student perceives the academic member of staff in their traditional role as an expert, the potential also exists for the student to expect that the academic member of staff is also an expert in WebCT. The student may not necessarily view the academic member of staff as a lay actor at the access point to WebCT. If the way in which the technology is developed and used by the academic member of staff fails to meet the expectations of the student. Then the possibility exists for the student to question the traditional expertise of the academic member staff.

The case study findings revealed that students expected academic staff members to facilitate their teaching and learning experience in more diverse ways than before. Academic members of staff commented on the negative student evaluations based on WebCT, in which the students commented less on the intellect of the subject area, but more on the multimedia aspects of the module, such as *'the slides should have more colour'*. Academic members of staff also felt that students expected WebCT to provide *'pearls of wisdom'*, in that extensive detailed notes should be uploaded onto WebCT. This was instead of using WebCT as a support tool to illustrate the detailed concepts explained by the lecturer in their traditional role as an expert during the lecture. These examples drawn from the case study findings illustrate how through a process of time-space distanciation WebCT has the potential to place the expertise of the academic staff members in a vulnerable position. Further, how the technology creates a heightened culture of expectation. These two critical issues are discussed further in the chapter.

Using Giddens (1996) sociological concepts of expert systems is a useful way to demonstrate the impact that WebCT has on the academic staff member as the technology changes the role of the academic staff member and this can be illustrated at two distinct levels as illustrated in Diagram 13.

## DIAGRAM 13: THE DUAL ROLE OF THE ACADEMIC STAFF MEMBER




1. **Lay Actor:** The academic staff member as a lay actor [i.e. an operator of WebCT, not an expert] at an individual level and with the student at the access point to WebCT, which subsequently holds and or supports their expert knowledge. The social relations between the academic staff member and student have now been dissembedded and re-embedded via the abstract system. The expert academics role now changes from an expert to a hybrid lay actor and expert as illustrated in Diagram 13. The traditional role of the academic member of staff as an expert often leads to the presumption that the academic member of staff is also an expert in WebCT, rather than a lay actor. Yet, as the findings from the study reveal academic staff members may not necessarily be technical experts in WebCT. As such, the faceless commitment has the potential to significantly impact on the trust

relations between the academic staff member and the student. In other words, the academic member of staff as a lay actor may have had training to use WebCT, which affords the lay actor with a certain level of skills, but not the level of professional education as an expert.

2. **Expert:** The academic staff member in a traditional role as an expert academic having gained the professional qualifications through a process of formal education. The academic is in the traditional role of an expert within their subject area and this professionalism is displayed via teaching and research. Academics as experts display their trustworthiness via facework commitments. The trust relations are largely dependent on the academic displaying their expertise through face-to-face interactions with students during lectures and seminars in a campus-based environment, and to research colleagues at conferences.

The implementation of WebCT as an expert system influences the trust relations between the student and academic member of staff, as well as the trust in the system. At the Case Study University before the implementation of e-mediated learning technology, the academic staff members' only method of interaction with a student would have been face-to-face. The implementation of WebCT has stretched the traditional vehicle of face-to-face interaction between academic staff members and students, and created an additional vehicle for interaction, which is a result of time-space distanciation. This takes place in virtual space through e-mediated learning technology. Therefore, in effect, the academic staff member is now faced with upholding and maintaining trust relations with their students via both facework and faceless commitments.

Before the implementation of such an expert system the relationship between the academic member of staff and student was embedded and personalised. As such, the academic staff members' only role was as an expert as described earlier. If a student wanted to discuss an issue with a member of academic staff the only option available to the student would be to sign up for office hours. Academic staff members interacted with students by placing appointment sheets on the front of their office doors, which students could sign. This created a physical barrier between the student and the academic staff member. By adopting an e-mediated learning system, the academic staff member takes on the additional role of the lay actor at the access point of the expert system. Consequently, the relationship between the academic staff member and the student has become virtual, as students can contact academic staff members in both ways, face-to-face and via e-mediated learning systems. Previously, if the appointment sheet was filled the student would have to wait for the next available slot to see the lecturer. Thus, creating a physical barrier between the two.

E-mediated learning technology as an expert system has changed the traditional relationship and recreated the student and academic staff member interaction across virtual space. In addition, due to a lack of explicit guidelines about best practice and e-mediated learning etiquette the boundaries between students and members of academic staff have become blurred. This means that students can now contact academic staff via this technology 24 hours a day, 7 days a week. This is driving a heightened culture of expectation between the student and academic staff member. Therefore, in effect it can be argued that e-mediated learning technology does not reduce the work tasks of the academic staff member, as claimed by its advocates. However, because a separate channel of interaction has been created this adds to the workload of the academic staff member. Consequently, this paradoxically changes the nature of the relationship between the academic staff member, creating two separate access points through which academic staff members interact with students and vice versa. This critical finding will be subsequently addressed. [From here after the academic member of staff will be referred to as either a lay actor or expert in the context of their dual role] The findings that have emerged from the case study data are now presented in the context of the two distinct roles through which the academic staff member interacts with students and vice versa as follows:

1. Access point 1: Academic staff member as a **lay actor.**
2. Access point 2: Academic staff member as an **expert.**

# THE ACADEMIC STAFF MEMBER AS A LAY ACTOR

## Trust in Expert Systems

As noted previously, trust plays a fundamental role where expert systems are involved. This is because the trust is transferred from the individual to the abstract system and individuals place trust, and faith into expert systems because they have limited knowledge of how expert systems work. These expert systems are disembedding mechanisms as they remove social relations from the immediacy of context by providing guarantees of expectations across time and space. Through a grounded theory approach to analysis of the case study material, the findings illustrate that WebCT within the Case Study University setting also has a similar effect. In the School of Management, academic staff members took on the similar role of lay actors at the access points to WebCT. At a technical level, the lay actors became very concerned about the robustness of WebCT and that if they placed their materials online, they would run the risk of losing their material. One interviewee summed up the feelings of academic staff members quite well:

> *"There are concerns about the robustness. Is it going to be up and running when I want to use it? If you've made a promise to students to make material available online on a specific date and time, it is very frustrating if the system is down. If I set up a multiple choice quiz and say it [WebCT] messed up the mark in some way and I hadn't noticed and some student said, I thought I got 65, actually I'm not really sure if we would have anyway of finding that out really. Protecting the integrity of student marks would be the most important thing WebCT could do."*
>
> Senior Lecturer

Secondly, the amount of trust placed in the abstract system [WebCT] by the lay actor is likely to be influenced by their experiences at the outset with the abstract system [WebCT]. This places the lay actor at the access point of WebCT in a vulnerable position as they attempt to illustrate their faith in WebCT, because they provide the connection between facework and faceless commitments. The issue of trust tends to manifest when there is an element of scepticism regarding the knowledge claims of technical experts, or thoughts and intentions upon which an individual relies. Giddens (1996) highlights that access points are often places of tension between lay scepticism and professional expertise, and this makes the access points a potential source of vulnerability for abstract systems. It is perhaps for this very reason that individuals at access points attempt to demonstrate their trustworthiness, as they provide the link between personal and systems trust. The following comment made by an interviewee illustrates how the access point of WebCT has the potential to become a source of vulnerability:

> *"WebCT is a much bigger operation. It's geared towards delivering at a distance. You can manage students, although it's ironic that students keep coming up and saying that's not working, this is not working, they can't get WebCT working at a distance, which is a bit of a condemnation of it, because that's what it was designed for. The Intranet has very small amount of functionality compared to WebCT, but it was all right because people could access the Intranet internally. The Intranet seems to be very easy to use. For example, in WebCT you think you've uploaded your lecture notes, but students can't view the notes until you click on update student view and I'm sure that's a problem for a few people. Whereas with the Intranet when you put up the notes they are there."*
>
> Lecturer

With WebCT, there is a risk that the entire mechanism can falter affecting all those who use it. A carefully designed plan, together with training can help to minimise mistakes made. However, there is always an element of risk involved where both the technology and individual are concerned, regardless of how well the abstract system [WebCT] is designed, or the efficiency of the lay actor. The ramifications of its [WebCT] integration and functioning in relation to the operation of other systems and human activities in general cannot be entirely foreseen. Admittedly, the implementation of WebCT, or e-mediated learning technologies cannot be viewed in isolation; universities as a whole have to be viewed in a more holistic way. Not simply as the exchanging of information, or the convergence of students and staff within a concrete setting, but as a system of people, machines and objects that work together to make the institution what it is. It is not until the system breaks down in some way that we can begin to appreciate the complex nature of institutions, and fully understand the tacit ways in which the campus facilitates the process of learning and research.

**Surveillance**

The case study findings revealed that by adopting WebCT the lay actors were anxious that the wider implications of WebCT would give rise to autocratic management practices, such as surveillance. Typical characteristics evident within modern institutions are the surveillance techniques used to exert power and control over employees. These can include, open plan office call centres where employers can control and monitor levels of employee productivity. This type of surveillance is explicit, given that management will very often be in the same room as the employees. Computing technology enables management to check productivity levels, such as the number of calls made, and the outcomes of the calls and whether the calls are sales related or customer service based. At a surface level, it appears nonsensical that WebCT gives management in universities similar levels of control and power, such as those management practices that are typically found in low skilled service and manufacturing industries. Moreover, it appears ironic that highly qualified expert academics that have very often chosen this field for freedom of expression and thought, and are highly empowered individuals should require such surveillance techniques.

Yet, scratching beneath the surface, the findings outline that the possibility of surveillance techniques afforded by WebCT are very similar to the call centre example, albeit at a tacit level. If the lay actor places their course materials on the WebCT server, this technology becomes connected to the Case Study University's main network. This makes the academic member of staff much more accountable to both management and students. In terms of accountability to management, by adopting the role of the lay actor the expertise of the academic member of staff becomes more open to assessment. In terms of accountability to students, it is a type of disciplinary control where the lay actors are expected to respond to students instantaneously. Therefore, this type of control is changing the dynamics of the student and academic staff relationship, paving the way for a heightened culture of expectation. As discussed in chapter 1, the introduction of private sector practices due to market forces is one of the changes that the UK higher education sector has been experiencing over the last few decades. Consequently, it can be argued that these surveillance techniques may emerge from a need to control the product of the expert knowledge. By codifying the knowledge of experts, the knowledge becomes separated from the individual by placing the material onto an e-mediated learning system. Thus, the university then owns that knowledge as a product.

Nevertheless, it can be argued that a positive outcome of the expert system [WebCT] is that using the technology can improve teaching standards. This can be seen as positive for the university, particularly since the quality assurance assessment was introduced, as adopting the abstract system [WebCT] will drive the expert into making their knowledge explicit. Except on the other side, it can be argued that perhaps this is another reason as to why lay actors are adopting the technology at a basic level. This is because the technology forces academic staff to codify and systemise their knowledge removing the spontaneity from teaching. This pedagogical model may not necessarily tally with the experts view of teaching and learning, as discussed in the previous chapter. The introduction of email provides a good example to put the situation of surveillance into context. Email was initially introduced as an informal system, but has now become one of the most powerful surveillance tools that exists. The case study findings reveal that lay actors believed that using email made them extremely accountable. The following comment made by an interviewee summed up the issue quite well.

> *"I would treat email as I would a memo, or a letter. It's a permanent record. At least with a letter you can tear it up. You can't with an email. I find I have to be very careful how I answer emails, because I can come across as being quite rude, quite flippant."*
>
> Senior Lecturer

As with email, WebCT is a permanent record in which user activity can be traced and monitored. Another academic staff member in the role of a lay actor at the access point to WebCT comments on the issue of using such technologies:

> *"You say ah, I must really answer my emails because people will be able to say I did send you an email. The problem is the more you reply to emails and this will be true to everybody, the more you create for everybody and the more they reply the more that comes back. So I had a meeting in Wimbledon yesterday, four of us generated about 18 emails just to decide where we were going to meet, what time, what date and what the items for discussion were. Had we just sat with our diaries at the last meeting and said we're meeting on these dates throughout the year. I think the emailing time was probably twice the length of the meeting. I think it's incredibly unproductive to do things in this way."*
>
> Lecturer

It can be argued that on the positive side by adopting the role of the lay actor, the abstract system [WebCT] encourages the expert to be more systematic in terms of their dissemination of knowledge. Yet, at the same time the danger of knowledge dissemination is that it can lead towards the standardisation and codification of knowledge dependent on the level of WebCT adoption. So for instance, incorporating multiple choice assessment tools would require knowledge to be completely broken down, raising pedagogical questions about the appropriateness of such assessment methods at a university level. The technology also removes spontaneity because the teaching and learning material is set up before hand, breaking down knowledge into small chunks. The issue of codifying knowledge and putting the knowledge onto WebCT also raised legal concerns, and intellectual property was a reoccurring theme that emerged from a grounded theoretical analysis of the case study material, which is subsequently discussed.

**Ownership of Knowledge**

In adopting the role of a lay actor, academic staff members were increasingly concerned about their rights over their knowledge once put onto the abstract system

[WebCT], particularly since the university owns the technology. The case study findings reveal that as lay actors, academic staff members were in the grey about the issue of copyright at two levels. Firstly, they were unaware of whether they could upload other academics articles without authorisation and whether they would be breaching any laws by doing so. Secondly, it was unclear who owned the copyright of the academics work if put onto the abstract system [WebCT]. For instance, if the work was published in a journal and then the lay actor decides to upload that article onto the abstract system [WebCT] to support their teaching and learning practices, does that action transfer the right over to the university, given that the university owns the technology? On the other hand, is the lay actor in breach of copyright laws by taking such action? Indeed, this is a serious issue and academic staff members are frustrated that in adopting the dual roles of an expert and lay actor they are expected to use the technology without receiving clear guidelines about intellectual property issues. This finding highlights a lack of communication and direction between stakeholder groups. A senior lecturer noted:

> *"The whole business of intellectual property is dubious. I suspect that the official position is what is online is de facto university copyright, although it's interesting that it has not been advised to us."*
>
> <u>Senior Lecturer</u>

A significant amount of resources are expended on developing a course. Knowledge, skills and experience that have developed over a period of time are codified. There is a possibility that by placing course materials online, other academic staff members both internal and external to the university, students and the education market can exploit the knowledge. For example, an academic staff member talked of her experience in the role of a lay actor.

> *" I did find once that even on the Intranet one of my colleagues was taking my lecture notes down and using them for his own lecture without telling me or asking me. I just happened to find out by chance because I was in the print room at the same time and there it was. I have to say I did feel slightly miffed by that, because it's fair enough sharing, but I wasn't told. I found out by chance and it does have implications, because one of the*

*lectures he was printing off, I teach on a level 1 module and he was using it for a level 2 module."*

Senior Lecturer

Ingrained in this debate about the ownership of intellectual property are two deeper issues, firstly trust. We can see how scepticism manifests when the trust is transferred from the individual to the Intranet [abstract system]. The amount of trust placed in the e-mediated learning system is likely to be influenced by the experiences of the lay actor at the outset with the system. So the above quote infers that in adopting the role of a lay actor at the access point of the abstract system, the academic staff members negative experience with the outcome of technology has led to distrust and made their expertise a source of vulnerability. Secondly, the serious issue of quality arises and the wider consequences of immoral behaviour. Clearly, year 2 material is of a higher level than year 1; therefore, the standards of teaching material are being compromised. Appropriate measures to prevent and deal with such instances need to be put into place.

**Re-definition of Academic Staff Roles**

The emergence of the dual role of the academic staff member has inadvertently changed the nature of the social relationship between the academic staff member and student. This has created a greater culture of expectation and blurred the boundaries between students and academic staff members. The findings reveal that by taking on the role of a lay actor, academic staff members were increasingly concerned that the tacit consequences of adopting WebCT would have the potential of redefining their traditional roles as experts. Members of academic staff raised the critical issue of whether their job specification extended to also being technical experts in WebCT, as well as experts in their respective fields. A grounded theory approach to analysis of the case study findings shows that to adopt WebCT, lay actors require adequate training and support in order to use WebCT at an advanced level. It can be argued that it would be beneficial for lay actors to receive training in using and managing WebCT, and that these skills would add to their staff development portfolio. However, at the same time academic staff members questioned whether their traditional role as an expert extended to involve an element of technical expertise.

Many academic staff members argued that they did not consider themselves technical experts, but experts in academia. Academic staff members with reference to adopting the role of lay actors made the following comments:

> *"One of the points of discussion is should the technician be preparing materials to go online? I think lecturers are quite happy to write the material, the problem is to format it to get it compatible for WebCT. I don't think the lecturers should be doing it and the technicians don't want to do it. I think the question is who is responsible for doing that? I think that's partly why people aren't convinced you get a great deal of benefit from using it. Unless people can see that there are some helpers who can take their standard documents and reformat it into an educationally effective way. If people are expected to do this themselves, they aren't going to be very happy about it."*
>
> <u>Lecturer</u>

> *"The issue for me at this point if I'm perfectly honest I don't see it as the role of the lecturer to have to be doing these things. That's where the school needs to get involved. There has to be a debate about what is the appropriate and proper role of a lecturer? There's no reason why it shouldn't change over time, but if we're going to require that kind of facility and input then they'll probably have to be trade-off's. We can't keep expecting even more diverse skills from people. Do you know what I mean? Being able to use WebCT and design the site and manipulate the technology is an integral part of what is expected as a lecturer, then it should be in the job description. It should be an integral consideration when you interview people. There should be sensitive training for people. When I started lecturing it was considered sophisticated even if you had OHPs' that were typed, it was far more conventional to just write things on, and look where we are now."*
>
> <u>Senior Lecturer</u>

Clearly, these quotes suggest that academic staff members do not feel it is within their job remit to take on the additional role of a lay actor without adequate support and training. Consequently, this issue is further contributing towards WebCT being contested and adopted at a basic level by the majority of academic members of staff, leading towards low technological equilibrium.

