Teacher Thinking about Technology in Higher Education: putting pedagogy and identity in context

Institute of Education

Submitted for the degree of Doctor of Philosophy

2014

Christopher Shelton

Abstract

Educational technologies occupy a significant and high profile position within higher education with some technologies widely used across the sector. However, although the use of new technologies is often encouraged through institutional policy, training and funding, there is significant variation in actual practices - especially with regards to teaching and learning. Research on teacher thinking suggests that this variation is related to university teachers' beliefs and knowledge about technology and learning.

A mixed-methods approach was used to investigate university teachers' thinking about their use of technology. The first stage of data collection was a quantitative survey of 795 higher education teachers from a sample of 27 UK universities. This identified institutional and subject-related differences in teachers' perceptions of impact and use of particular technologies in their teaching. The second stage of data collection was a qualitative multi-site case study of eleven university teachers from three universities that identified their perceptions and beliefs about technology and the contexts in which they act. It investigated how these individuals formed and reinterpreted their beliefs about technology and how they made decisions about when and how to use (or not use) technology.

The thesis shows how university teachers' thinking about technology is situated in the culture and contexts in which they live and work. It explores the relationships between pedagogic beliefs, beliefs about technology and teachers' perceptions of 'control' over how they use technology. It identifies how some teachers used technology to communicate their personality and build relationships with students but, also, how some used technologies despite believing that these did not have a positive effect on student learning. It shows how, in making sense of their use of technology, academics draw on multiple sources including understandings of the impact of technology on culture and society, perceptions of higher education and their institution, their subject disciplinary background and their identity as teachers and academics.

Acknowledgements

I would like to thank all of the survey respondents and interviewees who gave their time and made this project possible.

I would also like to thank my supervisors, Neil Selwyn and Martin Oliver for their support, encouragement and challenge throughout my PhD.

Finally, I would like to thank Miriam, Samuel and Sarah for helping and supporting me all the way through the project.

Declaration

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

C.Shelton

Word count (exclusive of appendices and bibliography): 85,440 words

Contents

List of Tables

List of Figures

1 Introduction

For a number of years now, claims for the beneficial impact of technology on higher education have had a very high profile. According to the Higher Education Funding Council for England (HEFCE), "technology has a fundamental part to play in higher education" (HEFCE, 2009b, p. 2) and it has been claimed that technology can have a transformational effect on higher education (Mayes *et al.*, 2009) or lead to fundamental shifts in academic practice (Weller, 2011). As a result, national governments and individual educational institutions have introduced initiatives that have raised expectations of the use of technology in education and led to huge investments to purchase and make use of new equipment and software, train staff and generally 'technologise' educational provision.

However, despite these investments and the potential improvements promised by early innovators, there is significant variation in how technology is used in higher education. Many teachers and students make only limited use of technology (Selwyn, 2007). While a number of explanations for this variation have been proposed, this thesis will consider the role that university teachers' thinking about technology and learning play in their decisions to use technologies and their perceptions of its relevance to teaching. It will show how teachers' thinking about technology is related to the context and culture in which they work, their professional identity as teachers and their beliefs about teaching and learning.

Technology and higher education

The term 'educational technology' and the many related terms (e-learning, blended learning, learning technology, technology enhanced learning, and so on) have been defined in diverse ways by different authors. These definitions often reflect the wider ideological intentions or technological predilections of the writer and so can be used in conflicting or confusing ways (Reiser and Ely, 1997). For example, some authors define 'educational technology' in terms of the process of developing educational systems (e.g. Ely, 2002) while others use the term to refer to specific pieces of ICT hardware or software (e.g. Kiraz and Ozdemir, 2006). For the purpose of this research, the thesis will follow JISC (2004b) in using the term 'Information and Communication Technology' (ICT) or just 'technology' to refer to the whole range of resources used to process information (including, but not limited to, computers and their software). The terms 'e-learning' JISC (2004b) and 'educational technology' (Dugger and Naik, 2001) will then both be used to refer to the use of any of these

technologies to support learning and teaching. This definition encompasses both widely-available and established technologies, such as word-processors or DVD players, alongside newer technologies, such as virtual learning environments or Web 2.0 applications. In addition, it includes technologies that support both distance and face-to-face teaching, course preparation and communication with students.

