Influential factors in the adoption and implementation of educational technology at the University of Liverpool

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September 2013

This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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This thesis was completed as part of the Doctoral Programme in e-Research & Technology Enhanced Learning.

This thesis results entirely from my own work and has not been offered previously for any other degree or diploma.

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Abstract

This research explored the factors perceived to be influential for members of staff at the University of Liverpool (UoL) to adopt and implement educational technologies. The research was based in practice and the UoL examined as a case study. The theoretical framework was based upon innovation research and informed by Rogers' (2003) Diffusion of Innovations (DOI), and Ely's (1999) eight conditions of implementation. Semi-structured interviews were conducted with sixteen members of staff. Thematic analysis of the interview transcripts complemented an analysis of relevant UoL documentation.

I did not find evidence for five categories of adopters as defined in the DOI. Instead I proposed three categories: Enthusiasts, Pragmatists and Risk Aversives. These categories were not perceived to be static but varied as a result of contextual and individual factors.

Participants' perceptions of drivers and rationales were examined using Hannan's (2005) concept of drivers for directed, guided and individual innovations. Directed institutional drivers were generally perceived to be lacking, though some faculty, school or departmental drivers were reported. Guided drivers were not reported. However, participants perceived certain general institutional activities to be drivers. I defined these as indirect drivers. Several individual drivers were reported including a perception of benefit, general interest and career benefit.

Factors perceived to enable participants to utilise educational technologies effectively were split between the support available from central services and informal developments within faculties, schools and departments. The availability of accessible colleagues, or near peers, was reported as one of the most influential factors.

My findings were contrasted with the innovation-decision process of Rogers' (2003) DOI and Ely's (1999) eight implementation conditions. A new model focused upon the importance of context was proposed. There are implications for how the UoL supports the adoption and implementation of educational technologies. Recommendations are made and areas for further research are identified.

Contents

Acknowledgements

This doctoral study has been one of the most rewarding, yet challenging activities that I have done. I am grateful to all the people who have provided support throughout but I would like to thank the following people in particular.

Dr Gale Parchoma, my supervisor for the invaluable knowledge and encouragement in helping me develop my ideas. Thanks also to Alice Jesmont and the staff within the Department of Educational Research at Lancaster University.

Dr Anne Qualter, my Head of Department (HoD) at the UoL for making this opportunity a possibility in the first place and for the continued and much appreciated support throughout. Thanks also to colleagues Dr Patrick Doherty, Dr Christos Petichakis and Dr Janet Strivens for their many words of wisdom.

Sincere thanks to Dr Ian Willis and Jaye McIsaac for always being there when needed and for helping me to believe that completing this PhD was really possible.

I could not have wished to meet a more supportive group of people to share this journey with than the members of Cohort One, in particular my good friend Jane Davis. I am very grateful for all of the camaraderie, fun and laughter along the way.

My greatest thanks go to my family for their generous understanding and unwavering support throughout.

List of abbreviations

University of Liverpool acronyms are indicated by (UoL).

BERA	British Educational Research Association
CBAM	Concerns-Based Adoption Model
CLL	Centre for Lifelong Learning (UoL)
CPS	Certificate in Professional Studies (UoL)
CSD	Computing Services Department (UoL)
CTI	Computers in Teaching Initiative
DfES	Department for Education and Skills
DOI	Diffusion of Innovations
EDD	Educational Development Division (UoL)
eLU	eLearning Unit (UoL)
H&LS	Faculty of Health and Life Sciences (UoL)
H&SS	Faculty of Humanities and Social Sciences (UoL)
HE	Higher Education
HEI	Higher Education Institution
HEFCE	Higher Education Funding Council for England
HoD	Head of Department
IT	Information Technology
JAsPer	[The Human Resource management data system (UoL)]
JISC	Joint Information Systems Committee
L&T	Learning and Teaching (UoL)
LGoS	Liverpool Guild of Students (UoL)
LMS	Learning Management System

LUSID	Liverpool University Student Information Database (UoL)
NSS	National Student Survey
ORBIT	Online Room Booking and Integrated Timetabling (UoL)
PG Cert	Post Graduate Certificate in Learning and Teaching in Higher Education (UoL)
PS	Professional Services (UoL)
RIPPLES	Resources, Infrastructure, People, Politics, Learning, Evaluation and Support
S&E	Faculty of Science and Engineering (UoL)
SPIDER	Spider Student Web (UoL)
TAM	Technology Acceptance Model
TLTP	Teaching and Learning Technology Programme
TRG	Technology Review Group (UoL)
TULIP	The University of Liverpool Information Portal (UoL)
UCISA	Universities and Colleges Information Systems Association
UoL	University of Liverpool
UTAUT	United Theory of Acceptance and Use of Technology
VITAL	Virtual Interactive Teaching At Liverpool (UoL)
VLE	Virtual Learning Environment
VOCAL	Virtual Online Collaboration at Liverpool (UoL)
XJTLU	Xi'an Jiaotong-Liverpool University

List of Figures and Tables

Chapter 1: Introduction

This chapter introduces the research and my interest in this area. The research was conducted at my workplace, the University of Liverpool (UoL). I begin by describing the wider context for the adoption and implementation of educational technologies in Higher Education Institutions (HEIs). I explain the aims and purpose of this research and identify my research questions. I provide an overview of the local setting and describe how the research is relevant to both the local and the wider context. I outline the conceptual framework used to inform the research as well as the intended audience and the key stakeholders. The chapter is concluded with an overview of the structure of the remainder of my thesis.

1.1: Wider research context

Educational technologies are becoming increasingly more available prompting HEIs to give serious consideration to the opportunities they bring for learning and teaching (Westera, 2004). Garrison and Anderson (2003, p. 34) defined educational technologies as "those tools used in formal educational practice to disseminate, illustrate, communicate or immerse learners and teachers in activities purposively designed to induce learning". When used appropriately, the Higher Education Funding Council for England (HEFCE, 2009) contend that educational technologies have the potential to increase student satisfaction, retention and achievement.

The 2008 and 2012 Universities and Colleges Information Systems Association (UCISA) surveys suggested that enhancing the quality of learning and teaching, meeting student expectations as well as improving access to learning for students off

campus, were significant drivers for HEIs to promote educational technology developments (Browne, Hewitt, Jenkins, & Walker, 2008; Walker, Voce, & Ahmed, 2012). Attwood (2010) explains that institutions are now encouraged to consider how they can offer a wider variety of courses by online distance learning. Particularly as the Joint Information Systems Committee (JISC, 2008) proposed that online distance learning may be a way to respond to increasing financial and widening participation pressures, and a demand to educate a larger and more diverse student body without increasing the size of the physical campus.

The implementation and embedding of technologies in education is becoming an increasingly important strategic issue for Higher Education (HE) and a number of influential bodies have now published strategic recommendations. The Dearing (1997) report was one of the first to highlight the importance of using educational technologies to improve the quality and flexibility of HE. The Department for Education and Skills (DfES) published the *Harnessing technology: Transforming Learning and Children's Services report* (DfES, 2005) which outlined a need for interactive technologies across all learning opportunities from school activities to work-based learning. Similarly, the Higher Education Funding Council for England (HEFCE, 2009) created a strategy that provided recommendations for how learning and teaching can be enhanced through the use of technology. These strategic reports emphasised the need to embed technologies appropriately and proposed ways to support institutions in the process of strategic planning and change management (Mayes, Morrison, Mellar, Bullen, & Oliver, 2009).

Stiles (2006) suggests that educational technologies are fully embedded when they are perceived to be part of normal practice and there is a complete and seamless integration between all institutional policies, procedures, roles and responsibilities. However, achieving such an embedded position is a complex process (Stiles & Yorke, 2006). Educational practices in academic institutions are often slow to change and rarely match the speed that technologies change (Hagner & Schneebeck, 2001). HEIs can struggle to be strategically agile so the sustainable integration of technological developments remains a major challenge (Schneckenberg, 2009). For example, the speed that social networking software and other personal technologies develop is likely to mean that institutions find it difficult to keep up with the technological opportunities now available.

The integration of technologies into education must avoid placing an emphasis on the technology itself and instead focus on the experience of members of staff and students (Conole, 2010). Stiles and Yorke (2006, p. 265) state that individuals involved in the embedding of educational technologies "need to examine closely what methods might be employed to enable innovation to be sustained and to question what strategic and policy approaches are needed to avoid blocking both organisational and cultural change". Understanding the factors that influence members of staff to adopt and implement educational technologies along with the support that they find most beneficial is therefore a pertinent issue (Straub, 2009; Surry, Grubb, Ensminger, & Ouimette, 2009).

1.2: Aims and purpose of the research

Educational technology research is an emergent field that has been considered from a range of perspectives (Selwyn, 2010). Historically there has been a focus on the development of technologies or strategy aspirations rather than on the human dimensions and embedding of innovation (Tham & Werner, 2005). Serious development beyond projects by people considered to be innovators has been modest, and if technologies are to be successfully embedded in institutions to the benefit of both staff and students then new approaches are needed (Salmon, 2005). Oliver (2012) reviewed six educational technology journals over ten years and found that much of the research over that time focused on deterministic models of technology, or the "recurrent assumption in the literature – that technology causes particular effects" (p. 374). Rather than on understanding the more complex relationship that technology has on people, practices and purposes.

Ensuring that educational technologies are embedded and widely accepted requires a clear understanding of the experiences of individuals when they adopt and implement new technologies in their teaching practices (Burdett, 2003). Utilising educational technologies can have significant implications for individuals and often requires a change from their traditional teaching practices (Dillenbourg, 2008). These implications can cause staff to be resistant or have negative attitudes about using technologies (May & Short, 2003). It is only when institutions have sustainably embedded educational technologies that a constant change management and lobbying approach can be replaced by a truly innovative approach (Nichols, 2008).

My research focuses upon the experience of academic staff at the UoL and the factors that influence their adoption and implementation of educational technologies. I wanted to find out about their approach to using technologies, what influenced their decision to adopt a technology, as well as their perceptions of the impacts of technologies on their daily activities. I was also interested in who, or what inspired or convinced a member of staff to use educational technologies. As Straub (2009, p. 625) summarises, "why does one individual choose to adopt a technology while another resists?" Research into these issues has not been undertaken to my knowledge at the UoL. The main research question is therefore: What are the main factors that influence a member of staff to adopt and implement technology at the UoL?

1.3: The research setting

This research is set entirely within the UoL. The UoL was founded in 1881 and claims to be the original Redbrick University; the term Redbrick is said to come from the distinctive appearance of the University's Victoria Building. The University is a member of the Russell Group[1], a group of 24 United Kingdom universities leading in research, teaching and learning, and links with business.

The UoL is divided into four main areas. Three of these include the academic faculties: Health and Life Sciences (H&LS), Humanities and Social Sciences (H&SS) and Science and Engineering (S&E). The fourth area is Professional Services (PS), which encompasses the University's support and administration departments. Each of the faculties is split into schools, institutes or departments, whilst PS is split into

[1] http://www.russellgroup.ac.uk/

departments or other areas that provide institutional support. Some of the departments within PS offer training or accredited courses for developing skills in the use of educational technologies. Figure 1.1 provides an illustration of the four main areas (the number in brackets by each name indicates how many sub-divisions each area is further split into).

At the time of writing the UoL has over 27,000 students and approximately 5000 members of staff with about 1400 of these academic and 800 research staff. The strategic plan for 2009-2014 (The University of Liverpool, 2009) states an intention to increase the number and diversity of international staff and students, and increase the number of online programmes at undergraduate and postgraduate levels.

Since 2006 UoL has also had a partnership with Xi'an Jiaotong University located in Suzhou Industrial Park, near Shanghai, China. The collaboration between the two institutions is known as the Xi'an Jiaotong-Liverpool University campus (XJTLU). The UoL aims to have 10,000 students studying in XJTLU by 2015[2]. XJTLU students have a range of options available to them to transfer to the UoL to complete part of their studies[3].

[2] http://www.liv.ac.uk/xjtlu/vision/

[3] http://www.liv.ac.uk/xjtlu/opportunities/

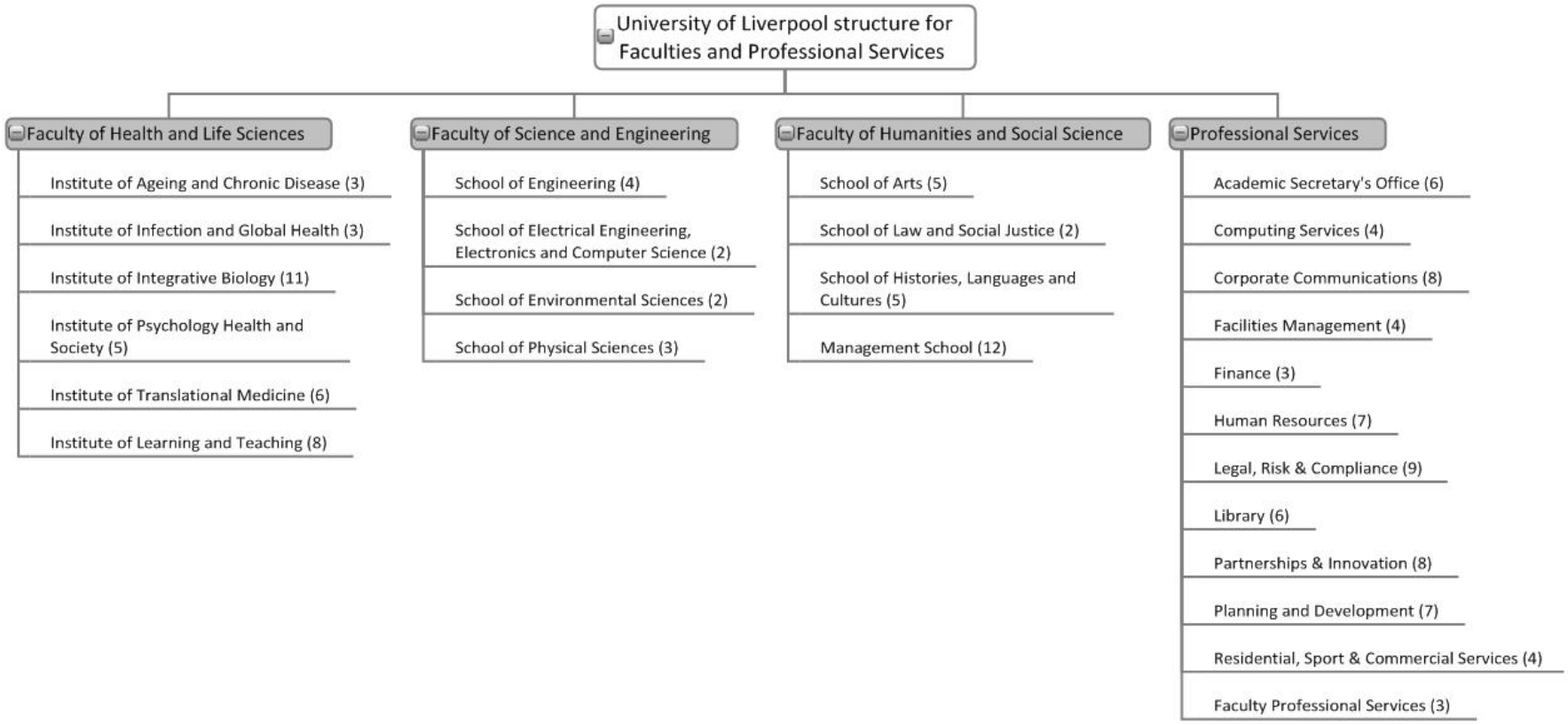

Figure 1.1: Overview of the structure of UoL Faculties and Professional Services

Similar to other Russell Group universities, the UoL has traditionally focused on maintaining an excellent research profile. This focus can create a tension for members of staff with regards to how they split their time between the competing demands of research, teaching and administration duties. Learning and Teaching[4] (L&T) activities have always been valued but have not had the same high profile status. Arguably the balance between research and L&T is beginning to change with recognition of the importance of the student experience within the strategic plan (The University of Liverpool, 2009).

The UoL generally agrees and implements strategies and policies through the institutional and faculty committee structures. Whilst this structure allows for consultation and consensus about the functioning of the institution, decision-making can also be slow moving (Middlehurst, 2004). It can therefore be difficult to gain momentum for new innovations and institutional changes may take a while to progress.

Each of the three academic faculties is structured and operates slightly differently, particularly with regard to the use of, and support for, educational technologies. At the time the data was collected, no central process for making decisions about the use of educational technology existed. There can be a great deal of autonomy and variation in the way that technology is adopted and implemented and members of staff tend to be relatively free to approach and engage with L&T activities in a way that suits them.

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[4] The UoL uses the phrase *Learning and Teaching,* rather than the more traditional phrase *Teaching and Learning*.

1.3.1: Institutional strategies and policies to support educational technologies

Similar to other HEIs, the UoL must remain responsive to technological developments but at the same time provide a stable, reliable platform for online activities (The University of Liverpool, 2007). An E-learning policy was developed in 2007 and was current until 2010. There was much discussion about the value of an updated policy or strategy at institutional level committees. For a variety of reasons an updated policy had not been produced at the time the data for this research was collected.

In 2009, the UoL undertook a strategic review (The University of Liverpool, 2009) and developed a new five year strategic plan identifying five key areas of activity: the Research Performance, Global University (internationalisation), Student Experience, Knowledge Exchange and Widening Participation. Educational technologies are referred to in all five key areas, although highlighted more strongly in the student experience and the global university.

At the time of writing the UoL has not defined a minimum standard of use of the institutional VLE (Virtual Learning Environment) in policy or strategy documents, though use of the VLE is generally encouraged but is not enforced. Students report that they are relatively happy with the VLE but they would prefer it to be used more consistently (Liverpool Guild of Students, 2013). Liverpool's Guild of Students (LGoS) would like to introduce a minimum requirement for use of the VLE, but this has not yet been implemented.

1.3.2: Online provision at the UoL

Historically there have been two relatively independent aspects to the online provision offered at the UoL; the delivery of wholly online masters degrees through the partnership with Laureate Online Education[5] and the online support for the UoL's traditional on-campus undergraduate and postgraduate activities.

The partnership with Laureate Online Education

The UoL has offered wholly online academic education to working professionals across the world since 1999[6] through the partnership with Laureate Online Education. Laureate is a private company with a worldwide network of institutions offering undergraduate and postgraduate degree programmes. There are 41 programmes[7] that are offered in partnership with the UoL and accredited by the UoL. Students are registered with the UoL rather than with Laureate but the programmes are administered through Laureate's systems and VLE. Through this partnership the UoL has gained a reputation for being one of the leading wholly online distance learning education providers.

The UoL had a partnership with Laureate to deliver wholly online degrees approximately three years before implementing an institution wide VLE and resourcing on-campus educational technologies more seriously. Both Laureate and the UoL use Blackboard as their VLE, although Laureate's installation of Blackboard is

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[5] http://www.university-liverpool-online.com/

[6] http://university-liverpool-online.com/about-us/laureate-online-education

[7] http://university-liverpool-online.com/programmes

separate from the UoL's installation. The wholly online degree students have access to UoL library facilities and computer services but there is little integration with on-campus activities.

The contractual relationship with Laureate is often misunderstood. Laureate have first refusal to deliver any online module developed by UoL members of staff, although their business model means that they are only interested in delivering modules that can be offered at large scale. Colleagues sometimes misinterpret this arrangement and two potential misunderstandings are commonly reported. The first is that members of staff may report they are confused about who is responsible for developing online materials. The second is that there has historically been reluctance from members of staff to develop online modules because of (generally unfounded) concerns that Laureate will take ownership of the module. In practice, few online modules or programmes developed by UoL staff reach the scale that is required to match Laureate's business model. As understanding about the role of Laureate is improved, the impact of these issues will reduce, but a number of unhelpful myths about Laureate's interest in online developments still persist.

On-campus online provision

The UoL purchased Blackboard as the institutional VLE in 2003. A decision was taken right from the start of the implementation that the VLE would be integrated with the central student records system and the programme information system. Therefore, every module had an electronic presence within the VLE and students were enrolled automatically onto appropriate modules. By providing a common technology platform for L&T, it was hoped that members of staff would perceive there to be fewer barriers

when using the VLE (Severance, Hardin, & Whyte, 2008). Usage statistics show that a high percentage of modules make use of the VLE, which may be attributed to the integration of the programme and student systems from the outset. However, the biggest use of the VLE tends to be as a repository for notes, which student's value but can be uninspiring (Casquero, Portillo, Ovelar, Benito, & Romo, 2010).

Promoting a single VLE system can be problematic. Johnson et al. (2007) cautions that institution centred VLE's can lead to an inflexible system that meets the needs of the institution more than the user. Discussions with members of staff suggest that they consider the institutional VLE to be restrictive when compared with the wealth of new opportunities that Web 2.0 or social networking software now offers. As a result, members of staff may decide to use technologies that are not formally supported by the institution, which is not generally discouraged so long as personal data is not compromised. At a strategic level this means the UoL has to make difficult decisions about which new technologies to resource. A greater understanding of the reasons why members of staff choose different educational technologies and what influenced their decision would therefore be beneficial for effective resource allocation.

1.3.3: Support for educational technologies

Two departments within Professional Services provide the main institutional support for educational technologies. The Computer Services Department (CSD) who are responsible for maintaining and supporting the technical infrastructure and the Centre for Lifelong Learning (CLL) who support staff in the development of their L&T activities. Two of the divisions within the CLL support the L&T activities in particular, the eLearning Unit (eLU), which is the unit that I lead, and the Educational

Development Division (EDD). The eLU offer pedagogical advice on adopting and implementing educational technologies effectively and the EDD run the accredited programmes in L&T: the Certificate in Professional Studies in L&T in HE (CPS); the Postgraduate Certificate in L&T in HE (PG Cert); the Postgraduate Diploma/Masters in L&T in HE (PG Dip/MA); and the Teaching for Researchers Course. From 2006 the CPS was compulsory for all new staff and was a requirement for completing the three-year probationary period. All accredited programmes include L&T information about the effective use of educational technologies and members of the eLU contribute to these programmes.

The eLU offers a wide range of support for members of staff; catering for those with little experience of educational technologies, and those who are more experienced. A variety of workshops are provided covering basic and more in-depth topics, each of which are supported by online guidance material. The eLU has fostered the creation of a thriving *e-learning network,* which is supported by face-to-face meetings and an active email list. Members of staff can use this network to share ideas about the educational technologies they are using and find out about the technologies that colleagues may have tried. These support structures appear to work reasonably well for centrally supported technologies such as the VLE. However, members of staff sometimes report they are unclear about which technologies are centrally supported and the amount of help they can expect to receive.

Supporting members of staff to use technologies at a time of such technological change, whilst balancing institutional and external drivers is a challenge for the UoL. In the past some members of staff have reported that the institution was unsupportive

of their efforts to be innovative and slow to recognise new opportunities. This together with a reward structure that has historically focused more on research achievements rather than excellence and innovation in teaching practice can lead to staff feeling frustrated (Parchoma, 2008).

Implementing new technologies can be a challenge and it is not clear what members of staff perceive to be the main influences that encourage them to use educational technologies at the UoL. It would therefore be beneficial if the UoL gained a more in depth understanding of these factors.

1.4: Theoretical framework

This research originated from a desire to understanding the most influential factors that support and help staff to adopt and implement educational technologies. My focus is on the perspective of individual members of staff and their perception of using educational technologies in practice. Educational technologies are defined as the electronic tools that support individuals to communicate with, or engage learners in activities that are designed to encourage learning (Garrison & Anderson, 2003).

Over the last 20 years, investigations into the adoption and implementation of educational technologies have often focused on the experience of individuals who tend to be the first to use a technology, and the factors that encourage these individuals to utilise technologies effectively (Hagner & Schneebeck, 2001; Marshall, 2010; Taylor, 1998). Rogers (2003) identifies these individuals as Innovators, Hagner & Schneebeck (2001) calls them Entrepreneurs, Spotts (1999) describes them as High-Level Users and Taylor (1998) suggests they are Lone Rangers. They are an

important group of people to study but educational technologies are now more widespread and available and there is a greater expectation that the general population of members of staff will make use of educational technologies (Sharpe, Benfield, & Francis, 2006). Although Salmon (2005) suggests that institutions are still struggling to engage anyone other than innovators in real innovative practice. Innovative practice is described as activities that go beyond the usual practice (Taylor, 1998), or as Dearing (1997, para. 66) contends, when the individual engages in "an imaginative leap".

My study is located within innovation research and considers how the introduction of new technologies may be perceived to be an innovation. An innovation is defined as an idea or practice that is perceived to be new by an individual (Ely & Atkinson, 1978; Rogers, 2003). Two models of innovations are used to inform the theoretical framework, Rogers' (2003) Diffusion of Innovations (DOI) and Ely's (1990, 1999) eight conditions of implementation. Both focus upon the individual person and examine the influential factors in the introduction of an innovation, whilst describing their approach from the perspective of adoption or implementation. Adoption is defined as the point when an individual makes a decision to use an innovation (Hardaker & Singh, 2011). Implementation is regarded to be "post-adoption behaviours" (Cooper & Zmud, 1990, p. 124). Diffusion is described as the process by which information about an innovation is communicated through the social process (Rogers, 2003). Chapter two provides more detail about these terms in the context of the literature.

Research into adoption-diffusion theories have traditionally focused on the perceptions of the innovation rather than the perceptions of the use of the innovation (Moore & Benbasat, 1991). It is important to understand the factors that are influential in enabling members of staff to use or implement technologies in their professional practice (Tornatzky & Klein, 1982). The term professional practice was used to encompass the activities that a member of staff engages in to do their job, which include teaching and research activities (Fitzmaurice, 2010).

The DOI is arguably the most influential model in adoption-diffusion literature (Ensminger, Surry, Porter, & Wright, 2004; Straub, 2009) and is widely cited (White, 2007). It is a complex model that claims to provide a broad foundation for understanding the factors that influence an individual when they chose to adopt an innovation (Straub, 2009). Rogers (2003) claims that it is essentially a framework to understand the communication and spread of an innovation over time throughout the members of a social system. There are a number of different aspects to the DOI, including a consideration of the prior conditions, the personal characteristics of the adopters and the attributes of an innovation.

Rogers (2003) describes the way that an individual makes a decision about whether they should adopt or reject an innovation as the innovation-decision process. The innovation-decision process has five stages – knowledge, persuasion, decision, implementation and confirmation. Criticisms of the DOI suggest that the implementation stage is weak (Lyytinen & Damsgaard, 2001). Fullan and Pomfret (1977, p. 336) contend that, "Implementation is not simply an extension of planning and adoption processes. It is a phenomenon in its own right". Therefore, the eight

conditions of implementation outlined by Ely (1999) are used to extend the understanding of implementation in this research. Cohesion and gaps are identified between the Rogers' DOI and the Ely's implementation process in the context of practice and I build on my contribution to knowledge and propose an alternative model.

1.5: Research Questions

My interest in this area developed from two complementary sources. From my own professional practice, which relates to the strategic implementation and support of educational technology use across UoL; and from work undertaken during the initial taught part of my doctoral studies, which is when I began to investigate the issues concerning the implementation and support of educational technologies at the UoL in more depth. It was clear from these preliminary studies that there is only anecdotal information about the factors that made a difference to staff about whether and how they used educational technologies, even though new technologies are introduced fairly regularly at the UoL.

I discussed potential research questions with UoL colleagues to determine the questions that would be most helpful for investigating my area of interest. The overarching research question for my thesis became: What are the main factors that influence a member of staff to adopt and implement educational technologies at the University of Liverpool?

The main research question was split into four sub-questions.

1. What do members of staff at the UoL perceive to be the drivers and rationales for using educational technologies in their professional practice?
2. What impacts do members of staff perceive educational technologies have on their professional practice?
3. What do members of staff perceive to be the enablers for the successful adoption and implementation of educational technologies in their professional practice?
4. What are the implications of the research findings for supporting the use of educational technologies at UoL and beyond?

1.6: Research approach

As described in Section 1.3, the setting for this research was the UoL. All participants were members of staff and the research was bounded by the UoL context. As I am also a member of staff at the UoL I had an insight into the experiences of colleagues but was careful to be aware of the disadvantages and power imbalances that an insider researcher's perspective may create (Costley & Gibbs, 2006).

Examining the UoL as a case study was chosen as the most appropriate methodology. A case study is a specific instance of a bounded event, often with a small sample size (Denzin & Lincoln, 2008). It is a unique example of real situations with real people (VanWynsberghe & Khan, 2007). Case studies are eclectic and do not have prescribed methods of data collection (Bassey, 1999).

I used a qualitative interpretivist approach to collect data. I began by creating a series of statements based on Rogers' (2003) definition of the DOI adopter categories to prompt discussion about the participants' perceptions of their own approach to educational technologies. Audio-recorded semi-structured interviews were employed as the main source of data collection. The interview data was complemented by an analysis of relevant institutional documentation, for example appropriate policies and strategies. Finally, I kept a detailed research journal, which I used to document the data collection process and reflect on the experience of conducting this research. More detail is provided in chapter three about my research design and the data collection methods employed within this study.

1.7: Intended audience

Educational developers and Learning Technologists, both internal and external to the UoL, may find the recommendations made to be of use. Understanding the factors that influence staff to use educational technologies in their professional practice and ensuring that members of staff are supported efficiently is essential in order to make effective use of available resources.