**Re-Structuring of Work Tasks**

Advocates of e-mediated learning technology suggests that the technology can increase the efficiency of work tasks (Shimabukaro, 2005; Twigg, 2003: Laurillard, 2001). However, the case study findings reveal that these claims are not entirely justified. It becomes clear how on the one hand WebCT enables work to be transferred between the stakeholders of the university. This allows the work tasks to be redistributed, transferring divisions of labour, theoretically saving the academic staff member time to concentrate on other priorities such as research. However, on the other hand transferring the work task does not necessarily mean that time can be saved, or that the academic staff member is relived of a certain task. To illustrate this point an academic staff member made the following comment:

> *"We get nothing by paper now and everything comes across by email. Everything you get, the calendar, the phone book, you have to print it out and you have to trot around. Add that all up and what does that make? It makes another task added onto all your other tasks. Reading all your emails takes an hour a day constantly going back in case you miss something. It's depressing especially when you come in on a Monday morning it could be more. It depends on what's coming up. It doesn't reduce your work. It increases your work. It changes the nature of your work."*
>
> Senior Lecturer

What the above quote summarises is that the work task is not reduced, but it is the method through which the task is carried out that changes. In many cases the lay actor will have to learn a whole new set of skills in order to use the system in the first instance, and when the system is upgraded then the lay actor academic will be required to invest additional time into updating their skills. The previous chapter highlighted 7 different stages that academic staff could adopt WebCT. So as academic staff members climb up the ladder of adoption they incorporate more advanced tools of WebCT, such as during stage 6 where the technology is being used pedagogically to host online seminars via chatrooms in real time. Nevertheless, adopting the technology at this advanced level requires a different set of skills. These can include the management of online seminars, because the dynamics of facework [traditional face-to-face seminars] and faceless [online seminars] commitments are entirely different. The findings have shown that the majority of academic staff interviewed who used WebCT at stage 6 were unsuccessful, and simply did not possess the skills set to use WebCT at such a level. This adversely affected their perception of the technology and as such, they went back to using the abstract system [WebCT] at a basic level.

It can be argued that online seminars allow students that are less confidant to communicate more openly via e-mediated learning technology. Yet, unlike a face-to-face environment it becomes difficult to gauge what the student is thinking, without body language to support the non-verbal communication. One interviewee in the role of a lay actor made the following comment with regards to his experience of conducting online seminars:

> *"It's a bit frustrating, and if it's a consistent pattern and still not getting a response then I have to question whether it's something the students value. The other thing is the preparation there is a degree of passivity here. It works well if you've got a student who questions, then fine but if you've got a student that logs on and waits for pearls of wisdom to pop through then I have very little idea of what they may be finding difficult, unless they tell me. Am I being too reactive here? Should I have constructed something? Should I have set the agenda? And if one is going to do that, then that's additional time and preparation and I really don't know what I would hope to achieve by it."*
>
> Senior Lecturer

Giddens (1996) suggests that facework commitments are a critical ingredient in generating continual trustworthiness even for those lay actors deeply committed to supporting the abstract system. This is because the process of re-embedding social relations links the confidence in abstract systems to their reflexively mobile environment, together with affording the opportunities and rituals through which collegial trustworthiness can be sustained. Adopting WebCT at such a level requires a serious investment of the lay actors time to learn a diverse set of skills so that trustworthiness can be demonstrated through faceless commitments with the student. Which begs the question, how is the technology freeing up academic staff time? At an intrinsic level it can be argued that WebCT is not living up to the claims that it is portraying.

## THE ACADEMIC STAFF MEMBER AS AN EXPERT

### Culture of Expectations

In chapter 1, the reader was introduced to the changes being experienced by universities in the UK. The chapter outlined how in an increasingly competitive environment the British university system has had to create policies, and take action in order for the UK higher education sector to compete at both, a national and international level. Indeed, government reform has significantly contributed towards shaping the UK higher education sector, as we know it today. Amongst other factors, increasing student numbers and widening participation has created the need for alternative teaching and learning methods to meet the diverse needs of these student bodies. As such, the introduction of e-mediated learning technology is often viewed as a solution to changes universities are experiencing.

Despite universities in the UK faced with an influx of students, this increase in student numbers has not been matched by an increase in government funding. Therefore, the British government has had to develop alternative methods of coping with the increasing student cohort, such as encouraging higher education institutions to adopt e-mediated learning technologies and charging students tuition fees. Each university has the autonomy to set its own tuition fees from 2006. Although this strategy may help universities to become self-sufficient, a consequence of this action is that it is also contributing towards the changing nature of the relationship between the student and the university. This is making the relationship far more direct and consumer-like and this relationship is set to intensify from 2006. Increased student expectations are prompting a move towards a 'service-based culture' and the case study findings show that the implementation of WebCT at the Case Study University is further contributing towards this heightened culture of expectation.

Inasmuch as discussed earlier, WebCT as an expert system acts as a disembedding mechanism that removes social relations and then restructures these relations across time and space. In the context of WebCT as an expert system, this process changes the nature of academic staff member and student interaction from a traditional expert and student relationship, to a hybrid expert/ lay actor and student relationship. Such systems blur the boundaries between the academic staff member and student and drive a heightened culture of expectation. The case study findings highlight that in the traditional role of experts, academic members of staff were increasingly concerned about the ramifications that the abstract system [WebCT] would create when they adopted the role of a lay actor at the access point of the expert system. In particular, the impact that the abstract system was having on their social relations with their students. For instance, one academic staff member talked of her experience:

> *"I've even had situations where students are not abiding by proper regulations around the submission of course assignments. I've been emailed essays by students, when that's not the way to submit them in, and I don't accept them because I have to print them out and I have to hand them in and that's not my job. I even had one of my personal tutees just before Christmas send me an email, because she said she was going away the week before Christmas and she had to submit an essay and she needed all the time she could get. So she was going to send the essay to me and I was going to submit it for her, because she was on holiday and that to me just summed it up."*
>
> Senior Lecturer

Ironically, in a quest to free the experts' time by transferring the work task to the student through the introduction of WebCT, this process has in fact created a greater culture of expectation. This is in addition to blurring the boundaries between what students expect from academic members of staff in their traditional roles as experts, and what these experts are prepared to give. This points to the fact that in adopting the role of a lay actor, the relationship between students and academic members of staff is becoming individualised. This is because WebCT stretches the physical boundaries between the lecturer and student. It can be argued that this is a positive outcome, in that it helps to bring the student closer to the expert and facilitate the learning and teaching process. Yet, it often appears that student expectations are based more around administrative and resource issues, rather than the development of intellect. This in turn results in students expecting more from experts when academic staff adopt e-mediated learning systems to support their teaching and learning methods. Conversely, this can increase the workload for the expert. To illustrate this point a couple of interviewees sum up the issue quite well:

> *"I get daft questions being asked because they [students] won't find the stuff out for themselves. Before they had to come into the library and do it, and now they've got email. Where should I put headings? Should I put a bibliography at the end? All of this stuff you have to deal with. In the past you found out that stuff for yourselves, either from your peers or you found it out by reading the course handbook, or you went into the library and got a book out and found that stuff out for yourselves. To my mind this really is going to increase the work of the lecturer, not in an enjoyable manner."*
>
> Senior Lecturer

> *"I still think they [students] need to respect the fact that they need to work within boundaries. Perhaps I'm feeling like this from when I was on maternity leave. I started to get emails from students who knew that I was on maternity leave, asking for help with their dissertations. I found that particularly difficult because I had to reply to them and explain that they couldn't come to me because I was on maternity leave. But it also made me realise that as far as I could tell even if you're not completely accessible to them [students] they will still cross those boundaries."*
>
> Lecturer

Critically, the findings highlighted that academic staff members felt pressured by their role as lay actors at the access point to WebCT and the expectations that the expert system created. This expectation moved beyond servicing students, and at a tacit level had the potential to expose lay actors that felt they could not use the technology to its full potential. Certain academic staff members in their roles as lay actors felt they were being scrutinised by students if the technology was not working properly. They also felt they were being scrutinised if they chose to put up key points as supporting lecture notes, as opposed to detailed lecture notes, which they were expected to provide. This meant that a significant component of the students overall assessment of the lecturer is based on WebCT. Therefore, the tendency exists for the traditional expertise of the academic member of staff to be ignored, on the part of the student. It is this heightened culture of expectation that leads to the issue of vulnerability. (This critical issue that has emerged from the case study findings deserves further research. This study focused on an academic account. Future research will explore the student perception of WebCT and how this technology impacts on their interaction with academic members of staff.)

Interestingly, the findings revealed how scepticism about WebCT emerged when lay actors encountered technical hitches or when the intended outcomes were not delivered. Lay actors that were initially enthusiastic about the advanced features of e-mediated learning technology, such as online chat rooms and discussion boards changed their minds about adopting the technology at such advanced levels as they had negative experiences with the technology. As a result, they went back to using the technology at a basic level. Academic members of staff made the following comments:

> *"I used online chat rooms for distance learning students, it was quite useful and I felt encouraged by that, so I also did it the with the level 2's [undergraduates] which was a pathetic failure. They showed very little interest only 4 or 5 people logged on out of 100. This time I didn't run a lecture in the reading week, so I said I'd run a couple of these sessions, so if you're doing some reading and you've got a query that the way to check it out. I think I had a grand total of 1 person log onto each, not the same*

*person. So it was very select and not a very productive conversation really.*

Senior Lecturer

*"When I have done discussions in chat rooms I have been really disappointed. The first time I did a chat room, I was amazed. We were all set up to do it and we had about 10 people in the room, I was really excited. So I got my first question and began to answer it, I got to question 2, which was totally unrelated to that question. I thought I'm not going to answer that. I ended up having 10 conversations, no one contributed to any of the answers and once they got their answers they just left the room."*

Professor

*"When we tried it on the MBA, the level of responsiveness from MBA students was virtually zero, we created a notice board and chat rooms for all our MBA modules, it went by and nothing happened, nobody used it. Our MBA students especially the ones on campus also wanted face to face contact. I suppose even with me I gain more pleasure by direct contact. In a sense if you can see people and read their expressions you get a better sense of where they're at."*

Lecturer

Certain academic members of staff believed that WebCT made it easier for students to miss lectures, and if they did, they could then email the academic staff members asking for the lecture notes. Upon analysis, these findings raise two issues. Firstly, that full-time students may not be appreciative of the advanced tools of WebCT [chat rooms, discussion boards] as a method of receiving their education. As their reasons for being full–time students may extend beyond simply receiving a degree at the end of their study. It may also be based upon the desire for direct facework commitments as the main form of social interaction with experts and their peers. Therefore, the mode of study incorporating advanced tools of WebCT may be more suited for part-time students.

The case study findings identified a critical issue regarding a lack of strategy in terms of how the implementation of the expert system [WebCT] influences the expert and student relationship. Without explicit guidelines for best practice, the boundaries remain extremely blurred. Clear boundaries need to be established in terms of what students want, and what experts are prepared to give. Again, this can only be determined after extensive deliberation with the relevant stakeholder groups within the university. This issue is returned to in chapter 9. At a wider level, the study has identified how e-mediated learning technology changes the social relations between the academic member of staff and student. These social issues provide a crucial insight into why e-mediated learning technology is being used sub-optimally in UK universities.

## CONCLUSION

The empirical research findings drawn from the case study data resonate with Giddens (1996) claims that expert systems act as disembedding mechanisms, as they remove social relations from local contexts of interaction and then restructure these relationships across time and space. By drawing on Giddens (1996) sociological concept of expert systems and time-space distanciation the tacit findings that emerged from the case study data were put into context, and helped to explain why WebCT was being contested by academic staff. The empirical research identified that the implementation of the abstract system [WebCT] into the Case Study University significantly changed the nature of the relationship between the academic staff members and the students, inasmuch as the expert system removed the traditional social relations, and then restructured these social relations across time and space. The case study findings identified that this process resulted in the creation of an additional channel through which the academic staff members and students interacted with each other. Consequently, this changed the nature of the relationship between the two.

At an intrinsic level, the findings identified how WebCT blurred the boundaries between students and academic staff by encouraging a heightened culture of expectation, between what the students wanted and what the lecturers felt they were prepared to provide. This led to academic staff members questioning their roles as lecturers. At a tacit level, trust emerged as a significant issue influencing the adoption of WebCT. Consequently, negative experiences at the outset of the technology can ultimately affect the degree to which WebCT is adopted. At a wider level, a number of issues arose regarding the ramifications of introducing such technological systems into UK universities. The findings revealed how WebCT has the potential to drive autocratic management practices in that the technology gives rise to surveillance techniques by allowing the work of academic staff members to be monitored. Interestingly, the findings revealed that WebCT might not have the ability to reduce the amount of time it takes to complete a work task, because the work task is either re-formed or transferred to other stakeholders. Therefore, the academic staff member is still faced with having to complete a work task, however it may be disguised.

Despite the claims that WebCT brings with it certain advantages, such as administrative benefits, at a deeper level the empirical research has revealed that in fact these claims are not entirely justified. Therefore, the introduction of e-mediated learning technologies in UK universities can be viewed as a double-edged sword, because although the technology brings with it certain advantages for instance, providing global access, such advantages also have ramifications. By making reference to the work of Giddens (1996) this chapter has drawn on sociological concepts to rationalise the issues influencing the adoption and integration of WebCT at the Case Study University. Hence, this chapter further adds to our understanding of why despite continual investment in e-mediated learning technologies by higher educational institutions, technological diffusion within UK universities has been a slow process.

# CHAPTER 7-DISCUSSION

## INTRODUCTION

This chapter discusses the findings of this research, presented in chapters 5 and 6 of this thesis. The objective of this research was to explore the adaptation process of e-mediated learning technology by academic staff in a campus based UK University, with specific regard to pace and barriers to adoption, and the impact of the technological on social relations.

The theoretical framework guiding this study is that individuals adopt innovations at different periods of time based on a number of social and organisational dynamics. These dynamics include characteristics of the individual, such as personality traits and the way the individual perceives the benefits of the innovation. Organisational dynamics include the way in which the innovation is communicated and marketed to the individual, and the norms and values of the organisation. The conceptual framework also guiding this study is that through a process of time-space distanciation expert systems have the potential to change social relations.

To address the aims and objectives of this research an interpretivist in-depth case study exploration was conducted. The findings of this study are fully discussed in this chapter. This chapter is structured in two sections as follows. In the first section, the findings for each research question are discussed and explained within the context of this research study. Relevant literature is drawn on where appropriate to compare and contrast against the empirical research findings. The second section reflects on the implications of these findings for e-mediated learning technology in UK universities.

# DISCUSSION OF RESEARCH QUESTIONS

## RESEARCH QUESTION ONE:

**What are the factors that influence the pace at which academic staff in a campus-based UK university adopt e-mediated learning technology?**

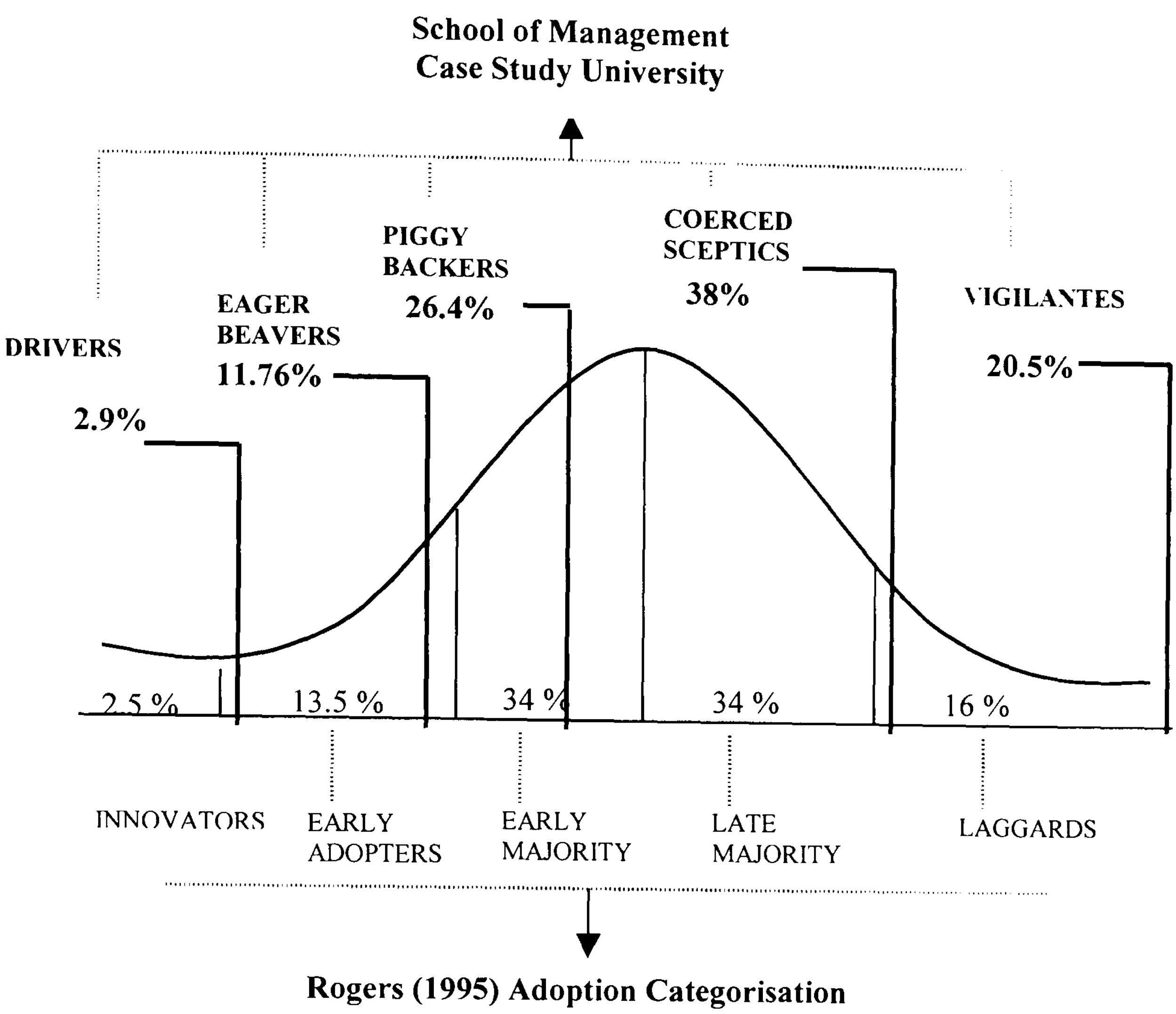
As explained in chapter 2, individuals adopt innovations at different rates, and the pace of adoption can be illustrated in the form of an S shaped curve. Subsequently, these individuals can be classified into adopter categories (Rogers, 1995). The findings of this study, presented in chapter 5 point to the presence of five distinct adopter categories exhibited by academic staff in a campus based UK University. These adopter categories are classified as follows: Drivers, Eager Beavers, Piggy-Backers, Coerced Sceptics and Vigilantes. A detailed look at the findings indicates that each of the identified adopter categories share some common factors with adopter categories found in the existing diffusion of innovations literature.