The thesis is particularly concerned with how these educational technologies are used for teaching and learning in higher education. The term 'higher education' is used to refer to the study of any course of education at degree level or above whether taught face-to-face or online. Hativa and Goodyear (2002) note the range of terminology used in research into this sector with 'Higher Education', 'Tertiary', 'Post-compulsory', 'Post-Secondary', 'College level', and 'University level' all appearing in the research. Although higher education courses can be taken in a range of institutions in the UK, this thesis will focus on teaching in universities and institutions that teach predominately higher education courses. The terms 'HEI' (Higher Education Institution) and 'university' will be used interchangeably to refer to any of these. The terms 'academic', 'lecturer' and 'teacher' will be used to refer to those staff employed (full-time, part-time or temporarily) by a university who, as part of their responsibilities, work directly to help students learn.

If we consider this higher education landscape then, in theory, education technologies occupy a significant and high-profile position. Among the most prominent of these are Virtual Learning Environments (VLEs), which provide a single point of access to a number of different ICT resources such as course documentation or communication tools that can be used flexibly alongside traditional 'face to face' teaching or for distance education. VLEs are now used by all UK universities with the most popular being 'Moodle' (Walker, Voce and Ahmed, 2012). VLEs enable university staff to communicate online with particular groups of staff or students (e.g. those enrolled on a particular course) and can also be used for two-way communication; for example, a message board may be used by students to debate a topic or to create an online group resource.

Technologies that support online collaboration and dialogue are sometimes highlighted as having particular potential for education (e.g. Booth and Hultén, 2003). More recently, educators have been exploring ways in which the online tools known collectively as 'Web 2.0' (e.g. online group publishing tools or social networking websites which encourage active participation from their users) might be used to enhance learning in higher education (e.g. Newland and Byles, 2013). Mitchell (in Klobas, 2006) suggests that the "collaborative, creative nature" of Web

2.0 applications enables educators to increase the "interactivity, authenticity and social purpose" of learning opportunities (p. 122).

While much discussion of technology has focused on distance learning and those technologies that take learning outside of the classroom or lecture hall, this definition of educational technology also encompasses technologies intended to support face-to-face teaching. For example, lectures may be supported by presentation applications, such as a Powerpoint slideshow, displayed via a projector. With smaller classes, Interactive Whiteboards provide tools for interacting with and annotating slides on a projector while lecture podiums and tablet computers provide a method of doing this in larger spaces. Some universities have used electronic voting systems that allow students to answer questions and provide feedback during lectures (JISC, 2005) and a growing number of students have brought their own technologies, such as laptops or iPads, to university teaching sessions. In addition, universities that are predominantly campus-based and teach through traditional lectures and seminars have integrated some of the tools and techniques of distance learning into their programmes. Sometimes referred to as 'blended learning', this seeks to gain any advantages due to the use of technology without losing any of the quality of existing teaching methods. For example, a tutor may supplement a traditional lecture with further online material such as a webpage, a file attached to an email, or more recently, an audio podcast, or video lecture.

As well as supporting the formal provision of teaching and learning, educational technology is also widely used in other aspects of a teacher's role. For example, a range of technologies known as e-assessment or Computer Assisted Assessment (CAA) are claimed to help teachers provide high quality assessment and feedback (JISC, 2007a). These encompass a wide range of applications from online tests or quizzes to sophisticated systems that enable students to build and submit an electronic portfolio of work. Some e-assessment systems may mark work automatically to provide instant individual feedback, moderate the quality of feedback to ensure consistent quality (e.g. OpenMentor described in JISC 2007) or detect plagiarism (Goddard and Rudzki, 2005). Technology is also used for the management and administration of courses. Common administrative tasks such as record-keeping or publishing course information are now often reliant on ICT, and for many teachers, email is a key tool for course administration.