Members of staff who support the technical infrastructure of educational technologies provision may find the information about the perceived risk and impact of updates useful for planning and supporting the effective management of hardware and software in the future.

Senior managers and policy makers of the UoL who are in a position to influence decisions and resource allocation may find information about the importance of the

support from colleagues and informal networks of interest, as well as perceptions about effective central provision. It may also be useful for senior managers to have an understanding of the variety of drivers and rationales that members of staff perceive to be in place for using educational technologies.

Researchers may be interested in the analysis of Rogers' (2003) DOI model and Ely's (1999) eight conditions for implementation and the implications for understanding adoption and implementation in more detail. These implications include the importance of the context and that adoption and implementation are multi-layered processes that are influenced by an array of factors.

1.8: Stakeholders

I have been fortunate to be able to combine my personal interest in this area with a strategic institutional view. The main stakeholder for this project is my employer, the UoL. My department, the Centre for Lifelong Learning (CLL) funded my doctoral studies and will therefore expect my thesis to contribute recommendations about the UoL context.

Members of staff who participated in this research are another group of important stakeholders. They may be people that I work with either directly or indirectly in the future and so may have an expectation about the impact of this research. The use of educational technologies for L&T at UoL, as with most HEIs, has not been without problems. Managing staff expectations about the remit and scope of this research will be important.

1.9: Overview of the thesis

The following is an overview of the chapters that form the remainder of my thesis.

- Chapter two provides an overview of relevant literature.
- Chapter three explains my research design and methodology in detail.
- Chapter four considers the relevance of the DOI adopter categories and proposes an alternative model.
- Chapter five focuses on the participants' perceptions of the drivers and rationales for using educational technologies in their professional practice.
- Chapter six examines the participants' reports of the perceived impacts, potential risks and the key enablers for utilising educational technologies.
- Chapter seven concludes the research and includes a summary of the research findings in respect of the research questions and theoretical implications of the study.

Chapter 2: Literature Review

This chapter reviews the literature that informs my research. I begin by considering how innovation research provides a starting point to gain an insight into how educational technologies are often new innovations for staff. I explain the two models that inform my theoretical framework in more detail. These models are Rogers' (2003) Diffusion of Innovations (DOI) and Ely's (1999) eight conditions for technology implementation.

Rogers' (2003) DOI is one of the most utilised models for understanding the innovation-decision process of educational technology innovations (Wilson & Stacey, 2004). I state why I used it to inform my investigation into the adoption and implementation of educational technologies at the UoL. As my research is based in practice, I also consider the everyday use, or implementation of these technologies. Rogers claims that implementation is one of the stages within the innovation-decision process of the DOI although Lyytinen and Damsgaard (2001) criticise it for being weak in this area. Ely (1990) contends that the implementation stage in the DOI is too simplistic and does not recognise the processes involved in implementation satisfactorily. Fullan & Pomfret (1977) agree and suggest that implementation is not part of adoption, but a separate area of study.

I compare and contrast the DOI with the eight conditions of implementation that Ely (1999) proposed and conclude the chapter with a summary of the contribution my research makes to understanding the adoption and implementation of educational technologies at the UoL.

2.1: Innovation research

Innovation research identifies the relationships between the adoption and implementation of an innovation and the attributes of that innovation (Tornatzky & Klein, 1982) and comes under the broad umbrella of change theory (Ensminger et al., 2004). Fullan (1982) identified four stages within innovation research, the approach, adoption, implementation and continuation or institutionalisation.

The term innovation has been used inconsistently within different disciplines making it difficult to identify one standard definition (Hurt, Joseph, & Cook, 1977; Wolff, 2008). For example, Wolff studied four main disciplines: economics, sociology, engineering and education and found that each contextualized the term innovation differently and employed diverse methods to understand the implications of introducing innovations.

The challenge of identifying a definition for an innovation is not a new problem. Over 30 years ago Downs and Mohr (1976) claimed that it was not possible to identify a single model that described how innovations are adopted and implemented. Downs and Mohr contend that even the implication that a single theory exists should be considered as questionable and instead proposed a broad conventional definition. They state that an innovation is "the adoption of means or ends that are new to the adopting unit" (Downs & Mohr, 1976, p. 701). This broad definition matches Ely & Atkinson's (1978, p. 151) statement that "an innovation is an idea, practice, or object perceived as new by an individual" and Rogers' (2003) assertion that it is the perception of novelty of an innovation that is important even though the innovation

itself may have been available for some time. Smith (2011) also identified innovativeness to be a highly contextual term.

An individual's decision to integrate an innovation into their life is referred to as adoption; it is a micro-perspective on behaviour change that focuses on the individual and the choice they make to accept or reject an innovation (Straub, 2009). Straub suggests that an adopted innovation may not be beneficial to the individual; nor does it have to be something concrete, it could be more abstract like an idea.

Innovation research became more popular when the potential benefit of innovation adoption was identified as a strategy for change in institutions (Rogers, 2003). As technologies became more prevalent, research then focused on understanding how these technologies could be introduced effectively into an organisation (Hannan, 2005).

2.1.1: Innovation in Higher Education

Innovation in the context of HE has been interpreted as a planned or deliberate process of introducing change, directed towards (but not necessarily achieving) improvements or solving or alleviating some perceived problem (Hannan & Silver, 2000). Hannan and Silver describe how innovations in HE have been studied since at least the 1960s. They explain that during the 1970s the innovator was largely the individual enthusiast. However a number of different opportunities during the 1990s became available which influenced the way that innovations were considered; for example, the Teaching and Learning Technology Programme (TLTP) (Tiley, 1996) and the Computers in Teaching Initiative (CTI) (Martin, 1996).

Hannan (2005) described three types of educational innovations that are typically initiated in HE: an individual innovation, which is driven by enthusiasts who are keen to try out new technologies; a guided innovation, which is supported by funding opportunities or a desire to improve L&T; a directed innovation, which is driven by institutional imperatives such as student experience or efficiency savings.

Introducing and embedding educational technologies into an HEI can be a complex process and a major cause of change (Conole, Carusi, de Laat, Wilcox, & Darby, 2006; Hanson, 2009a; Stiles & Yorke, 2006). Organisational barriers and individual resistance may result; each having the potential to impact on how successfully the innovations are embedded (Miller, Martineau, & Clark, 2000). A multidimensional approach is required to help staff engage with new teaching approaches, develop revised resources, or change underlying pedagogical assumptions (Spotts, 1999).

Theories of innovation are popular as a basis to explain the adoption patterns of educational technologies (Allen, 2000) although introducing technology is not necessarily innovative for learning (Hannan & Silver, 2000). Marshall (2010) claims that in many contexts, including HE, the term *technology* is used synonymously with innovation and change. Somekh (1998) warned that whilst the connection between technology and innovation is often made, the lessons learned from innovation research have not always been applied effectively to the introduction of technology; resulting in the avoidable repetition of technological failures and problems.

Failures and problems can contribute to an individual's perception that educational technologies are an imposition or a requirement forced upon them from the institution (Albirini, 2006). A number of myths and naive assumptions exist about the potential for educational technologies in education (Dillenbourg, 2008; Njenga & Fourie, 2008; Zemsky & Massy, 2004). As a result, it is not uncommon for staff to have negative perceptions of educational technologies and consider them to be "a challenge, a depriver, and a consumer of time" (May & Short, 2003, p. 679), or something that increases workload (Samarawickrema & Stacey, 2007). Njenga and Fourie (2008) proposed ten myths for how the use of technology in HE is alleged to solve many of the learning and teaching issues that staff face. For example, they describe how educational technologies may be considered as a saviour, "its redemptive power is overreaching and every educational institution should adopt it" (p. 4), and how "technopositivist ideology is a compulsory enthusiasm" (p. 2). Or, how technological optimism has seen new technologies implemented without proper consideration of the consequences.

Despite more than 20 years of research in this area many of these issues remain and technology developments may still be hampered by management, cultural, financial and staff development issues (Marshall, 2010). Lei and Morrow (2010) describe how technology can be expensive to resource, risky to use and could potentially conflict with established procedural and administration systems. Understanding what motivates members of staff to use educational technologies and what is likely to influence the reasons why they engage with, and use technology, is therefore an important question (Hannan, 2005) and of key importance in my study.

2.2: Adoption-diffusion theories

Adoption is defined as the point when an individual makes a decision to use an innovation (Hardaker & Singh, 2011). Diffusion refers to the communication of an innovation through the social process (Rogers, 2003). Adoption theories are commonly known as adoption-diffusion theories as they consider the spread of an innovation over time (Straub, 2009).

Straub (2009) explains that an adoption decision may be a one-time event but it is affected by contextual, cognitive and affective factors, which are described in terms of stages of progressive knowledge and understanding. Innovation diffusion is the process by which an idea or product is progressively adopted (Klein, 2005). Diffusion theory takes a macro-perspective view of contributing factors and individual adoptions (Rogers, 2003).

Browne and Jenkins (2008) identified eight factors that may negatively influence an individual's adoption of technologies these were: lack of time, lack of knowledge, lack of money, the institutional culture, lack of support staff, lack of recognition for career development, lack of staff development and lack of incentives. The increased use of educational technologies now means that members of staff are required to take on a wide range of professional roles, for example content developer and web designer (Conole & Oliver, 2007). However, Schneckenberg (2009, p. 413) asks whether members of staff 'have the competences to respond to these challenges?"

Many different models have been developed to understand technology adoption. Straub (2009) suggests that four of the main ones are the Concerns-Based Adoption

Model (CBAM) the Technology Acceptance Model (TAM), the United Theory of Acceptance and Use of Technology (UTAUT) and the Diffusion of Innovations (DOI).

The CBAM was created to understand change in schools from a top-down perspective (Anderson, 1997). It ignores teachers' preferences and instead focuses on mandated change (Straub, 2009). I decided not to use this model because of the focus on the school context and because educational technologies are not a top-down initiative at the UoL.

The TAM was developed by Davis (1989) to study an individual's perception of a technology innovation and focused upon the perceived ease of use and the perceived usefulness. The TAM has mainly been used in information systems literature and emphasises the notions of instrumentality and extrinsic motivation, whilst ignoring an individual's subjective feelings and holistic experience (Zhang, Zhao, & Tan, 2008). Criticisms of this model include the lack of acknowledgement of individual differences and that it does not account for prior experience (Agarwal & Prasad, 1998). The lack of individual differences meant that the TAM was rejected for my research.

Venkatesh, Morris, Davis, and Davis (2003) reviewed eight of the most common theoretical frameworks for technology adoption and use, and combined the most salient characteristics of each in order to develop the UTAUT. This model generally considers mandated rather than optional technologies, and does not identify the

influences relevant for educational institutions (Straub, 2009). Therefore it was rejected as a framework for my research.

After reviewing the different models in the literature the DOI was deemed to be the most appropriate to inform this research. The next section provides an overview of the DOI.

2.2.1: Diffusion of Innovations

Ensminger et al. (2004) and Straub (2009) argue that Rogers' (2003) DOI is the most influential model in adoption-diffusion literature. The DOI is a widely cited model that has been used to examine many different innovations (White, 2007). It was originally developed in 1962 from a rural agricultural and sociology background (Hornik, 2004). Despite the agricultural origins of this model, Prescott (1995) claims that it is appropriate to use to study information technology innovations. It is now prevalent in the literature discussing the introduction of new technologies (Wilson & Stacey, 2004).

Even though the DOI has been used widely there are critics of this model (Lyytinen & Damsgaard, 2001). Straub (2009) suggests that the DOI is primarily descriptive rather than prescriptive and does not explain how to facilitate adoption. Straub continues by suggesting that future adoption research should focus not just on what is offered by the formal institutional setting but also how individuals understand, adopt and learn about technologies outside of the formal perspective.

Rogers (2003) claims that the DOI can be applied to a range of innovations, although typically one innovation is examined at a time so that attributes and characteristics can be compared. Tornatzky and Klein (1982) reviewed 75 innovation articles discussing innovation characteristics and their relationship to innovation adoption and implementation and found that in more than half of the studies only one innovation was examined. Tornatzky and Klein encourage comparisons across different innovations so that a more representative picture of the attributes and characteristics important for each person can be obtained.

My research provides the participant with an opportunity to discuss a technology of their choice, thus allowing comparison across different innovations. Limiting the discussion to an educational technology that I had chosen was unlikely to help identify any subtle factors that were personal to the participant's individual use of technologies in practice. Plus, identifying a common technology that all participants used would be difficult as there is no requirement to use educational technologies at the UoL. Even the VLE, which is the closest to a required technology, is used in many different ways. I also recognised that identifying a technology that was understood by all participants to be the same would have been challenging. Particularly as terms such as educational technology, e-learning, online learning and distance learning can be interpreted as many different things (Kirkwood & Price, 2013; Moore, Dickson-Deane, & Galyen, 2011) and are regularly used interchangeably at the UoL.

Three of the most commonly referenced aspects of the DOI model that contribute to the decision to adopt an innovation are stated as the innovation–decision process, the

attributes of the innovation, and the characteristics of the adopters (Ensminger et al., 2004; Hanson, 2009a).

The innovation-decision process

Rogers (2003) states that an individual's decision to adopt an optional innovation (or an innovation that is not enforced) is generally not instantaneous. Rather, Rogers says the process occurs over time and consists of five stages. These stages include gaining initial knowledge or awareness of the innovation, forming either a positive or negative opinion about the innovation, choosing to adopt or reject the innovation, implementing or using the innovation and looking for evidence that supports the decision to adopt or reject the innovation. Rogers claims that individuals are constantly seeking information to decrease uncertainty about the benefits of an innovation and determine if using the innovation is better than their existing practice. Hornik (2004) suggests that there are different influences that affect each of these stages. The five stages in the innovation-decision process are displayed in Figure 2.1 and briefly outlined as follows.

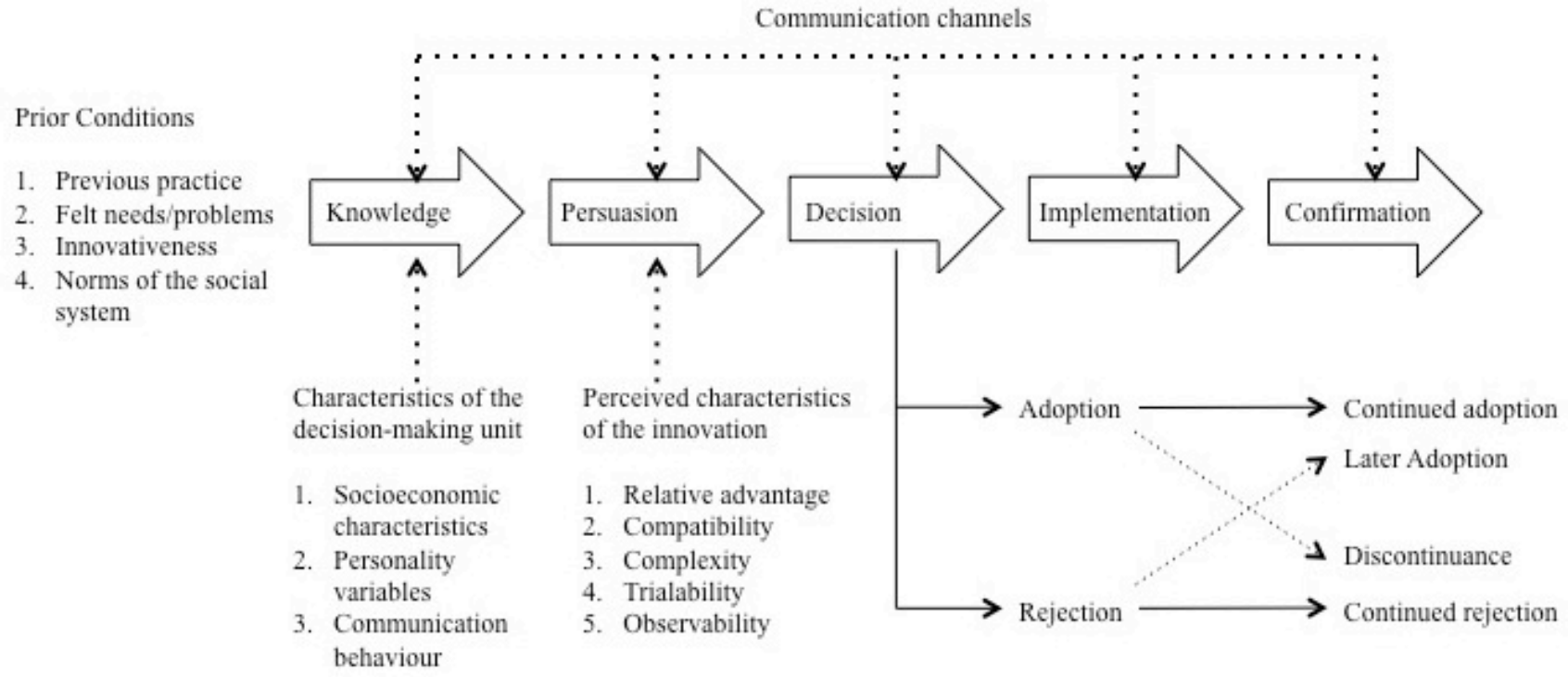

Figure 2.1: The innovation-decision process – from Rogers (2003, p. 170)

The first stage is termed *knowledge.* Rogers (2003) claims this is mainly a cognitive stage when an individual becomes aware of an innovation. It may be an active process where the individual seeks out the innovation or a passive process where the individual comes across the innovation, perhaps by accident. Knowledge is influenced by prior experience and conditions such as the amount of practice an individual has had, the individual's interpretation of the problem, how innovative the individual is, and the expectations of the social system. Rogers also says that the individual's characteristics affect knowledge, for example their socioeconomic characteristics, personality variables and how they prefer to communicate.

The second stage is *persuasion.* Rogers (2003) defines this as an affective, or more emotional stage when the individual becomes psychologically involved with the innovation. Rogers claims this is when positive or negative feelings are developed about whether to adopt or reject the innovation. The individual may also seek social reinforcement from colleagues that the innovation is appropriate to consider adopting. Rogers states that this stage is most closely linked to the attributes of the innovation.

The third stage is *decision.* It is the point when an individual chooses to adopt or reject an innovation. Rogers (2003, p. 177) defines adoption as "a decision to make full use of an innovation as the best course of action available". Rogers states that the decision may change and later adoption or discontinuance may result.

Rogers (2003) contends that the fourth stage, *implementation* and the fifth stage, *confirmation* occur when an individual acts on the decision and a more practical approach is taken. Rogers (p. 179) states, "Until the implementation stage the

innovation-decision process has been a strictly mental exercise of thinking and deciding". Rogers acknowledges the importance of a trial during the first three stages to help the individual make a decision. However, a trial that is strictly a mental exercise does not appear to me to be logical. From my experience of supporting educational technology implementation at the UoL, a trial is often essential prior to a member of staff making a decision to introduce a technology into their professional practice. Rogers suggests that re-invention occurs during the implementation stage when innovations are likely to be changed or modified by each individual to suit their particular need.

The fifth stage is *confirmation,* when Rogers (2003) claims that an individual reflects on the decision and looks for evidence that supports their decision to adopt or reject the innovation. Rogers says this is based on whether the innovation does what they want and expect it to do.

Rogers (2003, p. 195) states that the innovation-decision steps usually occur in sequential order although he admits that the stages are a "social construction, a mental framework that we have created and generally agreed to", and it is unlikely that clear distinctions can be identified between each of the steps. Lyytinen et al. (2001) agree and question the sequential nature of the steps. They assert that when the model is applied in practice it is difficult to identify where one step starts and another finishes. Cooper and Zmud (1990) and Wolff (2008) suggest that a linear model is problematic when applied to real life situations and claim that it does not depict the actual implementation.

Allen (2000) warns that the innovation-decision process has a pro-innovation bias and an innovation is often considered to be positive. Selwyn (2003) also suggests that the innovation-decision process is deterministic and presumes that a technology is beneficial. Therefore the measure of adoption over time means there is an implicit expectation that it will eventually be adopted.

Porter (2005) opposes the use of time as a measure of innovativeness. Rather he says people gain experience based on individual needs, hopes, values, skills and experiences. Therefore slow adopters should not face consequences for rejecting an innovation as everyone is entitled to formulate their own perception of an innovation's value.

Characteristics of the adopters

Rogers (2003) proposes that individuals have different characteristics that indicate how quickly they are likely to adopt an innovation. The adopter characteristics relate to the degree of innovativeness, or how long it takes an individual to adopt an innovation within a social system. Reviewing the different adopter characteristics may help to gain an understanding of the factors that members of staff consider to be most influential in order to utilise educational technologies (Hagner & Schneebeck, 2001).

Rogers (2003) defines five adopter categories although he acknowledges that the concept of innovativeness as a characteristic of adopters will lie on a continuum with very innovative at one end and not innovative at the other. Rogers claims he created the five categories simply for convenience, and to make it easier for the researcher to identify and categorise different characteristics and compare findings. Therefore

Rogers (p. 282) says that the five "ideal types" of adopter categories simply standardised the numerous descriptions that existed at that time, for example:

> The most innovative individuals were termed "progressists," "high-triers," "experimentals," "lighthouses," "advance scouts," and "ultraadopters." The least innovative individuals were called "drones," "parochials," and "diehards". (Rogers, 2003, p. 272)

The five ideal types of adopter categories were defined as the Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Individuals in each category are predicted to have different characteristics and approaches to adopting an innovation. Rogers (2003) describes these categories as:

- *Innovators* – individuals who can understand and apply complex technical knowledge. They are venturesome, daring and willing to take risks. They can cope with uncertainty about whether an innovation will succeed and will not be put off if something does not work. They typically find out about and communicate with people about innovations from outside of their local circle of peers. They are said to have access to financial resources and are usually the first to purchase and try out an innovation.

- *Early Adopters* – adopt new ideas just before the average person, although they are not considered to be as far ahead of the average as the innovators. They are often described as the opinion leaders and the people that potential adopters look to for advice. They are more measured in their decisions about

whether to adopt innovations; they can cope with uncertainty but look to interpersonal networks and near peers for an evaluation of the innovation. Maintaining the respect of colleagues by making well-judged decisions is more important for these individuals than pushing the boundaries of technologies.

- *Early Majority* – this group is said to make up one third of all members of a social system. They tend not to be the opinion leaders and can deliberate for quite a while before adopting new ideas.

- *Late Majority* – again, this group is said to make up one third of members of a social system. They are uncertain about adopting new ideas and may only do so when there is an economic or peer pressure to do so. The Late Majority must be very certain that an innovation will work before they are willing to adopt it.

- *Laggards* – these are the last group to adopt an innovation and can be suspicious about the benefits of adopting innovations. They cannot cope with risk and want to be very certain that an innovation will succeed before they are willing to try it. Their decision is based on whether something has worked in the past and they can be resistant to change. Laggards are not said to be individuals who refuse to adopt an innovation, although the term has sometimes been used this way (Klein, 2005). They simply take longer to adopt than the other four categories.

Rogers (2003) makes generalisations about the characteristics of individuals when he defined these adopter categories. Based on my experience of supporting members of staff to adopt and implement educational technologies at the UoL, some of the generalisations he makes are questionable in a HE context; particularly "generalisation 7-3: Earlier adopters have more years of formal education than do later adopters" (p. 288) and "generalisation 7-12: Earlier adopters have more intelligence than do later adopters" (p. 289). Jacobsen (1998) also considers these generalisations and characteristics to be problematic because of the way the categories understate the uniqueness of the individual.

Previous research into technology adoption has commonly focused on the experience of the Innovators and Early Adopters (Hagner & Schneebeck, 2001; Marshall, 2010). These groups were likely to be the first to engage with a technology and understanding their experience was considered to be important for informing the implementation of technologies more generally (Zemsky & Massy, 2004). However, as educational technologies have become more pervasive and available (Kanuka, 2008) there is arguably more expectation that the general population of members of staff in HE will be expected to use these technologies. Geoghegan (1994) warns that the experience of Innovators and Early Adopters may not transfer easily to informing how other categories of adopters approach the adoption and implementation of technologies. Similarly Sharpe et al (2006) says that the experiences of Innovators and Early Adopters may not be the best way to understand the issues that the general population are likely to face. Particularly as Rogers (2003) asserts that people within each of the adopter categories are influenced to adopt an innovation by different factors.

There has been a tendency in the literature for the adopter category to be identified by the researcher rather than by the participant (Hurt et al., 1977). Hurt et al. suggest that researcher identification can suffer from faulty memory or the misconception of past events and there is the potential for the identification to be overly biased by a singular innovation. As this study is focused on the individual I wanted to investigate whether it was possible for the participant to identify an adopter category that they considered matched their approach to educational technology.

Hagner and Schneebeck (2001) proposed that it is important to determine the ways that members of staff approach educational technologies so that appropriate strategies for engagement and support structures are employed. HEIs have been accused of making a technology available and then expecting individuals to adopt it, simply because it has been made available (Bell & Bell, 2005). If there are differences between the characteristics of adopters, then it is possible that individuals deemed to be Innovators are likely to explore new technologies and fit the "if we build it they will come mentality" (Zemsky & Massy, 2004, p. 3). However, Zemsky and Massy suggest this approach will generally not lead to successful technology adoption. According to Jacobsen (1998) support structures need to be available and appropriate for the whole range of adopter categories, particularly as Rogers (2003) says each is likely to be influenced by different factors.

If each of the categories is indeed influenced by different factors; then it may be possible to provide a member of staff at the UoL with customised training and support programs designed to meet the different needs of each adopter group (Yi, Fiedler, &

Park, 2006). Therefore, Yi et al. (2006) suggest that information about these individual adopter characteristics could have substantial value for the successful implementation of technology and information systems.

Attributes of the innovations

Rogers (2003) proposes that the perceived attributes of the innovation influence the individual's decision to adopt or reject the innovation, particularly during the persuasion stage. He states that five of the most influential attributes of an innovation are said to be the relative advantage, compatibility, complexity, trialability, and observability.

Rogers (2003) contends that the most important attribute of an innovation is the perception of the *relative advantage*. This is defined as the degree to which an innovation is perceived as being better than what has been used before and can include, for example, the cost, status or benefit from rewards/incentives. *Compatibility* is the amount that an idea is perceived as similar to current beliefs, values or past experiences. *Complexity* is the perception of how easy it is to understand and use the innovation and *trialability* is the degree to which an innovation can be tried and experimented with. Rogers predicts that the opportunity to try a new innovation will result in it being adopted more rapidly. During the trial, the innovation may be re-invented to make it more appropriate to the individual. Finally, o*bservability* concerns how visible the results of an innovation are to others.

2.3: Implementation of technology innovations

Implementation extends the notion of adoption-diffusion theories and is regarded as "post-adoption behaviours" (Cooper & Zmud, 1990, p. 124). Surry et al. (2009) explain that whilst the adoption and diffusion of innovations has been researched for the past 60 years, the shift in focus from adoption to implementation did not occur seriously until the late 1970s. Surry and Ensminger (2003) identify that implementation is an area that would benefit from being more clearly understood.

Often the implementation of an innovation has been considered within an adoption-diffusion process (Somekh, 1998). Ensminger et al. (2004) agree, stating that research in this area has traditionally focused on adoption (or the initial decision to use an innovation) but more recent research has been related to implementation. As indicated in Section 2.2.1, one of the stages within the innovation-decision process of the DOI is identified as implementation, though Ely (1990) contends that this stage does not recognise the processes involved in implementation satisfactorily. He says implementation is: "Apparently so simple that it can appear as a one-word command, yet so complex that it requires special knowledge to do the job efficiently and thoroughly" (Ely, 1990, p. 1). Fullan and Pomfret (1977, p. 336) also propose that implementation is a more complicated phenomenon, stating: "Implementation is not simply an extension of planning and adoption processes. It is a phenomenon in its own right". Ely (1999) claims that Fullan and Pomfret were one of the first to focus on the importance of identifying implementation as a separate activity in the process of planned change, and define implementation as the use of an innovation in practice.

The rapid increase in the use of educational technologies in HE means that there are now many more opportunities to adopt new technologies (Kanuka, 2008). This has led researchers to look beyond the adoption stage (Ge, Lubin, & Zhang, 2010) and pick up on earlier implementation research that examines why some educational changes subsequently fail to become established (Fullan & Pomfret, 1977). Conole (2010) describes how the implementation of educational technologies in practice are now understood to be dependent on a complex and multifaceted range of interconnected pedagogical, organisational and technical factors.

2.3.1: Conditions of implementation

One of the most cited authors in the implementation of instructional technology innovations is Professor Donald P. Ely (Ensminger et al., 2004). Ely developed the notion of conditions of implementation from his work determining technological change within a library context (Ely, 1990).

Ely and Atkinson (1978) first proposed eight conditions that facilitate the implementation of educational technologies. These conditions were reported to have evolved through experience and observation and were further developed by Ely (1990, 1999) into dissatisfaction with the status quo, existence of knowledge and skills, availability of resources, availability of time, rewards and incentives, expectation of participation, commitment by those who are involved, and the evidence of leadership (see Figure 2.2).