The factors classifying each of these categories and the similarity amongst the identified adopter categories and the existing literature on diffusion of innovations are subsequently discussed. Secondly, upon closer exploration the findings revealed that not only does the pace of technological adoption vary, but also the level at which academic staff adopt e-mediated learning technology. This substantial finding builds on the existing model of critical mass found in the diffusion of innovations literature. This is because the levels as well as the pace at which individuals adopt innovations provide critical determinants of how innovations are diffused across organisations. As such, a discussion of the identified levels of WebCT adoption is presented, compared, and contrasted against traditional models of critical mass found in existing diffusion of innovations literature.

# ADOPTER CATEGORIES

A useful way to begin this discussion is by comparing and contrasting the adopter characteristics of the findings presented in chapter 5, against Rogers (1995) categorisation of adopters as presented in chapter 2. This is illustrated in Diagram 14 below

# DIAGRAM 14: COMPARISON OF ADOPTER CATEGORIES




Source: Adapted from Rogers (1995)

## DRIVERS

Similar to Rogers (1995) categorisation of innovators, as introduced in chapter 2, and illustrated in Diagram 14, the findings presented in chapter 5 indicate that drivers of WebCT in the School of Management made up a small percentage of the overall adopter categories. The drivers of WebCT made up the first 2.9 percent of the school that were willing to explore the potential of WebCT. This percentage is slightly higher than Rogers (1995) categorisation of innovators. The drivers of WebCT in the school were enthusiastic about the technical capabilities of the system and possessed advanced technical knowledge. They adopted the technology during the pilot stage of the implementation of WebCT, which took place between 2001-2002. It is understandable that the drivers of WebCT implemented the technology during the pilot stage of the implementation project. Given that this group held research backgrounds within the area of e-mediated learning and would therefore, have been attracted to this project during the pilot phases.

As discussed in chapter 2, Hamilton and Thompson (1992) suggest that drivers of innovation play a fundamental role in the subsequent take-up of e-mediated learning technology by other individuals. As such, they play a pivotal role in making the attributes of the technology transparent to others. However, the findings from this study show that the drivers did not disseminate information about the technology to mainstream academic staff members. In fact, the drivers of the technology went on to create a separate WebCT server. This was isolated from the WebCT server that was launched campus wide and was password protected. Therefore, only select members of the school had access to this site. Because, the drivers of the technology isolated themselves from the rest of the school, mainstream users did not receive the peer support and encouragement from the drivers of the school. This may have partly contributed towards WebCT being adopted at a basic level. This indicates a lack of communication between groups within the school. The findings consistent with Rogers (1995) and Hamilton and Thompson (1992) indicate that drivers shape subsequent use of e-mediated learning technology.

**EAGER BEAVERS**

Eager beavers made up the following 11.76 percent of the school to adopt WebCT. This group adopted the technology when WebCT was implemented campus-wide across the university, between July 2002- June 2003. This percentage is very close to Rogers (1995) categorisation of early adopters. The eager beaver group of adopters were willing to take the time to explore the capabilities of the technology, and to experiment with the various tools and features. The outcome of this experimentation determined the subsequent use of WebCT.

A striking feature of the eager beaver group of adopters was that their research background and area of expertise were not IT related, but they were nevertheless interested in exploring the potential of the technology.

The findings from this study are consistent with Ram and Jung (1994) and Jacobsen (2000) as discussed in chapter 2. In that, the eager beaver group of adopters initially used more features and options within WebCT than piggy backers or coerced sceptics. The eager beaver groups explored the diverse capabilities of the technology and experimented with the assignment submission tool, multiple choice question tools and communication tools [discussion boards, chat rooms and email]. Subsequently, this group were more aware of the multiple features and capabilities of WebCT and they sought multiple uses for WebCT, rather than the piggy backers and coerced sceptics.

Interestingly, the findings from this study revealed that higher levels of technological expertise are not an indication of early adoption of WebCT by academic staff. It is often presupposed that individuals that are highly skilled in e-mediated learning technology will become drivers or eager beavers of the technology. Yet, academic staff that did not believe in the potential of WebCT despite holding research backgrounds in information technology and being highly skilled in using forms of e-mediated learning technology were not drivers or eager beavers of WebCT. Alternatively, a number of eager beavers who did not consider their IT skills levels to be particularly advanced, but were still eager to explore the diverse functionality afforded by WebCT. The findings of this study are in support of Jacobsen's (2000) study, as presented in chapter 2, who found that an increasing number of academic staff members that used computers were not necessarily highly skilled, but were nevertheless eager to use the technology.

**PIGGY BACKERS**

The empirical research drawn from the case study found that the piggy backer group of adopters made up the following 26.4 percent of the school to take-up WebCT. This group adopted WebCT between July 2003 and June 2004. The piggy backers were reluctant to experiment with the advanced tools and mainly used WebCT as a document repository and notice board. Yet, the findings from this study in relation to the piggy-backer group of adopters is inconsistent with Rogers (1995) categorisation of the early majority group of adopters. This percentage differs by fewer than 10 percent. According to Rogers (1995) as discussed in chapter 2, this group provides an element of interconnectedness between the interpersonal networks that exist within the organisation or social unit. A striking finding that emerged from the study is that many of the piggy backers adopted WebCT because of peer encouragement. In that, these academic staff members shared a module with a colleague that belonged to the eager beaver group of WebCT adopters, and therefore, had prior experience of using the e-mediated learning system.

However, a number of academics had commented that although they were willing to explore the potential of WebCT, they decided not to adopt because they were sharing a module with a colleague that was unwilling to use WebCT. Therefore, they did not want to be burdened with the work of creating and maintaining the site. This is hardly surprising, as the findings presented in chapter 5, show that members of academic staff have to juggle a number of conflicting priorities. Therefore, due to time pressures and increasing workloads, any time spent on innovative activities has to be carefully considered in light of other responsibilities. Perhaps these factors help to explain why a lower percentage of piggy backers adopted WebCT in comparison to Rogers (1995) categorisation of the early majority. Further, consistent with Rogers (1995) these findings also point towards the powerful influence of peer support and informal networks of communication as a partial determinant of the take-up of e-mediated learning technology.

**COERCED SCEPTICS**

The coerced sceptics made up the following 38 percent of academic staff to take-up WebCT. This group adopted the technology between July 2004 and June 2005. Interestingly, this group adopted WebCT when all other e-mediated learning technologies became obsolete, and were therefore, coerced into adopting WebCT. Similar to Rogers (1995) categorisation of the late majority group of adopters, the coerced sceptics are followers and approach innovation with a certain level of trepidation and peer pressure is often a key factor in driving adoption. However, in contrast to Rogers (1995) categorisation of the late majority group of adopters, uncertainty about WebCT was not eliminated before the coerced sceptics decided to adopt. As such, the coerced sceptics of WebCT may not necessarily have adopted the technology because they felt that WebCT superseded the Intranet system. Instead, the findings show that the coerced sceptics were facing pressure to adopt WebCT at an institutional level. This is in addition to pressure from peers and students. Furthermore, because the Intranet system was made obsolete, the coerced sceptics had no other alternative but to adopt WebCT, other than to refrain from using any e-mediated learning technology.

The coerced sceptics of WebCT were reluctant to experiment with the advanced tools and mainly used WebCT as a document repository and notice board. This group of adopters believed their IT skills levels were relatively basic compared to the drivers, eager beavers and piggy backer groups that adopted WebCT. Hence, they lacked confidence and questioned their ability to use the advanced tools of WebCT. This is consistent with the earlier research of Ram and Jung (1994), as presented in chapter 2, who observed that late adopters tend to be intimidated by a new technology. Further, academic staff members that felt intimidated by the technology were reluctant to attend training sessions, or continuously ask for support out of fear of being labelled incompetent.

**VIGILANTES**

The vigilantes make up the remaining 20.5 percent of academic staff to adopt WebCT. Similar to Rogers (1995) categorisation of laggards, the vigilantes are sceptical of change agents. The findings show that vigilantes were sceptical of the underlying motivations and wider social implications of using WebCT. This was because they believed the technology had the potential to change the culture of academia. However, in contrast to Rogers (1995) findings, the vigilantes were not ambiguous towards innovation. They were highly proficient in technological advances but were sceptical about the underlying intentions that the university had of introducing the technology.

Further, the findings also indicate that the success of the technology did not influence the vigilantes to adopt. This is in contrast to Rogers (1995) categorisation of laggards, because the vigilantes were more concerned about the wider implications of implementing WebCT. In particular, how e-mediated learning technology goes against the culture and values of what a university in the UK stands for. This interesting finding highlights the importance of communication and deliberation between all stakeholder groups about the wider impact of e-mediated learning technology across UK universities.

## LEVELS AND STAGES OF WEBCT ADOPTION

As presented in chapter 2, certain innovations are adopted by individuals at different rates, and this diffusion process can be illustrated in the form of an S shaped curve (Rogers, 1995). Categories of adopters can be represented on the S shaped curve as follows. Innovators and early adopters represent the beginning of the curve. The early majority represents the take-off point of an innovation, and the late majority and laggards represent the top end of the curve. Existing literature on the diffusion of innovations (Abrahams, 2004; Jacobsen, 2000; Groves and Zemel, 2000; Mahajan, Muller and Srivastava, 1990) advocate the use of Roger's (1995) critical mass model. Critical mass occurs when between 10-20 percent of individuals adopt the given innovation, so that subsequent adoption of the innovation becomes self-sustaining in the organisation.

However, the findings as presented in chapter 5, indicate that using models of critical mass in isolation to indicate the take-off point of e-mediated learning technology is misleading. This is because; e-mediated learning technology consists of multi-functional capabilities and therefore, can serve numerous functions at any given time. This means that as well as adopting WebCT at different periods of time, academic staff can also adopt WebCT at 7 different stages and at 4 levels, as illustrated in Diagram 11 in chapter 5. These levels and stages are briefly discussed.

### LEVELS OF ADOPTION

- **NO ADOPTION**: 20.5% of academic staff [vigilante group] chose not to adopt WebCT.
- **BASIC LEVEL:** 76.6% of academic staff [eager beaver, piggy backers, and coerced sceptics] adopted WebCT at this level. At this level, the technology was

mainly used as a document repository and passive communication vehicle. This was in a similar way to the system [Intranet] that WebCT superseded.

- **ADVANCED LEVEL:** 2.9% of academic staff [drivers] adopted WebCT at this level. During this level, academic staff incorporated interactive and real-time tools into their teaching and learning practices.
- **INTEGRATED LEVEL:** At this point in time, no member of academic staff had adopted WebCT at this level. This is because to adopt the technology at this stage would require complete pedagogical, organisational and administrative integration with all functions within the university system. Thus, WebCT has been implemented as a stand-alone tool and has yet to be integrated fully within the Case Study University.

## STAGES OF ADOPTION

- **STAGE 0:** The vigilante group of academic staff are representative at this stage of non-adoption.
- **STAGE 1:** The drivers, eager beavers, piggy backers and coerced sceptics will have passed through this stage, which involves the steps taken to create a web-base. Such steps may have involved participating in training sessions, and or networking with colleagues and or peers.
- **STAGE 2:** The drivers, eager beavers, piggy backers and coerced sceptics may have passed through this stage. This stage involves utilising the site as a document storage and repository facility for course material such as lecture notes, power point slides or external links.
- **STAGE 3:** The drivers, eager beavers, piggy backers and coerced sceptics will have experienced this stage. During this stage, academic staff will be utilising the technology for passive communication purposes, such as a notice board.
- **STAGE 4:** At this stage academic staff have progressed from an basic level of adoption to an advanced level of adoption. The drivers group of adopters may have experienced this stage. At this stage academic staff will have gone beyond using WebCT as a passive vehicle for communication and will have introduced an interactive element to their web base. This may include using e-mail or discussion boards.

- **STAGE 5:** The drivers group of adopters may have experienced this stage. This stage involves the integration of assessment tools such as assignment submission and multiple-choice quizzes.
- **STAGE 6:** The drivers group of adopters may have experienced this stage. During this stage, academic staff will have integrated tools such as chat rooms and discussion boards pedagogically in real-time.
- **STAGE 7:** This stage represents the shift from the advanced to the integrated level. It is understandable that no member of academic staff experienced this stage, as this stage requires complete pedagogic, organisational and administrative integration with WebCT. Given that as of yet WebCT has been implemented as a stand-alone tool.

## MULTI-FUNCTIONAL TECHNOLOGIES

Taking both the levels/stages of adoption together with the rates at which an innovation is adopted provides an entirely different perspective than using models of critical mass alone. The official statistics presented by the Case Study University indicate that the adoption of WebCT by academic staff members has reached critical mass levels with over 300 web bases currently live and 150 web bases in development. These figures have sharply increased from just over 35 live web bases, and 35 in development in 2002. This quantitative 'blanket' perspective gives the illusion that WebCT has been successfully diffused across the Case Study University, because it assumes that if a web base is live then activity will be taking place. Yet, this perspective fails to take into account 'individual activity' in that academic staff in fact use WebCT in diverse ways.

Therefore, in contrast to Rogers (1995) model of critical mass the findings reveal that a qualitative, interpretivist exploration into the diffusion process of WebCT by academic staff found that in fact the majority of academic staff (76.6% eager beavers, piggy backers and coerced sceptics group of adopters) were adopting the technology at a basic level, which is between stages 1-3 as illustrated in Diagram 11 in chapter 5. Further, the findings show that WebCT was being used in a similar way to the Intranet system it superseded. This was mainly as a document repository and as a form of passive communication. The findings from this study support the argument made by Geoghegan (1994) as presented in chapter 2, who suggested that critical mass is insufficient to sustain the diffusion of instructional technology to mainstream users.

At a wider level, this major finding has substantial implications for the diffusion of innovations literature, in particular for the indicators of the successful diffusion of innovations. To put this finding into context it is important to discuss how this thesis builds on Rogers (1995) diffusion of innovations literature, and specifically how it adds to existing models of critical mass. This is to indicate how ICT innovations require multi-dimensional models to determine more thoroughly, how these technologies are successfully diffused across organisations.

Increasingly, ICT technologies serve multi-functional purposes. For instance, the findings from this thesis show how WebCT is a multi-functional e-mediated learning system, in that there are a number of different and diverse tools that can be flexibly integrated into existing teaching and learning practices. For instance, at a basic level WebCT allows lecturers to make lecture notes and supporting material available to students. The technology also enables interactive communication to take place between a lecturer and his/her students via chatrooms, email, and discussion boards. The technology also enables real-time video streaming to be incorporated into instructional design, so that the lecturer does not have to be physically present within a campus-based classroom in order to deliver a lecture/seminar. At its highest level, as illustrated in Diagram 11 in chapter 5, the entire university system and supporting processes can be integrated into WebCT. These include the student registration system, the financial system, student and staff records, and e-mediated learning content.

Given that WebCT allows such flexible integration, it is understandable that not all tools will be relevant or needed in the same way for each member of academic staff that adopts the technology. As such, it becomes more difficult to predict the successful diffusion of WebCT across universities based solely on the pace at which academic staff adopt, which is what critical mass models traditionally indicate. This is because these models allow organisations to predict the take-off point of an innovation at which point it is considered that the innovation will become self-sustaining.

In contrast, the findings from this study indicate that because academic staff adopt WebCT at different levels/stages and at different paces, WebCT does not become self-sustaining. Further, as the technology is being adopted at a basic level, it can be argued that the technology is not being successfully diffused. This is because it is only being used in a similar way to the less-functional system, which it replaced, despite affording greater functional capabilities.