The impact of technology in higher education

However, despite large investments and the dedicated work of many pioneering educationalists, it can be argued that educational technology has not transformed teaching and learning in the way that many had anticipated (see, for example, Blin and Munro, 2008; Cuban, 2001).

From the 1940s onwards, teachers in UK universities have experimented with a wide range of different technologies, including radio, television and film (Kay, 1979) but although these technologies continue to be used in some form they have not fundamentally transformed education (Spotts and Bowman, 1993). Despite this, each new innovation has been accompanied by claims about its potential impact, for example, multimedia computers were described as the "wave of the future" (Charp, 1995), online learning as "a paradigm shift" in learning (Harasim, 2000), and Cochrane and Bateman claimed that mobile Web 2.0 tools could transform pedagogy and facilitate student engagement (2010).

As this thesis will show, some of these technologies are now widely used, particularly presentation tools and VLEs, and there have been many examples of effective practice in the literature (e.g. JISC, 2004b). However, it has been claimed that technology has remained "marginal" for most academics (Conole, 2004) and failed to produce the radical improvements to practice that some had hoped for (Kirkup and Kirkwood, 2005). According to Kirkwood and Price (2013), it is often taken for granted that technology 'enhances' learning, however their review of studies of technology in higher education found that most of these explored how technology might supplement or replicate existing practices and few studies took up the potential for technology to transform teaching or learning. This can also be seen in students' responses to technology; for example, Kinash, Brand and Mathew (2012) argue that their students were "mostly neutral" (p. 651) about their experience of mobile learning using iPads.

Some writers have gone further and suggested that some uses of technology have had a constraining and even detrimental effect on education (e.g. Noble, 2001) or have "spawned a small but passionate revolution" amongst the academics forced to use it (Oppenheimer, 2003, p. 105). Njenga and Fourie (2010) suggest that some of the claims made for technology are just myths and they identify a "technopositivist ideology" of compulsive enthusiasm for technology. This debate over the potential mismatch of the rhetoric and reality of ICTs in education is one which the thesis will return to throughout the course of the discussion.

A number of different explanations have been suggested as to why technology has not achieved the transformative impact that some had hoped. One possible explanation could be limitations of the technology itself. It could be argued that the technology is not yet good enough and there is no doubt that some technologies fail to work reliably, especially when first introduced (e.g. Perreault *et al.*, 2002). However, Schneckenberg (2010) describes explanations such as these as "short-sighted" (p. 980). As discussed above, there have been many different technologies introduced into education over a very long period and limitations in individual technologies are not sufficient to explain why pedagogical practices have not been improved or transformed as hoped for.

Another approach to explaining the effect of technology in education has been to identify factors that may mitigate against the successful use of technology. As technology has been promoted as a solution to perceived problems or as a force for changing teaching practices, when that change has not appeared, this may be attributed to 'barriers' to its progress. Such 'barriers' are well documented in research into the use of technology in schools. For example, Bingimlas' (2009) literature review identifies a number of barriers and categorises these as "school-level" or "teacher-level" barriers. School-level barriers are said to be "lack of time", "lack of effective training", "lack of accessibility" and "lack of technical support", while teacher-level factors are identified as "lack of teacher confidence", "lack of teacher competence" and "resistance to change and negative attitudes". Bingimlas further acknowledges the complex relationships between these factors. Each of the issues identified by Bingimlas and others researching technology in schools have parallels in the higher education sector.

However, while each of these 'barriers' may affect how technology is used (or not used), even together, they do not provide a complete explanation for the lack of sustained impact of technology on higher education. The implication of this discourse is that if the barriers can be overcome, then technology will be able to do what was promised. But this 'technological determinist' view of technology itself as an agent of change has frequently been challenged (e.g. Oliver, 2011) for suggesting that technology has the power to cause social change (in this case educational 'transformation').