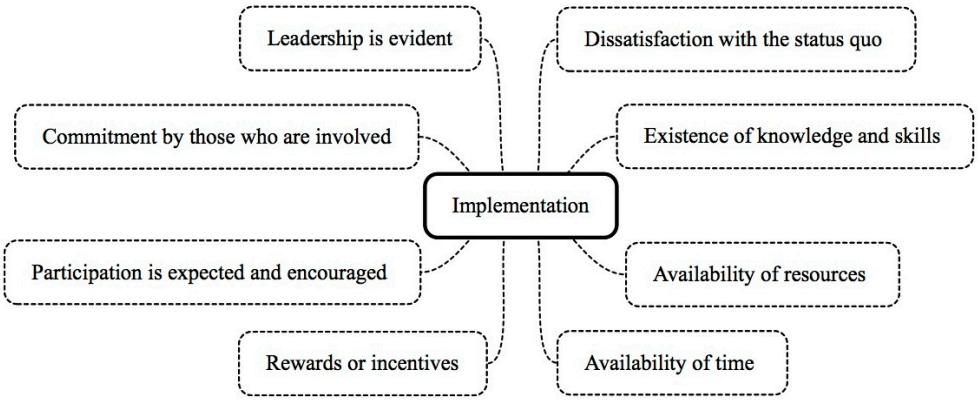

Figure 2.2: Eight conditions of implementation – adapted from Ely (1999)

Ely's (1999) conditions of implementation are described in more detail as:

- *Dissatisfaction with the status quo* – a perception that things could be better, or that others are moving ahead. It is the desire to improve or change the current situation.

- *Existence of knowledge and skills* – required for the individual to be able to use the innovation.

- *Availability of resources* – which includes the hardware and software required to make the implementation work. This could also include funding in general and access to support resources.

- *Availability of time* – for the individual to acquire knowledge and skills, plan how they will use the innovation, adapt and integrate the innovation and reflect on what they are doing.

- *Rewards or incentives* – Ely (1999) argues that although rewards and incentives sound similar they relate to slightly different things. A reward is something given for a job well done or a good performance and an incentive is something that serves as an expectation of a reward or fear of punishment. This condition could be further split into extrinsic rewards and intrinsic rewards. Where extrinsic rewards can be observed and intrinsic rewards are internal to the individual.

- *Participation is expected and encouraged* – this condition includes shared communication and decision-making about the innovation amongst all innovators, and a process for representation when direct participation in decision-making is difficult.

- *Commitment by those who are involved* – includes firm and visible evidence that the innovation is endorsed and there is continuing support for implementation of the innovation. This condition is measured by the perceptions of the implementers.

- *Leadership is evident* – there are two aspects to leadership: organisational leadership comes from a strategic perspective, whilst project leadership relates more closely with the day-to-day activities of the innovation being implemented and the people who can help.

Although the eight conditions are reported sequentially, Ely (1990) cautions that they do not necessarily occur as a linear process or a set of rules to adhere to. Instead he proposed that they are interrelated and present in varying degrees depending on the nature of the innovation studied. The eight conditions are tempered by the local conditions and the context or setting in which they are applied. Ely says that most of the conditions will apply most of the time and in most situations, but they will seldom be present for all innovations in all environments. The absence of any condition is likely to reduce the effectiveness of the implementation process. Ely considers that the strength and importance of each of the conditions is a function of the context and the innovation. In practice, Ely also recognises that it is difficult to split the conditions between those that are personal characteristics of the implementer and those that are facilitated by the institution.

Porter (2005) opposes the inclusion of time as one of the conditions. He says that people and time are two major underlying factors in the implementation process. Time, he claims is not related to the other seven conditions but is, "nothing more than a concept resulting from measurement of motion in space. Referring to it as an active part our social activity is not sound" (p. 1064).

More recent studies into implementation have investigated how Ely's (1990) eight conditions apply in different contexts. Surry and Ensminger (2003) compared the perceived importance of the factors that facilitate implementation in a business and an education environment. Surry and Ensminger claim their research supports the importance of Ely's eight conditions, though interestingly they found the two environments resulted in a different perception of the importance of each of the

conditions. As this research is now over 10 years old it is important to recognise that the respective environments may have changed. Within the education context the three most important factors for facilitating implementation were reported to be resources, participation, skills and knowledge. However, within a business context the most important factors were time, leadership and resources. Table 2.1 summarises Surry and Ensminger's findings.

Rank	Education context	Business context
1	Resources	Time
2	Participation	Leadership
3	Skills and knowledge	Resources
4	Dissatisfaction	Skills and knowledge
5	Leadership	Rewards and incentives
6	Rewards and incentives	Commitment
7	Time	Dissatisfaction
8	Commitment	Participation

Table 2.1: Perceived importance of Ely's conditions of implementation from Surry and Ensminger (2003)

Building on Surry and Ensminger's (2003) work, Ensminger et al. (2004) developed an implementation profile inventory, which they proposed could be used to identify the most important implementation factors for an institution. Surrey et al. (2005) then created a model of implementation focused on HE institutions that they termed RIPPLES (Resources, Infrastructure, People, Politics, Learning, Evaluation and Support). I considered using the RIPPLES model to inform my research. However, RIPPLES takes a macro perspective and is more focused at institutional understanding

of implementation whereas my focus for this research is on the perception of individuals.

Surry, Grubb, Ensminger, and Ouimette (2009, p. 3) claim that, "The study of implementation in higher education is an important and growing area of research with numerous unanswered questions and rich opportunities for continued investigation". Georgina and Olson (2008) agree that more understanding and research is needed about effective training strategies and how these can be improved and individualised. Surry et al. (2009) continue that implementation research is increasingly taking a wider focus that considers enablers to innovation rather than simply the barriers.

2.4: Research gap

This chapter began by identifying the importance of innovation research in the study of the adoption and implementation of innovations. Research about the adoption and implementation of educational technologies has never, to my knowledge, been done at the UoL. Understanding how educational technologies are used effectively is becoming a more important issue for institutional planning and decision-making. As Straub (2009, p. 646) says "the constant bombardment of new information technologies makes understanding the hows and whys of user technology adoption a particularly pressing issue now and in the future".

A large amount of literature concerning the adoption of technology makes reference to Rogers (2003) DOI model, or has considered it a basis for further work (Straub, 2009). The DOI has merits as a framework to inform my research. It is focused on the

individual, which fits with my approach, and provides a structure for examining the factors that are influential in affecting the use of educational technologies at the UoL.

Straub (2009) cautions that studies in this area have tended to look at the adoption of educational technologies from a descriptive or prescriptive perspective. Fewer studies examine the factors that influence implementation and look at the contribution these factors make in a facilitative manner (Ensminger et al., 2004). Surry and Ensminger (2003) explain that the implementation phase is still a mystery and is too often dismissed as simply the step after adoption. Using technology can have significant implications for members of staff (Dillenbourg, 2008). This research contributes to understanding the experience of members of staff when they use educational technologies at the UoL. By identifying these influential factors, my research will help to ensure that the UoL is well placed to take an informed position in the future support of educational technologies.

From a theoretical perspective this research compares and contrasts Rogers (2003) DOI and the eight conditions of implementation outlined by Ely (1999) in the UoL context. The implementation stage of the DOI is criticised as being weak and for not acknowledging the complexity of implementation (Fullan & Pomfret, 1977). However, as Surry and Ensminger (2003) suggest, implementation is a concept that needs to be more clearly understood.

By comparing and contrasting these two models my research contributes to understanding the adoption and implementation of educational technologies at the UoL and more widely. Examining the UoL as a case study and using qualitative data

collection methods means that I obtain a rich picture of the issues that staff face and the factors that act as enablers. Considering the applicability of the DOI and the eight conditions of implementation in practice, I propose an alternative non-linear but contextually based model.

Chapter 3: Research design

In this chapter I describe my research design and its relevance for the context of this research. I explain the reasons why I used qualitative research in this social science context and explain decisions I made about which methodology and methods to employ. I provide details about the participants, clarify how the research data was collected and explain how I analysed the data within the remit of the ethical requirements. I acknowledge my role as an insider researcher and my influence on the interpretation of the results. Finally, I reflect on the limitations of my approach and the quality of the research.

3.1: Research methodology

The research methodology was determined by the research purpose, context and questions introduced in the first chapter along with my philosophical stance as the researcher. I adopted a constructivist interpretivist approach and examined the UoL as a case study.

The main research question for my study was: what are the main factors that influence a member of staff to adopt and implement educational technologies at the University of Liverpool? My aim was to understand the experience of staff in the context of their day-to-day activities within their normal working environment.

There are many factors that could potentially influence a member of staff in their decision to adopt and implement an educational technology in this context. Social science research is concerned with human behaviour in society (Creswell, 2007). It is

a subjective rather than objective activity which is reliant on human interpretations (Cohen, Manion, & Morrison, 2007) and recognises the influence of a complex maze of uncontrollable variables and unpredictable interactions (Tobin & Kincheloe, 2006). Qualitative research is an inquiry technique that explores the social or human context (Creswell, 2007). Denzin and Lincoln (2008, p. 4) define qualitative research as a "situated activity that locates the observer in the world".

A constructivist perspective acknowledges that individuals create meanings in the interactions between these uncontrollable variables and unpredictable interactions (Lee, 2012). Meanings can be varied and multiple and the researcher must make sense of them by interpreting the participants' personal and complex views of the situation (Creswell, 2007). This is done in order to get "an in-depth understanding of how meaning is created in every day life and the real-world" (Travis, 1999, p. 1042).

An interpretivist perspective recognises the researcher's values and their ontological and epistemological perspective. The researcher therefore plays a key role in interpreting the research data. This means there were no right or wrong answers to my research questions and I did not seek to identify a generalisable cause and effect. As Moses and Knutsen (2007, p. 194) explain, "Truth isn't just 'out there'. Knowledge about the social world is always knowledge-in-context; it is socially situated and has social consequences. As a result, knowledge is always somebody's knowledge".

Before I decided to examine the UoL as a case study with semi-structured interviews and thematic analysis of the data I considered whether other approaches were more appropriate for my research. Initially I looked at grounded theory but it is important

that the researcher collects data without preconceived theory (Charmaz, 2006). I had already identified Rogers (2003) DOI as a framework that would inform this research so decided that grounded theory would not be appropriate. However, the literature on grounded theory provided a useful insight into how to utilise thematic analysis. I also considered using action research but after reviewing the scope of this research I realised that I did not have enough time to conduct an action research study, neither was I confident that I would be able to collect a second set of data from participants. Conducting a case study with thematic analysis of semi-structured interview data and a review of key institutional policies and strategies appeared to be the most appropriate choice in order to address my research questions.

3.1.1: Case study

A case study is not a methodological choice; rather it is a decision about what is to be studied (Stake, 1995). It is a specific, unique and bounded example of a real situation with real people (Cohen et al., 2007) often with a small sample size or population (Denzin & Lincoln, 2008). Eisenhardt (1989, p. 537) explains how, "the concept of a population is crucial, because the population defines the set of entities from which the research sample is drawn".

Case studies have been described in a variety of ways. In the past 30 years, VanWynsberghe and Khan (2007) claim there have been more than 25 definitions of this term. For example, a case study has been defined as a research strategy (Eisenhardt, 1989), a research method (Yin, 2009) and as a "form or research in its own right" (Simons, 1996, p. 225). VanWynsberghe and Khan (2007, p. 2) propose that it is none of these and that it is a "transparadigmatic and transdisciplinary

heuristic". By transparadigmatic they mean that it can be used in any of the research paradigms and transdisciplinary implies that it can be used in social science, natural science or any other discipline as required. Flyvbjerg (2006, p. 241) suggests that case studies are a "necessary and sufficient method" for social science research.

A case study facilitates the process of describing, understanding and explaining the data in a particular situation, which makes it appropriate for a qualitative research approach (Tellis, 1997a). Creswell (2007, p. 73) summarises a case study as follows

> Case study research is a qualitative approach in which the investigator explores a bounded system (a ***case***) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving ***multiple sources of information*** (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case ***description*** and case-based themes. [Italics and emphasis in original].

A case study does not require a prescribed method of data collection. Indeed Bassey (1999) advises researchers that they must use methods that seem to be appropriate and practical. Various means of collecting data can be utilised, including interviews, questionnaires, observations and archives (Eisenhardt, 1989). Yin (2009) suggests that using multiple sources of data facilitates cross verification, or triangulation, and supports findings that are more likely to be accurate and convincing.

There are strengths and limitations of case study research. Strengths include the ability to study a specific and real situation in detail, therefore allowing an in-depth understanding of exploratory *how* and *why* questions when the researcher has little control over events (Yin, 2009). The advantages of this lie in the potential capacity for understanding the complexity of the situation. Case studies can provide opportunities to gather important information to complement more traditional experiments.

However, the potential strengths of a case study approach may also result in limitations. Yin (2009) cautions that there are four common concerns about the use of case study research. The first is the potential for a lack of rigour. Generally, case study research does not follow a set of systematic procedures. The researcher must therefore be careful to avoid sloppy practices or adopt biased views, which could influence the findings and conclusions. The second concern is that it may not be possible, or appropriate to generalise findings from the analysis of a specific situation to other contexts (Simons, 1996). Yin cautions against trying to generalise, and instead suggests it is more important to provide enough detail about the case so that the reader can infer the relevance of it in their own context. The third concern is that case study research can take a long time and generate massive amounts of data. However, Yin suggests the collection of massive amounts of data only happens when the method of data collection requires long periods of time in the field, for example when using an ethnographic approach. The fourth objection is that case studies cannot address causal relationships as in the case of experiments that tightly control any contributing variables.

Case studies can take a number of forms; for example, they can be exploratory, descriptive or explanatory and can be designed around a single or multiple case, each with a unit of analysis that defines the case that is being studied (Cohen et al., 2007). VanWynsberghe and Khan (2007) suggest that the unit of analysis is constructed and discovered as the case study develops rather than being fixed from the beginning.

The setting for this research was located entirely within the UoL. I therefore determined that it was appropriate to examine the UoL as a case study (Yin, 2009). This case study was bounded by the UoL context and that all participants were members of staff. The unit of analysis was the reported experiences of participants at the UoL when adopting and implementing educational technologies and remained constant throughout the course of the research.

3.2: Research methods

I used a range of research methods to collect the data, the main being semi-structured interviews with sixteen individual members of staff (see Section 3.2.2). Tellis (1997b) states that interviews are an important source of case study information. Three further members of staff were interviewed in the pilot-testing stage as I designed and revised my interview protocol. From this pilot-testing phase, six adopter category statements were created from the adopter characteristics described within the DOI. These were used to introduce the interview and to help me explore participants' perceptions of the relevance of the adopter categories. The semi-structured interview questions were then developed. In addition, I also reviewed relevant institutional documentation to consider the UoL policies and strategies that may influence the decisions of members

of staff. Finally I kept a reflective journal throughout the duration of the research and documented my thoughts and experiences as I progressed.

3.2.1: Development of the interview protocol

A qualitative research interview attempts to uncover and understand the participant's point of view (Mann, 2010). However, Kvale and Brinkmann (2009) recognise that there are two contrasting metaphors for the role of the interviewer in this process, and it is important to recognise that each describes a different epistemological conception of the interview process.

The first metaphor is that of a "miner" (Kvale & Brinkmann, 2009, p. 48). This approach assumes that the interviewer is simply uncovering knowledge that is already there, waiting to be found. Therefore, the actions and conduct of the interviewer do not affect the knowledge that is obtained from the interviewee. This approach searches for pre-existing truths and pertains most often to a positivist and empiricist approach where data collection and data analysis are seen as separate procedures.

The alternative metaphor is that of a "traveller" (Kvale & Brinkmann, 2009, p. 48). Here, the interviewer encourages the interviewee to tell their own stories of their lived experiences. This approach is not a search for pre-existing truths and the interview is an intertwined phase of knowledge construction. Indeed, Kvale and Brinkmann suggest that: "Knowledge is constructed in the inter-action between the interviewer and the interviewee" (2009, p. 2). Although Mann (2010) recognises that this approach means that the influence of the interviewer must be acknowledged in the interview process.

My methodological approach assumes a constructivist interpretivist perspective so I favoured Kvale and Brinkmann's (2009) traveller metaphor. I determined that a semi-structured interview with each participant provided sufficient structure so that the interview data could be compared between participants, but sufficient lack of structure to allow some flexibility to follow interesting lines of discussion (Robotham, 2004). However, I accepted that the data would provide a snapshot of the participant's view at that point in time in an interview context rather than the participant's own context in practice (Mann, 2010).

To address my research questions I devised an interview protocol that asked participants to answer a series of questions, these included: their perception of the University drivers for technology adoption, how they generally find out about educational technologies, what persuaded them to use the technologies, the support they find most useful in order to utilise technologies effectively, and their perception of the impact of technologies on their professional practice. I attempted to explore the participants' rationales for adopting educational technologies, whether educational technologies were generally something that they enjoyed using and were interested in pursuing, or whether they considered them to be something they would rather avoid.

In order to explore these questions in more detail and try to get a more in-depth understanding of the individual factors that had influenced their decisions to use educational technologies, I asked participants to consider a technology of their own choice that they had started to use fairly recently when they answered the questions. I did not impose a timescale for *recent* but participants typically provided examples that

ranged from something they had used a few days prior to the interview to something they used within about a year before.

To identify the most effective and useful questions for my study, I discussed the interview protocol with my supervisor and also sought feedback from a work colleague, who is an experienced social science researcher. I then decided it would be beneficial to undertake three pilot interviews in order to test and refine my interview questions and use the opportunity to practice my interview skills.

Pilot-testing phase

The process of conducting research interviews is made up of a series of steps, with one of these to "refine the interview questions and procedures further through pilot testing" (Creswell, 2007, p. 133). Sampson (2004) describes how a pilot can help a researcher find their way through the research field in a qualitative study. Sampson explains that a pilot must be undertaken with care and must highlight all aspects of the research design, including analysis of the data as well as the piloting of research instruments. She says: "It is only having gone through a process of analysing and evaluating the limited data generated by a pilot that the kind of distance often required to focus on the wider issues of research importance is generally acquired" (Sampson, 2004, p. 399). Similarly, Kvale and Brinkmann (2009) advise that interviewing is not a systematic method with mechanical rules to follow; it is a skill to be learned through practice and reflection.

I was keen to pilot my interview protocol before beginning my main data collection to improve my interview skills and my confidence that the questions would result in rich

data (Cohen et al., 2007). I therefore asked three colleagues from my own department at the UoL if they would allow me to conduct a pilot interview with them. I chose these three colleagues because I was confident they would critique my approach and act as critical friends, thus providing me with valuable feedback about my interview questions and technique (Cohen et al., 2007). McNiff and Whitehead (2002, p. 105) describe the importance of identifying critical friends to provide advice and criticism; "critical friends need to be supportive, but not so supportive that they do not point out real or potential flaws". The test and re-design approach employed within the three pilot interviews provided useful information about how to improve my interview questions and procedure and I am grateful for the comments and support that my critical friends provided.

During the pilot interviews, I transcribed one of the audio recordings. I then went through the process of analysis as per Sampson's (2004) advice to undertake all aspects of the research design at the pilot stage. Sampson advises:

> It is only on a proper interrogation of the findings via systematic coding and analysis of data that a pilot really begins to yield dividends. Such detailed analysis of pilot data is rarely reported as having been undertaken and without it a pilot is of limited use. (Sampson, 2004, p. 399)

The main points identified from the test and re-design approach employed during the pilot-testing phase were are as follows:

Participant information: I refined the documentation repeatedly through the pilot interviews making text clearer and more succinct.

Audio recording: I tested the most effective way to audio record the interviews and decided upon using two recording devices; a dedicated Dictaphone for improved sound quality and the audio recording function on my smart phone as a back up. I made it clear to all participants that I was using two devices and when these were switched on.

Adopter characteristics: traditionally within DOI research it is the researcher that identifies the participant's adopter category. Instead, at the beginning of my research I was keen to explore whether participants could identify whether one of the adopter categories matched their general approach to adopting technologies. This process proved to be more difficult than expected.

I did not want to use the DOI terminology for the adopter categories in case the category names were perceived negatively, as for example has been found with the term Laggards (Klein, 2005). I tried a number of different approaches to avoid this. I began by attempting to create a diagram that gave an overview of the adopter categories as a series of statements on a continuum (see Figure 3.1).

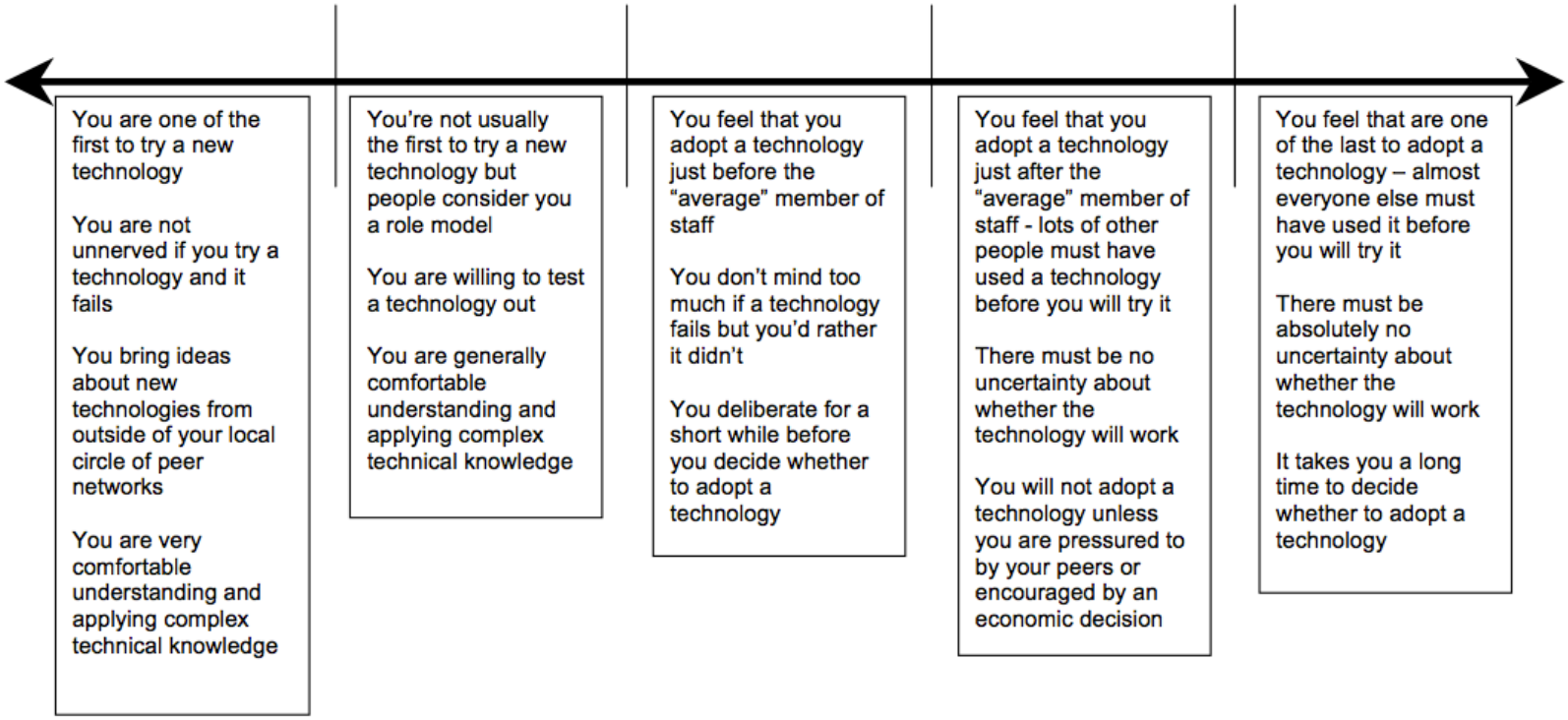

Figure 3.1: Representation of the statements created for each of the adopter categories during the pilot-testing phase

I asked participants to identify which of the statements in the boxes they thought most closely matched their usual approach to adopting educational technologies. This did not work well; participants reported that the statements within each of the boxes contained too much information to read and digest effectively at the start of the interview. Also, participants found it difficult to identify the most appropriate box for them as the statements within a number of boxes could apply.

In order to minimise the amount of text I asked participants to read at the start of the interview I reduced the number of statements within each box to include only the first sentence, however this was still perceived to be unhelpful. After each pilot interview with my critical friend, we conducted a feedback session to determine what had worked well and what should be improved. They reported that they had chosen the middle box because it felt like the *safest* place to identify with. Therefore the suggestion of a continuum seemed to have inadvertently biased the participants' answers towards the middle of the diagram.

After discussing this with my supervisor, I decided that representing the adopter categories on a continuum was probably not the best way of displaying the information. Instead we decided that it would be more effective to create a series of statements that described the adopter characteristics and let the participant chose from the statements (see Appendix 1). The statements would then be given to each participant at the beginning of the interview and they would act as a set of prompts for participants to discuss their perceived adopter category. This appeared to work more effectively.

Interview questions: Whilst conducting the pilot interviews I constantly refined the questions and re-ordered them until I felt they were less repetitive and allowed the questions to flow more easily.

Research diary: I kept a diary throughout the duration of my research. This proved invaluable as my ideas developed. It was particularly useful during the pilot interviews and during the main data collection when I wrote about any specific statements or ideas that could be relevant in my analysis. I meticulously noted anything of interest within an hour of finishing the interview so that my memory of the event would be fresh.

Transcription and analysis of the pilot interviews: I was concerned about the quality of the data gained from my semi-structured interviews so I reviewed the data collected during the pilot-testing phase. I transcribed one interview and used this as an opportunity to test the most effective way to transcribe the data. To help record the themes in the data (Braun & Clarke, 2006; Ryan & Bernard, 2003) I used the NVIVO qualitative research software, simply because it was freely available to me at the UoL. I then reviewed and discussed these themes in detail with my supervisor.

3.2.2: Interview questions

The test and re-design phase during the pilot interviews was a particularly worthwhile process to help me refine my interview skills, questions and procedures. As a result I identified a core set of eleven questions to ask participants during the semi-structured interviews. These were:

1. What do you perceive to be the University drivers for using technologies in your professional practice?
2. How do you think the University should support staff to adopt technologies?
3. How do you tend to find out about technologies?
4. What impacts do you think technologies have on your professional practice?
5. How important do you think the adoption of technology will be to your professional practice in the future?
6. Can you recall a particular technology that you recently started to use in your professional practice?
7. How did you learn to use the technology?
8. What persuaded you to use the technology?
9. Who supports you to use the technology?
10. Are there any university-approved technologies that you are either reluctant to adopt or have not adopted.
11. Are there any other factors that you think were important in your decision to adopt the technology?

3.2.3: Review of relevant institutional documentation

To understand the strategies, policies and papers that may influence participants' approaches to educational technologies, I reviewed a number of institutional documents. These include the UoL e-learning strategy (The University of Liverpool, 2007), which expired in 2010 but at the time of writing had not been replaced; and the current strategic plan (The University of Liverpool, 2009). More details are provided about these documents in Section 1.3.1.

I established that I had access to the most recent version of the strategy or policy and then went through the documents to identify where educational technologies were referenced directly or via any activities that would require, or benefit from, the use of educational technologies. Any statements identified were noted and compared. Where possible, I checked previous versions of strategies and policies to see if statements about educational technologies were different. I also asked my critical friends if they thought any other strategies would be relevant. I did not manage to obtain faculty strategies or policies for educational technologies, although discussion with faculty colleagues suggested that they were scarce.

3.3: Participant selection

When I began this research I had initially wanted to use the DOI's adopter categories as a way of selecting staff to interview. I had hoped to include four or five participants from each of the adopter categories. Unfortunately this did not work. I quickly realised during the pilot-testing phase that it would be difficult for participants to clearly identify a category that best described their approach to adopting educational technologies. I recognise this may have been due to the way I presented and discussed the adopter categories with participants, and of course that the pilot-testing phase only included three members of staff. However, I did not feel confident that selecting participants using the adopter categories would work effectively. After discussing potential solutions with my supervisor, I decided instead to try to include participants that represented the four main sections of the UoL equally. Due to the potential issues with insider research (see Section 3.4 for more details) I tried to interview members of staff that I had not worked with closely.

I used strategic sampling (Mason, 2002) to identify participants. Mason explains that strategic sampling is employed to identify participants who encapsulate a relevant range of experiences, characteristics, processes or types in relation to the wider context. I asked a colleague in my department who leads the Certificate in Professional Studies (CPS), a required qualification for new teaching staff, if he could suggest members of staff in faculties with experience of educational technologies who might be willing to take part. The CPS provides attendees with a basic knowledge of educational technologies as part of the course. As director of the CPS he has contact with a wide range of staff across faculties. He was able to provide a list of 63 people; most had either completed, or were currently registered as students on the CPS. From this list I identified 31 that I had not worked with previously and emailed each of them individually to provide details of my research and invite them for an interview.

Sixteen members of staff subsequently agreed to take part. Table 3.1 shows the number of participants from each of the four main areas of the University.

Acronym	Faculty	Number of Participants
H&LS	Health and Life Sciences	6
H&SS	Humanities and Social Science	4
S&E	Science and Engineering	3
PS	Professional Services	3

Table 3.1: Number of participants from the four main areas of the University

I included Professional Services within my research sample because some colleagues from this area of the institution were just as likely to have a perspective on the

adoption and implementation of educational technologies as colleagues from academic departments. At least three of the departments within Professional Services provide central support and accredited courses and training for members of staff to use educational technologies. Members of staff from Professional Services were also included in the list suggested by the director of the CPS. However, as some of the departments in Professional Services are quite small I used the acronym PS to maintain anonymity.