At a more general level, it is predicted that the findings from this study will also be applicable to determine the diffusion of ICT innovations across organisations or social units. Using only models of critical mass in isolation to predict the successful diffusion of ICT innovations that possess multi-functional capabilities will yield a limited perspective. For instance, at this given moment in time mobile phones serve to perform numerous functions. These functions include SMS text messaging, pictures, videos, video chat, Internet surfing, email and PowerPoint presentations. As well as its primary function, this is to provide a vehicle to allow wireless verbal communication between individuals. It is understandable, that not all individuals will require or use all of the tools afforded by these multi-functional mobile phones at the same level/stage. Each individual that adopts a mobile phone will have different needs and therefore, utilise the mobile phone in diverse ways. Yet, statistics presented in the media about the adoption of multi-functional mobile phones indicate that these technologies are successfully adopted. Research carried out by Gartner (2005) presented in http://www.bbc.co.uk states that world wide mobile phone sales have risen by 22% between July-September 2005 and forecasts total sales of 810 million for 2005. This is without providing a thorough evaluation of the stages and levels at which the mobile phones are being adopted.

If we compare multi-functional innovations to technologies, which only serve a single function, such as early landline telephones, it becomes clear how landline telephones could only perform a single function, which was to allow the verbal communication between two individuals. Thus, models of critical mass could provide an informed indication of how the technology was being diffused, because there was only one level/stage at which the technology could be used.

Whereas, similar to e-mediated learning technologies other multi-functional ICT innovations such as mobile phones can no longer rely on models of critical mass in isolation to evaluate the successful diffusion of the technology. This is because they serve multi-functional purposes and can be integrated at various levels and stages. Therefore, models that take into account the development of these technologies over time and incorporate both the pace as well as stages/levels of adoption will provide a more informed perspective of the diffusion process of an innovation.

## SUMMARY AND CONCLUSION OF RESEARCH QUESTION ONE

The findings from this research study provide an important insight into the adoption of e-mediated learning technology exhibited by academic staff in a campus-based UK university. The adopter categories identified provide evidence that individual characteristics displayed by academic staff influence the pace at which these individuals adopt e-mediated learning technologies. This finding shares certain similarities to Rogers (1995) classification of innovators in that drivers can be characterised by their high levels of technical expertise/background. However, the eager beaver group of adopters, unlike Rogers (1995) early adopters, did not necessarily possess advanced technological skills in e-mediated learning technology, but were still eager to experiment with the multi-functional capabilities of the technology.

Evidence from this research also shows that peer support and informal networks play a pivotal role in the adoption of e-mediated learning technology as the piggy backers decision to adopt was influenced by their colleagues involvement and attitude toward WebCT. However, in contrast to Rogers (1995) categorisation of the late majority group of adopters, the coerced sceptics decision to adopt WebCT was not because other colleagues had adopted. Instead, this was because they were coerced into adopting the technology at an institutional level, as existing e-mediated learning technologies became obsolete. The vigilante group of adopters shares similarities with Rogers (1995) categorisation of laggards, in that this group is sceptical and cautious of innovations. In essence, this findings points towards evidence of bureaucratic management practices, because although the technology was introduced on a voluntary basis, by making other e-mediated learning technologies obsolete, WebCT was introduced as an implicit directive.

Contrary to existing research on the diffusion of innovations, the findings from this study provide evidence that using models of critical mass in isolation is a misleading indicator of the successful diffusion of an innovation. This substantial finding points towards the importance of analysing the diffusion process of innovations through both indicators of pace and level/stages of adoption. This study provides evidence that models of critical mass could predict indicators of the pace of innovations that served single functions. However, increasingly ICT technologies provide multi-functional capabilities and therefore, models that indicate the successful diffusion of these innovations have to consider multi-functional capabilities. The levels and stages at which academic staff adopt e-mediated learning technology provides a more thorough perspective than using models of critical mass alone. This is because analysing the adoption of WebCT using models of critical mass indicates that the technology has been successfully diffused. However, analysing the diffusion process through a lens which takes into consideration levels and stages at which academic staff adopt WebCT, provides evidence that the technology is only being adopted at a basic level. This is despite the technology offering more functionality than the system it superseded.

Overall, based on the evidence presented in this research study, it can be concluded that academic staff adopt e-mediated learning technology at different paces, based on characteristics influenced by both social and organisational dynamics. This conforms to traditional views of adopter characteristics found in diffusion of innovations literature. However, in contrast to existing diffusion of innovations literature, relying on critical mass models alone to determine the successful diffusion of e-mediated learning technology is misleading. This is because such technologies serve multi-functional purposes and therefore, indicators of the successful diffusion have to be analysed through a different lens, which takes into account levels/stages as well and the pace of adoption.

## RESEARCH QUESTION TWO

**What are the barriers to take-up of e-mediated learning technology by academic staff in a campus based UK University?**

In Chapter 2, the literature pointed towards the differences in opinion about the successful diffusion of e-mediated learning technology projects in higher education. Whilst advocates of the technology, such as Shimabukaro (2005); Drucker (1997); Twigg (2003) and Laurillard (2001) argue that e-mediated learning technology brings with it many benefits that can increase the efficiency of work tasks, the success of such projects is highly dependent on the willingness of academic staff to adopt the technology. As such, academics, such as O'Neill et al (2004), Agre (2000); Cornford and Pollock (2003); Goddard *et al* (1999); Hara and Kling (2000); Bates (2000); Kenny (2001) and Kaur (2002) provide contradictory evidence which indicates that the successful take-up of e-mediated learning technology is influenced by a number of social and organisational dynamics. These barriers include, adequate support, IT skills, re-institutionalisation, hierarchical organisational structures, the bureaucratic nature of such institutions, quality assessment exercise, standardisation, intellectual property, and pedagogy.

The findings from this study support the argument that the take-up of e-mediated learning technology is influenced by a number of social and organisational dynamics. However, pertinent to this study WebCT was only being adopted at a basic level by the majority of academic staff, despite the system offering more functionality than existing systems. As such, the findings from this study identify 5 distinct barriers to the take-up of WebCT by academic staff as follows: conflicting priorities, pedagogy, lack of knowledge, IT skills levels and adequate training and support. These findings are subsequently discussed in light of existing research.

## CONFLICTING PRIORITIES

The findings show that the conflicting priorities between research and teaching related duties emerged as a critical barrier to the take up of WebCT by academic staff. The institutional objective to focus on becoming a research-led university, meant that academic staff faced increasing pressure to spend their time actively researching. Institutional pressure to research combined with teaching related duties resulted in little time for any other activity. The findings from this study are consistent with O'Neill *et al* (2004); Quinsee and Hurst (2005) Abrahams (2004); Jacobsen (2000); Rogers (2000) and Agre (2000) Goddard (1999) and Cornford and Pollock (2003) as presented in chapter 2, who reject the notion that e-mediated learning technology can reduce the amount of time academic staff spend on work tasks, as claimed by Laurillard (2001); Twigg (2003) and Shimabukaro (2005).

The findings as presented in chapter 5, indicate that academic staff found WebCT to be a complex system to use compared to the system WebCT superseded and therefore, extremely time-consuming. Interestingly, academic staff members adopted WebCT in a similar way to the Intranet system that WebCT replaced. Even if they chose to integrate the technology at advanced levels, pressure to research and conflicting priorities results in priority being given to research and teaching related duties.

Understandably, the organisational restructuring exercise taking place partly influenced how academic staff time was spent. This is because, academic staff that were considered non-research active faced the possibility of redundancy. Therefore, the potential fear of job losses provided further impetus to focus on research related activities rather than spending time adopting and developing WebCT sites.

A possible explanation for the underlying decision to focus on research and teaching related activities, by academic staff is that the development of innovative activities is not accounted for in anyway. As such, rewards and incentives decisions made at an institutional level have ramifications on how academic staff spend their time and what they perceive to be of up-most importance to them. It is understandable, that any activity which goes unrecognised will take less precedence over activity which directly impacts on job security. Consequently, a lack of explicit rewards and incentives for adopting e-mediated learning technology influences the amount of time and effort spent on adopting and developing such technologies.

This finding is consistent with Jacobsen (2000); Abrahams (2004) and Berge and Muilenberg (2001), as presented in chapter 2 who suggest that academic staff who have adopted e-mediated learning technology receive minimal explicit recognition for their work. Therefore, academic staff are less likely to adopt e-mediated learning technology if they believe their efforts in this area will go unrecognised.

**PEDAGOGY**

The findings from this study as presented in chapter 5, show that academic staff were unclear about the pedagogical value of WebCT. A lack of explicit guidelines about how the technology was to be integrated with existing teaching and learning practices acted as a barrier to the take-up of the technology. Understandably, a significant amount of confusion existed about whether WebCT was to be adopted as a delivery vehicle or a pedagogical function. The findings from this study supports the work of Fetherston (2001) as presented in chapter 2, who argued that the use of the Internet as a learning technology faces pedagogical challenges. This is because the use of the Internet needs to be re-conceptualised from a technological medium to a pedagogic tool.

However, using WebCT in this way will require a complete overhaul of existing pedagogical practices, as such academic staff will be required to transform their existing methods of teaching to integrate such technological systems. Further, as the findings indicate social and organisational readiness, together with the fact that UK universities are historically entrenched in bureaucratic and hierarchical structures makes such a vision a tall order.

At an institutional level, it is argued that assessment tools can be used to facilitate the demands of increasing student numbers. Yet, the findings indicate that academic staff resisted adopting such tools because either they were too time consuming to use, in the case of online submission of assignments. Alternatively, that the use of tools such as multi-choice quizzes is ineffective for assessing management related discourse at a university level. Furthermore, the findings from this study are consistent with Cornford and Pollock (2003) as presented in chapter 2. Cornford and Pollock (2003) argued that in an attempt to become virtual, universities end up taking on more policies and procedures which results in the university taking on characterises that are evident in a concrete university.

The findings from this study support the work of Quinsee and Hurst (2005) as presented in chapter 2 who point towards the fact that new procedures and guidelines would need to be set up in order for the technology to be used in such a way. For instance, the assessment tools within WebCT allows assignments to be submitted online, but existing protocol requires that students submit assignments with an attached front cover sheet that has been signed by the student claiming that the work being presented is their own (i.e. they have not plagiarised). This is done personally at the school office. In order to do this online, new procedures and regulations would need to be established which incorporate such a form of submission. Further, the findings from this study point towards a lack of communication and open deliberation about the strategic and pedagogic direction of WebCT between various stakeholder groups.

**LACK OF KNOWLEDGE**

The findings as presented in chapter 5 indicate that a lack of knowledge about WebCT partly attributed to reluctance on the part academic staff to move beyond adopting WebCT at a basic level. Substantial gaps in information about the capability of using the technology at an advanced level existed. This finding shares similarities with an earlier study by Hamilton and Thompson (1992) as presented in chapter 2 who observed that the role of early adopters in the diffusion process is critical as they make their adoption visible to potential adopters thus, influencing subsequent adoption.

The findings from this study illustrate that because the driver group of adopters chose not to make the innovation process transparent to mainstream academic staff members, this partly influenced subsequent adoption of the technology at a basic level. This is because the critical process of knowledge sharing and dissemination about using WebCT at an advanced level failed to take place. Thus, drivers of WebCT possessed an extensive research background in computing related subject areas and were in a powerful position to discuss the technology at an advanced level with their peers, but chose not to take this opportunity to do so.

## IT SKILLS LEVELS

A key finding to emerge from the study, as presented in chapter 5, was that IT skills levels of academic staff influenced the level at which they adopted WebCT. Evidence from a computer skills survey into academic staff skills levels, also presented in chapter 5, revealed that 60 percent of academic staff considered they had 'no skills' in using WebCT. 30 percent felt they had some skills, 6 percent believed they had intermediate skills and 3 percent believed they had no skills. What was interesting about this finding is that academic staff rated their skills levels higher where those skills were similar to the ones used in previous e-mediated learning systems.

This finding is consistent with the work of Rogers (2000) as presented in chapter 2, who observed that academic staff felt anxious towards using e-mediated leaning technology when personal frustrations about their IT skills levels emerged. Consequently, this fear acted as a major barrier towards the subsequent adoption and adoption of WebCT beyond a basic level. What is also interesting about this finding is that although certain members of academic staff displayed an eagerness to adopt WebCT at an advanced level, a lack of IT skills to use the technology prevented them from adopting the technology at an advanced level.

In light of the findings from this study, evidence exists that IT skills levels determine the level at which academic staff members adopt WebCT. Subsequently, due to conflicting priorities academic staff are restricted in the amount of time they can dedicate towards IT skills development. As such, this finding contradicts the argument made by Shimabukaro (2005) as presented in chapter 2, who argued that academic staff members as well as providing subject specific expertise, will take on the role of a learning advisor. In this additional role, academic staff will be skilled in working with students to identify their learning styles and goals suited to their individual needs. Furthermore, they will be highly skilled in using innovative technologies in a dynamic way for e-learning purposes.

It is understandable that at least within the context of the British campus-based university system, such a paradigm shift will involve a significant investment of time on the part of the academic staff member to train in using innovative technologies at such a level, as well as major organisational change. Therefore, evidence from this study reveals that due to increasing pressure to produce research output as well as conflicting priorities leads to a lack of time on the part of academic staff, to dedicate towards updating IT skills levels. As such, the vision as presented by Shimabukaro (2005) appears unrealistic.

**ADEQUATE TRAINING AND SUPPORT**

The findings as presented in chapter 5, revealed there was limited evidence that support strategies existed to facilitate the integration of WebCT. At a surface level, it appeared that support strategies and incentives were in place to facilitate the transition of academic staff from existing technological systems to WebCT. Official statistics presented by the university showed that WebCT was being widely adopted and had reached critical mass levels. Nevertheless, the findings discussed how relying on critical mass as an indicator of the successful diffusion of an innovation in isolation was misleading, because WebCT was being adopted at different levels. For instance, there was no evidence indicating that a needs analysis of academic staff members took place to identify the academic staff members individual IT skills levels and subsequently, the levels of support they would require. This issue played a pivotal role in WebCT being adopted at a basic level by the majority of academic staff. Inasmuch as the empirical research identified that in fact, even though academic staff members were adopting the technology at a basic level, they were incorporating different tools and features and at different stages and therefore, required different levels of support.

The findings presented in chapter 5 support the work of Bates (2000); Kenny (2001) and Kaur (2002) as introduced in chapter 2, who discussed the pivotal role that academic staff members play in the success of e-mediated learning projects. Bates (2000) maintained that the successful adoption of e-mediated learning technologies required a number of support strategies including staff incentives, staff support and professional development. Consequently, Kenny (2001) notes that the levels of support that academic staff members receive are often underestimated and under-resourced. Kaur (2002) highlights that a needs analysis of the academic staff members, students and institution is crucial in an e-mediated learning environment. There was little evidence in the case study that academic staff members were adopting WebCT at an advanced level. Whilst technological capability existed to exploit the system to its full potential, the technology was adopted at a basic level. Indeed, the degree of resistance demonstrated by academic staff members significantly contributed towards WebCT being adopted at a basic level. As discussed in chapter 2, e-mediated learning technologies are often introduced as a solution to the changes being experienced by higher education institutions.

Advocates of e-mediated learning (Shimabukaro, 2005; Drucker, 1997; Laurillard, 2001; Twigg, 2003) suggest that WebCT is the answer to increasing student numbers and freeing up academic staff time for research. However, in order for the technology to be used optimally, it requires academic staff to adopt WebCT at an advanced level, as illustrated in Diagram 11 in chapter 5. Yet, to use the technology at such a level necessitates a significant investment of resources and time, on the part of the academic member of staff. Abrahams (2004) and Jacobsen (2000) suggest that even if some academic staff members show a willingness to develop e-mediated learning technology, for the technology to be diffused at a wider and advanced level, extensive institutional support, incentives and reward structures are required. Although training was provided for academic staff members at the Case Study Institution, this was done at a fairly generic level.

It was envisioned by senior management that the centralised support and generic training would enable academic staff members to develop the technology individually and at their own pace. Yet, in chapter 5 it was noted that a number of academic staff members were sceptical about continuously asking for help from a centralised department, out of fear of being labelled incompetent. What this points to is that those academic staff members who are experiencing such feelings require more intense levels of support in order for them to feel comfortable exploring the technology. It is recommended that this can be facilitated by one-to-one, or small group training at the academic staff members' own convenience and in the privacy of their own offices. Yet, restricted funding limits the level of resources that can be allocated to fund such initiatives. On the other hand, investing resources into more intense and personal training and support may be the solution towards encouraging academic staff members to use the technology at an advanced level. Thus, utilising the technology more efficiently and offsetting the cost of the individualised training. This recommendation will be discussed in further detail in the chapter 9.

## SUMMARY AND CONCLUSION OF RESEARCH QUESTION TWO

The findings of this research study identified five distinct barriers to the take-up of WebCT exhibited by academic staff members. These barriers are conflicting priorities, pedagogy, lack of knowledge, IT skills levels and adequate training and support. The identification of these barriers to the take-up of e-mediated learning technology is consistent with the findings of existing research (Kaur, 2002; O'Neill *et al*, 2004; Abrahams, 2004; Jacobsen, 2000; Cornford and Pollock, 2003 and Rogers, 2003).

The findings illustrate that the design of e-mediated learning systems influences the levels at which the technology is adopted by academic staff. Therefore, as the complexity of a system increases, the level at which it is being adopted decreases. Academic staff found WebCT to be a complex system to use compared to the system WebCT superseded and therefore extremely time-consuming. As such, the technology was adopted by the majority of academic staff at a basic level.

While some academic staff members chose to integrate the technology at advanced levels, conflicting priorities meant that priority was given to research and teaching related duties. Understandably, the organisational restructuring exercise taking place partly influenced how academic staff time was spent. The findings from this study show that academic staff were unclear about the pedagogical value of WebCT. This highlights how a lack of communication and open deliberation between the various stakeholder groups about the pedagogic value of WebCT led to considerable confusion about whether e-mediated learning technology is to be integrated into current teaching and learning practices as a pedagogic tool or a delivery vehicle.