There are many alternative ways of understanding the relationship between technology and society (e.g. see Selwyn, 2010). One alternative to accepting technological determinism and the idea that technology can solve the problems of education, could be to understand technology as a neutral tool for users (in this

case teachers and students) to use or not use as they wish. However, this 'social determinist' or 'instrumentalist' view has been challenged for ignoring the unintended consequences of using technology and placing "far too much faith in people's abilities to exercise foresight and restraint" (Burbules and Callister, 2000, p. 8). In addition, another problem with both technological determinist and instrumentalist views is that they 'reify' technology by considering 'technology' to be a "single material thing with a homogeneous, undifferentiated character" (Chandler, 1995).

A different group of approaches to understanding how technology is used that attempt to avoid these pitfalls are 'social shaping' theories (see Selwyn, 2012). These consider how the creation and use of technology can be shaped by various organisational, political, economic and cultural factors. 'Cultures' are defined by Becher and Trowler as "sets of taken-for-granted values, attitudes and ways of behaving, which are articulated through and reinforced by recurrent practices among a group of people in a given context." (Becher and Trowler, 2001, p. 23). In terms of technology, this means that uses of technology are "socially and historically conditioned" (Trowler, 2008, p. 32) and operate in wider political and ideological systems (Monahan, 2005). Winner (1993) has noted that uses of technology embody existing power relationships in society and Trowler comments that "social practices undergo change as they utilise the tools, and the context of practice, in turn, influences the specific ways in which tools and other resources are used" (Trowler, 2008, p. 32).

Teachers' thinking about technology

This range of explanations reflects the complexity of learning and teaching in higher education. However, although some of these have been the subject of detailed investigation (for example, there is a strong tradition of researching, analysing and improving the design of educational technologies), there is still much to be learnt. In particular, the perceptions and beliefs of individual academics have been less well attended to within the research literature compared to the number of studies of students' perspectives (Gerbic, 2011).

The lack of empirical work notwithstanding, it has been acknowledged that an academic's individual beliefs about technology and learning influence their attitude towards and eventual use of ICT (Ferguson, 2004). This literature focussing on beliefs and technology forms part of a larger body of work investigating university teachers' thinking which also includes research into teachers' beliefs about teaching

and learning, and issues of professional identity (see, for example, Hativa and Goodyear, 2002).

If teachers' thinking about technology is important, then higher education institutions must address this when introducing or promoting new technologies. While some resources or teaching methods may easily fit into a teacher's existing ideas and practices, others may not; and so staff development and training that provides the technical competence necessary to use technology may fail if it does not address the beliefs, values and pedagogical practices of the academic (Errington, 2004). In these circumstances, it is important to understand how beliefs may be changed or reinforced.

While some authors have stressed the individual and personal nature of beliefs about teaching, others have pointed out that these are constantly re-interpreted within social and cultural contexts. For example, Windschitl and Sahl (2002) discuss how school teachers' norms and expectations for technology use are reinterpreted by individuals through participation in a variety of settings. However, unlike for school teaching, the connections between teachers' thinking and their context have not been sufficiently explored in relation to higher education. This thesis addresses this omission and explores how teachers in higher education may be 'reinterpreting' their use of technology use in terms of their perceptions of technology, teaching and cultural context.

Outline of the thesis

The thesis explores how university teachers' thinking about technology is related to the culture and context in which they work and shows how in making sense of their use of technology, academics draw on multiple sources including understandings of the impact of technology on culture and society, perceptions of higher education and their institution, subject disciplinary backgrounds and their identity as teachers and academics. In order to provide the framework within which to do this, the next chapter explores the contexts for teaching with technology in higher education and some of the rationales given for adopting new technology.

Chapter Three then considers the tradition of research into teacher thinking and discusses the terminology of 'beliefs', 'perceptions', 'thinking', etc., as applied to teachers. It relates this tradition to research about the use of technology and identifies three key strands: teachers' perceptions of technology, pedagogical beliefs, and professional identity. It shows that these strands have remained

separate in prior research, although each can contribute to a fuller understanding of teachers' thinking about technology.

Chapter Four sets out the research methods used in this study. The first stage of data collection was a quantitative survey of 795 higher education teachers from a sample of 27 UK universities. The second stage was a qualitative multi-site case study of eleven university teachers from three universities that identified their perceptions and beliefs about technology and the contexts in which they act. It investigated how these individuals formed and reinterpreted their beliefs about technology and how they made decisions about when and how to use (or not use) technology.