I was unable to obtain an equal number of participants from each of the four areas of the institution. However, as H&LS is the biggest faculty, I felt that the ratio of participants represented the split between the four areas relatively well.

Fourteen out of the sixteen participants had completed one of the University's accredited teaching awards, either the Postgraduate Certificate in Learning and Teaching in Higher Education (PG Cert) or the Certificate in Professional Studies (CPS).

3.4: Insider research

As described in Section 3.1, an interpretivist perspective to social science research means that the researcher plays a key role in the interpretation of the data. Therefore the researcher's relationship to the participant must be recognised to judge the validity of any claims made of the data. Indeed Griffith (1998, p. 361) asks whether "researchers with an intimate, often tacit knowledge of a group construct accounts that are more authentic or trustworthy"?

My experience during the pilot interviews made me much more aware of the issues involved in conducting research within my workplace. Different ethical considerations are needed when research involves friends or colleagues from those where the researcher's relationship to the participant is more transitory (Costley & Gibbs, 2006).

Researchers who are located within the same situation and context as the research participants may be considered to be insider researchers. Their familiarity with the research context may produce different knowledge than would be available to an outsider (Griffith, 1998). An insider researcher may experience advantages, disadvantages and power imbalances, which could potentially create ethical and political dilemmas (Costley & Gibbs, 2006).

As a member of staff at the UoL I could be considered an insider researcher. However, whether a researcher is an insider or an outsider is unlikely to be a static phenomenon and will change depending on the context in question (Griffith, 1998; McNiff & Whitehead, 2002; Mercer, 2007). For example, I am an insider within the UoL but when interviewing a member of staff from a department that I am not part of I am likely to be considered an outsider.

As an insider to the UoL, my access to participants and data collection was convenient and relatively easy. There were few problems with meeting staff once they had agreed to an interview and I could be flexible about interview times. The insider perspective afforded me a privileged position where I had access to the personal experiences and, at times private, concerns of staff. I was aware of potential role conflicts and the ethical implications of this knowledge, all of which had to be treated with a duty of

care, respect and dignity (Costley & Gibbs, 2006). This included the possibility of collecting incidental data, or data that was inadvertently outside of the remit of the research (Mercer, 2007).

My role as head of the eLearning Unit meant that staff occasionally confided in me about issues of concern in their own department. To manage any potential role conflict I tried to be very clear about when I was collecting data, though this was not always an easy distinction to make. At times it was difficult to know how to act appropriately on any reported issues whilst also maintaining the need for research confidentiality. If any participant raised an issue that I felt should be acted upon after the interview I highlighted this and briefly asked how they wanted me to act upon this information. Interviewing people who understood my role in the University often made the interview longer; as participants talked about general issues they were facing concerning technology use.

I recognised that colleagues may have been concerned about receiving an invitation for an interview to talk about their use of technologies from the head of the eLearning Unit. This concern could have introduced power imbalances and influenced the information that participants were prepared to discuss in the interview (Coghlan, 2007). To try to alleviate this concern I outlined the scope of my research, how it related to my work, when I would collect data and how I would use it (Costley & Gibbs, 2006). Importantly, I tried to be clear that it was not my intention to judge participants on their use of educational technologies.

My status as an insider of the UoL helped me appreciate the background to some of the general themes identified during the analysis of the data. However, I also recognised the importance of trying not to introduce bias by favouring issues that were more significant to me (Robotham, 2004). Coghlan (2007, p. 339) calls this *preunderstanding* and describes it as, "building on closeness and achieving distance… [researchers] need to be attentive, intelligent, reasonable and responsible in confronting the challenges of preunderstanding".

3.5: Ontological and epistemological position

Ontology concerns the nature of being in the world (Tobin & Kincheloe, 2006). It is a theory of existence (Lee, 2012) and defines how the nature of reality is understood. The interpretive perspective taken in this research informs my ontological position. I believe that a reality exists and that individuals have their own perception and interpretation of it in context.

This research was based in the context of my workplace and sensitive to the people and places studied. The pedagogical and technological choices of staff at the UoL are not objective phenomena. Each individual has a different and subjective interpretation of these choices. Their choices may be influenced by their previous experiences and actions, by the actions of their peers around them and by the social and cultural structures of which they are a part. Therefore knowledge is subjective, influenced by interactions and socially constructed.

Epistemology is a theory of knowledge (Lee, 2012). Given my ontological beliefs that reality exists, and individuals have their own subjective perception of reality; my

epistemological perspective is that evidence of this reality can be understood by examining the subjective accounts and reflections of the phenomena from each participant. Indeed Guba and Lincoln (1994) explain that human behaviour can only be understood when considered alongside the meanings and purposes of the human actors to their activities. Guba and Lincoln state that, "qualitative data, it is asserted, can provide rich insight into human behaviour" (1994, p. 106).

3.6: Data collection and analysis

Audio-recorded data was collected from sixteen semi-structured interviews. These were then transcribed and thematic analysis used to interpret the data.

3.6.1: Conducting the interviews

At the beginning of each interview the participant was asked to confirm they had received the information sheet attached to the email inviting them to participate. All participants indicated that they had received and read the information sheet. I then briefly described my research and confirmed that all data collected would remain anonymous. I explained that they were free to withdraw at any time and that all of their data would be removed from my research and destroyed if they decided not to continue. I explained the reason why I was audio recording the interview and checked they had no objection with this. If they were happy to proceed they were asked to sign the consent form.

Each participant was asked to indicate the answers they felt were most appropriate on the adopter category statements (see Appendix 1). I considered sending these

statements to each participant before the interview but it became clear during the pilot interview stage that it was more useful to present these statements at the start of the interview as they helped to introduce the discussion about the participant's adopter category. The interview then continued with the questions identified in Section 3.2.2. Interviews lasted between 20 minutes and one hour. After each interview finished I noted anything of interest or any ideas for analysis into my research diary within an hour of the interview finishing. This enabled me to build on my ideas as the interviews were completed and capture key points for the analysis stage.

3.6.2: Interview transcripts

Transcripts of the semi-structured interviews were created to assist with the data analysis. I transcribed two out of the 16 audio recordings. I then arranged for an administrative colleague, experienced at producing transcripts of audio-recorded research interviews, to transcribe the remaining 14 recordings. I checked each transcript for accuracy by listening to the audio recording again and compared it to the transcript. Once I was happy that the transcript was an accurate reflection of the interview, I emailed it to the participant and asked them to let me know if they did not consider it to be an accurate record of the discussion. This procedure helped to promote a transparent and trustworthy interview process (Mercer, 2007). One participant stated during the interview that he did not want to receive any follow up information; therefore I did not ask him to check his transcript. Only one participant asked for a change to make a comment more accurate.

Once the transcripts had been agreed I created pseudonyms for each participant so that their data remained anonymous. Loviglio's (2012) blog post, *Picking Pseudonyms for*

Your Research Participants was used to generate pseudonyms. I was careful to check that each pseudonym chosen did not match any of the names of staff in the participant's department at the time of writing.

3.6.3: Thematic analysis

Thematic analysis was used to interrogate the data by identifying structure and salient themes (Attride-Stirling, 2001). Qualitative data analysis can be complex, diverse and subtle and can involve large amounts of data (Holloway & Todres, 2003). As such, data reduction is an important strategy for qualitative analysis (Lee & Fielding, 1996).

Thematic analysis is a qualitative analytic method that has been described as both a tool and as a method in its own right (Braun & Clarke, 2006). Attride-Stirling (2001) suggests thematic analysis first developed around 1958 from argumentation theory, which explores the connections between explicit statements and implicit meanings in negotiation and discourse. Since then it has become one of the most common approaches to data analysis in the social sciences (Roulston, 2001) and is the basis for many analytic approaches (Ryan & Bernard, 2003).

Thematic analysis is essentially a method for identifying and reporting patterns in order to interpret data (Braun & Clarke, 2006). Themes can be inductive and come from the data or deductive and originate from the researcher's prior knowledge of the phenomenon being studied (Ryan & Bernard, 2003). The procedure for identifying and describing patterns or themes is known as coding. Coding is an iterative process that involves constant refinement of the themes (Ryan & Bernard, 2003). It is a

reflexive step and one that must recognise the role the researcher plays in determining the themes (Fereday & Muir-Cochrane, 2008).

Application of thematic analysis

Braun and Clarke (2006) suggest there are six steps to thematic analysis. Although they present these as linear steps they acknowledge that the process requires an iterative approach throughout the analysis. The six steps are described, along with how I applied these to my data.

1. *Familiarisation with the data* to gain an understanding of the depth and breadth of the data. This involved reading through the transcripts and checking them for accuracy against the audio recording of the interview (as described in Section 3.6.2). I then read through all the transcripts again to get an overview of the whole data set and generated a list of ideas and early thoughts.

2. *Generating initial codes* to identify noteworthy statements within the data. This stage was conducted using the NVIVO[8] software as a tool to help organise the data. I coded one transcript at a time and used an inductive approach to build up the codes as each transcript was added. Each code was given a name, a brief description of its characteristics and a description of how it differed from codes that appeared similar. The codes were constantly refined as each transcript was addressed and the data were organised into meaningful

[8] http://www.qsrinternational.com/

groupings. I then reviewed any codes that were similar but in different groupings.

I recognised that the codes generated within the first few transcripts were likely to be more influential on the overall structure of the data analysis. To counter this I kept notes throughout the process and remained aware of potential bias.

3. *Searching for themes* to focus on the broader themes and the relationships between the codes. Once a full set of codes was generated I organised and collated these into themes. To help this process I used mind-mapping techniques to identify and combine codes. Searching, reviewing and defining the themes (steps 3, 4 and 5) were, in practice, undertaken in a process of continual iteration.

4. *Reviewing themes* to check the themes are appropriate. Themes were refined and collapsed to form a coherent pattern and thematic map. If needed, new themes were created and codes adjusted to fit with the new theme.

5. *Defining and naming themes* by continuing to analyse and refine the themes so that the story of the data is identified. The main themes were grouped into the perception of the adopter categories, perception of drivers and rationales and the perception of impact and enablers. The essence of what each main theme was about, or the reason why it was identified was articulated.

6. *Producing the report* by conducting a final analysis and extracting the themes. Braun and Clarke (2006) state that the report should articulate the complexity of the data and tell the story of the findings.

I discussed the themes regularly with my supervisor and with a critical friend. Both helped me to feel more confident that the themes were appropriate. The support from a trusted critical friend was valuable at this stage (McNiff & Whitehead, 2002).

3.7: Ethical considerations

The development of regulatory codes of research practice from various professional bodies demonstrates a growing awareness of ethical concerns in research (Cohen et al., 2007). The British Educational Research Association (BERA) provides guidelines about the standard of ethical respect expected for educational research in Britain and advises that

> Individuals should be treated fairly, sensitively, with dignity, and within an ethic of respect and freedom from prejudice regardless of age, gender, sexuality, race, ethnicity, class, nationality, cultural identity, partnership status, faith, disability, political belief or any other significant difference. (BERA, 2011, p. 5)

To adhere to this ethical standard, BERA's guidelines require that researchers should carefully consider their responsibility to voluntary informed consent, openness and disclosure, the right to withdraw, incentives, detriment arising from participation in research and privacy in their research.

In a constructivist study, conducted in the workplace and using an interpretivist approach, it is essential to ensure that ethical respect is adhered to throughout the research both for the individuals participating in the research and the researchers themselves (BERA, 2011). The participants for this study were UoL teaching staff. Therefore ethical approval was required and gained from Lancaster University, and the UoL. Both institutions have their own ethical policies, guidance and procedures in place for research involving human participants. This research was therefore conducted in line with the ethical guidelines provided by both institutions and with the BERA (2011) guidelines.

Any form of research in an organisation is subject to political dynamics and influences (Coghlan, 2007). My research ultimately reports on UoL strategic issues, which could contain sensitive issues. On completion of the thesis I ensured that senior managers at the UoL were happy for the findings to be made public. If a conflict of interest was perceived to have occurred I agreed to follow their guidance and request that an embargo be placed on the thesis in line with their request.

3.8: Summary

This chapter described the research design and the approach I took towards this study. I provided a critical perspective on case study methodology and described the research methods used, my ontological and epistemological perspective and the ethical issues to consider in a constructivist interpretivist research approach. I outlined my rationale for the data collected as well as my application of thematic analysis.

Chapter 4: Adopter categories

The findings are reported and discussed within chapters four, five and six. Each chapter describes a key theme from the research. Discussions of the findings are supported with quotes from interview data, an analysis of relevant UoL documentation, personal commentary and relevant literature. All participants were given a pseudonym to preserve anonymity, see Section 3.6.2 for more information on how the pseudonyms were allocated. As a reminder for the reader, the acronyms used for each of the four main areas of the UoL are:

- H&LS – Faculty of Health and Life Sciences
- H&SS – Faculty of Humanities and Social Science
- S&E – Faculty of Science and Engineering
- PS – Professional Services

4.1: Identification of the DOI adopter categories

Studies in adoption and implementation have historically investigated the experience of Innovators and Early Adopters (Hagner & Schneebeck, 2001; Marshall, 2010). Understanding the approach of these two categories was presumed to be important for identifying how the wider population engage with educational technologies (Zemsky & Massy, 2004). Price et al. (2005, p. 72) report that, "early adoption is common and frequently studied, but mainstream adoption is poorly understood".

Chris (PS) was the only participant to identify with the statements that his approach to educational technologies matched the characteristics of an Innovator as identified by

Rogers (2003) in the DOI. Chris works for a department within Professional Services, which is the same area of the institution that my own department falls under. As a result I have slightly more knowledge about the nature of his work than some of the other participants and I think the description of an innovator is accurate for Chris.

Thirteen out of the remaining fifteen participants identified their approach to educational technologies as being somewhere within the three DOI adopter categories: Early Adopters, Early Majority and Late Majority although it was not possible to identify clearly between these three categories.

Bernard (H&SS) recalled how he used to consider himself to be an Early Adopter of educational technology but because of several negative experiences he now describes himself as *late adopter*:

> I've changed from being an Early Adopter to a late adopter; you have to drag me along now. That may be caused by my brain becoming older but I don't think the new things are really any better … When do you want to try new technology - as soon as it is available? Certainly not! That was the case with me but now I've become disillusioned. I've wasted money on problems, which have given me trouble. I have bought software, which is worse than the stuff it replaced. I spend money to make my life worse! One learns from experience.

I did not use Rogers (2003) terminology for the adopter categories during the interview and *late adopter* is not a term used within the DOI. However, after reviewing Bernard's interview transcript I felt that his description was similar to Rogers' use of the term Laggard. Keith (H&SS) called himself a Laggard and suggested that he dislikes educational technologies:

> I'm the Laggard! … I just don't like new technology, much … I'd like to be certain but I just don't think it ever is. Because that's the thing with me and technology; I just don't interact well with it and when it doesn't work that really annoys me. That's why I don't like it.

Given Keith's claim that he dislikes technologies, he then surprised me by describing some of the activities that he uses educational technology for in his lectures. Keith explains:

> You can incorporate different media into your lectures and make them more interesting, like I play intro music, I play video clips-stuff from the web and all that … [if] I can see how I'm going to use it then I use it and I do mix things up quite a lot … I think it makes lectures more engaging, or it can do if you think through how you're going to do it. It can be more entertaining; it can get the attention more. It can lead to more interactive sessions … [using] announcements, putting up lecture slides and things like that. Setting up electronic hand in things through Turnitin.

Incorporating media, playing video clips and setting up electronic submission seem quite innovative in comparison to some of the other participants, even some of those who described technologies more favourably. Keith's assertion that he dislikes technology compared to his description of how he uses educational technologies in practice made me reflect on Keith's use of the term Laggard. However, Rogers (2003) does not propose that a Laggard does not use technology. Rather, a Laggard is someone who is the last to adopt technology (Uhl, Andrus, & Poulsen, 1970). Keith states that he will use technology if he perceives there is a clear reason to do so:

> I think it would be quite a hard job to convince me of the value of some things that new technology has brought along with it. Other things I can see it and certain technology I will make use of … If someone explained the value to me or showed me the value of it for somebody then yes I'd probably do it and feel a lot better about it.

When I began this research I was interested to find out whether participants could identify an adopter category that was most relevant for them. As happened during the pilot interview stage, participants seemed reluctant to describe themselves as having characteristics that matched Rogers (2003) description of the Innovator or Early Adopter categories. I found that the statements created were useful for introducing different approaches to educational technologies but they did not provide enough detail. On reflection it may have been beneficial to provide participants with the full description of the adopter categories as described by Rogers (2003) and then ask them to identify which was most appropriate for them. However, the pilot interviews

indicated that it was likely to take participants a long time to read and digest the complete descriptions, which may have been too onerous.

If one accepts for the moment that the adopter categories exist as outlined in the DOI, I felt confident that participants were not just Innovators or Early Adopters. This is perhaps to be expected as Rogers claims that the number of people adopting an innovation over time in a population fits the following spread across a normal distribution curve, as shown in figure 4.1.

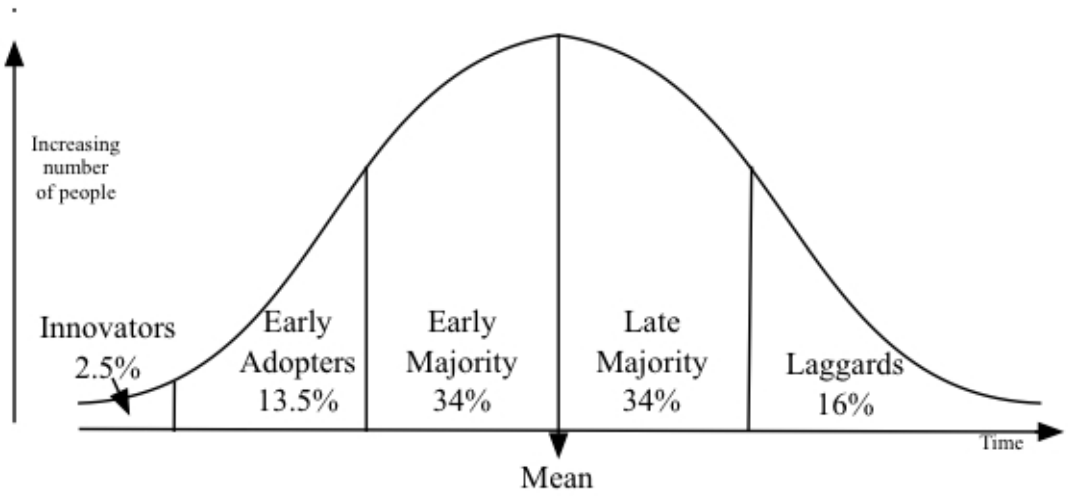

Figure 4.1: Percentage of the population proposed to be within the adopter categories – adapted from Rogers (2003, p. 281)

According to his model, Rogers (2003) predicts that 2.5% of the population will be Innovators and 16% will be Laggards. Extrapolating these percentages onto the sixteen participants in my research – then 2.5% of the participant population results in 0.4 Innovators, and 16% equates to 2.56 Laggards. Clearly this is a rough estimation but it approximates my findings that one participant reports they are an Innovator and

two are Laggards. It has not been possible to identify the other categories from my data.

The difficulty that participants experienced in identifying their adopter category may have been due in part to the quality of the statements I asked them to consider, and my intentional lack of definition about the term *technology*. I asked participants to respond to the adopter statements by considering their use of technologies generally. Using this approach revealed contextual issues that may otherwise have been missed had my data collection focused only on one pre-determined technology as Rogers (2003) says is usual for DOI research. My findings suggest that in the context of practice with educational technologies, the adopter categories are unlikely to remain constant and time is an unsophisticated measure of the adoption process. The adopter categories do not appear to be static and change according to the context. For example, Wanda (H&LS) said that it was difficult to respond to the statements, particularly as she had different approaches to technologies for teaching and for research and she felt her answers would be different depending on the context and the technology in question, she says:

> The problem is what you call technology; it can be any depending on which technology … So, I could tick all of [the statements] just depending on what we talk about.

For Wanda this dilemma was about the amount of time she was willing to waste. She felt that wasting time must be avoided in teaching but her approach to technologies that she uses for research is quite different:

> If it is for teaching, for example, then I just want it to work. I will be more innovative maybe in my research and I may be happy to try things and see because if it works and if it's new technology then that's very good for my research and my CV. It can be a new patent or a new publication so that's very good. If it's for teaching or email then for that I would not explore anything. I don't want to waste my time with that. It has to work.

Noel (S&E) and Bruce (S&E) also reported a similar contextual split between technologies for teaching and for research. Noel describes how his approach to technologies for teaching is less innovative than for research. About technologies for teaching, he says, "you can sort of see the benefits, it's just always the implementation", but he has a different approach with technologies he uses for his research, "I suppose research wise I have to use technology. I'd describe myself as an experimentalist". Bruce describes how his research is, "all about the technology" but when using technologies for teaching he says he is more conservative.

The difficulty of identifying a singular approach to adopting and implementing technologies was not only evident between teaching and research. Participants' perceptions about their use of technologies made the adopter category statements difficult to respond to. Gina (H&SS) considers she is innovative in comparison to colleagues but not in terms of how innovative she thinks she could be with technologies more generally:

> What I'm using is not necessarily innovative but I am quite keen to adopt it if it's useful. So in terms of my local context and the immediate context of my department it's quite innovative in that I use it, but what I do in the big picture isn't.

Flynn and Goldsmith (1993) point out that using time, as the measure of adoption means that findings cannot be compared across studies. Therefore the reliability and validity of time is difficult to determine. More importantly they say that time to adoption does not allow any prediction or management intervention to take place as all measures are taken after the decision to adopt has already been made. Hornik (2004) agrees that time is not an appropriate measure due to intra-individual processes, which he says are different at each stage of the adoption process and therefore influence the adoption of an innovation.

Towards the later part of my research I identified an article by Hurt et al. (1977) that described their development of a self-report measure of innovativeness. Unfortunately I became aware of this article too late to inform my data collection. Hurt et al. also criticised the DOI's use of time to adoption as an unhelpful measure for determining the adopter categories. They argue that measuring how quickly an individual adopts an innovation forces the researcher to focus on one innovation, which then limits the ability to predict the adoption behaviour of an individual more generally. Instead, Hurt et al. created a twenty-item questionnaire that they claimed would be more effective in predicting an individual's overall adoption behaviour because it measured an individual's general "willingness to change" (p. 63).

Agarwal and Prasad (1998) argue that willingness to change is actually a global measure of innovativeness, which does not predict an individual's behaviour for domain-specific innovations. Instead, Agarwal and Prasad suggest that personality factors are more influential in affecting an individual's innovativeness. Rogers (2003, p. 287) described innovativeness in terms of a "series of generalizations under three headings: (1) socioeconomic status, (2) personality values, and (3) communication behavior". Although Rogers did not state whether he considered these to be global or domain-specific measures of innovativeness. Considering that Rogers measured innovativeness in terms of time to adoption, I think that it is arguably unlikely that socioeconomic status, personality values and communication behaviour will change quickly between different innovations.

Analysis of the data suggests there are some similarities with the adopter categories of the DOI. Participants appeared to lie along a continuum with one towards the Innovator end and two towards the Laggard end. However, I did not find evidence for five categories and participants reported context and time issues that made it difficult for them to identify with one adopter category.

Rogers (2003) is not the only person to suggest a model for examining an individual's approach to technologies. Hagner and Schneebeck (2001) and Spotts (1999) also proposed categories that describe how an individual adopts an innovation. These are examined to determine whether they contribute to understanding my findings.

4.2: Alternative models for the categories of adopters

Hagner and Schneebeck (2001) reviewed the engagement and values of members of staff towards the adoption of educational technologies for teaching. They proposed four groups, or *waves* of adopters and claimed their model was a simplified version of Rogers (2003) DOI's adopter categories. However, Hagner and Schneebeck also considered the uniqueness of the individual as well as recognition of the importance of context. They acknowledge that individuals probably have characteristics across each of the groups, but suggest that their predominant characteristics are likely to fall within just one of the four groups, described as:

- *Entrepreneurs* – described as the "vanguard of innovation and risk taking in teaching and learning" (Hagner & Schneebeck, 2001, p. 3). They are committed to high quality teaching and learning and knowledgeable about new educational technologies. They can be disappointed if they do not receive positive feedback for their work but they tend not to actively seek rewards or recognition. They use their expertise to solve their own problems but their work is inclined to be idiosyncratic to their own faculty.

- *Risk Aversives* – share the same commitment to high quality teaching and learning as the Entrepreneurs but, as their name suggests, they are cautious about the risks. They are attracted to educational technologies but are concerned about the implications for them.

- *Reward Seekers* – are motivated to use educational technologies because of the institutional reward structures. They use technology because they see it as a way to advance their careers or achieve some award.

- *Reluctants* – believe that the traditional, non-technological methods of teaching are superior. They are hesitant to adopt new technologies, which may make them feel out-dated as colleagues adopt new technologies.

Chris (PS) appeared to be most closely linked to the description of an Innovator on the adopter categories of the DOI. Within the groups that Hagner and Schneebeck (2001) propose, Chris could also arguably fit well within the Entrepreneur category. He says he is committed to high quality learning and teaching and considers himself to be knowledgeable about new technologies. He explains, "I'm quite techno-savvy at home as well, trying to use it for the best of my ability with two young children, and making sure they don't get ahead of me."

Chris (PS) did not suggest that he is disappointed if he does not receive positive feedback for his work, but he recognises that helping people is important to him:

> What I want to do more than anything is to make a difference to individuals. The technology allows me to do that and that makes the difference.

Keith (H&SS) and Bernard (H&SS) identified themselves as Laggards and also appear to fit within the group that Hagner and Schneebeck (2001) call Reluctants.

They both report they are hesitant to use new technologies. Keith reports: "it is an imposition" and Bernard considers that educational technologies have had a negative impact on his students learning the tacit knowledge in his subject:

> [Educational technologies have] had a great impact in [subject] the skills that I have gained through history are in boxes on the shelf over there and put away forever, they have been rendered useless. The tacit knowledge, which is how it has been passed on since the renaissance, died about ten years ago. A shocking loss really.

As was the case with the DOI, the other 13 participants did not fit clearly into either of the Risk Aversives or Reward Seeker groups within Hagner and Schneebeck's (2001) model. For example, five participants, Gina (H&SS), Ivette (H&LS), Neil (PS), Tanya (PS) and Wanda (H&LS), may be similar to the Reward Seekers group. There are no explicit rewards for using educational technologies at the UoL but, as described in more detail in chapters five and six, these five participants reported that they engaged with educational technologies because of a perception that it might help them further their career. They also report that they share a commitment to high quality teaching and learning and a concern about the implications of using educational technologies: characteristics that are similar to the Risk Averse group.

Hagner and Schneebeck (2001) argue that it is important to understand the mix of the four groups proposed within an institution. They emphasise that support structures must be appropriate to each of the four groups and not based on the characteristics of just the Entrepreneurs. Hagner and Schneebeck's desire to understand the individual's

perspective within the institution is helpful for interpreting my findings, but the four groups proposed do not help me to interpret my findings completely.

Spotts (1999) interviewed staff from a US Midwestern University to investigate how to encourage greater use of technologies. Spotts questioned staff about five primary areas that are proposed to be influential for a member of staff to decide to use an educational technology, these were:

- perceptions about the *learners;*
- their status and role within the *faculty*;
- the attitudes and support needed to use *technology*;
- *environmental* influences such as policy, promotions, tenure and physical and emotional support;
- *perceived value* or benefit to using technology.

Spotts (1999) counted the frequency that staff mentioned these five aspects and proposed a model that outlined three categories of users:

- *High-level users* – had an interest in technologies and an optimistic attitude towards technology even when they were frustrated. They discussed how technologies could help learners generally, and when considering their own role in the faculty, reported that technology is integrated into their teaching style. The support they needed was reported to be at the environmental rather than the technological level. Attitude and time were reported as most important, but time was considered to have a negative influence. High-level

users were sometimes dismissive about the issues that would have discouraged Low-level users and instead perceived more benefit to justify using a technology.

- *Medium-level users* – were interested in how technologies could help learners generally. They perceived three distinct parts to their role in the faculty, their teaching style, their personal style and their use of technology. Attitude and time were reported as important within the technology aspect. However, learners, time, support and politics all had a negative influence.

- *Low-level users* – also reported that they considered technologies to be generally helpful for learners. They described their perceived role in the faculty in terms of technology use alone. Similar to the high and medium users, attitude, availability (of technology), politics and time all had a negative implications. Low-level users perceived issues as barriers to technology use and did not perceive that the potential benefits would outweigh the problems.

Spotts (1999) reported that staff attitude towards technology and the perceived value of technologies were the most important factors for determining whether the individual was a high-, medium- or low-level user. He found that attitude and perceived value were more important than factors relating to perceptions about the learner, faculty, technology and environment. Although Spotts acknowledged that the decision to use educational technologies was probably based on more than just these five factors. Similar to my findings he also claims that the relationship between the context and the personal history of the member of staff are influential.

The characteristics used to identify the adopters differed in the models that Rogers (2003), Hagner and Schneebeck (2001) and Spotts (1999) proposed. Since all of these models were created there have been many developments in educational technologies. However, despite more than ten years of research into technology adoption and implementation similar issues continue to be reported. Rogers, Hagner and Schneebeck and Spotts agree that it is important to understand the range of approaches to educational technologies so that appropriate support can be provided for effective implementation.