The findings also indicate that a lack of knowledge about e-mediated learning technology partly attributes to reluctance on the part academic staff to move beyond adopting WebCT at a basic level. What this finding also highlights is the powerful influence of interpersonal networks to facilitate the process of knowledge dissemination.

## RESEARCH QUESTION THREE

**How does e-mediated learning technology influence the social relations between academic staff and students?**

In chapter 2, expert systems (Giddens, 1996) was presented as conceptual framework also guiding this study. Expert systems combine the knowledge of individuals and technological systems. Such systems act as disembedding mechanisms since through a process of time-space distanciation, expert systems remove immediate social relations and then restructure these relations across time and space. The concept of expert systems was considered a useful framework to put the findings of this study into context. This is because WebCT acts as a disembedding mechanism by removing the immediate social relations between academic staff and students and then restructures these relationships across time and space.

As such, conceptualising WebCT as an expert system helps to explain how such systems have the potential to transform the social relations between academic staff and students. Thus, one of the primary aims of this research study was to explore how such systems influence the social relations between academic staff and students. The findings as presented in chapter 6 of the thesis revealed that e-mediated learning technology creates a dual role for academic staff member, firstly as a lay actor to WebCT and secondly as an expert. In adopting these dual roles, several factors were identified that influenced the diffusion process of WebCT as follows:

- **Academic Staff Member as a Lay Actor:** trust in expert systems, surveillance, ownership of knowledge, re-definition of academic staff roles, re-structuring of work tasks

- **Academic Staff Member as an Expert:** culture of expectations.

Each of these key findings is subsequently discussed in light of existing research.

## ACADEMIC STAFF MEMBER AS A LAY ACTOR

### TRUST IN EXPERT SYSTEMS

The findings from this research study as presented in chapter 6, indicate that in the role of a lay actor, the experience of the academic staff member at the access point to WebCT significantly impacted on the level of trust they place in the expert system. Academic staff members that had negative experiences of using WebCT were more sceptical of the expert system and this led to the technology being adopted at a basic level.

This finding is consistent with Giddens (1996) as presented in chapter 2, who argued that the tacit roles of faith and trust provides the foundation of expert systems, because individuals have limited knowledge of how expert systems work. Similarly, the majority of academic staff members in the role of lay actors had limited knowledge of how WebCT as an expert system worked, but in adopting the system placed their trust or faith in WebCT.

### SURVEILLANCE

As presented in chapter 5, surveillance emerged as a key finding that influenced the social relations between academic staff and students. In adopting the role of a lay actor at the access point to WebCT the academic member of staff becomes more accountable to both management and students. In terms of expert systems influencing the social relations between academic staff and management, this takes the shape of the exertion of power and control practices. In making their knowledge transparent on such technological systems, academic staff becomes much more accountable to management. Therefore, such systems encourage autocratic management practices.

In terms of accountability to students, this takes the form of a type of disciplinary control. This is because the 'boundary-less nature' of the expert system allows students to contact academic staff at any time, and academic staff are expected to respond to students instantaneously. Consequently, e-mediated learning systems change the dynamics of the academic staff and student relationship, paving the way towards a heightened culture of expectation. Without guidelines in place about e-mediated learning technology 'good practice', both academic staff and students are unclear about WebCT etiquette. Yet, to do this will require the creation of new policies, guidelines and procedures. This finding is consistent with the arguments put forward by Cornford and Pollock (2003) as presented in chapter 2, who comment on the paradoxical impact of the virtual university. They suggest that in attempt to become virtual, universities become bound by structures, policies and procedures and ironically end up reflecting characteristics that are evident within a concrete university.

The very nature of academia encourages the development of knowledge creation and through this creation of knowledge, the freedom of thought. Thus, for academic staff to flourish the environment that they work in should be conducive to this process of knowledge creation and dissemination. Therefore, it is understandable that academic staff members become sceptical of expert systems, which tacitly encourage autocratic management practices.

## OWNERSHIP OF KNOWLEDGE

Chapter 6 drew on sociological concepts of expert systems and theories of time-space distanciation to explain the issue of ownership of knowledge when adopting e-mediated learning systems. Using such systems as document repositories to hold academic staff and work of other academics is indeed a contentious issue. At the time of carrying out the empirical research, both academic staff and management were unclear about copyright issues and rights over intellectual property once knowledge was placed onto WebCT.

This finding is consistent with Scott (1998) as presented in chapter 2. Scott (1998) suggested that the some university administrators believe that if universities make significant investments in the development of e-mediated learning technology, then the university should also own the content. The content being the intellectual property of academic staff.

By identifying this finding it becomes understandable as to why academic staff members choose to exercise caution when adopting e-mediated learning systems at a basic level. This finding also points towards a lack of discussion between academic staff and management as to the wider consequence of WebCT on academia overall.

## RE-DEFINITION OF ACADEMIC STAFF ROLES

At a tacit level, the findings presented in chapter 6 identified that the implementation of WebCT at the Case Study University changes the social relations between students and academic staff. This intrinsic change in social relations leads to the redefinition of academic staff roles from an expert, to a dual role of a hybrid expert and a lay actor at the access point to WebCT. It is evident how this subtle change in academic staff roles actually has significant implications about the extent to which their job specification can be stretched to include an element of technical expertise in e-mediated learning systems. This finding helps to partly explain why academic staff would resist the adoption of WebCT altogether, or go beyond adopting the technology at a basic level. This is because there is a lack of an explicit definition of what an academic staff member's role is once they have adopted an e-mediated learning technology.

This substantial finding builds on Giddens (1996) concept of expert systems as presented in chapter 2, in the following way. Giddens (1996) suggests that expert systems have the potential to remove immediate social relations and then restructure these relations across time and space. This process is known as time-space distanciation. In light of Giddens (1996) concept of time-space distanciation and expert systems, by conceptualising e-mediated learning technology as an expert system, we can see how the technology removes the immediate face-to-face social relations between academic staff and students and then restructures this relation across the Internet.

Consequently, by adopting an abstract system [e-mediated learning technology] the academic staff member automatically takes on the role of a lay actor at the access point to the e-mediated learning system. Evidence from the case study findings as presented in chapter 6 illustrates that this does not necessarily imply that academic staff members are also experts in the e-mediated learning system they have adopted. As the majority of academic staff members adopted WebCT at a basic level. Yet, they are also expected to be experts in WebCT, as well as experts in the respective subject areas on the part of the student. Therefore, this substantial finding adds to Giddens (1996) theory of expert systems and time-space distanciation, as e-mediated learning systems not only restructure immediate social relations, but also re-defines academic staff roles. This creates a dual role for the academic staff member as an expert in the traditional sense and also as a lay actor to the e-mediated learning system.

What is also interesting about this finding is that there was an obvious lack of extensive deliberation between stakeholder groups about how WebCT would modify the roles of academic staff, with the technology often being viewed through rose tinted spectacles. Again, this points to the issue that there was a lack of discussion at a strategic level about how e-mediated learning technology would affect the role of academic staff members, and indeed other stakeholders. A degree of change is therefore inevitable, but care needs to be taken to ensure that the benefits of introducing such systems are outweighed against the negatives. Additionally, when creating a strategic plan for implementing such a technology, it needs to be viewed in a wider context of existing processes and procedures, in order for the technology to be successfully integrated.

## RESTRUCTURING OF WORK TASKS

Another key finding to emerge from the case study data is that e-mediated learning technologies restructure work tasks. This finding provides a counter argument to that presented by Shimabukaro (2005); Twigg (2003); Laurillard (2001) in chapter 2, who claim that e-mediated learning technologies increase the efficiency of academic staff.

This is because they claim that the technology can reduce the amount of time academic staff spend on work tasks, so that they can then spend their time on research and teaching related activities, thus leading towards reduced costs. Yet, the findings from this study show that by conceptualising e-mediated learning technology as part of Giddens (1996) concept of expert systems, the work tasks of academic staff members are not reduced but are restructured.

This finding builds on the earlier work of Grewal (2003; 2004) and supports the work of Quinsee and Hurst (2005) and Cornford and Pollock (2003) as presented in chapter 2. These authors contradict the claims that e-mediated learning technologies reduce academic staff time. This is because the technologies are extremely time consuming to develop and maintain and evidence from this study shows that the technology creates a new type of work task.

For example, the findings as presented in chapter 5 show that because of the multi-functionality of WebCT, academic staff members have to learn a range of skills for each level at which they adopt the technology. Thus, the more advanced stages that they progress to, the more diverse range of skills they have to learn. Adopting WebCT at an advanced level involves the use of interactive communication tools in real-time, yet to use these tools effectively requires that academic staff learn how to manage online discussions. At a basic level, even the maintenance of a discussion board or email tool can be extremely time-consuming and resource intensive.

As presented in chapter 6, whilst e-mediated learning technology has the potential to relieve academic staff of certain administrative work tasks such as photocopying. The transference of the work task to the e-mediated learning system shifts this responsibility to the student. Thus, the work tasks is not eliminated but simply transferred. However, academic staff members are not completely relieved of this work task, as they still have to scan, upload or reformat documents so that they can be placed onto the e-mediated learning system. This creates a new type of work task, as does the work task of email. With email the social relations between academic staff and students are becoming significantly blurred. This is because students believe they can contact academic staff at any time and expect immediate responses leading to a heightened culture of expectation, as discussed in the following sub-section.

The nature of email queries also impinges on academic staff time. as case study evidence as presented in chapter 6, illustrates how most queries are based around administrative related questions. Therefore, academic staff members spend a significant amount of time servicing administrative related queries. This paradoxically increases the amount of time academic staff spend on e-mediated learning systems, and creates a new type of work task.

Therefore, the implementation of WebCT has not relieved academic staff members of work tasks, but restructured these tasks and instead created an additional role for the academic member of staff. In adopting the role of a lay actor at the access point to the abstract system not only is the system vulnerable, but also the academic member of staff as they attempt to demonstrate their trust and faith in WebCT. Subsequently, this has changed the nature of the relationship between the academic staff member and student, paradoxically leading to a heightened culture of expectation and placed the expertise of the academic member of staff in a vulnerable position. Hence, increasing the workload of academic staff members. Consequently, what this highlights is that there was a lack of direction about how WebCT was to be used. Academic staff members felt that the use of WebCT should have been made explicit, but it was introduced as a flexible ad-hoc system

## ACADEMIC STAFF MEMBER AS AN EXPERT

### CULTURE OF EXPECTATIONS

Conceptualising e-mediated learning technology in light of Giddens (1996) theory of expert systems, identified 'culture of expectations' as a significant consequence of such technological systems. Evidence from the case study findings as presented in chapter 6 illustrates that e-mediated learning technologies partly contributes towards a heightened culture of expectations, on the part of the student. It has to be noted that this 'heightened culture of expectation' compliments the changes that the British University system is currently experiencing.

Chapter 1 highlighted how universities in the UK are facing pressure to change in light of government policy, technological change and competition from the higher education system overall. The introduction of the research assessment exercise, quality assurance assessment and tuition fees are changing the dynamics of the social relations between the student and the university. This 'consumer-like' relationship is driving increased student expectations and prompting a move towards a 'service-based culture'.

The findings from this study resonate with Quinsee and Hurst (2005) as presented in chapter 2, who argued that the use of use of e-mediated learning systems places 'a huge and often unanticipated burden on academic staff as students may expect support through discussion boards, chat rooms, email and face-to-face.' In a similar vein, the case study findings provide evidence that through a process of time-space distanciation, WebCT creates an additional role for the academic staff member. In their dual role as a hybrid, expert/ lay actor, the boundaries between students and academic staff become increasingly blurred and drives a 'heightened culture of expectation.'

This finding also supports the work of Cornford and Pollock (2003) as presented in chapter 2, who unequivocally state that the theory of the virtual university does not work in practice. This is because such technological systems have a paradoxical impact as they create more policies and procedures and begin to take on characteristics that are evident within a concrete university. In a similar vein, the implementation of e-mediated learning technology in the Case Study University created more work for academic staff because WebCT facilitated a greater culture of expectation. As such, academic staff members in their dual role as a hybrid expert lay actor are expected to service the demands of students in a way that they would not have been expected to do in their traditional role as an expert.

Evidence from this research study as presented in chapter 6 illustrates how e-mediated learning technology stretches the physical boundary between students and academic staff. This makes the social relation between academic staff and students more individualised. However, student's expectations are based around resource and administrative issues, and this conversely increases the workload of academic staff members.

Furthermore, this substantial finding adds to Giddens (1996) theory of expert systems. This is because the research findings as presented in chapter 6, critically illustrate how through a process of time-space distanciation expert systems restructure relationships across time and space and through this process make the access point to the abstract system a source of vulnerability. However, in relation to this study in adopting the dual role of a hybrid, expert/ lay actor; the heightened culture of expectation has the potential to place the expertise of the academic member of staff in a vulnerable position.

Therefore, the findings from this study contradicts the work of Shimabukaro (2005); Jones (2005); Drucker (1997); Twigg (2003) and Massy and Zemsky (1995) as presented in chapter 2 who claimed that e-mediated learning technologies can provide a panacea for the changes currently being experienced in universities. Evidence from the case study research as presented in chapter 6, shows how e-mediated learning technologies do not increase the efficiency of academic staff, by reducing the amount of time academic staff spend on work tasks or provide cost efficiency for the university overall.

This is because, such technological systems restructure academic staff roles creating an additional role as a hybrid expert /lay actor. Consequently, this process leads to a greater culture of expectation, on the part of the student thus, leading to an increase in work tasks for academic staff. Furthermore, the majority of academic staff members are only adopting the technology at a basic level, which shows that the e-mediated learning technology is being used sub-optimally. This is despite the technology providing a greater degree of functionality than the system it superseded, which begs the question: if WebCT is only being used sub-optimally, how does this equate to greater cost efficiency?

## SUMMARY AND CONCLUSION OF RESEARCH QUESTION THREE

Conceptualising WebCT in light of Giddens (1996) theory of expert systems revealed how e-mediated learning systems change the social relations between academic staff members and students. Through a process of time-space distanciation, WebCT creates a dual role for the academic staff member, as a hybrid expert/ lay actor. In adopting this dual role, several factors were identified that influenced the diffusion process of WebCT. These factors are **[Academic Staff Member as a Lay Actor]:** trust in expert systems, surveillance, ownership of knowledge, re-definition of academic staff roles, re-structuring of work tasks. **[Academic Staff Member as an Expert]:** culture of expectations.

Firstly, the findings of this research are consistent with Giddens (1996) concept of expert systems, in that the individual's experience at the access point of the abstract system, affects the trust /faith they place in the expert system. The findings from this study revealed that academic staff members that had negative experiences at the access point of WebCT affected the level at which the adopted the technology. Secondly, the findings from this research build on Giddens (1996) theory of expert systems, in that e-mediated learning technology redefines the role of academic staff by creating a dual role as a hybrid expert/ lay actor. Consequently, leading to a heightened culture of expectation, on the part of the student. Critically, this process has the potential to place the expertise of the academic member of staff in a vulnerable position.

Thirdly, there was a lack of evidence from this research study that e-mediated learning technology increases the efficiency of universities, thereby providing a panacea for the changes currently experienced by UK universities. As such, this study contradicts the work of Shimabukaro (2005); Jones (2005); Drucker (1997); Twigg (2003) and Massy and Zemsky (1995).

Finally, the findings from this study share consistencies with the findings of previous research (e.g. Quinsee and Hurst, 2005; Cornford and Pollock, 2003) on the paradoxical impact of e-mediated learning technologies in universities. This research suggests that e-mediated learning technologies do not increase the efficiency of work tasks. Instead, the technology creates additional work tasks and increases the workload of the academic staff member.

## IMPLICATIONS FOR E-MEDIATED LEARNING TECHNOLOGY IN UK UNIVERSITIES

The findings in this thesis raise important issues about imposing 'expert systems' of e-mediated learning technologies in UK Universities. This is because the findings from this study together with earlier studies (e.g. Cornford and Pollock; 2003) imply that the notion of e-mediated learning technology revolutionising the existing higher education sector appears over-ambitious. As such, the capability of e-mediated learning technology is often over-estimated and the complex nature of how universities as institutions work is underestimated. Therefore, adequate social, organisational and technical infrastructures need to be in place for the implementation of the technology to be a success. This necessitates a challenge to traditional values, commitment and support from each level of the university over a period of time.

The literature presented in chapter 2 highlighted a tendency for higher education institutions to implement e-mediated learning technologies without taking into consideration the influence that such technological systems will have on existing processes and procedures. Souleles (2004) and Cornford and Pollock (2003) in their respective studies argued that it was not sufficient to simply introduce e-mediated learning technologies as stand-alone systems into higher education, because of the hierarchical and historically entrenched nature of such institutions. For such projects to work successfully, an overhaul of existing systems and procedures would be required, often involving significant levels of organisational change.

As noted by Garrett (2004), the United Kingdom e-University project (UKeU) failed to meet recruiting targets and the project ceased in February 2004. However, online universities in the USA have been more successful than UK online universities. This is because US online universities such as the University of Phoenix Online focus on delivering education as a supplement. Therefore, such institutions are in a better position than UKeU due to a strong alignment that exists amongst the convenience branding of the parent body (the University of Phoenix itself) and the convenience branding of online learning. Whereas, UKeU's business model focused on a wholly online provision with limited evidence of a secure market. Moreover, convenience does not account for a critical part of the image of UK higher education at an international level. This is because the UK brand of higher education tends to emphasise tradition, place and quality, rather than convenience. This implies that imposing 'expert systems' of e-mediated learning technologies may be inappropriate for what the UK University system stands for.

The dotcom boom led advocates of computing technology to make over-ambitious claims. For example, Drucker (1997) predicted the imminent demise of campus based higher education, in favour of e-mediated learning made imaginable by advances in technology. Similar to the rise and fall of the dotcom era, in hindsight it becomes clear that like the claims made that the Internet would revolutionise the business world rendering existing business practices obsolete, radical change did not occur.

Likewise, the findings from this study imply that radical change has not occurred in the UK higher education sector. While there have unquestionably been crucial advances in e-mediated learning technologies, with numerous institutions having implemented a form of this technology. These changes have evolved alongside traditional campus based education, as opposed to replacing face-to-face teaching. Face-to-face teaching in a campus-based environment is still prevalent today and a preferred method of teaching and learning, by both academic staff and full-time undergraduate and post-graduate students. The literature presented by Souleles (2004); Bates (2000); Agre (2000); Goddard *et al* (1999) and Amiel (2004) in chapter 2 are also in accordance with these findings by highlighting the slow and gradual nature of e-mediated technological diffusion in higher education.

This evolutionary theme contradicts the work of Shimabukaro (2005); Jones (2005); Twigg (2003); Noam (1995); and Albury (1996) addressed in chapter 2, who predicted *'the end of campus based education'*. The research from this study has illustrated that such a radical transformation has yet to manifest in the UK higher education sector. The higher education sector continues to be dominated by traditional modes of face-to-face teaching in campus based institutions, despite considerable scope now afforded by advances in technology.

Souleles (2004) of course argued that because the organisational structures of institutions of higher education are historically entrenched, significant time would be required to adjust the organisational and social changes necessary in order for e-mediated learning technology to be used at an optimal level. Souleles (2004) maintained that during this transition, time would be required to determine the most appropriate model of change for the successful implementation of e-mediated learning technology. The author clamed that during this period a number of models will surface, and the resulting model once finally established would be significantly different from earlier versions, leading to hybrid and transitional forms of management.

Earlier work on the diffusion of innovations (Freeman and Perez, 1998) draws similarities to the work of Souleles (2004) regarding the emergence of a new paradigm as a result of new innovations. For instance, Freeman and Perez (1998) believed that a critical mass of IT innovations at a micro level would have an extensive impact upon the operations of the market as a whole. As well as influencing the activities of organisations within these markets by stimulating economic growth and competitive advantage. Through a process of selection via a number of diverse innovations, the potential existed for a new paradigm to emerge. Nevertheless, both Freeman and Perez (1998) and Harris (1999) argue that the process of change would take a substantial period of time to permeate through the economy. This is due to the process of learning, adaptation, incremental innovation and institutional change that would be required. They acknowledged that the existing social framework would be subject to extreme strain during the transitional period, because social change lags behind technological change. They further argued that once the new economic system emerged, adequate policies and considerable investment would be required to develop the necessary new infrastructure.

It could be argued in support of this earlier work that the modest steps that have been taken to integrate e-mediated learning technology into the existing social and organisational dynamics of UK universities are evidence of an incremental transition that has yet to generate returns. The findings that have emerged from this case study show that if this holds true, a lengthy journey still remains and to explore the issue a longitudinal study is required.

An alternative scenario is that the higher education sector in the future may encompass entirely different institutions. This vision may see traditional campus based universities as we recognise them today polarised into campus-based universities and virtual universities. The former consisting of a hybrid of face-to-face teaching and e-mediated learning systems, and the latter entirely online.

It is understandable how this divide may be likely to emerge particularly with the introduction of tuition fees, making it more difficult for a certain social class of students to afford campus based education. In addition to making it cheaper for these students to opt for studying for a university degree via e-mediated learning technology. Thus, making campus based education a privilege, which only certain social groups will be able to partake in, contrary to current rhetoric about social inclusion. These distinct institutions characterise a potentially radical alternative to existing modes of higher education. Nevertheless, it is evident that discretion is required in acknowledging these claims as an analogy can be made with former ostentatious predictions as to the radical impact that e-mediated learning technology would have on higher education.

The following chapter summarises and concludes this study.

# CHAPTER 8-CONCLUSIONS

## INTRODUCTION

This concise penultimate chapter of the study begins reviewing the thesis by discussing the critical narrative of the study. The chapter then goes on to present a summary of the contribution to new knowledge in the areas of the diffusion of innovations and expert systems as an outcome of this research study. Next, the chapter discusses the limitations of the study, and in particular considers whether the results from this study can be generalised. The following subsection outlines potential areas for future research. Finally, whilst reflecting on the findings from the study, this chapter draws to a close by discussing the management implications of implementing e-meditated learning technology in the UK higher education sector.

## REVIEW OF THE THESIS

The UK higher education sector was regarded as an important area to investigate the diffusion of innovations due to the sectors heavy and continual investment in e-mediated learning technology. Given that the UK higher education sector is heavily investing in the implementation of e-mediated learning technology, the findings from the study also have a wider bearing in the context of the diffusion of innovations in the UK economy.

This thesis has investigated the adaptation process of e-mediated learning technologies by academic staff in a campus based UK University. The intention was to firstly explore the pace e-mediated learning technology adoption by academic staff. Secondly, to identify the barriers to the take-up of e-mediated learning technology and thirdly to investigate how e-mediated learning technology changes the social relations between academic staff and students.

Whilst it is suggested that e-mediated learning technology has the potential to radically transform campus based higher education as we know it today, in contrast technological diffusion seems to be gradual and incremental. Academic staff members appear to be using e-mediated learning technology as a delivery mechanism alongside traditional face-to-face teaching, instead of the technology replacing face-to-face teaching. Furthermore, it takes a number of years for the technology to be integrated at an optimal level by mainstream academic staff members. This was illustrated by the minimal take up rates of WebCT at an advanced level in the School of Management. at the Case Study University. It would appear that face-to-face teaching as a delivery mechanism is still the preferred method, despite the alternative methods of delivery currently available.

At the beginning of this thesis, it was noted that the advent of e-mediated learning technologies offered significant opportunities for UK universities to compete with other higher education institutions at both, an international and national level. Likewise, the technology also threatened the traditional UK higher education sector from international and national universities offering online degrees. Under such conditions, the commercial incentive to implement e-mediated learning technology is considerable. Nevertheless, there seemed to be minimal evidence of this in practice. The paradox between the opportunity afforded by e-mediated learning technology and the slow diffusion of the technology in UK universities justified further investigation, and this key issue formed the basis of the study.

In chapter 1 the thesis was presented, which argued that a number of external and internal factors were driving the implementation of e-mediated learning technology in higher education in a radical way. These included social, technical, political and economic pressures. Furthermore, it was argued that the technology brought with it many benefits that could provide a panacea to the changes that UK universities are experiencing. However, the implementation of e-mediated learning technology in UK universities appears to be a gradual and incremental process. This paradox was further explored in chapter 2, by reviewing the literature on the key debates of the implementation of e-mediated learning technology in higher education. By reviewing the literature on the key debates of the implementation process of e-mediated learning technology in higher education, it was possible to provide a balanced perspective on the critical debates informing this study. Whilst certain advocates argue that e-mediated learning technology has the potential to meet the changing demands of higher education, provide freedom from time and spatial barriers, provide cost savings for the university and time-savings for academic members of staff. Yet, a number of factors were identified which suggest that implementing e-mediated learning technology offsets the benefits that the technology brings with it, or overestimates the capability of the technology. Some of these factors include, work organisation and design, standardisation, pedagogy, intellectual property and re-institutionalisation. This is because the successful implementation of e-mediated learning technology into higher education institutions is a complex process. This is highly dependent upon the readiness of the people, processes and infrastructure surrounding the technology, rather than the functional capability of the technology in question.

In chapter 2, the theoretical and conceptual framework that guided this study were also presented. The theoretical framework [diffusion of innovations] was that individuals adopt innovations at different periods of time, and the decision to adopt an innovation is largely determined by a number of social and organisational factors. These factors include individual personality traits, the way the individual perceives the benefits of the innovation and the way the innovation is communicated to the individual. The conceptual framework that also guided this study [expert systems] is through a process of time-space distanciation, expert systems have the potential to change social relations. Respectively, these theories helped to inform the empirical investigation. The key issues drawn from the literature review required further investigation at a primary research level.

By carrying out a case study investigation into the ways that academic staff approached the implementation of WebCT, it was possible to identify a number of factors, which contributed to the technology being adopted at a basic level. Chapter 3 discussed the methodological approach and methods adopted in this study and the background to the case was presented in chapter 4. The findings from the implementation of WebCT at the Case Study University were analysed in depth using a grounded theory approach to draw out the issues in detail.

The analysis of the case study findings discussed in chapters 5 and 6 identified that firstly academic staff adopt e-mediated learning technology at both a varied pace and at different levels/stages. This substantial finding builds on existing theories of diffusion of innovations, in that levels/stages of adoption, together with the pace of adoption provide critical indicators of the successful diffusion of multi-functional e-mediated learning technologies. As such, relying on critical mass isolation is a misleading indicator of the successful diffusion of a multi-functional technology. Secondly, the findings identified several social and organisational factors, which act as barriers to the adoption of e-mediated learning technology by academic staff. Thirdly, the findings identified how through a process of time-space distanciation e-mediated learning technologies change the social relations between academic staff and students. Consequently, this process leads to a heightened culture of expectation, on the part of the student, and has the potential to place the expertise of the academic member of staff in a vulnerable position.

The findings from chapters 5 and 6 resonate with the arguments presented in chapter 2 (e.g. Cornford and Pollock, 2003; Goddard, 1999; Quinsee and Hurst, 2005; Souleles 2004;). As such, the findings from this thesis support the argument that the diffusion of e-mediated learning technologies is a slow process, partly because of the historically entrenched nature of UK universities. This is in addition to these organisations encompassing a complex, inter-related network of people, systems and processes. Therefore, the introduction of e-mediated learning technologies requires integration with this network, not simply implementation. Chapter 7 pulled the findings from chapters 5 and 6 together. These chapters concluded that the Case Study University was unable to integrate WebCT into its existing processes and procedures so that academic staff could adopt the technology at optimal level. This was for the advantage of greater cost-efficiency for the university at a wider level. Hence, notwithstanding the high level of resources the university has invested in WebCT, the adoption of the technology at an advanced level remains fragmented and transient.

## SUBSTANTIVE CONTRIBUTION TO NEW KNOWLEDGE

- Firstly, the findings from this research study revealed five distinct adopter categories exhibited by academic staff in a campus based UK University. These adopter categories are classified as follows: Drivers, Eager Beavers, Piggy-Backers, Coerced Sceptics and Vigilantes.

- Secondly, the findings from this study also indicate that academic staff adopt WebCT at different levels/ stages as well as at different rates. These levels are no adoption, basic level, advanced level and integrated level. The findings show that the majority of academic staff adopted e-mediated learning technology at a basic level.

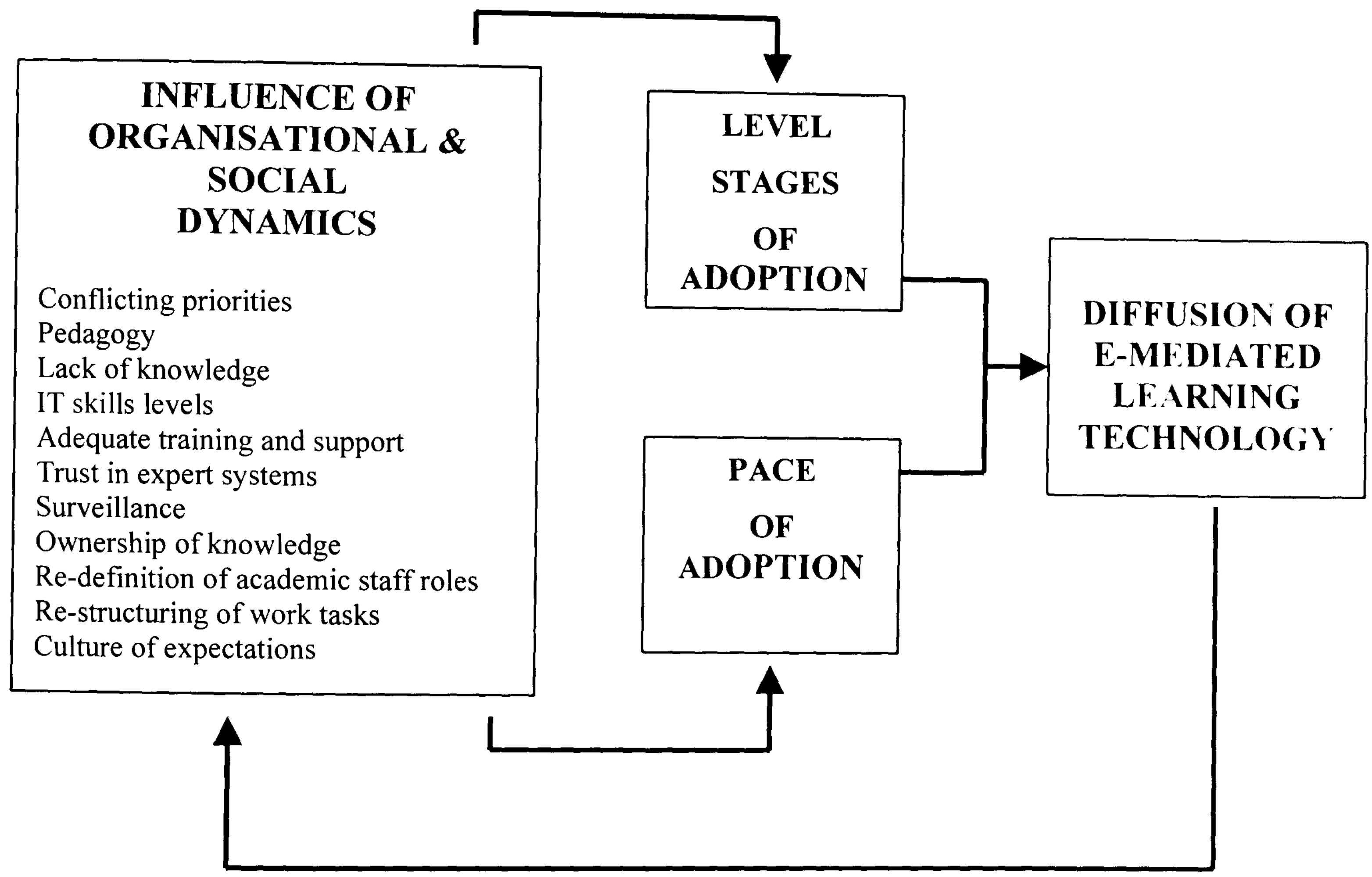
- Thirdly, the findings of this research build on Rogers (1995) diffusion of innovations theory, in that using critical mass in isolation is a misleading indicator of the successful diffusion of multi-functional technologies. Therefore, it is important to take into consideration the levels and stages at which individuals adopt innovations, as well as the rates at which they adopt.

- Fourthly, the findings of this research study identified five distinct barriers to the take-up of WebCT exhibited by academic staff members. These barriers are conflicting priorities, pedagogy, lack of knowledge, IT skills levels and adequate training and support. The identification of these barriers to the take-up of e-mediated learning technology is consistent with the findings of existing research (Kaur, 2002; O'Neill *et al,* 2004; Abrahams, 2004; Jacobsen, 2000; Cornford and Pollock, 2003 and Rogers, 2003).

- Fifthly, the findings from this research show how conceptualising WebCT as an expert system explains how such systems have the potential to transform the social relations between academic staff and students. The findings reveal that e-mediated learning technology creates a dual role for academic staff member, firstly as a lay actor to WebCT and secondly as an expert. In adopting these dual roles, several factors were identified that influenced the diffusion process of WebCT as follows: [**Academic Staff Member as a Lay Actor**]: trust in expert systems, surveillance, ownership of knowledge, re-definition of academic staff roles, re-structuring of work tasks. [**Academic Staff Member as an Expert**]: culture of expectations.

- Finally, the conceptual framework below illustrates the key findings of this study. The model shows the perpetual cycle of the diffusion of e-mediated learning technologies and how organisational and social dynamics influence the levels/stages, as well as the pace at which academic staff adopt e-mediated learning technology. Together, these factors influence the diffusion process on an ongoing basis.

## DIAGRAM 15: A CONCEPTUAL MODEL OF THE DIFFUSION OF E-MEDIATED LEARNING TECHNOLOGY.




Throughout the process of analysis care has been taken to compare and contrast the findings with earlier studies, and where possible to build upon existing theories. It is therefore, maintained that this study has made contributions to existing knowledge. This was done by building on Rogers (1995) diffusion of innovations theories, in particular the model of critical mass. In addition, by drawing on Giddens (1996) sociological theories of expert systems and time-space distanciation to explain how e-mediated learning technology changes the social relations between academic staff and students.

As discussed in chapter 5, relying on critical mass alone is a misleading indicator of the successful diffusion of an innovation. As such, this study has added to Rogers (1995) work at an intrinsic level by documenting and understanding the adoption characteristics displayed by academic staff members when adopting e-mediated learning technology. Specifically, the empirical investigation revealed that using models of critical mass in isolation is a misleading indictor of the successful diffusion of multi-functional e-mediated learning technology. As such, the levels and stages of adoption as well as the pace of adoption provide critical determinants of the successful diffusion of multi-functional e-mediated learning technologies.