Rogers' (2003) adopter categories and the DOI model have been used extensively to examine technology adoption (Ensminger et al., 2004; Straub, 2009) but my findings did not provide evidence that entirely supported the DOI adopter categories. Instead, I found evidence that supported aspects of all three models. The primary areas that Spotts based his model on were also similar to the areas that I found to be important. My findings highlighted three categories of users, each identified as a mixture of the three models as follows:

- *Enthusiasts* – are keen to try educational technologies and explore the potential benefits. They do not need to have a clear reason for using technology; indeed they are likely to find their own reason. They are willing to try to overcome difficulties that might put others off and they are generally confident that they can find a way round problems if they consider the technology is worth persevering with. They know where to get advice from if they need help and often provide advice to other individuals about effective ways to use

technology. They have a good understanding of the technologies that may be beneficial to support and improve the student experience.

- *Pragmatists* – are willing to try educational technologies so long as there is clarity about the potential benefits. The risk of using technology is generally perceived to be manageable but they will often look to others for support to overcome problems and suggest ways to use educational technologies effectively. They are concerned about improving the student experience and can see where their investments of time and energy for learning, adopting and implementing educational technologies into their teaching practices can contribute to a better learning experience. They can be innovative when they are confident about what they are doing. They accept that educational technologies can help to provide efficient management of educational administration duties.

- *Risk Aversives* – are hesitant to use educational technologies and sceptical about the potential benefits. Technologies are generally considered to be risky and something that generates more work. Risk Aversives will use technologies but they need clearly stated reasons. When clear benefits for using educational technologies exist and they commit to using a technology, Risk Aversives may be quite innovative. Although they are concerned about having sufficient support to help them over difficulties. The student experience is important to them but they are concerned that using technologies may have a negative impact.

4.3: Summary

This chapter reports the findings from the participants' perceptions of their approach to educational technologies and their adopter characteristics. I discuss the relevance of my findings against the adopter categories of the DOI and the models proposed by Hagner and Schneebeck (2001) and Spotts (1999).

Unlike the DOI, I did not ask the participant to discuss a single technology innovation during the interview. This allowed a more in depth understanding of the individual issues for each participant to be identified. Discussion of the adopter statements and characteristics meant that I was fairly confident that participants had a range of different approaches to using technology. This was important because many of the studies into adoption and implementation have in the past focused mainly on the experience of the Innovator or Early Adopter (Zemsky & Massy, 2004).

Participants found self-identification of a singular adopter category difficult and I was unable to accurately identify participants against the five categories of adopters proposed in the DOI. Contributing factors appeared to be the variation in the participant's perception of risk according to the context that the technology innovation was applied to. For example, a participant may identify with the Innovator characteristics when using technology for research and the Laggard category when using technology for learning and teaching activities. Therefore, rather than a participant belonging to a single adopter category, which is defined by time, my findings suggest that the adopter categories change according to the context. This claim supports some of the criticisms of the DOI that the amount of *time* that an individual is exposed to an innovation is an unsophisticated measure of adoption.

The chapter concluded with the proposal for a model based on my findings with three categories of user: the Enthusiasts, Pragmatists and Risk Aversives.

Chapter 5: Perceived drivers and rationales

This chapter reviews the participants' perceptions of institutional drivers and their personal rationales for using educational technologies. The word *driver* is defined in the Oxford Dictionary to mean "a factor which causes a particular phenomenon to happen or develop" ("Driver," 2012). Understanding the drivers and rationales that influence and encourage engagement with technologies is important for successful implementation (Ely, 1990). The chapter concludes with a comparison of my findings against Rogers' (2003) innovation-decision process and Ely's (1999) eight conditions of implementation.

Morris (2008) suggests that the drivers for educational technologies are changing from unsophisticated discussions about financial cost and benefit, towards an emphasis on pedagogic gains and the potentially positive impact on student learning. Previously Spotts (1999) investigated the effect of environmental influences such as policy, promotions and tenure to determine whether individuals were high, medium or low users of educational technology. Similarly, Hannan and Silver (2000) measured the effects of institutional structures, processes and culture to determine the reasons why individuals engage with innovations in HE.

Marshall (2010) suggests that technologies and innovations are so closely related that the use of the word innovation is now synonymous with technology. Hannan and Silver (2000) contend that three types of drivers for innovations exist: directed, guided and individual. Hannan (2005) outlines the following descriptions.

- *Directed innovations* – are driven by institutional imperatives, possibly aimed at promoting efficiency, maximising an investment in a technology, or a statement about expectations for student centred-learning.

- G*uided innovations* – are those that are supported by the institution either by providing funds or other types of support that are generally connected to notions of improving learning and teaching.

- *Individual innovations* – are driven by the ideas of enthusiasts and often motivated by personal reasons.

During the interview participants were asked to discuss a technology that they had recently used, regardless of whether they perceived it to be optional or required. Hannan's (2005) three drivers for innovations acknowledge both optional and required drivers and are used to inform an analysis of the reasons why participants engaged with educational technologies in the next section.

5.1: Perception of directed drivers

The perception of freedom versus institutional control may influence the effort participants are prepared to invest in utilising technologies (Stiles & Yorke, 2006). Participants were asked whether they thought the UoL communicated clear institutional drivers or explicit directives about using educational technologies. If participants identified explicit directives they were asked to describe what they were and how influential it was for them. Data from the participants' interviews were supplemented by analysis of key documentary texts. These primarily included the

UoL Strategic Plan (The University of Liverpool, 2009) and the E-learning Policy (The University of Liverpool, 2007).

5.1.1: Perception of institutional drivers

As this research is based in the everyday practice of members of staff at the UoL it is important to understand the participant's perception of institutional messages and whether they are utilising technology because they perceive they are directed to do so (Spotts, 1999). Fifteen out of the sixteen participants reported that they were unaware of any clearly identified institutional directives for the use of educational technologies. For example, Ellen (H&LS) states, "I don't think there's a specific edict [to use technology]" whilst Bernard (H&SS) explains that, "The drivers for me using computers and information technology have come from myself". Kevin (H&LS) was also unsure what the institutional drivers are and suggests that if they do exist they are unclear:

> I don't think the University have been very clear. I've never seen anything written as to why we want to use technology. That could be because I've not explored it – it might not be because it doesn't exist. If it does exist and I've not seen it then they've not publicised it well enough.

One of the reasons for the lack of perceived institutional drivers may be the freedom that participants have to use educational technologies in their professional practice. At the time the data was collected there was no minimum baseline requirement for the use of either the VLE, or of educational technologies more generally, although my

findings suggest that some departments place more emphasis on the importance of utilising educational technologies. The lack of an institutional minimum requirement is not necessarily negative. Stiles (2004) warns that demanding a minimum usage may simply result in the creation of a large number of modules that are used as little more than a document repository. Rather, Stiles suggests that it is more important to encourage the development of innovative pedagogy to support learning through the VLE rather than demanding a minimum standard.

Neil (PS) was the only participant to identify the UoL Strategic Plan (The University of Liverpool, 2009) as a driver, "… a number of the strands of the Strategic Plan, particularly the supporting excellence in research and supporting student experience are definite drivers for what we do". Although interestingly he also says: "I'm not that aware of University drivers that would affect me directly". Neil is sometimes required to support staff to use the educational technologies that his department provides. He reports that he uses technology regularly and even though he did not identify with the characteristics of an Innovator on the adopter statements, he suggests that using technology is just part of his job. He reports, "In my professional practice I've never much thought of those drivers in the sense that I've just needed to use it". This may be because Neil is part of Professional Services and he uses educational technologies slightly differently to an academic member of staff.

Brad (S&E) states that using technology in his professional practice does not need to be highlighted. He explains that educational technology is just as important to an academic member of staff as the tools that a plumber requires to be able to do their job:

> It doesn't need to be articulated. It's like if you were a plumber, you'd show up with spanners every day! … It is an integral component of what you're doing … I don't think it's an articulated thing. I'm not aware or familiar with anyone ever having to say, or to encourage you to use most of the technology available. It's just there and you engage with it as a routine matter of course.

Chris (PS) recognises that drivers probably do exist but these have not been articulated explicitly and so are unclear, "I don't think it's signposted as clearly as it could be. I think it needs to be a lot clearer". Similarly Tanya (PS) explains, "It's almost like the drivers are there but they're not articulated in a way that actually brings any drive to them, so they're passive and they all need triggering somehow".

When Professor Sir Howard Newby became the Vice Chancellor in 2008, he initiated a major restructure and a new Strategic Plan (The University of Liverpool, 2009) was produced. The Strategic Plan identifies an institutional remit to engage with educational technologies or, *e-learning* as it is called in the plan:

> We will expand further our e-learning provision in response to market need and to support our strategic priorities. We will use a dual approach of expansion with our partnership with Laureate Online Education and through our own e-learning initiatives. Our reputation for high quality provision is important to us and we will maintain our high standards in expanding Masters provision and developing new programmes, whether they are undergraduate

> courses, professional doctorates or Continuing Professional Development (CPD) courses. We will also consider how to use our expanded e-learning to benefit our campus-based students through blended learning. (p. 6).

As well as:

> We will seek the right balance between personal contact with tutors and innovative e-resources across a spectrum of blended learning options, support a framework to encourage and assist in the sharing of best practice in learning, teaching and assessment. (p. 8).

An example of how the UoL's current activities can be enabled or enhanced through the use of technology is also provided:

> We will explore opportunities to enhance the tools for research and learning so that we provide networking facilities that support collaborative working and benefit our global communities. These tools include our successful virtual learning environment already in use and tools to support e-recruitment and a virtual research environment. (p. 14).

The Strategic Plan is a relatively short document written to provide a high-level overview of activities. Considering the length of the document, the references to *e-*

learning (as educational technologies are referred to within the document) are noticeable.

The implementation of the Strategic Plan is supported by various other policy and strategy documents. One of these was the E-learning Policy 2007-2010 (The University of Liverpool, 2007). When the E-learning Policy was created it included a number of recommendations that arguably may have supported a wider and more varied implementation of technologies. However, the implementation of the policy was acknowledged not to have been as successful as hoped, partly due to a lack of available resources (eLearning Steering Group, 2011). This policy expired as I began my research and although work had begun to produce a new version (see Section 1.3.1 for more details) the policy had not been updated and replaced at the time the data was collected.

Given the absence of a current policy, minimum baseline expectations, or perceived clarity about the reasons to use educational technologies, it is perhaps not surprising that participants were unclear about institutional drivers to use educational technologies. However, Gunn (2010) warns that if strategies do exist individuals are often unaware of them. The references to technology within the Strategic Plan and an E-learning Policy are unlikely to have been effective on their own (de Freitas & Oliver, 2005). de Freitas and Oliver explained that policies can indeed drive organisational and pedagogic change but whilst their impact on practice is unclear, individual resistance to change will still occur. They emphasise the importance of "individual meaning-making" (p. 93) to help overcome resistance and improve the

engagement with change. Thus individuals have to make sense of the reasons for using educational technologies themselves or strategies to be successful.

My findings support Conole's (2010) proposal that there is often a gap between policy rhetoric and the use of educational technologies in practice. Conole proposes a framework for the successful embedding of technology innovation (see Figure 5.1)

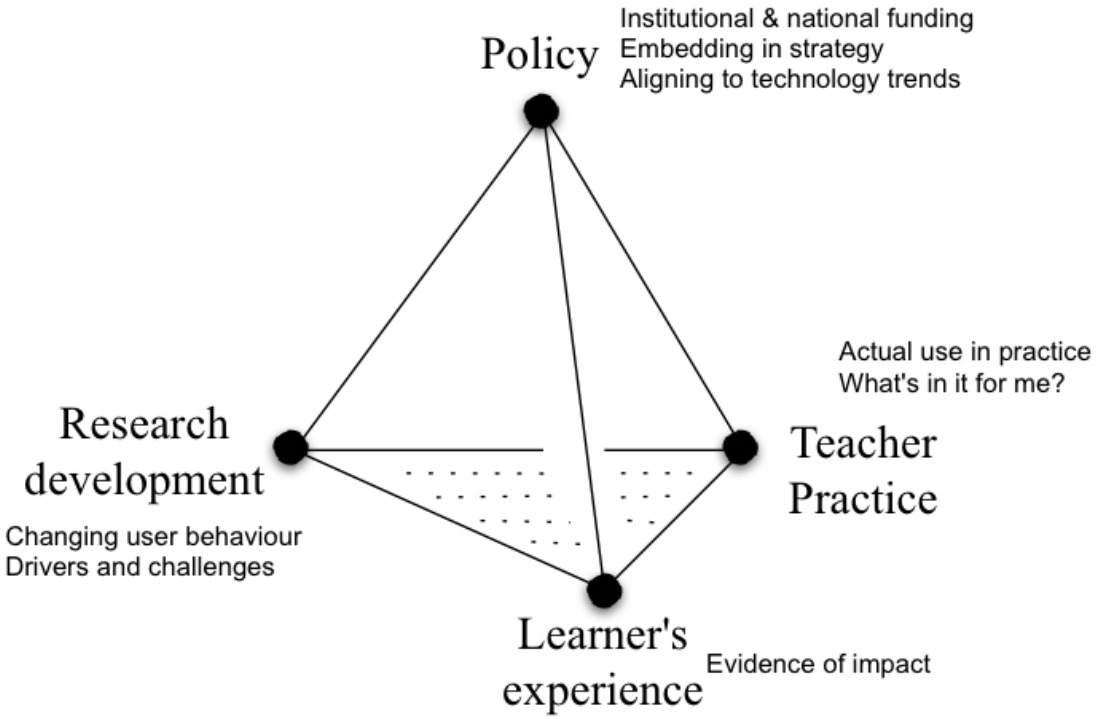

Figure 5.1: A framework for successful technological intervention – from Conole (2010, p. 23)

Conole (2010) identifies the need for a connection between policy, research and practice (where practice is split into teacher practice and learner experience) and contends that, "only by taking account of all three at once and their impact on each other can effective technology intervention be achieved" (p. 24). Similarly, Stiles (2006) states that educational technologies are successfully embedded when their use

is considered to be normal practice by all staff, including the administrative, academic, management and senior management. To make this happen, Stiles (2004) explains that the organisation's culture, policies and procedures must ensure that educational technologies are not considered in isolation. Stiles emphasises the importance of integrating and supporting a policy or strategy for adopting and implementing educational technologies into the institution's overall educational and business vision for the future:

> Clearly understanding where you are starting from is as important as understanding where you want to get to. Expanding the use of eLearning in an institution requires a clear and honest analysis of the organisation in terms of strengths and weaknesses viewed against its strategic goals (Stiles, 2004, p. 14).

5.1.2: Perception of faculty, school or departmental drivers

Participants were not asked directly about their perception of faculty, school or departmental drivers although if they identified any in their response they were asked to provide further information. It is important to acknowledge that drivers from a central institutional statement may be interpreted as coming from the faculty, school or department simply because of the communication route that information takes as it progresses through the committee structure. Some of the faculty committees have educational technology as a standing item on the agenda, although inclusion of this standing item is often a relatively new addition.

Four participants reported the existence of faculty, school or departmental drivers and that they were relatively important. Ivette, (H&LS), for example describes how:

> We are encouraged to use VITAL [Virtual Interactive Teaching At Liverpool] to support students in our teaching … it was agreed at some Board of Studies meetings within the former School of [name] and has been adopted by the School of [name] that we use VITAL as much as we can … There's been a verbal edict made, most people do what they're asked to do, so most people do it.

Although Ivette admits that this edict has little influence on her use of educational technology. She says:

> Does that make me feel pressured to use it? No. Do I use it in the way that the school suggests that I do? Not necessarily.

Kevin (H&LS) is in the same faculty as Ivette but within a different school (see Figure 1.1 for an overview of the UoL structure). Kevin is relatively new to his department but feels that he is encouraged to use educational technologies. He explains, "that's the feeling I get from this department but that's kind of what I felt before I came here anyway". Noel (S&E) states that his school has adopted a slightly different approach to teaching, which has influenced how educational technologies are used in the school:

> Teaching wise, I don't know if the School of [name] is unique in the University or is part of a unique group. There has been this adoption of [a different teaching approach], which has led us down certain technology paths.

Similarly, Keith (H&SS) reports that his school encourages the use of educational technologies but he expresses concern about the reasons for this:

> [As a school] we are being encouraged to consider putting all of our lectures, filming them and putting them on as podcasts and webcasts … I'm not sure about the faculty but certainly within the school there are moves to do this and that worries me. It worries me because there's an assumption there that lectures aren't interactive or are interactive in a peculiar way.

The UoL engaged in a major faculty restructure in 2009 when six faculties were reduced to just three (H&LS, H&SS and S&E). The three new faculties were restructured slightly differently to reflect the individuality of the faculties that had merged. This results in each faculty resourcing and supporting educational technologies in a slightly different way. Ivette (H&LS) commented on the changes, "I don't know what they call themselves these days; everything's just been renamed and restructured. It was formally the Teaching and Learning Group. I'm not sure what they're called now".

Strong leadership has been identified as a key factor for integrating educational technologies into practice (Lei & Morrow, 2010). My findings support this view with Noel (S&E) highlighting the importance of supportive senior managers in his faculty for educational technologies to be successfully implemented:

> There was a cohort of senior staff who were very in favour of it and there was a cohort of staff who didn't appear to be. They weren't giving out the positive signals that one might expect so there were very mixed messages coming across about the adoption of any technology to support active learning. I think some people really went for it and others didn't.

Ellen (H&LS) also describes how important it is that senior managers are supportive and in particularly that they trust their staff:

> She knows I'm not a huge risk taker and I just said we ran this module before and it was okay but we've added this because we think it will add something … she just sees that we've had a go, and that's fine, she trusts us enough not to do anything silly. And that's really important really because otherwise that's just going to stifle any creativity, isn't it.

The perception that the drivers from the faculty, school or department are more relevant than the drivers from the wider institution may be expected (Silver, 2003). In a study of innovations in learning and teaching in higher education conducted between

1997–99, Silver describes how his interviewees found it difficult to respond to questions about the teaching culture of their University when these questions treated the University as a "unitary entity" (Silver, 2003, p. 158). Instead, his interviewees placed more importance on the decisions taken within their immediate environment by their faculty or school as these may affect the resources they could access or their chances of promotion.

Rogers' (2003) innovation-decision process and the eight conditions within Ely's (1999) model both concern optional innovation decisions. As using educational technology is generally optional within the UoL the strategy and policy documents may not be influential, particularly if the statements about educational technologies are considered to be passive and unclear.

My findings suggest that participants considered the drivers from faculty, school or department to be more important than institutional directives. This is similar to research by González (2011) who also found that decisions taken to embrace educational technologies at faculty or school level can encourage the use of technology, whereas high level institutional decisions can create reluctance. Therefore ensuring that the drivers for educational technology developments are located in the faculty, school or departmental is one way to support the successful future implementations.

5.2: Guided or indirect drivers

Hannan (2005) proposed that guided innovations are actively encouraged either by making funds available or by promoting innovative learning and teaching activities. I

found little evidence of guided drivers as Hannan suggests, but my findings extend the notion of guided innovations by considering the influence of the more passive, drivers that participants reported. I determined these drivers to be indirect because they arose as a result of general activities that the institution supported, but these activities did not actively encourage the use of educational technologies. For example, participants reported that they were influenced to use educational technologies simply because of the availability of technology on the institutional network; or because they perceived that using technology was just an expectation of their role as a modern member of staff; or because of financial drivers and student expectations; or the need for flexible delivery.

5.2.1: Availability of technology

Although there is currently no official institutional requirement to use educational technologies, the UoL makes a wide range of technology freely available for staff to use on the IT network. Participants reported the ease of availability as one of the reasons why they use educational technologies. Wanda (H&LS) explains:

> In terms of software, what I like is that is it available; there is plenty of software available for free for us in the University to download … all the software we can download, and they are available, and that's good.

Isabel (H&SS) explains how the availability of audio-visual technology has changed her teaching and allowed her to do different things, "just having the technology there in lecture theatres, which I've never had before, such as projectors, and computers that

are looped to the projectors". Ellen (H&LS) reports that the constant availability of technologies encourages her to use it, "so much is offered to you, it's almost like a 'drip, drip, drip'. It's like you're constantly being persuaded that this might be a good idea". Similarly Tanya (PS) considers the amount of money and resources that the institution puts into providing a VLE, including the departments needed to support educational technology developments, are a driver. She says, "There's all the work of the eLearning Unit, which, however we look at it, is quite seriously financed".

The large amount of technology available to staff was reported to be confusing at times. Participants were sometimes uncertain about the differences between the technologies available. Brad (S&E) explains:

> Every day when I come in and I log on, the first thing on the home page is, gosh there's so many of them, VITAL [Virtual Interactive Teaching At Liverpool], TULIP [The University of Liverpool Information Portal], VOCAL [Virtual Online Collaboration At Liverpool] and now JAsPer [The human resource management data system] – I don't even know what that is! LUSID [Liverpool University Student Information Database], SPIDER [The University of Liverpool Student System] – there's lots of these things. These feel like they're an integral part of the day-to-day life really.

Three of the technologies Brad describes, TULIP, SPIDER and JAsPer are administration systems rather than educational technologies as described in this research, though participants are required to use these systems to enter programme or student data.

It may be beneficial to provide more detailed information about each of the technologies and how they could be used (Abrahams, 2010). This could help to overcome some of the confusion participants reported. Indeed participants suggested that it would be beneficial to provide more examples about what different educational technologies could be used for. However, it may not be advantageous to dictate how they should be used. Allowing staff the flexibility and freedom to adapt educational technologies in ways that suit their need is likely to be more productive (Conole & Dyke, 2004). Bruce (S&E) describes the difficulties of being prescriptive about the use of educational technology:

> I think the other thing is that a lot of the technological devices these days are so multi-purpose, particularly in research … They can be used in so many different ways. I think part of the problem is that different people see different ways of using them and that can sometimes make it difficult for things to spread.

5.2.2: Perceived expectation of working efficiently

Seven participants reported that utilising educational technologies was just an expectation of being an up to date member of staff and that using technology did not need to be articulated. For example, Diane (H&LS) suggests that technology is, "just life in the 21st Century" and Brad (S&E) comments that the use of technology is now just part of the culture of academic life:

> I think it's hard to say what actual driver there is apart from it's endemic…it's inherent isn't it, to many things that we do … it's a general sort of culture that students demand it, the institution expects that you engage with things like VITAL and TULIP and that you put up lecture slides and use PowerPoint.

Diane (H&LS) explains how she has to use technology to fulfil one of her roles in the department, "I suppose my point of view is a bit skewed in that I'm an admissions tutor as well". Harry (H&LS) admits that he cannot identify specific drivers and he just expects to have to use technology, "I'm not sure what I think the drivers are … I generally quite enjoy new technologies but I've never felt there's any pressure to use it. Maybe that's just because I'm quite happy to use it".

Utilising educational technologies to help cope with an increasing number of students and achieve gains in effectiveness and efficiency has been documented in the literature, for example JISC (2008). Although Boucher (1998) and Lei and Morrow (2010) admit that it is difficult to assess the associated benefits accurately.

Participants reported that they expected the institution would want them to use educational technologies to be more effective and efficient in their daily activities. Brad (S&E) explains that, "There is an expectation that you will [use technologies] and that you should – and that it makes life easier or doing your job more effective and efficient". Kevin (H&LS) says that using technology is perceived to be an effective way to work. He says it is a, "clever way to work. A clever way to work, in my mind, always saves money or saves time so saves money". Neil (PS) agrees, "You

need to be efficient. There are a lot of efficiencies to be gained from our use of online technologies. We see the use of technology as something that improves our services". Similarly Chris (PS) claims that, "for me it's efficiencies. Both time and cost more than anything", and Tanya (PS) identifies that for her, "there's the driver for cost efficiencies and administration and organisation of information". Bruce (S&E) agrees, but is also concerned about the implications of using educational technologies in his role as a member of staff:

> I think there's a certain amount of wanting to be seen to use technology … otherwise we might be perceived as being not leading edge … you feel like there's a need to look like you're keeping ahead, keeping up to date with your career by using technology. But it's not always the right thing to do.

Gina (H&SS) recognises that staff can be fearful about having to use technologies in their teaching activities. Al-Fudail and Mellar (2008, p. 1109) call this "technostress". Gina explains:

> People feel obliged to use technology of all kinds and either do it badly, because they feel they have to do something, [even though] they don't feel comfortable with the piece of technology or [they] don't do it at all because they're scared.

There have been a number of claims about the potential benefit of using technologies. JISC (2008) claimed that educational technologies could help staff to save time and

cope with the increasing pressures and challenges that staff now face, for example, larger student numbers. Diane (H&LS) comments, “We do have to do something to help us streamline our teaching and try to reduce our contact hours”. Keith (H&SS) agrees, “Some of it is a result of the large numbers of students we have to teach. That's pretty much the drivers as I see them”. Isabel (H&SS) wonders if technology can be used to “make students feel that they’re having more contact time even though they’re not really”. Kevin (H&LS) already considers that educational technology is a benefit to him in this regard:

> It saves me time; it improves things for [students] and makes things more accessible. They can just go onto VITAL and look at a PowerPoint and I can have notes on the bottom of all of these and sticky notes that I stick on the bottom, whereas they couldn't do that if I just worked on acetates all the time.

5.2.3: Financial drivers and student expectation

The funding changes in HEIs and the subsequent increase in student fees, mean that there is more pressure on institutions to remain competitive (Brown, 2011). Participants reported that it is important for the institution to be seen as leading edge so that students want to study at the UoL. Kevin (H&LS) describes the type of institution he would prefer to attend in the 21st Century, “I’m sure I wouldn’t want to go to a university where things were old fashioned. I’d want to go somewhere that’s embedded well within the modern and within the future way we see the world”. Gina (H&SS) states that using technologies effectively can help to promote this perception, “I think that this university like many others is trying to keep up with what’s going on.

There is a general move, as far as I can see, in terms of technology, new technologies particularly being adopted in academia".

The data was collected during July and August 2011 when the student fees were just over £3000 per year. At that time there were indications that the fees would increase to £9000 in September 2012 and members of staff were beginning to consider the implications of the increase on student expectation and experience. For example Isabel (H&SS) states: "I think [technology] will be more important, especially for us because with the £9k fees … students are expecting a lot more". Tanya (PS) suggests it is important for the university to be, "seen to be up to date and have an identity in relation to technology", Tanya continues, "externally the fees are really key as a driver". Diane (H&LS) also explains that recruitment and attracting students are important, "which equates to money at the end of the day … ultimately all those things come back to finances". Similarly Neil (PS) identifies there are economic drivers that influence his use of technology; "one of the top ones would be financial drivers".

Only Noel (S&E) described the National Student Survey (NSS) as a driver in relation to fees and the student experience. Noel says, "I suppose then this comes round to student experience but also the National Student Survey and those sorts of pressures". I was surprised that only one participant reported the NSS as there is a large amount of discussion that takes place in the different institutional committees concerning the scores.

Meeting student expectation was reported to be an important driver for participants to engage with educational technologies. Bruce (S&E) states, “It’s what the students expect and I get good feedback from the students”. Diane (H&LS) agrees, “It’s what students of this generation expect. They expect things to be available electronically”. Ivette (H&LS) says that, “most people use [the VLE] to throw up their PowerPoints. The students have come to expect that”. Keith (H&SS) finds that audio-visual equipment improves the student’s experience in the lecture theatre, “You can incorporate different media into your lectures and make them more interesting, I play intro music; I play video clips- stuff from the web”. Kevin (H&LS) explains that for him the driver is “mainly the student experience” and Neil (PS) reports that, “Supporting the student experience are definite drivers for what we do”. Gina (H&SS) perceives that the student expectation is the institution’s, “main driver for pushing the educational things”.

My findings support the outcomes of the UCISA survey (Walker et al., 2012) for technology enhanced learning for HE in the UK, which found that student expectation has been one of the leading drivers for using technology since 2008. However, Jones, Ramanau, Cross, and Healing (2010) caution that academic staff should not change their practices just to accommodate student pressure or, a presumed “new Net generation of Digital Native students” (p. 731) as the situation in reality is more complex. Jones et al. (2010) suggest that age related differences are not consistent, for example mature students face different challenges than younger students and ultimately exposure to technology may make more of a difference to student expectation than the student’s age.

5.2.4: The demand for flexible delivery

Students have many demands on their time (Gibbs, 2010). They may need to work to support their studies, or they may be professional people who undertake further training and therefore have to fit their studies around busy work and family life (JISC, 2008). Diane (H&LS) explains what happens on the course they run for professional people, "We've got students in [location] they're not physically in Liverpool. They need extra help and support to prepare for re-sits in August. They often do take time out and come and see us but it's not that easy".

Ellen (H&LS) acknowledges that a student's academic activities have to, "Fit in with where they're working and their home lives, and everything else [so it should be] blended in delivery or wherever possible doing distance learning". Chris (PS) comments on the importance of flexible access to resources, he welcomes "the ability to revisit online learning as opposed to having to re-book on a course in six months when it's all disappeared".