The findings also identified that the majority of academic staff members were adopting e-mediated learning technologies only at a basic level, based on a number of social and organisational factors, this was despite the functionality and flexibility afforded by WebCT. These factors included conflicting priorities, IT skills levels, a lack of knowledge and adequate training and support. Even though the majority of academic staff members adopted the technology at a basic level, because of the functionality and flexibility of the system they were using the technology at varied levels and at different stages and subsequently, the technology was being used at a sub-optimal level.

Therefore, the study identified that because of the functionality and flexibility afforded by WebCT, academic staff members require appropriate support strategies to facilitate the adoption of e-mediated learning technology. The findings from chapter 5 support the literature presented in chapter 2 (Cornford and Pollock, 2003; Goddard *et al*, 1999; and Agre, 2000). These authors argued that the practice of implementing e-mediated learning technology in higher education institutions does not match up to the theory. This is because implementing these technologies into such institutions requires an overhaul of existing systems and processes, which takes a significant amount of time.

By drawing on Giddens (1996) sociological concepts of expert systems and theories of time-space distanciation in chapter 6, the study has helped to explain why WebCT was being contested by academic staff members. Upon further investigation, Giddens (1996) work helped to identify how the implementation of such technological systems changes the social relations between the academic staff member and student. By adopting a cross-disciplinary approach to analysing the case study findings the study has identified tacit factors influencing the adoption of e-mediated learning technology by academic staff members. These factors include trust, creating a heightened culture of expectations between academic staff members and students, redefining academic staff roles and restructuring work tasks. In addition, the research also identified that the technology had the potential to place the expertise of the academic member of staff in a vulnerable position. This means that the study may have relevance in a wider context than is usually provided by focusing upon a single disciplinary background, as some of the issues identified in the empirical research may be generally applicable to other campus based universities in the UK. Indeed, the issue concerning the changing nature of the relationship between academic staff members and students is a fairly significant issue that is also being driven by government reform and economic, social and market changes.

This study has supported the findings of earlier work that has identified the diffusion of innovations as a critical issue in the management of e-mediated learning technology. Additionally, the study has built on these findings by identifying how determinants of critical mass in isolation provide misleading indicators of the successful diffusion of multi-functional e-mediated learning technologies. In addition, by drawing on sociological concepts based on expert systems, and theories of time-space distanciation (Giddens, 1996) this study has identified how e-mediated learning technologies change social relations between academic staff and students. Moreover, at an intrinsic level, the conceptual framework of expert systems helps to explain why e-mediated learning technology was being contested. The study has further built on these findings, as previous research has centred on the implementation of e-mediated learning technology from a student centred perspective, and from a wider organisational perspective. Earlier studies have not focused on an in-depth qualitative analysis on the levels and stages and which academic staff adopt e-mediated learning technology. Neither, have earlier studies explored how e-mediated learning technologies change social relations between academic staff and students. Hence, minimal notice has been taken of the critical issue of the need to integrate e-mediated learning technology. Therefore, it can be maintained that the study has added to the theoretical argument about the nature of the diffusion of innovations, and the explanations for the slow diffusion of e-mediated learning technology in UK universities.

## LIMITATIONS OF THE STUDY

The empirical study investigated the adaptation of e-mediated learning technology by academic staff members in an attempt to address the research paradox: Despite continual investment in e-mediated learning technology by higher education institutions, why has technological diffusion within UK universities been a slow process? Although this thesis has made progress in answering this research paradox, the findings of the study should nevertheless, be interpreted with an awareness of the limitations of the study. Chapter 3 discussed the methodological limitations of the study. The chapter acknowledged potential weaknesses of adopting a single case study approach for investigation, given that the approach often faces criticism regarding the validity and reliability of the study.

However, chapter 3 discussed the rationale for adopting a single case at both a macro and micro level. At a macro level, the organisation studied possessed similar characteristics to other higher education institutions in the UK. These include external pressures such as competition, funding, and government policies directly influencing the method with which the university delivers education. At a micro level, the researcher had significant access privileges to the university where the case study data was collected. This made the collection of case study material data relatively straightforward. As such, because the researcher was afforded with access privileges, this enabled a plethora of in-depth rich data to be collected, which may not have been possible if other organisations were studied.

The fact the researcher had significant access privileges to the Case Study Institution can raise a potential limitation in terms of providing an objective viewpoint of the case study data. The researcher acknowledges that to remain entirely objective throughout the study was a tall order, and that subjective bias may have influenced the analysis stage of the data. However, an awareness of this potential bias allowed the researcher to both, attempt to remain objective throughout the study, and to also highlight a limitation of the study.

A further possible limitation of this study is that the empirical investigation focused only on an academic staff perspective of e-mediated learning technology. This potential sampling bias could be construed as a weakness of the study. This is because a more holistic perspective of all of the stakeholder groups consisting of students, management, administrative staff and support staff within the university is required to get a more complete understanding of why the diffusion of e-mediated learning technology within UK universities has been a slow process. However, for reasons of space and time it was not possible in this study to carry out an in-depth qualitative investigation with each of these groups at this stage. A longitudinal study will be required to carry out such a task, this will be discussed in further detail later in the chapter. Moreover, a review of the literature identified that relatively little research had been carried out on the academic staff perspective of e-mediated learning technology. In addition, because the technology has a direct impact on academic staff teaching, this was both a contemporary and a critical area that required an in-depth investigation.

As discussed in chapter 3, the reliability of using a single case study research design often comes under scrutiny, because of the extent to which the findings from the case can be generalised to a wider population. Therefore, it is dangerous to infer that the findings of a single case study analysis have a broad application in other circumstances. All the more, even if a greater number of cases had been investigated, the technique ceases to allow evidence to be ascertained in a statically meaningful sense. However, the current position of the UK higher education sector as a significant investor in e-mediated learning technologies made it a particularly appropriate setting in which to study the adaptation process of e-mediated learning technology by academic staff. Furthermore, as discussed earlier, the organisation studied was typical of other higher education institutions at both a macro and micro level. This was because the Case Study University faced the same pressures for reform, and was a campus based institution offering undergraduate and postgraduate degree programmes. This means that the findings generated from the case study material may have a wider relevance across the UK higher education sector in general. In addition, as discussed in chapter 3, a qualitative single case study investigation of a contemporary case has the potential to provide the in-depth rich detail required to illustrate the social influences on the implementation of e-mediated learning technologies. This is something that a quantitative study would have been unable to provide.

## FUTURE RESEARCH

This empirical study focused upon a case study investigation in a UK university and uncovered some questions and areas that require and deserve further study. Future research, which builds upon the findings from this study and focuses on a comparative study of the diffusion process of e-mediated learning technology in higher education institutions across a number of different countries, may be of significant value.

This study is a snapshot diffusion research that documents a stage in the process of academic staff members adopting e-mediated learning technology. As the diffusion process is still taking place, it would be useful to carry out a study that builds on this research to investigate any changes that have taken place over time.

As noted in chapter 7, the present focus of this thesis has centred on the influence that e-mediated learning technology has on academic staff members. Indeed, the implementation of any technological system has a pervasive impact and changes other higher education support functions such as administration, library, and technical support. It was also discussed earlier in this chapter that this study has focused on academic staff members. A longitudinal in-depth study concentrating on each of the stakeholder groups would be required. These groups would include students, administrators, support staff and management. The research would also need to investigate the influence that the technology has on each of the support functions in order to build a more complete picture of the impact of e-mediated learning technology in higher education.

Future research that addresses the question 'are we being locked into e-mediated learning systems by creating dependency on information and communications technology and the Internet' would also make an interesting study.

## CONCLUSION

This final section of the study concludes by considering the extent to which the findings from the empirical research can anticipate potential management implications of integrating e-mediated learning technology in the UK higher education sector. At this point in time it remains difficult to forecast the extent of change across the higher education sector. Nevertheless, what has become transparent is that the increased efficiency afforded by the potential of e-mediated learning technologies is likely to bring benefits to the student. In chapter 1, a historical review of learning technologies to aid the teaching and learning process illustrated how the emergence of such technologies evolved, and were used to enhance traditional teaching and learning practices over a period of many years. At this stage, it is critical to note against the incessant tendency to overestimate the potential of new technologies as discussed in chapters 2 and 7. The assertion that e-mediated learning technologies will revolutionise the UK higher education sector as we know it today, by rendering traditional campus-based universities obsolete may certainty be premature.

In earlier chapters, it was argued that efforts to introduce radical changes in teaching and learning based upon e-mediated learning technologies have at this stage been both gradual and elementary because of the historically entrenched culture of UK universities. However, as discussed in previous chapters, social, technical, political and economic pressures together with competition at both a national and international level is forcing the UK higher education sector to adopt innovative teaching and learning technologies. Although action is being taken by UK universities to provide support to facilitate the adoption of the technology, it is clear from the empirical investigation and previous research that the changes have had a minimal effect to date. This is because the technology is still being utilised at a sub-optimal level in the context of the wider organisation. Previous research has also found that diffusion of innovations tends to be gradual and incremental in nature, and the social transition associated with the implementation of the new technology tends to lag behind, taking a substantial amount of time to permeate through the organisation.

In contrast to traditional campus based universities, the Open University in the UK and the University of Phoenix have been extremely successful because of their ability to provide distance-based education to a specific make-up of students, consisting of mainly part-time, mature students that seek post-graduate qualifications. Furthermore, notwithstanding current scepticism, the level of investment in e-mediated learning technologies by higher education institutions, together with a diverse range and larger number of students requiring alternative forms of delivery for their life long learning needs, driven by demands from the industry sector. On this premise, it would therefore seem that the potential exists for e-mediated learning technologies to become widely diffused in UK universities over time. Only it appears that these technologies will exist alongside traditional methods of face-to-face teaching to facilitate traditional methods of teaching and learning, at least for the near future.

# CHAPTER 9-RECOMMENDATIONS

Chapter 5, presented a model that identified the stages that WebCT was being adopted by academic staff members at the Case Study University. Out of the seven possible stages of adoption the findings revealed that the majority of academic staff members adopted WebCT between levels 0 and 3, which was classified as a basic level. Subsequently, chapters 5 and 6 addressed the organisational and social issues that emerged from the case study findings as to why WebCT was being adopted at such a basic level. Hence, leading to the technology being used at a sub-optimal level. The findings from this study together with earlier research carried out within this field argue that the following factors play a significant role towards the slow diffusion of e-mediated learning technologies in institutions of higher education.

- A lack of extensive deliberation between key stakeholders of the university.
- A lack of explicit guidelines for best practice of e-mediated learning technology.
- A lack of a needs analysis of academic staff members.
- A lack of adequate training and support.

Based on these key issues the following recommendations are made to facilitate the successful integration of e-mediated learning technology in higher education institutions.

1. **Extensive and open deliberation with stakeholders of the university.**
2. **Identification of academic staff members' individual training and support needs.**
3. **The introduction and allocation of 'e-fellows' for e-mediated learning technology support and training.**
4. **The development of explicit guidelines for the use of e-mediated learning technology.**

# 1. EXTENSIVE AND OPEN DELIBERATION WITH STAKEHOLDERS OF THE UNIVERSITY

It is recommended that the first stage in facilitating the successful integration of e-mediated learning technology in higher education institutions requires open and extensive deliberation to occur amongst the stakeholders of the university about the strategic plans for e-mediated learning technology. Although steering group meetings are regularly held by the Unit for Learning and Teaching at the Case Study University, and attended by representatives of each school, the outcomes of such meetings are rarely conveyed and discussed within each school. It is suggested that the steering group representative of the school involve management, academic staff, student representatives, administrative staff and other support staff in this loop by discussing the findings from the steering group meetings.

These stakeholders can be invited to attend informal meetings to discuss experiences that they have about e-mediated learning technology and the representative can advise the stakeholders of the technology. Subsequently, the representative at the next steering group meeting can convey the experiences or issues that stakeholders raise about e-mediated learning technology back to the Unit for Learning and Teaching and so forth. This will enable stakeholders to become a part of the development process of e-mediated learning technology, and it is envisioned that such a process will facilitate the communication process between stakeholder groups. Thus, easing the issue of a lack of communication experienced by academic staff members, emerging from the case study findings. Hurst and Quinsee (2005) in their study, evaluate the strategies developed to support WebCT at City University in the UK. They maintain that it is crucial for academic staff members and other stakeholders to feel involved in the implementation process of e-mediated learning technologies to ensure successful diffusion.

## 2. IDENTIFICATION OF ACADEMIC STAFF MEMBERS INDIVIDUAL TRAINING AND SUPPORT NEEDS.

In chapter 5, the researcher identified a paradox in the way that WebCT was presented as being successfully adopted. The case study findings identified that in fact the majority of academic staff members were adopting WebCT at a basic level, but at different level/stages. A significant factor contributing towards the adoption of WebCT at a basic level was that academic staff members had diverse sets of IT skills, and therefore, required different levels of support. However, the training provided for academic staff members was generic in that it failed to take into account the individual IT skills levels that academic staff members possessed. Thus, adequate training and support that would need to be provided based on such skills levels.

Therefore, it is recommended that a comprehensive IT skills survey be conducted with academic staff members to identify current skills levels to identify the appropriate levels of training and support needed. The survey should be modified to reflect any changes or updates to the e-mediated learning system, and should also include a general IT skills survey. Additionally, the survey should make provisions to allow academic staff members to discuss any individual needs not covered in the survey. The case study findings identified the critical issue of an increased workload for academic staff, with time playing a pivotal role in determining the level at which WebCT was adopted by academic staff. Given that creating and maintaining the web base is extremely resource intensive such time spent on developing or carrying out activities within the web base, such as developing discussion boards therefore, needs to be acknowledged, recognised, explicitly time-tabled and allocated for course preparation. Once the training and support needs are analysed, 'e-fellows' can be allocated to individual academic staff members to develop and support their e-mediated learning needs. This recommendation is discussed next.

# 3. THE INTRODUCTION AND ALLOCATION OF 'E-FELLOWS'

In chapter 5 it was noted that conflicting priorities emerged as a critical factor influencing the adoption of WebCT at advanced levels by academic staff members. Increasing pressure to research resulted in academic staff members giving precedence to research related activities, which left very little time for other activities. Although academic staff members received general centralised support from the Unit for Learning and Teaching, this level of support was inadequate to meet the individual needs of academic staff members. As such, inadequate levels of support partly led to WebCT being adopted at a basic level.

It is therefore, recommended that there is a need to provide academic staff members with individualised decentralised support to enable the vigilante group to adopt the technology, and the eager beaver, coerced sceptics and piggy-backer groups to adopt the technology at an advanced level. However, the research drawn on in chapter 1 and chapter 2 together with the empirical findings presented in chapter 5 identified that because levels of government funding that UK universities receive has decreased over the last few decades, resources allocated to such initiatives have to be carefully considered by the institution. Therefore, it is not cost-effective to provide such intense levels of support, as this will require the deployment of additional support staff to facilitate such support levels.

In order to overcome this barrier, an alternative strategy utilising final year undergraduate students or postgraduate students with a background or interest in computing related fields as e-fellows is proposed to support academic staff members with the development of their web bases and e-mediated learning skills. It is envisioned that such a strategy would be beneficial at three levels:

1. **Cost effective**: As it would not require any additional staff to be employed, but to make use of existing resources.
2. **Provide adequate levels of support**: Individualised support will ease the pressure on academic staff members and allow them to focus on their research and teaching related activities.

3. **Use of WebCT at optimal levels**: As academic staff members will receive individualised e-mediated support, it is envisioned that this will encourage the use of WebCT at advanced levels this leading to the optimal use of the technology.

Abrahams (2004) acknowledges the advantages of assigning students to academic staff members as e-fellows, in that utilising students in this way is cost-effective, and students are often more tech savvy than academic staff members. However, this relies on the willingness of the academic staff members and students to partake in such apprenticeship roles.

## 4. THE DEVELOPMENT OF EXPLICIT GUIDELINES FOR THE USE OF E-MEDIATED LEARNING TECHNOLOGY.

The findings that emerged from the empirical research identified that there were no clear guidelines in place about how to use e-mediated learning technology as a support tool for face-to-face teaching. Chapter 6 illustrated that academic staff lacked direction about how to effectively use e-mediated learning technology. This often resulted in a negative experience with the technology, ultimately leading to the academic member of staff either opting out of using a particular tool within the virtual learning environment, or altogether abandoning the technology. The findings from chapter 6 also revealed the paradoxical impact that WebCT was having on the academic staff and student relationship by creating a greater culture of expectation between the two. The case study findings illustrate how the boundaries between students and academic staff become blurred without explicit boundary lines being drawn between students and academic staff.

Therefore, it is crucial that transparent policies and procedures form the basis of the e-mediated learning technology, in the same way that policies and procedures and developed with face-to-face courses, so that both academic staff and students are aware of what is required of them. Policies and procedures also need to be created at an institutional level stating correct protocol for legal issues of using e-mediated learning technology. These policies should specifically address ownership of knowledge and copyright issues. Such policies need to be extended to include administrative staff and support staff. It is envisioned that if academic staff members are aware of their legal rights over their knowledge and at a service level what is expected of them, they may feel more positive about using e-mediated learning technology. Equally, the development of explicit guidelines will make it clear to students what they can expect from their lecturers, so as to establish boundaries between the two. Finally, the strategy will also have to be conveyed to administrative staff.