Keith (H&SS) was less positive and concerned that the introduction of educational technology has less to do with the need to be flexible and more to do with checking that members of staff are doing their job effectively. He says, "Some of it is a need to – how can I put this – some of this is done to protect ourselves from accusations of impropriety or not doing our jobs by the students". The introduction of educational technologies can cause stress (Al-Fudail & Mellar, 2008) and anxiety (Korukonda, 2005) even if the reasons for introduction are entirely positive.

My findings about the perceived need for flexibility provide further support to the issues identified in the 2012 technology enhanced learning survey by UCISA (Walker et al., 2012), This survey, as well as previous UCISA surveys (Browne et al., 2010, 2008), state that improving the access of students who may be learning off campus or studying at a distance is becoming increasingly important.

Even though participants generally did not report the presence of directed drivers as Hannan (2005) describes, there nevertheless appear to be day-to-day institutional activities that the UoL engages in that influence participants to utilise educational technology. This is perhaps to be expected in a modern University but the influence of these activities is worth reflecting upon as future decisions are made. For example, considering the most effective ways to identify and promote the educational technologies available on the institutional network may have more of a positive effect on the adoption and implementation of educational technology than previously anticipated.

5.3: Individual drivers or rationales

This section focuses upon the participants' personal desires and rationales to use educational technology. These included the perception of benefits, participants' willingness to explore potential benefits, participants' interest, enthusiasm and perception of novelty value, and the potential benefit for career progression. Identifying when the rationale was a personal desire as opposed to an institutional or indirect driver was sometimes a challenge. When a participant did not articulate the difference clearly, their report is subject to my interpretation within the context of their answer (Cohen et al., 2007).

The participant's personal desires and rationales link most closely to Hannan's (2005) description of an individual innovation. Hannan says that individual innovations are motivated by personal reasons and influenced by enthusiasts. Within chapter four I already identified that participants had a range of adopter characteristics and were not individuals who could all be described as enthusiasts.

Participants' rationales were particularly evident when they were asked to discuss a technology that they had recently started to use. Examples of the technologies participants described include: Skype, Wikis, voting handsets, VITAL, social bookmarking tools, photography software and Articulate (some of the technologies described have been omitted from this list to protect confidentiality).

5.3.1: Perception of benefits

Two participants from Professional Services perceived that educational technologies directly benefit and improve the work they do. Neil (PS) considers that technology has a positive effect and states, "We see the use of technology as something that improves our services". Chris (PS) explains that, "What I want to do more than anything is to make a difference to individuals. The technology allows me to do that, and that makes the difference".

Ellen (H&LS) and Neil (PS) report how technologies can help them to make better use of their time with students. Ellen uses educational technologies so that she can make sure the time she spends with students is efficient, she says, "The time that we have with them is very, very valuable so we've got to use it to the best effect". Whilst,

Neil utilises technologies so that he can be more confident that the resources his department puts in place are used effectively, “What [technology] actually allow us to do is to demonstrate where particular student demand lies”.

My findings suggest that participants’ perceptions of the effectiveness of technologies determined whether and how they would use it. In a review of HE members of staff, Georgina and Olson (2008, p. 2) also found that it is “not the effectiveness of technology, but the teacher's perception of the effectiveness of technology that determines whether technology will be used”. Academic staff are reluctant to change their learning and teaching practices without an understanding of the potential benefits (Salmon, 2005). Rogers (2003) identifies that relative advantage, or perceived benefit, was one of the five attributes of an innovation that influence adoption in his innovation-decision process.

Hagner (2000) found that technologies were implemented because the resources were available and the perceived benefits for students were high. Participants also discussed how they use technologies so that they can provide more effective learning opportunities for students. Isabel (H&SS) describes how she uses technologies to, “make it as easy as possible for [students] to be able to research and write the essay and to get the information so they’ll not panic”. Kevin (H&LS) uses educational technologies to supplement the resources he provides for students. He says, “[students said it was] really useful to hear the words on top of the PowerPoint, so they really liked that”. Bruce (S&E) explains how he uses technologies to increase student understanding:

> If you can put together a good animation of how things move over time it can really get to another level of the understanding of the student … They can practice and explore – I'm finding that can be very useful … it's what the students expect and I get good feedback from the students.

Ellen (H&LS) uses educational technologies to support the different ways that students learn:

> If they're a real visual learner, and they need to keep seeing it, and then doing it themselves, then we've got to meet that need haven't we … if somebody's a really theoretical learner, and they need to listen to our lecture again just to go through perhaps a model, or an equation, or something, and just ruminate on that, then let's do that.

Wanda (H&LS) explained how she uses educational technology if she sees "that it will help the students, or me, to achieve that learning outcome". Whilst Brad (S&E) explained that:

> I'd normally adopt it if it was something I could clearly see was of use to me … if I can see a direct benefit. I realise that sounds a bit mercenary … I use it if it's something that will make life easier.

Bruce (S&E) highlighted the importance of ensuring there is a legitimate need for using educational technology: "it can work very well if it's not being done for the sake

of it" and continued, "I wouldn't go out of my way to learn something or to acquire technology just because it was there". Identifying the added benefit of using educational technologies over and above traditional methods is essential. Wanda (H&LS) summed this up as:

> If I see the added value, or if I see something good in it, yes I will be pretty keen to use it. If I don't see it, or I just think it is just another little gadget, then I don't see the point of using it.

Njenga and Fourie (2008, p. 1) highlight a "compulsive enthusiasm" or "technopositivism" that is often propagated with regard to the potential benefits of utilising educational technology. Njenga and Fourie highlight the importance of adopting educational technologies for the right reason rather than an over optimistic list of promises and benefits. Noel (S&E) also makes the point that there must be a clear added benefit. He uses a description of smart phones to make his point:

> I like playing with other people's smart phones. The stuff that they tell me is good about them, like you can point it at the stars and it will tell you the constellation - but I can get that in the book. I suppose it's the practical applications like being able to navigate your way around places. When I start going to lots of places that I don't know my way around or can't find my way around with an A to Z then maybe I would think about it.

Participants reported that the perceived benefits of using technologies effectively have to be balanced against the time it takes to become competent. This finding supports research by Heaton-Shrestha, Edirisingha, Burke, and Linsey (2005) that learning how to use technologies can take significant time and this is often underestimated. Tanya (PS) describes how she regularly misjudges the amount of time that it takes to learn how to use educational technologies: “I think it won’t take a minute to learn that, but that’s like one of those white lies we all tell each other isn’t it”. Wanda (H&LS) comments that the expected benefit plays a part in how much time she is prepared to spend on finding out about a technology:

> If it’s just to add a bit more fun or something it’s not really the point. It has to improve the teaching. Otherwise if you just use technology for the sake of using technology, then I don’t see the point.

Diane (H&LS) also reports that she would not use educational technologies simply because they are available: “I don’t spend hours and hours for pleasure trying to get my head round something. I use it as I need to really”. This is also true for Ivette (H&LS) who says that she does not like using technology unless it is clearly useful: “I like using technology if it does something that I can’t do otherwise or if it gives me a benefit”. Brad (S&E) describes how PowerPoint software is now central to his lectures because of the benefit it provides:

> PowerPoint does allow you to introduce a whole different array of bits and pieces. Parts of it make it a lot easier and now I couldn’t

> imagine doing a lecture without PowerPoint to be honest with you. That would be hard now!

Four participants mentioned the compatibility of a technology with other similar software as beneficial. For example, Bruce (S&E) described the particular benefit of a technology for him; "It was integrated with tools that I was already using … so it wasn't something, which was isolated; it was something, which connected with things that I was already familiar with, so it was more of an extension". Tanya (PS) suggested that she was influenced to use a particular technology because, "the whole thing is like PowerPoint. It's a cross between PowerPoint and a very friendly Dreamweaver, very easy to use".

Isabel (H&SS) agrees that educational technologies make her job easier: "each lecture was taking me four days to do and it was hell! But then the next year you transport it all together and it's there".

5.3.2: Willingness to explore the potential benefits

Participants reported differences between how much effort they were willing to invest in exploring how educational technologies could help them. Some were willing to explore the potential and mould a technology to their requirements. Other participants reported that they just wanted technologies to work effectively straight away so that they did not have to adapt either the technology or their practice to utilise it effectively. For example, Harry (H&LS) is, "just generally interested in trying things out". Gina (H&SS) is keen to explore the potential of technologies that she comes across and says:

> What usually happens for me is if I hear about something, one of the first things I'm likely to think is how can I use that'. Rather than the other way around. Rather than looking for issues within my teaching that I need a solution for, I'll see something like Prezi and think, how can I make really good use of that?'

Ivette (H&LS) is also willing to explore the potential:

> I just feel like if it can be done why can't I do it too? If I know something can be done I'll work at it till it works. If it can be done I'll do it. If I invest the time in it once then surely I can do it lots of times in the future only much faster.

Tanya (PS) states that she tends to pick up the skills that she needs quickly and is willing to explore the opportunities that educational technologies offer for her professional practice.

> I view myself as a really quick learner and I have no barriers and I think that's one of the things really that makes people open to education and new technology. That's a big assumption on my part but that's kind of intuitively what I feel.

Kevin (H&LS) says he is, "pretty happy to have a go at most of the things", and is keen to help colleagues see the potential benefit of educational technologies, "I hope

that they'll see other people saving time and working more cleverly and getting the benefit of students who are much happier".

Albirini (2006) argued that the attitude of educators determines whether educational technologies are succesfully implemented. Agarwal & Prasad (1998) identified the willingness to explore potential benefits in terms of personal innovativeness. Innovativeness was one of the factors identified by Rogers (2003) in the prior conditions of the innovation-decision process. Rogers also links innovativeness to the adopter characteristics of the Innovator or Early Adopter. My findings do not suggest that it is only Innovators or Early Adopters, or Enthusiasts in the model I proposed, that display this willingness to explore the potential benefits. Rather it appeared to be a characteristic that was not linked to a particular adopter category.

5.3.3: Interest, enthusiasm and novelty factor

It was sometimes difficult to identify when interest, novelty and enthusiam differed from the participant's report of a perceived benefit as these factors appeared to be closely linked. However, three participants reported that the use of educational technologies was an enjoyable activity. Tanya (PS) explains, "There's the kind of personal drivers of academic staff who are excited or incited by technology for L&T in various ways". With one of the technologies that Bruce (S&E) describes he reports, "it's a while since I've done it, but it was quite good fun revisiting that". Kevin (H&LS) suggests that fun and novelty are important to tempt people to try educational technologies. He suggests, "It pulls people in; it's a little bit of bait at the beginning, perhaps, and then once you see the benefit, the novelty doesn't make any difference. It was just to get you in, I suppose". Klein (2005) also described how novelty can be an

important factor for encouraging enthusiasts to try new innovations, particularly when the innovations are in their early stages of development. It is at this stage, Klein says, that novely may be the only appeal for enthusiasts to engage with the innovation. My findings suggest that interest and novelty can be appealing to more people than just enthusiasts.

Enthusiasm to try educational technologies may result from seeing an example of how they could be used in another department or by a colleague. Ellen (H&LS) was motivated to try something new because of her experience in another faculty:

> I was teaching on a [module] for somebody else in a different faculty. It was only while I was there that it made me think actually, we're not using I.T. effectively. I'd done a few voiceover PowerPoints but not very much, but it really made me think about how we could be using video clips of this.

Tanya (PS) reports that she needed to find a technological solution to develop a set of resources. She was unsure what technology to choose and considered a few different options. She explains that she finally decided upon a particular solution because she saw an example of how other people were using the technology:

> They had kindly done a case study of their own difficulties and problems - they said we got this, we had all these difficulties, we had this timescale, we needed to produce this, they tried some other

> software as a solution. So I thought, that looks really good … that will help me enormously.

However, Gina (H&SS) reports that it is not important for her to have an immediate use for a technology in order for an example to be useful:

> I'll have these moments of seeing some piece of technology and I'll have a little flurry of being interested by it. I'll think, 'What I could do with it, how could it work with what I'm trying to do?' Then it will just sit there, in the back of my mind, part of a bank of stuff that will then just come up again sometime.

When participants were asked to recall a technology that they had recently started to use, Diane (H&LS) and Brad (S&E) described their interest in the technology. Diane (H&LS) explains, "I suppose the initial motivation was actually having a project that I have to do, to complete the [teaching] programme. That is the major motivation". Brad (S&E) describes how the requirements of a specific project were the reason that he decided to use a particular technology.

> I got a project two years ago to do some work with the University of [name]. The result of the project was a book. I needed to speak to them about once a week for months and months and months. They already were using it.

5.3.4: Potential benefit for career progression

Gina (H&SS), Ivette (H&LS), Neil (PS) and Tanya (PS) engaged with educational technologies because they perceived that they would help them to progress in their career. They reported that they were keen to be seen to be developing professionally. A similar point was discussed in the identification of drivers in Section 5.2.2 where participants perceived that there was an expectation that they would use educational technologies to do their job effectively and work efficiently. I have returned to this point because participants also reported a desire to use educational technologies to enhance their skills and career prospects. For example, Gina (H&SS) talks about wanting to be ready for new opportunities and her desire to be seen to be doing a good job:

> If the job came up in [location] I would want to be really, really, well prepared to be able to get it. I want to be somebody who would be sought after … it's quite important to me that what I do is visibly good … so that I can get the recognition and that then means progressing, career wise.

Similarly, Ivette (H&LS) described how keeping up to date with the latest technologies and completing training courses was important for her career progression:

> Being very paranoid about job security, I make an attempt to ensure I do at least one if not two staff development courses a year. I tend to focus that on the teaching and learning side of things or on the

> management side of things; areas where I haven't received as much formal training. The research I keep up with – that's a given – but I use the staff development things. I've been on all of the VITAL courses, on all of the advanced VITAL courses. I use that to keep me current.

This is echoed by Neil (PS) who reports, "I'm very much committed to the idea that part of being professional means that you're developing all the time … so [keeping up with technology is] just my own approach to my career". Tanya (PS) also describes how she is conscious of the importance of keeping her skills up to date:

> I feel quite fortunate. My skills are quite crude but I do have a degree of knowledge about digital literacies and technologies in education and that makes me feel equipped for the future. I think I'd be worried if I didn't – I'm going to be left behind here.

Bassendowski & Petrucka (2013) reflect on the changing skills that are needed to teach within the 21st Century and highlight the importance of individuals keeping their skills up to date. The "image of students passively absorbing information from an educator who is lecturing from behind a podium does not reflect the current scope and dimension of higher education" (Bassendowski & Petrucka, 2013, p. 665). Sappey & Relf (2010) identify a variety of skills that academics have undertaken in order to be able to engage with new work practices. Examples include, developing electronic learning resources and promoting social interaction and development (Goodyear & Ellis, 2008).

5.4: Summary

This chapter reported the findings regarding participants' perceived drivers and rationales for using educational technologies. I used the definition of the word driver to mean a "factor which causes a particular phenomenon to happen or develop" ("Driver," 2012). Hannan's (2005) three types of drivers for educational innovations in HE, directed, guided and individual, informed my understanding of the findings.

Participants' perceptions of directed drivers were examined and compared against relevant University documents. Only one participant identified the institutional strategy as a driver to use educational technologies. Instead, participants were arguably more influenced by their faculty, school or department. However, given the institutional routes for disseminating information through faculty committees, this finding may be expected. The perceived lack of institutional drivers may be anticipated given that, at the time of writing, the institution did not identify a minimum requirement for the use educational technologies. These drivers were most closely identified as matching Hannan's (2005) description of directed innovations.

Directed drivers are not reflected clearly within the stages within the innovation-decision process of the DOI. This may be because the DOI tends to consider optional rather than required innovations, and directed drivers are more likely to occur for required innovations. However, my findings suggest that support from senior staff is important for members of staff to utilise educational technologies effectively. This could link to the prior conditions in the DOI as input from senior staff may contribute to setting the norms of the social system. Within Ely's (1999) eight conditions,

directed drivers are likely to be perceived to be relevant to the commitment the institution is willing to make to utilising educational technologies and the leadership or guidance that is provided through senior staff support or priorities outlined in the strategy or policy. The lack of institutional drivers suggests that other factors are responsible for influencing participants to use educational technologies.

Indirect drivers were most closely related to Hannan's (2005) guided drivers. These included the availability of educational technologies on the network, the resourcing of central departments and the need to provide a flexible learning environment. Participants also identified improving the student experience as well as meeting student expectation as a driver, particularly in terms of the rise in student fees. Although there are many discussions about the NSS generally within the institution, this was only reported as a measure of student experience by one participant. Rather, improving the student experience was perceived to be a general expectation of being an up to date member of staff. Some participants were confused about the range of technologies available and what they could be used for. Ensuring that there is clarity about the reasons for using educational technologies may help alleviate some of the confusion.

Indirect drivers do not link clearly to the innovation-decision process. My findings suggest that participants are influenced by an expectation to use educational technologies to make working practices effective. These themes could link to the prior conditions with expectation expressed as a norm of the social system and through links to previous effective practice. However, I think these links are tenuous. It is easier to see the links between the indirect drivers and Ely's (1999) implementation

conditions where the availability of technologies on the network relates to the availability of resources.

Participants reported a personal desire and rationale, to use educational technologies, particularly if they perceived that a technology would be beneficial to them or their students. This category fitted most closely with Hannan's (2005) account of individual drivers. Personal drivers were reported to be related to perceptions of the benefits of the technology, a willingness to explore the potential, interest, enthusiasm and novelty factor and the potential benefit for career progression.

Rogers (2003) contends that the innovation-decision process considers the adoption factors relevant to the individual person. Therefore, it is perhaps to be expected that the individual drivers from my findings appear to align more closely with the innovation-decision process. My findings suggest that participants expressed different expectations in the way they were prepared to engage with educational technologies as well as different levels of interest, novelty and enthusiasm towards using technologies. Attitude may be influenced by an individual's previous experience or practice (Albirini, 2006). Previous practice is included within the prior conditions of the innovation-decision process. Similarly I also found the perceived benefits of a technology to be important for participants. Rogers (2003) describes perceived benefits as an central part of the DOI, particularly with regard to the innovation attributes and relative advantage or compatibility.

Within Ely's (1999) implementation conditions, interest, novelty and enthusiasm may relate to the rewards and incentives that participants experience when using

educational technologies. The perceived benefits of utilising educational technologies could relate to dissatisfaction with the status quo as participants examine how beneficial a technology is against what was used before. However, Ely does not identify perceived benefits directly other than through the availability of resources and perhaps the opportunities to save available time so these connections may be weak. My finding relating to the potential for career progression links more closely with the rewards or incentives available.

Chapter 6: Perceived impacts, risks and enablers

This chapter describes the participants' perceptions of the impacts of using educational technologies in their professional practice, the perceived risks of utilising technologies, and the perceived enablers. The chapter concludes with a comparison of my findings with Rogers' (2003) innovation-decision process and Ely's (1999) eight conditions of implementation.

6.1: Perceived impacts of using educational technologies in professional practice

An individual's perspectives on pedagogy can impact on whether and how technologies are used (Errington, 2004; Ertmer, 2005). Ertmer (2005) suggests that some people perceive educational technologies to be just another tool that they can utilise to facilitate student learning, whereas others consider technologies are an imposition or an extra task on top of their normal activities. Price et al. (2005) argue that this difference could be due to whether the technology is perceived to be a tool for administration purposes or a tool for teaching. However, Straub (2009, p. 624) proposed "individuals construct unique (but malleable) perceptions of technology that influence the adoption process". For example, Ge et al. (2010) examined individuals' perceptions and experiences of a new Learning Management System (LMS) and found that individuals' initial responses to the implementation were determined by their perceptions of prior experiences.

Oliver and Harvey (2002) identified four levels of impact when evaluating the use of educational technologies: the impact on the student and on the academic as well as the

institutional and the national impact. Hanson (2009b) argues that there is an increasing understanding of the impact that educational technologies have on student experiences, but there is less of an understanding of the impact that technologies have on academic roles and identities. Oliver and Harvey contend that impact is complex and particularly difficult to measure when considering the impact on academics.

Price et al. (2005) conducted a literature review into the impacts of educational technologies on academic roles and practices in HE. They found that much of the research had focused on distance and on-line learning rather than on the use of educational technologies for campus-based students. There was also a tendency to focus on the impact of funded projects in educational technologies, arguably a situation similar to Hannan's (2005) notion of a guided innovation. Price et al.'s review concluded with a series of questions proposed to help understand impact. One of these questions proposed as important was similar to the focus of this research – "How do academics perceive technology, and how do these perceptions affect their subsequent practice?" (Price et al., 2005, p. 67).

Extending the literature review by Price et al. (2005), Price and Oliver (2007) created a framework for examining the impact of educational technologies on the changing roles and practice of individuals. Their framework proposed three ways of conceptualising the relationship between technologies and practice, which they termed *anticipatory*, *on-going* and *achieved*. *Anticipatory* concerned the rhetoric of policy or opinion, *on-going* reviewed the process of integration of educational technologies into practice, and *achieved* evaluated the summative effects. Kirkwood (2009) provided a similar perspective on the effect of impact but described the difference between the

potential, or the perceived or claimed benefits and the *actual* experiences in practice. Whatever framework is used, Price and Oliver argue that understanding the perceived impacts of educational technologies are important to inform decisions about technologies for supporting L&T.

Participants' perceptions of the impacts of educational technologies were both positive and negative. Participants' reports focused on the impacts on students or on the participant's own academic practice. They generally referred to issues concerning the *actual* integration of educational technologies into practice (Kirkwood, 2009) or what Price and Oliver (2007) identified as *on-going* impact. Table 6.1 provides an overview of participants' positive and negative perceptions of the impact of educational technologies in their professional practice.

Positive	**Negative**
Technologies provide a supportive system for effective academic professional practice.	Creates new challenges for students and staff (for example a blurring of reliable and unreliable electronic information).
Provides a flexible online support environment for students.	Students may become lazy and overly reliant on technologies for quick and easy answers.
Enables interactions with a greater diversity of students with different learning strategies.	Increased number of administration tasks accompanied by a need to learn and relearn infrequent technology processes.

Table 6.1: Overview of perceived impacts of using educational technologies

Noel (S&E), Tanya (PS), and Neil (PS) reported that technologies are essential for their professional practice. Noel says, "I think generally I would consider technology to be positive". Tanya reports that technologies have a beneficial impact on her everyday activities in terms of saving her time, "I think it's been a very positive thing because I remember photocopiers that you turned with the handle". Tanya also highlights how educational technologies provide her with flexible ways to support her students, "being able to support students and develop their skills online is really really good".

This finding supports the proposals in the JISC (2008), *Exploring tangible benefits of e-learning,* report which highlighted the beneficial opportunities that educational technologies can provide for flexible delivery of materials. Similarly Samarawickrema and Stacey (2007) highlight the importance of developing flexible online learning opportunities to support web-based learning.

Neil (PS) described how important the use of technology is for him to do his job effectively, "Technology is the ecosystem and without it there would be no service … certainly my job is unthinkable without the Internet, I couldn't do anything". Dillenbourg (2008, p. 127) proposed that "digital technologies are melting into university ecosystems" and that a vision of educational technology as something different is no longer appropriate. Similarly, Price et al. (2005) asked whether educational technologies are becoming so embedded that they are now becoming invisible? Based on these findings I do not think that educational technologies have reached an invisible level at the UoL as yet, although participants nevertheless

reported that educational technologies are becoming more central to their professional practice.

Participants were also cautious about potentially negative impacts of using educational technologies. Neil reported that people are becoming too reliant on technology providing quick and easy answers: “There are some aspects of the technology I use which sometimes you can see has a sort of negative impact … the general dumbing down of everything. As technology gets more advanced, people get dumber”. Similarly, Gina (H&SS) describes how her students can become lazy: “Students will often send me an email that they don’t need to, they're asking me a question that they could have found out if they looked in the module handbook”. There was concern that educational technologies can make it too easy for students to contact staff. For example, Gina (H&SS) comments on how quickly her students now expect responses to questions:

> They’ll expect a response to an email that they sent at eleven o clock on a Friday night and by Sunday morning they're saying, ‘Did you get my email?’ It does get a little bit intrusive when people treat email as if they’re going to get a much more instant response than they should necessarily expect.

This finding supports concerns already expressed in educational research literature that using technology can make it easy for students to contact members of staff at inappropriate times, which could lead to a potential increase in workload (Kuntz, 2012). In a study of student expectations with self-directed study Deepwell and Malik

(2008, p. 11) found that students had a high expectation of instant tutor feedback; they report that one student said he "regretted that the lecturer was not online simultaneously with the student when he was logged on at midnight". My findings provide some evidence that supports Deepwell and Malik's report that educational technologies are changing student expectations about staff availability.

Ivette (H&LS) is positive about the impact that technology has on her teaching: "It helps me interact with a greater diversity of students with different learning strategies". However, Ivette also considers that educational technologies create new challenges for her students, including the ability to distinguish between credible peer reviewed materials and the availability of easy to access information such as Wikipedia:

> You may find that the most recent paper has been referenced in their bibliography using the web URL rather than the journal or the page numbers … Interpreting what is a good information source and what is an unbiased information source – that is something that I was never faced with.

Littlejohn, Beetham, & McGill (2012) also reported that academic staff perceived that students struggled to judge and evaluate the credibility of information sources. Students now have access to many different resources as well as those available through the institutional library. Despite the wealth of information available, Lea and Jones (2011) claim that students still rely on the authority of the lecturer to direct them to appropriate resources and would therefore benefit from training in the range of

skills that may now be needed. Littlejohn et al. (2012) suggest that it would be beneficial to teach students these skills rather than presuming that they are competent. Beetham et al (2009) agrees that more could be done to help learners develop skills in this area. My findings support the current literature that there is a perceived skill deficit with student's information handling skills.

Keith (H&SS) is concerned that technologies do not make his job easier, particularly with regard to administrative tasks:

> It has increased the admin load. It's meant that I have to fill in things online. Now the annoying thing about that is I don't want to do it. I don't see any value in it because no one's told me what the value of it is and it's not immediately apparent. Then I have to learn how to do it which, because I don't see any value in it I'm not overly keen on doing. Then, because of the way it's connected to things that only occur once or twice a year, by the time I've come round to using it again I've forgotten it because I don't retain the knowledge because it's of no value. So I have to re-learn it again in order to fit in with some online form or something. That's kind of annoying, that takes up my time. It is an imposition.

The quote from Keith's transcript is interesting for two reasons. Firstly he perceives that there is a lack of clarity about the reasons for using technologies for some administration tasks. Secondly, Keith highlights a perceived increase in workload caused because he uses some of the technologies only once or twice a year. He says

that by the time he is required to use the technology again he has forgotten how to use it because of the time that has lapsed. Therefore the need to learn and then relearn how to use technologies results in a perceived increase in workload. There is a large body of literature that discusses a perceived lack of time as a barrier to using educational technologies (see Section 6.2.1 for more details). However, I was not able to identify literature that directly addressed the importance of considering any relearn time for infrequent tasks when examining perceived impacts.

Keith (H&SS) appeared to be relatively innovative in comparison with the other participants when using educational technologies in his interaction with students but rather hesitant about the value of using technologies when considering administrative tasks. This finding supports Price et al.'s (2005) assertion that there is a difference between the use of technology when it is perceived as a tool for administration purposes or a tool for teaching. Introducing technologies into HE activities for administration, teaching or research activities can result in a change in the roles that members of staff are expected to engage with in practice (Sappey & Relf, 2010; Tham & Werner, 2005). Littlejohn et al (2012) also note that an increasing requirement for digital literacies means that members of staff are expected to take on different roles and skills. However, Tham and Werner (2005) warn that members of staff require training to help empower them to carry out any new activities and roles effectively.

6.2: Perceived risks of using educational technologies

Findlow (2008) identifies how perceived risks may be identified as barriers to the use of educational technologies. It was not my aim at the beginning of this study to focus solely on the risks or barriers to adoption and implementation of educational

technologies. However, participants discussed some of the perceived risks in terms of barriers during the interviews. Instead I was more interested to understand participants' perceptions of enablers, or how risks or barriers are overcome. Surry et al. (2009, p. 3) suggests that "the focus of implementation research is gradually moving from the determination of barriers to implementation to a broader focus that includes both barriers and enablers to innovation". Abrahams (2010) identifies that it is important to understand the perceived risks and the enablers in order to identify how participants can be helped to overcome these issues.

Barriers have already received a lot of interest in the literature, for examples see: Ertmer (1999), Butler and Sellbom (2002), Browne and Jenkins (2008), Schneckenberg (2009) and Walker et al. (2012). Ertmer proposed that it is useful to split barriers into two types: first and second order. First order barriers are extrinsic to individuals and include a lack of access to computers and software, insufficient time, and inadequate technical and administrative support. Second order barriers are described as being intrinsic to individuals and include perceptions about teaching, beliefs about computers, established classroom practices, and an unwillingness to change practice. Ertmer reports that second order barriers are more of a challenge to address.

My findings are not dissimilar to the barriers identified in the literature for the past 10-15 years implying that despite the wealth of research, these issues persist. Participants perceived there to be two main risks when using educational technologies at the UoL: activities that lead to an unproductive use of time and activities that potentially result

in a detrimental effect on the student experience. Table 6.2 provides an overview of the perceived risks of using educational technologies at the UoL.

Perceived Risks	**Description of risks**
Unproductive use of time	• The cost-benefit returns on investing time to achieve a level of competence. • Unreliable technologies and poorly equipped teaching spaces. • The reinvestment in time needed after a software or hardware update.
Detrimental effect on the student experience	• Required level of skill of the member of staff. • Lack of student engagement. • The member of staff receiving negative feedback from students resulting in a lack of HoD support. • Negative feedback from students resulting in an institutional drop in the league tables or poor NSS score.

Table 6.2: Overview of perceived risks of using educational technologies

6.2.1: Unproductive use of time

Participants were concerned that adopting and implementing educational technologies could be an unproductive use of their time. This was due to the amount of time that participants reported it could take to become competent to use a technology, the amount of time that may be wasted having to find ways to mitigate for unreliable

technologies, and the amount of time that they may need to reinvest in order to relearn how to use a technology and redevelop materials and resources after a software or hardware update.

Cost-benefit returns on investing time to achieve a level of competence

Participants reported that the amount of time it took to become 'competent' with educational technologies contributed to the reasons they were cautious about using educational technologies. Bruce (S&E) describes how, "having the time to actually make the investments and learn how to use [a technology] properly" was a challenge. Similarly Brad (S&E) was concerned that the time needed to learn how to use educational technologies would take him away from time he says he should be spending on research:

> … the degree of time it would take to work out [a technology]. If I did that I think when it came to time allocation schedule and I put in I'd spent 30 hours on [a technology] my head of school would say, 'Why are you doing that and not writing a grant application or doing some research because that's why you're here'.

Spotts (1999) says there are pressures on members of staff to address the activities that the institution emphasises are important in order to keep their job and then apply for promotion. Therefore the pressures of day-to-day activities may conflict with the time available to learn about educational technologies. This view is supported by Wanda (H&LS) who says, "I have some time but for research and I need that time". Gina (H&SS) describes the problems that staff face:

> I think that one of the hardest things to find, as an academic is time. You can roll out the same thing you did last year, and it's a lot easier to do that than risk anything, especially for people who are not comfortable with technology.

Diane (H&LS) explains that she is frustrated by promises that different technologies will make her job easier, "I think we all agree that [using educational technology] is one of these things that we feel we should be doing", but she reports she is frustrated about claims that educational technologies can save her time:

> If you put a nice multiple answer diagram up with twenty labels and ask them to label the items, unless [the students are] spelling it exactly as you put it into the system then it will mark it wrong - which it might not necessarily be … We just go through and mark them by hand like we would an ordinary exam paper. Other than the images being better for the students, it's not saving any time at all as far as marking.

Diane (H&LS) is also concerned about a lack of time to try new technologies: "Our workload is enormous. The stress levels that go with it are enormous. Things like the new technologies … we just haven't got the time to stop and breathe and get our head round them". Ellen (H&LS) reports that she is under more pressure each year, "I don't know how other people feel, but you feel every year you've got less and less time. That's how I feel". Concerns such as these are not new to HE (Walker et al., 2012). A

lack of time is also one of the factors that Al-Fudail & Mellar (2008) claim can create stress when trying to use educational technologies.

Noel (S&E) explains that he could use educational technologies more effectively if he had more time to invest in developments:

> I guess it's one of those things that come back to time. If I had more time, if I had an infinite amount of time to learn how to use these things then we all probably be doing much better at it. There are so many other things that fight for your attention.

In contrast, two participants reported that using technology allows them to have more time. Kevin (H&LS) says, "it saves me time; it improves things for [students] and makes things more accessible". Similarly Isabel (H&SS) reports that she has more time because of the way she uses technologies: "Especially with things like my inability to have good filing techniques - I would lose the lecture notes, or the overheads. Having it all on [the VLE] means you can just go look".

My findings provide further support for the well documented literature about a perceived lack of time having a negative effect on the adoption and implementation of educational technologies (see Abrahams, 2010; Browne et al., 2008; Parchoma, 2008; Walker et al., 2012; White, 2007). In a survey of technology enhanced learning in UK higher education institutions, Walker et al. (2012) reported that a lack of time continues to be perceived as a key barrier. Conole (2010) posits that academics report a lack of time as a common response to technological change. In a study of the critical

success factors for embracing and managing institutional change and educational technologies, White (2007) identified a lack of time as an overwhelming limiting factor.

Unreliable technologies and poorly equipped teaching spaces

Participants reported they had been concerned in the past about whether educational technologies would function correctly when needed. Bernard (H&SS) described his frustration with unreliable technology.

> My email broke yesterday. It breaks every few months for some reason when they update the servers and change the password and it falls over … I don't want any more technology … I didn't enjoy getting it, it was a nuisance. I didn't turn it on straight away; it was something I felt obliged to do.

Participants also reported concerns about the ease of use of educational technologies. Brad (S&E) explains that technology needs to improve for him to use it more:

> They could make technology better. That would encourage you to use it. There are parts of it that don't always work terribly well … I use it already because I have to but I probably would use it more if it was better than it is.

Diane (H&LS) explains the importance of educational and administrative systems working well together and timely support to fix problems quickly if something goes wrong.

> We've also had a lot of issues with ORBIT [Online Room Booking and Integrated Timetabling], the new room booking system … the room was not suitable at all. It didn't have any IT kit in … if you go over there and there's any glitches or problems then there's nobody to ask.

Participants reported that access to appropriate, well-supported and resourced teaching spaces were important for utilising educational technologies effectively. Bruce (S&E) describes his frustration when this is not in place:

> Some of the computers we're using for example in the teaching labs have reached the end of their useful life! They're not replaced … and sometimes things are very slow to be repaired or fixed and you know, it can cause real frustration.

Similarly, Keith (H&SS) identifies the importance of keeping the use of educational technologies in mind when decisions about refurbishing teaching spaces are made:

> They've just spent a load of money refitting particular rooms … nobody bothered to put in a budget for any AV equipment and there isn't any in there except nobody tells you that. So you turn up

> expecting there to be the usual provision of computers, projectors and all that kind of thing and there's nothing.

Unreliable technologies can erode trust, which can result in a member of staff losing confidence about using them in the future (Butler & Sellbom, 2002). Riegelsberger, Sasse, and McCarthy (2005) highlight the importance of developing trust in order to implementation educational technologies.

The reinvestment in time needed after a software or hardware update

Software or hardware updates were reported to be more problematic than I anticipated and some participants expressed frustration with a number of issues after an update was applied. In particular they reported concern about the amount of time it could take to relearn how to use a technology if an update resulted in changes to the user interface, Diane (H&LS) explains:

> You just about get to grips with a system and then it all changes! It's at this time of year when you have to pull over all your modules and get them all set up for September. You're thinking, 'I did this last year but I can't now!'

There seemed to be a lack of understanding about why some updates were implemented. Participants stated that they would like more information about planned updates and increased consultation prior to the updates being applied. Keith (H&SS) explained his frustration:

> I just think why have you done that? Why have you changed that? How is this better? I can't see. Maybe it is for somebody but I think a lot of the changes seem to be done for change's sake.

Similarly, there was a concern that upgrades are implemented without a thorough testing of the software. Bruce (S&E) explains:

> I think the other issue as well is one of backwards compatibility, that some of the software for example is regularly being updated. And then the code that you've written to work with that software doesn't always work with the new update.

Noel (S&E) also describes the frustration of having to spend time recreating resources due to changes in an update:

> I had a very good attempt at learning how to use the [technology]. I got all the slides set up for questions and so on. The following year they changed the system so the software was the same but the hardware was different. It wasn't quite compatible. You then have to spend time to re-jig it all.

Al-Fudail and Mellar (2008) describe how lack of confidence in a technology working as expected may deter individuals from investing the time to generate resources. My findings agree, as Bruce (S&E) explains:

> You make a big investment in getting things established so that they're convenient for you to use, and then [an update] comes along which is going to require a lot of time and effort to get to work with the new stuff, that can be a real turn off.

I was not able to identify research that discussed the issues with updates. However, it is possible that similar findings may be reported in the literature within the complexities of a lack of time or the negative impact of unreliable technology.

Although updates are perceived as problematic, Butler & Sellbom (2002) state that out of date technologies can also cause concern. Harry (H&LS) considers that regular updates are positive: "Computer upgrades like Windows 7 are available very quickly and I generally find the software runs quite well". Managing institutional decisions about the most effective time to apply updates are not straightforward. Balancing the problems caused when updates are applied against the issues associated with allowing technologies to become out of date can create complex issues that impact on individuals' adoption decisions. As an increasing number of academic activities now rely on technologies either for administration, teaching or research it would be beneficial to undertake further research to identify particular issues with updates in more detail.

6.2.2: Detrimental effect on the student experience

Five participants perceived that their use of educational technologies could have a detrimental effect on students' learning experiences. Some participants reported that they did not have the skills to utilise educational technologies effectively in their

professional practice. For example, Ellen (H&LS) described how she perceives she needs different skills because expertise in educational technology is not her subject speciality:

> I know loads about [subject] but not a lot about the IT! But sometimes we expect a lot of ourselves with the IT, don't we? You sit there and you expect yourself to know absolutely everything, and I think calm down, actually this is not my field of expertise really. I am using it, but I need some guidance.

Both Isabel (H&SS) and Ellen (H&LS) explain their concerns about developing resources using educational technologies. Isabel explains, "I don't think that you engage so much when it's online". Whilst Ellen (H&LS) is anxious about the effect on students, "I think it needs some careful thought about how you're going to construct it because you don't want something that's going to completely de-motivate the student either". Bruce (S&E) argues that it is important to be careful about changes that are made to the students' learning environment, "What was supposed to be an upgrade to make things more modern actually had a detrimental effect on the learning experience for students". Keith (H&SS) was also concerned about the negative effects of educational technologies on the student experience and reported that a good student experience is becoming important for the ratings on league table scores:

> I have concerns that we're moving to 'infotainment' rather than focusing on education and facilitating learning … we're being pressurised into making things more entertaining for students so that

> they give us better feedback scores so we look better on some ridiculous league table … It can lead to more interactive sessions but again you have to think through pedagogically very carefully why you're doing any of these things or it can end up with loads of show and no real content and no real understanding.

Participants expressed concern that their HoD may not support future educational technology developments as a result of any negative effects. However, Gibson (2010) explains that it is important to foster safe opportunities for staff to take risks if a University wants to develop the creative potential of its staff and an engaging educational environment. Particularly as Fisher, Denning, Higgins, & Loveless (2012) found that teachers' knowledge is often developed locally and informally. Similarly, Devlin and Samarawickrema (2010) argued that a shared understanding of effective teaching is important to drive up standards. Hannan and Silver (2000, p. 1) suggest that an individual may face difficulties if they want to implement an innovation that is either not required or directly supported by the institution or department: "For an individual to pursue innovation outside strategic planning and responses to internal and external review and judgement may be seen as eccentric, at worst as dangerous".

The JISC (2008, p. 33) explored tangible benefits of e-learning and stated that the "appropriate use of technology is leading to significant improvements in learning and teaching across the sector and that this is translating into improved satisfaction, retention and achievement". However, my findings suggest that the use of educational technologies is a more complex concept than this statement suggests, and participants were cautious about the proposed benefits of adopting and implementing educational

technologies in practice. Parchoma (2010, p. 63) argues that *technologies* are often considered as a single entity with the benefits examined in terms of the "effectiveness, consistency, efficiency and fiscal sustainability", which tends "to ignore or reject the interrelationships between disciplinary ways of knowing, underpinning philosophies of teaching and technology" (p. 61). Similarly, Oliver (2011) asserts that there is often an overemphasis on the influence of a technology in research and a presumption that it has a causal power over any social effects. Thus Oliver says, there is a focus on technology devices rather than the role of meaning and learning in the way that technologies are utilised.

6.3: Perceived enablers for utilising educational technologies

Participants identified enablers that helped them to overcome the perceived risks and barriers and use educational technologies more effectively. The identification of enablers is becoming more important in implementation research (Surry et al., 2009). Ensuring that University leaders focus upon and develop opportunities for enablers to flourish is becoming essential (McPherson & Nunes, 2008). Whilst Svensson, Ellström, and Åberg (2004) argue that these enablers must form supporting structures for educational technologies to be effectively utilised in practice at work.

Enablers reported by participants were split between the central University support available from the departments within Professional Services, and the more informal support that participant's often fostered and initiated. Table 6.3 provides an overview of the perceived enablers for using educational technologies.

Perceived support	Description of enablers
Centrally provided	• Accredited courses. • Workshops and accessing exemplars of good practice. • One-to-one support.
Faculty/School/Departmental and colleagues	• Informal Faculty/School/ Departmental local networks and groups. • Accessible colleagues or near peers.

Table 6.3: Overview of the perceived enablers for adopting and implementing educational technologies

6.3.1: Perception of centrally provided support

The Centre for Lifelong Learning (CLL) is located within Professional Services in the UoL structure (see Figure 1.1). The CLL provides a range of support for members of staff in their teaching activities including guidance about how to use educational technologies effectively (see Section 1.3.3 for more details). The support available includes opportunities to take accredited courses, attend regular workshops, access case study information and exemplars of good practice and obtain one-to-one support.

Participants were approached to take part in my research through a process of strategic sampling (Mason, 2002), which identified members of staff who had either completed, or were currently enrolled on one of the accredited courses on offer from the CLL; either the Certificate in Professional Studies (CPS) or the Postgraduate Certificate in Learning and Teaching in HE (PG Cert). The accredited courses were

reported by participants as a valuable opportunity to share information and experiences about the effective use of educational technologies, particularly for new lecturers to the UoL. Kevin (H&LS) explains how he found the CPS useful; "Another thing that has really helped is that you have to complete the CPS within the first two years, if you are a new lecturer". Isabel (H&SS) found the CPS useful, but explained that it would have been beneficial to undertake it earlier: "The module on the CPS on [subject] was really useful, but it came after I'd already done a lot of it".

The CLL provides short workshops on topics that are either requested or known to be of general interest. Ellen (H&LS) describes how she makes use of these: "When we get the email saying what's available from the Centre for Lifelong Learning I have a look to see whether it's something that I can fit in". Colleagues from the CLL try to adapt workshops to the ability of those attending as much as possible, but it may not always be possible to pitch the workshops at the right level for all participants. Bruce (S&E) describes his experience: "I've attended some of the training courses which to be honest have not been terribly useful. And one that was supposed to be at a kind of intermediate level I found very basic". Gina (H&SS) considers that it is beneficial to tailor support towards the different abilities of staff, "I think that what they should do in terms of supporting people to adopt new technologies differs according to how comfortable people are along the way". Designing resources and workshops that cater for the ability of all staff attending can be challenging. Diane (H&LS) sums this up, "I guess the problem is that it's trying to balance developing staff in these skills and empowering them to use them when they're already very busy".

Gina suggests that as well as workshops, she finds case studies or short examples useful for her, “I want to hear about those things fairly regularly and have opportunities to try them out. I want to see how they work in practice in a five-minute video”. Similarly Noel (S&E) would like to see good practice examples of technologies in use that are easy to find, “I’d like to see decent worked examples … good solid exemplars. ‘Here is a video of a good solid use of a [technology].’ They may exist, in fact they probably do, but how do I find them?” Four participants reported that providing case studies that demonstrate how educational technologies could be used would be beneficial. Neil (PS) suggests:

> I think it’s more about making the case for why to use it rather than supporting its use. I'm of the feeling that with most of these new technologies, once you know why you would want to use them they’re actually quite straightforward. Most people should be able to figure it out for themself … I think the university could make the reasons why you should use a certain technology clearer.

Noel (S&E) reports that he would appreciate more information about the reasons to use educational technologies: “If you’re trying to push a technology, show me why I should use it”. Keith (H&SS) is also keen to have more clarity about the reasons to use technologies: “I think it's very important to be very clear on why we're required to use the technology that we are”. Similarly, Wanda (H&LS) says she would like to understand how technologies could help her, “a bit more explanation of what’s available and what we can do with it or how it can help”.

Three participants reported the personal contact they had with members of the central support team as an important source of support. Diane (H&LS) explains, “I’ve spent a lot of time with [name] lately. What I think is great about [name] is [s/he] has a very calm approach. If I ask [him/her] the most basic of questions, [s/he] never makes you feel stupid or anything”. Gina (H&SS) describes the support she received from the central team as helpful, “I've had a conversation with [name] about a provision for studying [subject] as a first year module and we’ll get chatting about something and [s/he’ll] suggest, ‘there is this thing that you can use’”. Similarly, Tanya (PS) finds the support offered by a member of the central team to be important: “[name] is quite good, [s/he] informs me of a lot of things”.

Although Kevin (H&LS) admits that he knows about the central provision he is unclear who to ask for support on a particular subject:

> I think the courses at the Centre for Lifelong Learning are good and that's how I first began to get into it … I wanted to put exams online and even turn them into computer marked assessments and things. I wasn't quite sure where to go or who to see and in the end I am going round and asking people. It doesn't feel a very structured approach. There doesn't seem to be some place you go to.

Beetham (2001) examined ways of supporting members of staff to develop their skills in using educational technologies and identified that one-to-one help, staff development, and case study materials were effective methods of providing support. Although Beetham’s paper was written some time ago my findings also suggest that

participants continue to find these sources of support important. Beetham argues that in order to effect change, a range of mechanisms need to be in place as there is no one method of support that works for everyone.

6.3.2: Support from colleagues

There were more departmental networks and groups for sharing examples of effective practice reported to exist outside of the central provision in faculties, schools or departments than I anticipated. Participants described these local networks as a useful source of support. For example, Ellen (H&LS) describes the local network that she finds useful; "we have got a school e-learning group, which is slowly starting to share knowledge throughout the school". Gina (H&SS) also describes the departmental network that is beginning to support educational technology activities:

> We have a, 'Lets share what we do' hour and I could show of what I do and [a colleague] demonstrates something that he does and we can talk about, 'Is there anything you would like to do in your module that you don't think you can?' Just kind of throwing ideas around and saying, 'This is what we do and if you want to know how to do it then we'll show you'.

Support from colleagues who were easy to contact and accessible was also reported to be one of the most important enablers when participants considered adopting and implementing educational technologies. Gunn (2010) suggests that this could be due to a perceived lack of useful and easy to access central support. However, educational technologies are sometimes feared (Parchoma, 2008) and participants may be

reluctant to seek support from centrally based, and perhaps less well-known people. Although Rogers (2003) proposes that it may simply be more convenient to ask for help from trusted and available colleagues.

Support from colleagues appeared to be reliant on the participants' interpersonal networks. Kevin (H&LS) describes how he met the people that influence his use of educational technologies: "I play football with a few of them". Isabel (H&SS) explains how influential a colleague's support was for her, "everything I know about technology in the university all came from [a colleague in the department], who spent days and days showing me how to use everything, what everything was, the ways around the problems. She was brilliant". Wanda (H&LS) highlights the importance of the support she receives from a colleague who is willing to try things out and share his experience:

> I know somebody in the department and he's involved a lot in developing new technology for teaching. He's happy to try things and waste his time on that. Then he gives us his feedback and we use it when it's okay. That's fine. He's the one who is wasting his time. He has decided to do a bit less research and put a bit more time in teaching and developing technology.

Noel (S&E) suggests that the only way he has been able to adopt and implement educational technologies has been by, "finding the experts in the School to ask how do I do this". Similarly Kevin (H&LS) explains how important he finds the support of someone who can tell him what might be possible:

> There are so many things I want to do. I am buzzing around, and the bit of time I had to try and develop something has gone. I've been faffing around and working foolishly with things. But if you could just point me in the right direction, that would save me some time and help me to learn.

The characteristics of the colleague providing the support were also reported as important. Colleagues who were willing to help and happy to suggest potential solutions were described as more influential. Diane (H&LS) identifies the importance of someone who gives her confidence, "what I think is great about [colleague] is she has a very calm approach". Ellen (H&LS) says it is important that this person understands what is required: "He understood perfectly what I was saying, where there were the holes in what we were doing … And he's really, really patient". Ellen also considers the support of a colleague to be crucial for her to have the confidence to try new things; "it was very empowering, because I'd say, 'I really want to have a go with that myself'. It could have gone badly wrong but [with a colleague's support] you think, I'll have a go". Gina (H&SS) talks about the importance of the encouragement she received: "her enthusiasm for it really gave it the green light that I wanted and the bit of reassurance that it was a good idea". Kevin (H&LS) says that it is crucial to have someone to go to and for this person to have a helpful attitude:

> It's not a major part of [colleague's] job, he just happened to have fiddled about first; he didn't go on courses, he just tinkered about and he's really good at that kind of thing. He's fabulous and he's a

> really 'can do' kind of person as well. That makes a big difference. Having the right kind of person … He's never too busy to help anyone. If I started to play with it, it may not have taken off in the same way.

Abrahams (2010) asserts that it is beneficial to have people in the faculty who can act as trouble-shooters and answer questions or identify problems as they arise. With the opportunities that virtual communication now provides, Noel (S&E) suggests that accessible may not just mean someone who is physically close, instead he says, "they're only an email way". Keith (H&SS) admits that for him it has little to do with the characteristics of a colleague and more to do with how accessible they are at that time:

> Proximity is the key … whoever is near and whoever I think could answer the question. If I get a decent answer and it works – hey presto – because for me that's the thing. If it works, great! I don't want to know how it works; I don't care how it works. I just want it to work in order for me to do what I want to do.

Rogers (2003) uses the term *near peers* to identify people who "serve as role models whose innovation behaviour tends to be imitated by others" (p. 36). Rogers claims that near peers are Early Adopters or opinion leaders. My findings do not support Rogers' assertion that near peers are necessarily Early Adopters. Instead I found that near peers could be anyone who was willing to support a colleague's efforts to adopt and implement educational technologies, but it helped if they had more advanced

knowledge of the technology at hand. Rogers suggested that near peers are most influential during the persuasion and decision stages within the innovation-diffusion process. My findings supported Rogers' claim to an extent, though participants reported that support from colleagues was important throughout all their of their adoption and implementation of educational technologies.

Lave (1991) also uses the term near peers within her concept of situated learning in the workplace. She describes learning from peers in terms of "ways in which the increasing participation of newcomers in on going practice shapes their gradual transformation into oldtimers" (p. 72). Lave's description of near peers appears to be focused on apprenticeships, she says that newcomers are "furnished with comprehensive goals, an initial view of the whole, improvising within the multiply structured field of mature practice with near peers and exemplars of mature practice" (p. 72). However, the descriptions of support from colleagues that participants reported did not necessarily follow Lave's description of near peers as an apprenticeship. Participants described the support they could access from a colleague who could help them relatively quickly with a problem or suggest a solution as important. The support participants reported they valued was informal and generally relied on interpersonal relationships rather than an apprenticeship model.

6.4: Summary

Within chapter six I described the participants' perceptions of the impacts risks and enablers associated with the adoption and implementation of educational technologies at the UoL. Perceptions of impacts were mixed. Four participants identified that educational technologies create a flexible opportunity for supporting students and that

technologies are essential for managing day-to-day teaching and administrative activities efficiently and effectively. However, there were also concerns that educational technologies could have a negative effect. Participants were concerned that students may not have the skills to cope with the new challenges that using educational technologies can present to students. There was also a concern that technologies can make it too easy for students to contact staff, which could increase workload if not managed effectively.

My findings suggest that an individual's perceptions of the impacts of educational technologies are likely to influence their decision to adopt a given technology. These perceptions may be formed from an individual's previous experience and understanding of a technology in practice. Ertmer (2005) also argues that previous practice could influence an individual's decision to adopt a given technology. Rogers (2003) does not identify perceived impact directly within the innovation-decision process. However, Rogers states that the prior conditions of an innovation include the individual's previous practice, needs and problems, level of innovativeness, and the norms of the social system. It could be argued that Rogers' notion of previous practice within the prior conditions of the innovation-decision process may relate most closely to perceived impact.

Participants identified several risks associated with adopting and implementing educational technologies and frequently discussed these in terms of barriers. The most frequently reported risks were the perception that it can take a large amount of time to become competent to use educational technologies effectively, the problem of coping with unreliable technologies, the challenge of teaching in poorly equipped teaching

spaces, and the potentially negative effects of software and hardware updates. These issues caused particular anxiety if they led to an impression that the member of staff was incompetent, or if the student experience was detrimentally affected by the introduction of an educational technology. If either of these situations arose there was concern that the HoD may become unsupportive of attempts to make use of technologies in the future.

My findings suggest that an individual's decision to adopt an educational technology was not taken in isolation. Rather it appeared to be a decision that considered wider institutional factors. Within Rogers (2003) innovation-decision process, perceived risks could arguably be more relevant to the persuasion stage, or to occur as a result of a lack of relative advantage, compatibility, complexity, trialability and observability. The innovation-decision process focuses upon issues that are relevant to specific innovations. However, some of the risks identified by participants appear to be linked to institutional factors rather than conditions within specific innovations. Therefore it is difficult to determine where my findings about perceived risks fit within the innovation-decision process.

Participants identified that the key enablers for overcoming risks and utilising educational technologies effectively were: the informal departmental networks, and colleagues who were accessible were influential; the availability of central support, including opportunities to enrol on the accredited programmes, take part in workshops and access one-to-one support. The innovation-decision process of the DOI does not consider the support that individuals need to enable them to use educational

technologies successfully. My findings indicate that an individual's decision to use educational technologies is influenced by the support that they have access too.

Within Ely's (1999) conditions of implementation, perceived impacts and benefits could relate to *rewards and incentives*. If a technology works effectively and is sufficiently resourced then an associated reward could be the opportunity to save time and effort. The availability of time and resources and a personal lack of knowledge and skills are three of Ely's conditions and could be identified as perceived risks if they are absent. Similar to the innovation-decision process, support was not referenced directly within Ely's conditions although it could link to having access to knowledge and skills. The support from senior staff appears to fit within commitment and leadership. However it seems to be difficult to account for my findings within the innovation-decision process of the DOI unless the individual factors that are included within each of the five stages that Rogers (2003) proposes are considered separately. Ely's eight conditions of implementation link more closely to my findings although this model also does not account well for all of my findings. The importance of context was a central finding in my research but does not seem to be addressed adequately in either Rogers or Ely's models.

Chapter 7: Conclusions and potential implications

In this chapter I summarise the findings against the research questions and discuss the implications for the theoretical framework. I build upon my contribution to knowledge and suggest an alternative model to Rogers (2003) DOI and Ely's (1999) conditions of implementation. I then reflect on my experience conducting this study, identify limitations of the research and suggest potential areas for further research.

7.1: Addressing the research questions

The principal research question was; what are the main factors that influence a member of staff to adopt and implement educational technologies at the University of Liverpool? This question was broken down into four sub-questions. Each sub-questions is addressed in one of the following four sections.

7.1.1: What do members of staff at the UoL perceive to be the drivers and rationales for using educational technologies in their professional practice?

The first research question explored participants' perceptions of influential institutional drivers as well as the participant's personal rationales. The findings from the semi-structured interviews were considered against an analysis of key institutional documents, including the UoL Strategic Plan (The University of Liverpool, 2009) and the E-learning Policy (The University of Liverpool, 2007).

Hannan's (2005) three types of drivers for innovations in HE, directed, guided and individual informed the analysis of the findings. Hannan described *directed* innovations as those that are driven by institutional imperatives. Only one participant

reported that institutional strategies and policies were drivers for using educational technologies. Gunn (2010) suggests that even though policies and strategies exist, individuals are often unaware of them. Therefore the perceived lack of an institutional driver may not be surprising. If participants perceived that institutional drivers existed, they were more likely to be reported as originating from the faculty, school or department. Silver (2003), argues this is perhaps to be expected. Institutional strategy and policy information is generally communicated from the central University committees to the faculty committees for consultation or dissemination.

There was a perception that institutional drivers are not needed and that utilising educational technologies is just an expectation of an up to date academic member of staff. At the time the data was collected participants were not required to engage with the VLE, or with any other educational technologies. However, the Liverpool Guild of Students (LGoS) subsequently issued a campaign to introduce minimum standards and a consistent level of use of the VLE.

Participants reported it was easier to engage with educational technologies when their HoD was supportive. However, support from senior staff was found to be inconsistent across the faculties. Participants were concerned that their HoD would not approve if they spent time developing educational technology resources instead of research or other academic duties. Findlow (2008) describes this as a conflict between accountability and innovation, and calls it a disabling tension.

Hannan (2005) described *guided* innovations as those that are encouraged by the institution, either by providing funds, or other types of resources or support. My

findings did not fit neatly with Hannan's notion of a guided driver. I therefore described these drivers as indirect because participants identified they occurred as a result of more localised faculty activities. Four of the most often reported indirect drivers for innovation and adoption were:

- The availability of the wide range of technologies on the Information Technology (IT) network.
- A perceived expectation that faculty members will employ efficient ways of working, which was often considered to involve using educational technologies.
- A need to meet students' expectations.
- The need to be flexible in the delivery of resource materials, particularly as there is a perception that there are now greater financial pressures on students and students often have to work in order to fund their study.

Hannan's (2005) description of *individual* innovations is that people are driven by personal rationales and draw upon the experience of enthusiasts. Participants' personal rationales for engaging with educational technologies were varied but some of the more commonly reported included:

- Participant's expectations of the technologies and whether they would work as they should immediately or whether members of staff would have to adapt technologies to fit pedagogical innovations.
- Perceived benefits and/or potential opportunities for career progression.
- A general interest in educational technologies, enthusiasm or novelty factor.

Hannan's (2005) three classifications provided a useful framework to inform my analysis and suggest future drivers for educational technologies at the UoL. These findings corroborate Straub's (2009) assertion that the drivers for adopting and implementing educational technologies are complex and multidimensional.