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## WEBSITES

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# APPENDIX A

# UNIVERSITY E-MEDIATED LEARNING INITIATIVES

| UNIVERSITY | E LEARNING INITIATIVES |
|---|---|
| **Brunel University** | • WebCT platform<br>• Internet Computing module via WebCT<br>• Virtual University Project<br>• Matheletics: the development of Online Objective Tests in Mathematics<br>• Foundations of computing module via WebCT. |
| **University of Birmingham** | • The Educational Technology Research Group<br>• Centre for Educational Technology and Distance Learning. (CEDTL)<br>• WebCT platform<br>• Lotus Notes collaborative work environment. |
| **University of Bristol** | • Institute for Learning and Research Technology<br>• VIOLET project; virtual integrated online environment for teaching. |
| **University of Exeter** | • The Department of Lifelong Learning<br>• Learning Cultures Beyond School; research into the use of interactive information and communications technology. |
| **Heriot Way University** | • Institute of Computer Based Learning<br>• The Learning Technology Dissemination Initiative |
| **University of Lancaster** | • CSALT; Centre for Studies in Advanced Learning Technology;<br>• NAT*Lab<br>• SAFE/Simulate<br>• TOSKA<br>• JITOL; just in time open learning<br>• MECPOL; collaborative networked learning.<br>• SHARP; multimedia conferencing<br>• LEARN-NET<br>• TEST for ODL; the use of WWW in university teaching |
| **University of Leeds** | • Institute of Computer Based Learning<br>• The Computer Based Learning Unit |
| **The Open University** | • Institute of Educational Technologies<br>• Knowledge Media Institute |
| **University of Nottingham** | • CREDIT; the design and evaluation of effective learning environments |
| **Carnegie-Mellon University** | • Psychology department; Artificial Intelligence |
| **Georgia Institute of Technology** | • Edu-Tech; multidisciplinary research organisation. |
| **Northwestern University** | • ILS; Institute for Learning Sciences: an interdisciplinary research and development lab dedicated to applying principles of cognitive science, computer science, artificial intelligence and educational theory to improving the way people learn |
| **University of Pittsburgh** | • LRDC; Learning Research Development Centre. |

# APPENDIX B- SAMPLE INTERVIEW LETTER

**E Mediated Learning in Higher Education**

Dear:

I am currently researching the above in order to determine the social and organisational issues associated with the implementation of e mediated learning technology in UK universities.

You have experience that would be of value to me and I would very much like to know your views on e mediated learning technology.

As a follow up to my preliminary research, I am now arranging a further group of interviews involving academic staff members who can give their personal insights about their opinions of e mediated learning technology.

The interview will be in two parts. The first part will commence with a few basic questions about current computing skills in the form of a questionnaire. The second part of the interview will consist of a discussion of the research topic. An outline of the key themes to be discussed is attached. I will be conducting interviews between October 2003 and June 2004 and envision that these will take approximately one hour. An audio-tape will be used to record the interview but only with your permission.

I am aware of the need to treat the findings with the utmost confidentiality. Therefore, I will maintain the anonymity of all participants.

I hope you are able to help me and should be grateful if you would return the attached pro-forma. I will contact you on receipt to confirm arrangements where you are able to participate. If you prefer to talk to me to arrange a suitable time and venue please call me or email me on the following

E-mail:

Telephone:

Mobile:

If you require any further information please do not hesitate to get in touch.

Sincerely,

Simran K Grewal
Doctoral Researcher

# APPENDIX C

# SAMPLE- INTERVIEW TRANSCRIPT

1. Q: Did you attend any of the training sessions for WebCT?
2. A: No.
3. Q: Are you using WebCT in any way?
4. A: No, I did have the intention to attend, and use it, but I just didn't have the time.
5. Q: Do you use any other electronic resources to support your teaching practices?
6. A: I use the Intranet quite a bit. Most of my materials are up on the Intranet. It's not a case of I won't use it. It's more a case of at the moment the Intranet is adequate, bearing in mind the amount of time that is required to prepare materials. So with the Intranet you can convert them to PDF format and put them online. With WebCT, to get any benefit out of it you'd have to have it formatted into a proper e learning system, which would take a lot of time to do. If I were to use it, I think it should be a soft thing where they put a proper online learning system not just an electronic document store. My only exposure to WebCT has been on Dr.X's MSc course. That's not too bad at all. At that kind of level it could be useful, but that does require extra effort to convert some of the documents you have into that kind of format, and the moment we don't have the time really to do that. The computing group is thinking about having our own web page, our own identity, our own group set up, but that hasn't really got off the ground yet.
7. Q: Do you have any concerns about using WebCT?
8. A: I'm a little concerned about the motivation behind getting us to move over to WebCT, and I'm not convinced why we should move across until there is sufficient support there for us to build pages, which would enlighten this kind of environment. So support is big issue. Also there is a certain template available, which you might be forced to use, which would mean trying to fit our materials into that format, and it may not fit. So I would be concerned about being constrained on how we present our own teaching material. I teach computer programming and web architecture.

9. Q: Do the types of material that you teach differ from something textually based?
10. A: Well your material would be more textually based and you probably won't get much benefit from having an online resource. It's really the interactivity that comes from an online course, and in my kind of subject, computing which is both visual, cause there's a lot of diagrams involved and interactive cause there's a lot of problem solving. So that's a kind of area which could be suited to online teaching.
11. Q: Does WebCT have the facilities to support that type of material?
12. A: I haven't seen it. What I've seen from the MSc's is it doesn't really take advantage of those facilities. If WebCT has it, it doesn't use it. That's why I'm reluctant to make the effort to move across, if I can't get any benefit from it.
13. Q: To what extent do you trust e-mediated technology?
14. A: First of all I have no concerns about copyright. I put all my materials online. You may know that MIT has done the same. They make a policy of providing all their materials online, and that's a policy I agree with, so no concerns about that. The only time it could become an issue is if you're providing sensitive material. It can be an issue if you're taking materials out of somebody's textbook and presenting it as your own. Obviously there maybe some restrictions there, but you can control the access to it by having password control. Personally I don't see it as a problem. I'm quite happy to make my materials available. I mean I use other people's lecture notes. I often do a web search to see what other people are doing. One of the reasons for putting materials on the web is that you want them to be freely accessed. So when you publish something on the web, you're giving your consent for it to be used freely. Technically, it's reasonably reliable. Occasionally networks go down. Security is not a real issue, because I don't put things up that are really sensitive. It's down to the network manager to ensure that we are safe from external attacks, viruses etc.
15. Q: Do you think there is an adequate infrastructure to support WebCT?
16. A: One of the restrictions you have here is that we are hooked in with the rest of the university. We did discuss about having our own internal network, fully managed by us, but it carried many impracticalities. So if it was completely under our control, we could design systems here to manage that, but since we

are hooked into the universities system we kind of restricted in our ability to control.

17. Q: Impracticality in what sense?
18. A: Well for one thing, adding users, password control, that goes through central university. The other problem is that if there's a problem with the university network, you can only get into our network having gone through theirs.
19. Q: Do you see the restructuring strategy having an effect on how the teaching materials are delivered, or the kind of systems that will be used?
20. A: I'm not sure. To be perfectly honest I'm part of the computing group. It's a tight knit group within the school/faculty. So we are more concerned with what we're doing, partly because the rest of the school hasn't accepted us. So I'm not too concerned with what's happening on the outside. I'm concerned about the computing group getting more of a high profile. One way for that is to have a bigger web presence and I'm trying to encourage everybody to actually use the Intranet. We were supposed to get rid of the Intranet last year, but there were too many complaints that we didn't have enough resources to get everybody trained up to use WebCT. Talk is now that it will happen next summer. One of the points of discussion is should the technician be preparing the materials to go online. I think lecturers are quite happy to write the material, the problem is to format it to get it compatible for WebCT. I don't think the lecturers should be doing it, and probably the technicians don't want to do it. I think the question is who is responsible for doing that?
21. How would you feel if WebCT was introduced as a directive?
22. A: Even if it happened, you'd never get everyone to use it. I'm not convinced it aids learning, only if it's produced on the right format. Just presenting a book online, doesn't necessarily give you an increased advantage. It helps as much as the Intranet helps in distributing material. So you don't have to produce handouts, but actual learning materials, unless its designed properly it won't have a great deal of benefit. I think that's partly why people aren't convinced you get a great deal of benefit from using it, unless people can see that there are some helpers who can take their standard documents and reformat it into an educationally effective way. If people are expected to do this themselves, they aren't going to be very happy about it. That's part of the

problem, you're focussing on technologically competent people, rather than looking at an educational environment and people that are aware of the technology and the educational benefits of it. Just now I was getting into evaluating educational technology and analysing whether some things are effective or not. It's too easy for technologists to put multimedia into a system and claim that it's the latest technology that's going to help. Its only people who are proficient in the educational aspect of it that can really evaluate whether the system can help or not and perhaps they weren't consulted, and it's not necessarily the fault of those that introduced it. It's just that it's such a new area that they haven't been given enough time to evaluate it properly. With e learning what you often find is that higher management want to show that they're aware of what's happening in education. So they want to make an effort to show they're the leading university in e learning, without understanding it. So you can make a decision about introducing something without fully understanding whether it is going to be effective or not. That's why I don't necessarily use it. E learning is my research area, I don't actually produce any e learning material because it takes way too long to produce it and it's a tremendous effort to actually do something and then go through the evaluation process and then redo it. We just don't have the time to do it.

23. Q: How do you see your role as a lecturer changing due to universities strategic plan to promote and encourage e learning?
24. A: It seems a little too much, a little contradictory. You want to pull in research active staff, but then you also expect them to be excellent teachers, and I think the two things are unachievable. To be a good teacher or researcher requires more than splitting your time half. You really need to devote you time to one or the other. When you're teaching it almost takes over everything. I've been here 2 years and every semester I'm having to prepare new modules because it's the first time its being taught. It leaves you very little time to do research. I'm in favour of streamlining people. If you're a researcher spend all your time researching. If you're a teacher spend most of your time teaching. It can be proven by the overseas lecturers we have here, they may be excellent researchers but they do have problems with communication and students will make a note of them.
25. Q: How do you see e-mediated learning shaping future teaching?

26. A: Well one thing for definite, I don't believe that it's the role of computer technology to replace lectures. The problem is that you can end up with a course, like the MSc course, which is primarily computing based. I think it loses more than it gains. You'd gain a lot more from a face-to-face interactive lecture than material just placed on line. That's the way teaching really should be. OK some people will just stand up there and talk to you for one hour, and not give the students any opportunity to question and interact and that's not particularly effective, but if you have the ideal teaching face-to-face, I think you get a lot more out of that. There are areas where computers can help and that's where you have lots of repetitive tasks. If you're developing some kind of physical skills, operating machinery for instance, you may be taught by your instructor at first, but you will pick it up by practice. Computing can replace in some instances, you don't need someone there once you have been told how to perform. It's only a case of increasing efficiency to do it, that's where I think simulation based teaching can be imposed. The only time you're going to be having a useful educational analysis for academic subjects is if they do have some in built facility to support interactivity with the student. Where they do give students the opportunity to ask questions, to affect the way the materials and content are taught. Those things are very rarely taken advantage of. So until you get to that stage where you can cater to individual needs. I don't think the people are going to be in danger of being replaced. I'm a strong believer that people and computing work together and what people do best let them do. I think people are realising that there are limitations and they're only realising that because they're performing more evaluations. Evaluations of e learning is so under funded, you need a lot more before you can say where e learning fits into the educational system. The place for e learning at the moment is for support and only for specific subjects. The kind of subjects will require lots and lots of practice. Not really textually based. If its something where you're trying to get across ideas, that probably is not its best area to work in, but if you're trying to teach somebody mathematics or some form of calculus, you don't need somebody there sitting next to you. The machine can do it. If its telling someone how to use a piece of machinery, again you can find assimilation for them to play with, the problem is people trying to use computers in areas they're not suited for.

27. Q: If you were offered an incentive to use WebCT, would this influence your decision?
28. A: Money, time off or teaching help? Well yeah, the money of course. but its all about time, what's my time worth to me. For my research I'll put on my own personal time to do that. I'm reluctant to do that for teaching. I'll do that Monday to Friday, but if senior management said to put my materials from the Intranet into reformatted materials for WebCT, I won't use my own time to do that. I would have to either be paid extra to do that, or if there's someone that's prepared to do that for me. It really just comes down to that, in principle I'd consider moving across, just a practicality of finding time to do it.

# APPENDIX-D

# PILOT STUDY

## INTRODUCTION

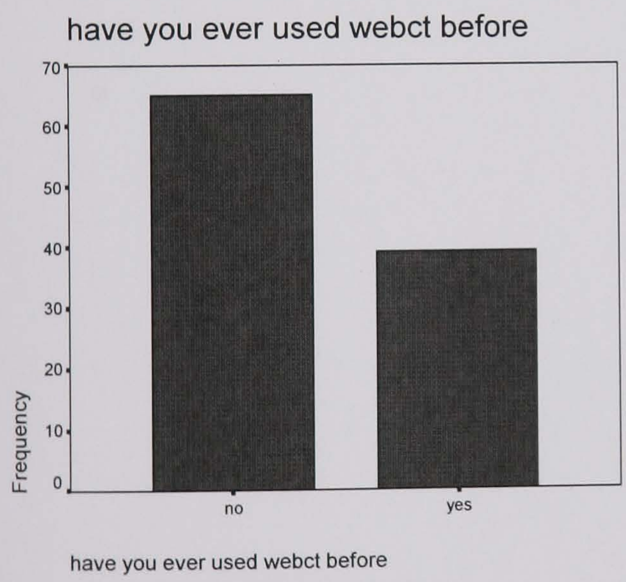
The pilot study was carried out between October and December 2002. The intention of the study was to facilitate a research focus for the main body of research. The research consisted of developing an understanding of undergraduate students' familiarity of using e-mediated learning technology. The e-mediated learning technology deployed was WebCT. WebCT is an e-mediated learning platform where faculty can use WebCT to create and deliver teaching materials. However, this medium is not passive. The technology enables an interactive dialogue to occur between the students and lecturers and amongst students, through communication tools such as chat rooms, discussion boards and email.

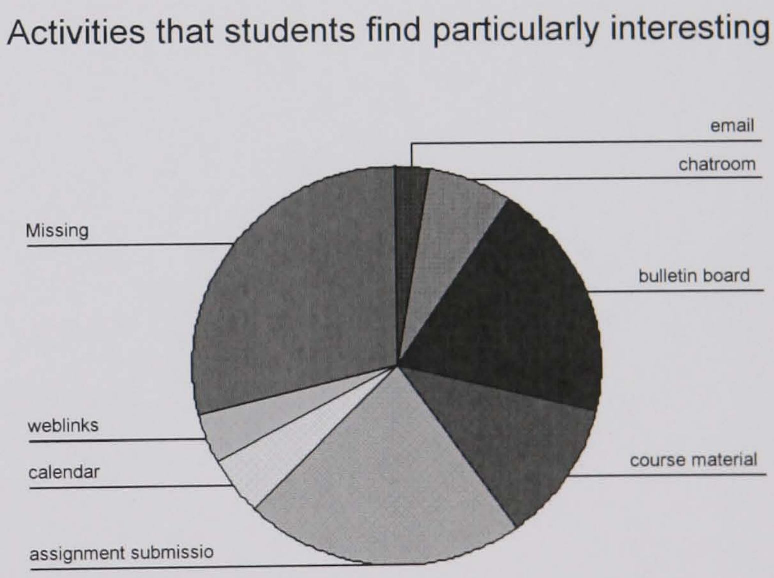
## RESEARCH

WebCT was introduced campus wide into the Case Study University at the beginning of 2002. So was a relatively new platform and this was the first time that both the students and faculty in the School of Management were using WebCT other than for trial purposes. The researcher began work on developing the site for two undergraduate modules in June of 2002, one 2$^{nd}$year, and one 3$^{rd}$ year module. The researcher attended a number of training courses to learn to use the technology and gather background knowledge about the wider pedagogical implications of e-mediated learning.

The pilot study consisted of research on two groups of undergraduate students that would be using WebCT for the first time. The research consisted of gathering responses of students in through questionnaires, which were distributed during seminars. The data was analysed using SPSS. The first stage of the research was conducted during the first seminar. The questionnaire attempted to identify the students' skills levels of using the various tools within WebCT and to highlight their expectations of the technology and what they hoped to achieve from the technology. Samples of the completed questionnaires are provided further on. The results from the first questionnaire showed:

- The majority 96% of students were familiar with using email,
- However, surprisingly only 40% of students had participated in a chatroom discussion.
- 54% of the students had never contributed to a bulletin board discussion,
- 96% had downloaded or printed course materials from a computer network,
- 61.3% of the students had never submitted an assignment via a computer network.
- 57.5% of the students were familiar with using a web based calendar.
- 89% of the students were accustomed to using weblinks.
- 62%of students had no prior experience of using webct
- 31.6% of the students suggested the assignment submission feature via the computer network was particularly interesting.
- 48% of the students were looking forward to using WebCT
- 27% of students were uncomfortable using WebCT.




From the results, it can be seem that the majority of students were comfortable using the technology, therefore it was important to determine the students' skills level of using the technology. However, discussing other faculty members' experiences of using the technology confirmed that although a student perspective of using e-mediated learning technology is an interesting area. The faculty members that are affected by the implementation of this technology is an equally important, yet relatively unexplored area. With this in mind, it was decided that a focus on faculty members rather than students would form the foundation of the study.

## WEBCT DEVELOPMENT

Developing the site was quite a laborious task in terms of time taken to familiarise with different tools and functions. Carrying out the functions was not difficult and once I became accustomed to the layout of WebCT it did become easier. However, it took about 3 hours to upload a file last week over a simple mistake. The lecture was visible in designer view, but not accessible to students, because there was a space in the title and WebCT could not ignore this. The WebCT course attended at the beginning of September helped to conceptualise the technology more holistically and the role it played in higher education.