7.1.2: What impacts do members of staff perceive educational technologies have on their professional practice?

The second research question explored participants' experiences and perceptions of the effect of using educational technologies in their professional practices. Ertmer (2005) explains that an individual's perspectives can influence how lecturers choose to engage with educational technologies. Participants' perceptions about the impacts of educational technologies were mixed.

Four participants reported that educational technologies were essential for them to do their job and had a positive effect on their ability to engage with students. I also found evidence of negative impacts, which were articulated in terms of barriers and risks and included lack of time, resources and clarity about the technologies available. These findings support existing research in this area, for examples see Browne & Jenkins (2008), Butler and Sellbom (2002), Schneckenberg (2009) and Walker et al. (2012). The four most reported risks were the reliability of technologies, effects of updates, amount of time needed to learn and become competent to use a technology, and the potentially negative effects on student learning.

7.1.3: What do members of staff perceive to be the enablers for the successful adoption and implementation of educational technologies in their professional practice?

This research question examined participants' views of the factors that helped them to make most effective use of educational technologies. Answers to these questions were split between the more formal, central support available and informal, often locally driven support.

My findings suggest that the informal networks in schools and departments were reported to be beneficial, often more than institutional networks. However, the most reported enabler was the opportunity to contact a peer or colleague who could provide relatively quick and informal support when needed. Rogers (2003) used the phrase near peers to relate to colleagues close by who then act as role models. My findings indicated that it did not matter if colleagues were physically near as electronic communication can reduce problems of communicating at a distance. Close proximity was a considered a bonus but not essential and being able to ask a question of a colleague who was nearby was discussed favourably. It was more important that colleagues were easily accessible. Participants described the importance of the characteristics of the colleague. One of the most commonly identified positive characteristics was their approachability and apparent willingness to help. Accessible colleagues did not necessarily have to be more knowledgeable than the participant but they were generally able to provide a sense of confidence that inspired participants.

7.1.4: What are the implications of the research findings for supporting the use of educational technologies at UoL and beyond?

The fourth research question explored the recommendations for practice. The implications from this research are mainly based in the UoL and it was not my intention to generalise past the present context. To empower members of staff to utilise educational technologies effectively it is important to understand the drivers, impact, barriers and enablers whilst reducing the perceived risks to a minimum. Lei and Morrow (2010, p. 152) summarises this as:

> For successful technology adoption to happen, all issues must be addressed: environmental barriers, knowledge and skills, and incentives. In addition to providing incentives, other factors must also be addressed, including strong peer connections, on-going support from peers and experts, and strong leadership.

Participants reported little understanding of any drivers or reasons to use educational technologies from an institutional perspective. Instead drivers from the faculty appeared to have more influence on participants' decisions. The support of senior managers was reported as important but the data suggests there are inconsistencies between the endorsements of the importance of using educational technologies from senior managers. Senior leads in the faculties are already being consulted on the development of faculty based educational technology strategies and implementation plans. Given that each of the faculties operate slightly differently, continuing to work with senior staff on embedding these plans in faculty would appear to be a sensible way forward.

As well as ensuring the reasons for using educational technologies are clear, it will be beneficial to consider the range of institutional activities that are perceived to indirectly influence how members of staff engage with educational technologies. My findings suggest that there were four main drivers that I identified as indirect; the availability of technology on the Information Technology (IT) network; an expectation that members of staff will employ efficient ways of working; a need to meet students' expectations of educational technology; and the need to provide flexibility in the delivery of resource materials.

The UoL has invested in a wide range of technologies that are freely available for members of staff to use on the institutional network. Although members of staff are not required to engage with educational technology, participants reported that they were encouraged to do so simply because the technologies could be easily and freely accessed. This finding appeared to be linked to the perception that using technology was just the expectation of a modern member of staff in their professional practice. However, the amount of technology available was also reported to be confusing and some participants were unclear about which technology would be most appropriate for their needs. Participants requested greater clarity about the technologies available and more information about how they could utilise it effectively in their teaching. Therefore articulating the reasons for using different technologies will be important for increasing the engagement of members of staff.

At present there are a number of websites and departments that members of staff can get information about different technologies available. Russell (2009, p. 15) explains

"decisions about use of e-learning technology are typically being made by individual lecturers. This dearth of support services is both a symptom and a cause of the slow adoption of new learning technologies". Ensuring that there is more co-ordinated approach between the departments providing this information may help to alleviate some of the confusion and provide the desired clarity. The request has contributed to the development of the institutional projects described in Section 7.3.5.

There was concern that technology is sometimes introduced as a way to check that members of staff are doing their job effectively. The current proposal from LGoS for minimum standards in the use of the VLE will need to be carefully managed to avoid this problem. It will be important to ensure that the focus of future proposals for increasing the use of educational technologies highlight the potential benefits that technology can offer. Concentrating on the benefits of using educational technology will help members of staff determine how technology can contribute to efficient and effective ways of working.

The students' desires for a consistent use of the VLE to support their studies have now become a strategic issue for the institution. Determining the most appropriate way to implement this requirement and achieve a solution that is embraced effectively could cause tension given the freedom that members of staff currently have about how they adopt and implement educational technologies. Particularly as members of staff quite legitimately at times argue that a consistent approach may not be appropriate for their subject area.

Central support is usually provided via an advocacy, or *buy-in* model, which may not help to administer strategic requirements. The central departments that support educational technologies can help members of staff to gain the skills to use educational technologies more effectively but they cannot generally force members of staff to use the VLE consistently or even require that they attend training. Institutional strategic intervention with an advocacy model for individual engagement could create extra challenges for implementation.

The three academic faculties support the use of educational technologies slightly differently; therefore any consistency is likely to be agreed at the faculty level. Discussions are currently underway with each of the three faculties to determine the most appropriate way to encourage members of staff to engage with the students' desire for consistency.

Participants' approaches to using technology appeared to be different when they discussed the different contexts of research and teaching. My findings suggest that participants were more willing to take a risk with the technologies they used in research. In this context failure was reported to be a tolerated part of the research process. However, when using educational technologies in their teaching they were less willing to take a risk and reported that it was important that the technology did not fail.

Participants identified a number of risks that could result in technology failing during teaching. These included reliability issues, negative effects of updates and a lack of knowledge about how to use technology effectively, which could then have a

detrimental effect on the student experience. The concern reported most from participants was the amount of time that was required to engage with educational technologies effectively. Learning how to use a technology, developing resources, or fixing any problems that occurred could take large amounts of time. Participants reported there were pressures to conduct research or take on departmental administration duties, which meant that they had less time to devote to educational technology developments. Therefore it is important to ensure that technology is reliable, that updates are tested thoroughly and that institutional process and procedures support the use of educational technologies rather than create barriers. Rather than focusing on trying to inspire members of staff with innovative ways of using technology, it seems it is more important to ensure that the hardware and software are reliable and appropriate to needs. As Spotts (1999, p. 8) suggests: "If equipment is readily available to develop instructional material and classroom facilities are available for using the material, an instructor might be motivated to use the technology".

Increasing engagement can also be achieved by accessing effective support. One of the most important sources of support that participants reported was informal support from their colleagues, or near peers (Lave, 1991; Rogers, 2003). Support from colleagues was reported to be important for providing suggestions, helping sort out problems and providing the confidence to *have a go*. Members of staff can be fearful about using educational technologies and colleagues appeared to play an important role in helping to overcome fears. This is an informal source of support that was most often reported to have developed through informal networks and personal contacts. Therefore implications for practice are difficult to identify. It may be possible to

identify departmental individuals who are willing to be a point of contact. However attempts to formalise what is essentially an informal process, built from interpersonal networks may be unsuccessful.

The UoL has experimented with identifying departmental advocates for raising awareness about educational technologies in the past with limited success. Jenkins, Browne, Walker, & Hewitt (2011) suggests that local champions may not be the best way forward. Finding a way to develop and maintain closer connections between the informal groups that are developing in faculties and the central support is important. It is clear that members of staff across the institution engage in innovative practice and disseminating this wider would be beneficial. Educational technologies can change quickly; therefore developing a wider network of individuals who can keep up with new opportunities and interpret any potential benefits for L&T would be beneficial. As Hagner (2000, p. 36) explains, "Communication is vital to successful institutional transformation. Support centres must be able to publicize their services to the academic community, and perhaps more important, faculty experiences with and opinions of transformation must be shared". Ensuring there is engagement and sustainability are not easy issues to address in a large institution that has established and complex processes and limited budgets.

7.2: Implications for the theoretical framework

This section summarises the implications of my findings for the theoretical framework that informed my research. I summarise how my findings relate to Rogers' (2003) adopter categories and suggest an alternative model based on the work of Hagner and Schneebeck (2001) and Spotts (1999). Neither the innovation-decision process of the

DOI or Ely's (1999) eight conditions of implementation explains my findings so an alternative model was proposed that centres on the importance of context.

7.2.1: Implications for the adopter characteristics

In previous research in this area it has often been the researcher who has determined the most appropriate adopter category to attribute to a participant. However this approach has been criticised (Hurt et al., 1977). Instead, I asked the participants to describe their own approach to engaging with educational technologies. Although the adopter category statements (see Appendix 1) were not a sophisticated measure, they were useful for helping to prompt the discussion. My findings identified differences in the approaches participants reported towards engaging with and utilising educational technologies. Similar to Rogers' (2003) proposal in the DOI, these differences seemed to lie on a continuum. However, I did not find evidence for five categories of adopters as Rogers claimed, and it was only possible to identify individuals towards the ends of the DOI's adopter category continuum. I was unable to discern any real differences between the adopter categories defined in the DOI as Early Adopters, Early Majority and Late Majority.

Participants reported that they found it difficult to identify with one adopter category. The categories were not perceived to be static and instead appeared to be determined by the context or the situation. For example, participants reported that they used educational technologies a great deal for some activities and considered they were one of the first to use a technology, but for other activities they indicated they were more likely to be one of the last to use a technology. As described earlier in this chapter,

this distinction was particularly apparent when participants described how they used different approaches to technology for research or for learning and teaching activities.

My findings support some of the criticisms of the DOI outlined in the literature. These include the lack of regard for the uniqueness of the individual in the adopter categories and the importance of contextual issues and that the concept of time as the main unit of analysis was also too simplistic to explain my findings.

As the adopter categories proposed by Rogers (2003) did not help me to interpret my data, I also examined the models proposed by Hagner and Schneebeck (2001) and Spotts (1999). Hagner and Schneebeck identified four groups of adopters, Entrepreneurs, Risk Aversives, Reward Seekers and Reluctants and claim their model is a simplified version of the DOI's adopter categories. Unlike the adopter categories of the DOI, Hagner and Schneebeck do consider the uniqueness of the individual and the context. Spotts identifies three categories of users, High-level, Medium-level and Low-level and conclude that staff attitude and the perceived value of technologies are important factors in determining whether an individual was high, medium or low user.

Reviewing Rogers' (2003), Hagner and Schneebeck's (2001) and Spotts' (1999) models I proposed three categories of users that seemed to fit my data more closely. *Enthusiasts* were identified as individuals who are keen to use educational technologies and explore the potential benefits, *Pragmatists* were willing to use technologies so long as there is clarity about the potential benefits and *Risk Aversives* were hesitant to use educational technologies and sceptical about the potential benefits.

Rogers' (2003) innovation-decision process and the notion of adopter categories continue to be well used in the literature. Although they have some merit as a basis to consider the adoption of innovations, my findings suggest they are not sophisticated enough to apply to an educational technology context.

7.2.2: Implications for adoption and implementation

This section reviews the implications of my findings and contribution to knowledge for Rogers' (2003) innovation-decision process of the DOI, and Ely's (1999) eight conditions of implementation.

Rogers (2003) innovation-decision process focuses on the individual and optional innovations, or the innovations that an individual has a choice over. Rogers' suggests that adoption and implementation studies typically tend to focus attention on just one innovation in order to compare and contrast the influential factors that affect an individual's innovativeness. However, Agarwal and Prasad (1998) claim that this is a measure of domain-specific innovativeness which does not indicate an individual's global innovativeness. At the time the data was collected the UoL did not require a minimum use of educational technologies. It would therefore have been difficult to identify just one educational technology that was equally relevant to all participants to focus the discussion upon during the semi-structured interviews as Rogers suggests. Considering Agarwal and Prasad's claim, participants were instead asked to discuss their use of educational technologies more generally, and then focus upon a particular technology that they considered was most relevant to them. This approach allowed a

more in depth discussion and revealed issues that may not have been identified had I restricted my questions to examining just one technology.

The DOI is a complex model. Rogers (2003) outlines five linear stages – knowledge, persuasion, decision, implementation and confirmation – in the innovation-decision process that he says an individual goes through to decide to adopt or reject an innovation (see Section 2.2.1 for more details, but Figure 7.1 provides a reminder of the innovation-decision process model for the reader).

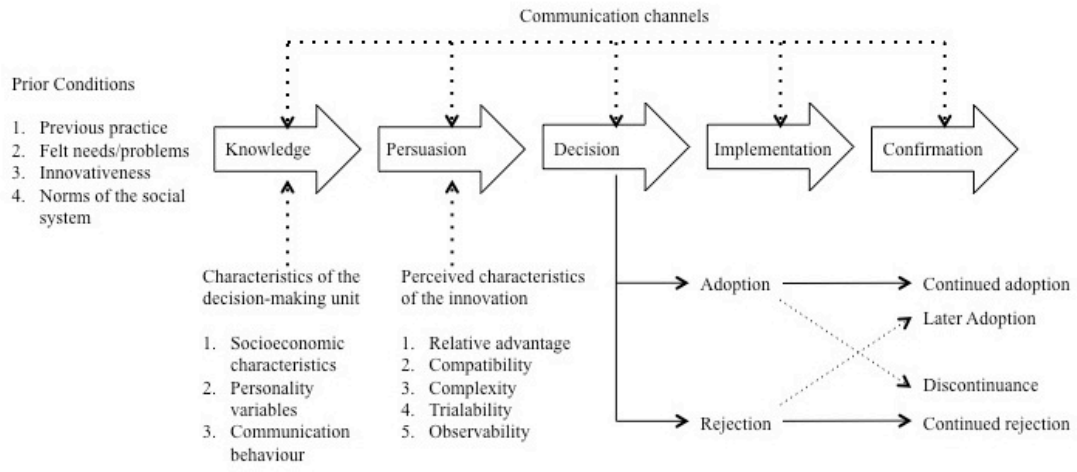

Figure 7.1: The innovation-decision process from Rogers (2003, p. 170)

Rogers (2003) proposes that knowledge, persuasion and decision are mental stages, but implementation and confirmation are more practical and the stages when an individual acts on the decision. I did not find evidence to support a separation between mental and physical stages of the innovation-decision process as proposed by Rogers. My findings agree with Lyytinen and Damsgaard's (2001) assertion that it is difficult to separate the five stages of the innovation-decision process. Rogers also

acknowledges that it is challenging to identify where one stage ends and another begins.

Similar to proposals by Salmon (2005) and Wolff (2008), my findings do not support Rogers' (2003) claim that adoption decisions are a linear process, rather my findings suggest that these decisions appear to be influenced by many factors and subject to constant review. Rogers suggests that the factors, prior conditions of the innovation, the characteristics of the individual and the characteristics of the innovation influence knowledge and persuasion. My findings suggest that it is worthwhile to consider a non-linear model that takes account of how the prior conditions, the characteristics of the individual and the characteristics of the innovation influence an individual's decision to adopt and implementation educational technologies. Figure 7.2 reflects how my findings revise Rogers' innovation-decision process to account for a non-linear process.

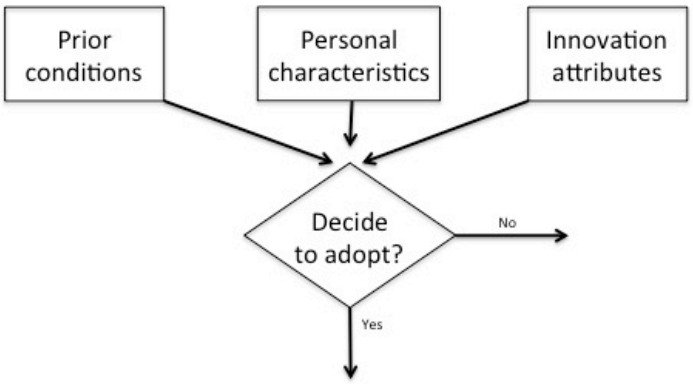

Figure 7.2: Revised decision process adapted from Rogers (2003)

Allen (2000) highlights the problem of a tendency for pro-innovation bias, or the expectation that innovations are inherently beneficial and will ultimately be adopted. I did not find evidence that supported a perception that innovations are inherently beneficial. Rather the decision to adopt was based on contextual factors that appeared to change relatively frequently.

Even though the DOI is well cited in the literature I found it to be a problematic model. My findings suggest that Rogers (2003) innovation-decision process does not account for all the factors that had reportedly influenced participants at the UoL. This was particularly true for the consideration of factors that affected the current context.

As described in Section 2.3, Ely (1990, 1999) proposed eight conditions that he says influence the successful implementation of educational technology. These are dissatisfaction with the status quo, existence of knowledge and skills, availability of resources, availability of time, existence of rewards or incentives, encouraged participation, commitment by those who are involved, and leadership. Ely suggested that an absence of any of the eight conditions of implementation was likely to hinder implementation and change. For example, if a clearly expressed purpose for the innovation is lacking, if there is no persuasive evidence that the innovation is better, if there is a perception that there is innovation overload, if there is little understanding about the innovations that have happened before, or if there is a change in the influence of personal relationships.

Ely (1999) does not suggest that these conditions exist in a formulaic way for every innovation, or that there is necessarily a linear process to follow. Rather he says that

"most of the conditions will apply most of the time in most situations" although they will be tempered by the cultural context and personality variables or personal characteristics (Ely, 1990, p. 5). Ely's (1999) conditions could arguably represent influences that are more relevant to the current situation, for example, current availability of resources and time.

My findings suggest that the decision to adopt a technology was not usually taken in isolation. Context was reported to be an important influential factor for participants and may begin to explain why some people resist educational technology in certain circumstances. For example, I found that participants reported they were more willing to take a risk when using technology for research, rather than when using educational technology in their teaching. Similarly, educational technology can be rejected for many reasons (Walker et al., 2012) and it is important to understand what helps an individual to overcome the barriers for rejecting an innovation (Lei & Morrow, 2010). Therefore, the stereotype that individuals are either good or bad with technology appears to break down in favour of a more context dependent model.

An area that does not appear to be represented in either of Rogers (2003) or Ely's (1999) models, but was evident in my findings, was the available support that participants reported to be most useful. As discussed in Section 6.3.2, one of the most important sources of support reported by participants was the influence of near peers, or colleagues and individuals who were easily accessible. Informal networks were increasingly reported to be influential as was the central support, particularly after a personal contact had been made or after attending one of the taught programmes.

My findings suggest that there are many factors that can influence an individual's decision to adopt and implement educational technologies. An alternative model is proposed in Figure 7.3.

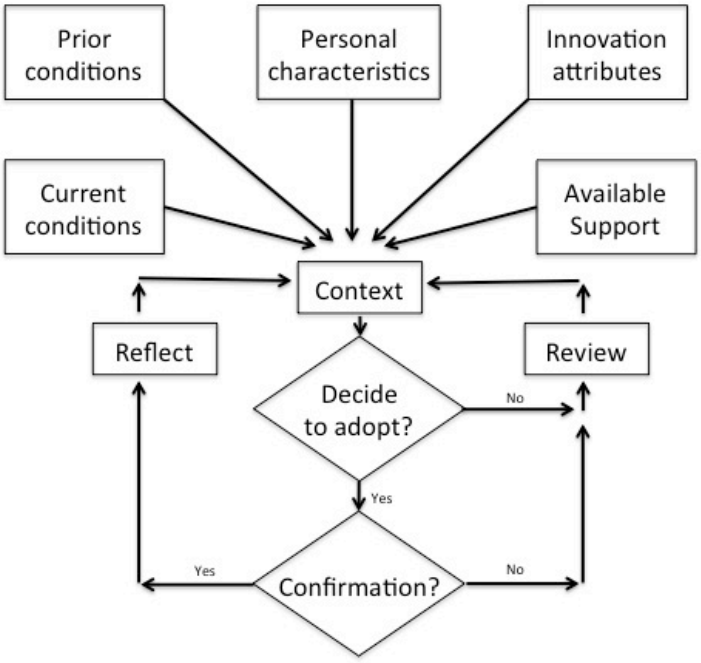

Figure 7.3: Revised innovation-decision process

This model identifies that rather than a linear process, adoption and implementation decisions are reflective and subject to changing contextual factors and a process of repeated confirmation and review. According to Fullan (1982) and Ely (1999) adoption and implementation are different. My findings agree and suggest that rather than being part of adoption, as Rogers (2003) suggests in the innovation-decision process, implementation is a more complex process that includes contextual and varied decision-making processes. Individuals continually reflect on a decision to adopt a technology and review whether it is beneficial when implemented in practice.

7.3: Reflections on the research and limitations of my approach

When I began this research I was fortunate that my role as head of the eLearning Unit within the Centre for Lifelong Learning provided a useful insight into the issues that affect members of staff. However, investigating the factors that are influential for participants to adopt and implement educational technologies at the UoL is something that I have become more interested in during this doctoral study. I am grateful for the opportunity that I have had to research this area.

As a direct result of this research I now have a more detailed appreciation of the issues that influence and hinder members of staff when they consider using educational technologies. This knowledge is extremely helpful for my professional practice and has already proved to be useful with the contribution this research has made to the institutional project described in Section 7.3.5. The remainder of this section describes some of the limitations I acknowledge in my approach.

7.3.1: Number of participants

This research was conducted with a small number of staff from across the UoL. However, the time and resources available to undertake this research limited the scale of what could be achieved. There was a relatively even split between the number of participants from each of the four main areas of the UoL, with six participants from H&LS (the largest faculty), four from H&SS, three from S&E, and three from PS. Even though the sample size was small, a rich set of data was collected during the semi-structured interview, particularly because of the freedom that participants were given to discuss a technology that was relevant to them.

7.3.2: Terminology and definitions

There are many terms that are used to describe how the use of technology is referred to within education and it is a term that is often misunderstood (Moore, Dickson-Deane, & Galyen, 2011). Although I thought I had defined what I meant by the term educational technology in the context of this research, I think the phrase caused confusion at times. Participants sometimes expressed uncertainty about what should be included within this definition. This was particularly evident when participants identified a technology to describe during the semi-structured interview as some participants struggled to think of a technology relevant to them. Allowing participants to choose the technology that they wanted to focus on to answer the interview questions provided flexibility and led to findings that would arguably not have been apparent otherwise.

7.3.3: Effectiveness of the adopter category statements

The adopter category statements I created and used at the beginning of the semi-structured interview (see Appendix 1) were developed from Rogers' (2003) characteristics of the five adopter categories in the DOI. Each statement matched characteristics that Rogers identified. Participants were given the choice of three responses to choose from, plus the opportunity to include open-ended answers.

Although the statements did not work as effectively as I hoped in terms of identifying a participant's approach to technologies, they nevertheless revealed some useful information. Also, the findings relating to the adopter categories in Chapter Four were

not based solely on the responses to these statements as data from the semi-structured interviews also contributed to examining the participants' approach.

Extending the pilot phase to include a thorough evaluation and redevelopment of the adopter category statements may have generated a more effective set of prompts. However, this may still have been problematic as I later identified the importance of context. Alternatively it may have been useful to consider and revise Hurt et al.'s (1977) *Scales for the Measurement of Innovativeness* although it was not possible during this research due to the timing of when I became aware of the paper.

7.3.4: Publications arising from this research

Undertaking part-time study whilst having the responsibility of a full-time job in a challenging and developing role has placed many competing demands and restrictions on my time during the course of this research. I have not been able to dedicate time to publishing from my research but this is something that I intend to do once the thesis is completed, particularly with respect to the institutional initiatives that have been informed by this research and the importance of the support from accessible colleagues.

7.3.5: Institutional initiatives informed by this research

My research provides evidence of the need to provide clear information about the technologies that are available and the support that can be accessed. The findings from this study have directly informed the development of an institutional initiative called *Spark* and an associated Technology Review Group (TRG). Spark and the TRG

contribute to the long-term goal of creating a streamlined, transparent and clear process to support and evaluate the use of new and existing technologies for learning and teaching at the UoL. These initiatives fit within the University's existing mechanisms for support and resource allocation and inform management decision-making processes.

7.4: Suggestions for further research

Conducting this research has been very interesting but has resulted in far more questions than I started with. There are many areas that I could focus upon to engage in further research. The first of these could be a more detailed investigation into the implications of the different approaches that participants reported towards educational technologies. It would be useful to consider the implications of the global and domain-specific innovativeness literature in more detail. I found that context was one of the most important factors in determining how participants decided upon and utilised technologies. Someone who appeared to be an enthusiast could also be quite risk aversive in another context. For example, participants reported very different approaches when they discussed the technologies they used for research and teaching.

My findings suggest that the perception of risk was complex. It would be particularly useful to examine the factors that contribute to risk in more detail and with a larger number of participants. Achieving a more comprehensive understanding of the risks and enablers will be useful for increasing the engagement with educational technologies at the UoL in the future. In particular with regard to the issues identified with updates, as I was not able to identify research that discussed these issues fully.

Although examining research that highlights a lack of time or a negative impact of unreliable technology in more detail may uncover similarities.

There has been a recent campaign from the LGoS that minimum standards and a consistent use of the VLE are needed. If this proposal is successful it will be interesting to examine the impact that minimum standards have on how members of staff are prepared to utilise the VLE. This will provide an opportunity to examine the effect of introducing a required technology on staff member's engagement with educational technologies. It will also be useful to examine the difference between the students' desires and the impact on the professional practice of the member of staff. For example, members of staff who consider the use of technologies to be a management tool that has been introduced as a way of checking that staff are doing their job correctly may not see minimum standards as a positive step. However, this is also an opportunity for some staff to legitimately commit more time and effort to the production of educational technology resources as it implies that there will be more support from senior staff. Whether it will lead to an increase in the amount or quality of educational technologies available is unclear.

Salmon (2005) argues out that there is a distinction between technologies that are easy to use and technologies that are considered to be more innovative. My findings suggest that innovativeness was interpreted in quite different ways. Smith (2011) conducted research that asked participants what they understood innovativeness to mean. A more detailed examination of what UoL members of staff understand to be innovative would be useful and could help to tailor the support that is needed in different parts of the institution.

The importance of accessible colleagues or near peers was reported regularly to be one of the most important enablers for the successful use of educational technologies. One suggestion for how to increase the number of individuals that use educational technology would be to identify a near peer for every member of staff. However successful near peers were identified through interpersonal contacts and identified as people who had certain characteristics, for example a willingness to help and patience though colleagues did not necessarily need to be experts. Therefore it is unlikely that a formal method for identifying near peers would be successful. However, it would be worth investigating the concept of near peers further, particularly in terms of the social and contextual influences of near peers and the distinctions among pedagogical, administrative and perhaps research uses of educational technologies.

This research was based entirely within the UoL and it was not my intention to generalise the findings beyond the UoL setting. As a Russell Group institution the UoL has a particular, though not necessarily unique culture with regard to the opportunities that members of staff have about whether and how to utilise educational technologies. However, given my findings about the importance of context it would be useful to conduct this research again both in other Russell Group and post-92 universities to identify whether similar or different findings are reported. It may also be worthwhile to explore the perceptions of a wider range of members of staff than those interviewed within the current research. This may begin to allow an examination of any disconnects between the perceptions of the adoption and implementation of educational technologies from more senior members of staff, as well as those from practitioners.

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Appendix 1: Adopter category statements

Name: _____ Dept.: _____ Date: _____

Please tick the statements that you think most appropriately describe how you approach technology in your professional practice.
Please ☑ as many as are appropriate.

1. Where do you hear about new technologies?

- ☐ Mostly from outside your local circle of peer networks
- ☐ Mostly from your peers at work
- ☐ Mostly from your friends outside of work

Other:_____

2. When do you generally want to try out a new technology?

- ☐ As soon as it is available.
- ☐ Only after a few people have tried it.
- ☐ Only after it has been thoroughly tried and tested by almost everyone else.

Other:_____

3. How certain do you like to be that a new technology will work?

- ☐ You are not unnerved if you try a technology and it fails.
- ☐ You don't mind too much if a technology fails but you'd rather it didn't.
- ☐ There must be absolutely no uncertainty about whether the technology will work.

Other:_____

4. How long does it take you to decide whether to use a new technology?

- ☐ You deliberate for only a short while before you decide whether to adopt a technology.
- ☐ You will not adopt a technology unless you are pressured to by your peers or encouraged by an economic decision.
- ☐ It takes you a very long time to decide whether to adopt a technology.

Other:_____

5. How do you think you use technology?

- ☐ You think you are quite innovative in your use of technology.
- ☐ You are willing to try some new things out but you are definitely not innovative.
- ☐ You use technology only for what you have to and no more.

Other:_____

6. How comfortable are you using technology?

- ☐ You are very comfortable using technology and you are happy to use it all the time.
- ☐ You are comfortable using technology.
- ☐ You are not comfortable using technology and only use it because you have to.

Other:_____