In Chapter Five, the results of the survey are discussed and the relationships between subject-discipline, institution and technology are developed. It identifies institutional and subject-culture differences in teachers' perceptions of impact and use of particular technologies in their teaching. It suggests a classification of 'core' and 'marginal' technologies and provides evidence that 'core' technologies may be used despite teachers believing that they would not have a positive effect on student learning.

Chapters Six to Nine report the results of the case studies. Chapter Six considers how teachers' thinking about technology is situated in the contexts in which they live and work. It extends the range of contexts identified as relevant in the literature and considers how these are interpreted by individuals. Chapter Seven explores how technology use relates to professional identity and discusses evidence that shows how teachers use technology to communicate their personality and build relationships with students. Chapter Eight explores the connections between technology and pedagogical beliefs and suggests that participants' beliefs did not fit neatly into the categories suggested in the literature. It suggests that pedagogic beliefs were mediated by beliefs about technology and that teachers' perceptions of 'control' over technology were important. Chapter Nine considers how teachers' thinking changes and the influences of formal and informal learning, and of successful and unsuccessful experiences on these changes. It also suggests that moments when change occurred in structures and contexts often made teachers' thinking more visible.

The different aspects of the study are brought together though the discussion in Chapter Ten, which argues that all three strands of research into teacher thinking about technology need to be combined to provide a fuller understanding of this topic. Finally, Chapter Eleven sets out the contributions of the thesis to

understanding research into teacher thinking about technology and explores the implications of the study for research and practice.

2 Technology in Higher Education

As this thesis is concerned with the interaction between university teachers' thinking and their context, it must first explore what that context is. Therefore, this chapter sets out the framework within which university teachers use and think about technology. It will discuss key influences on higher education institutions and teachers and how these relate to their use of technology.

As this chapter will demonstrate, many claims have been made for the potential of technology to improve or transform the 'business' of higher education both in terms of the quality of teaching and learning but, also, to enhance research, commercial engagement or administration. Many of these claims have assumed a deterministic, reified view of technology and although, there is a consistent pattern of promise and disappointment regarding technology in universities, each innovation finds supporters who are sure that this time things will be different. For example:

> "elearning is not simply another technology or add-on that will be quietly integrated or ultimately rejected...[it] represents a very different category and mode of communication" (Garrison and Anderson, 2003, p. 1)

As this quotation suggests, new technologies (in this case generic 'elearning') are sometimes seen as offering something new and different and often claims for technology are related to a perception that there is some need for improvement that new technology can solve. These 'needs' for improvement can come from a range of sources which reflect both the diverse mission of higher education and the overlapping contexts within which it operates. Therefore, to understand the various rationales for introducing new technology, it is important to recognise the different imperatives coming from both inside and outside universities and how they are internalised within institutions, departments or in the work of individual teachers.

Trowler (2008) suggests that even within and around a single university, many cultures can be found working dynamically together and suggests a 'Multiple Cultural Configuration' approach is needed to understand these. There are several ways of thinking about these multiple cultures (see, for example, the seven 'filters' proposed by Fanghanel, 2007) but in order to discuss these influences and claims systematically, this chapter presents these contexts and cultures as nested structures. As Selwyn (2010) has argued, the micro-level use of technology by an individual needs to be set against the 'bigger picture' of their immediate context and also wider cultural values. Hence, this chapter will first consider the macrosystem of

economic and political influences on the higher education sector. Second, the mesosystem of the higher education institution and, finally, the microsystem of immediate contexts for teacher and student.

Technology and the Higher Education Sector

Universities exist within changing economic and political contexts both nationally and internationally, and these macro-level factors may be influential in determining how individuals and institutions respond to technology. D'Andrea and Gosling (2005, p. 11) suggest that there have been 'major shifts' in the purpose of higher education over the last 20 years driven by economic and social demands. One of these changes is a move towards seeing universities as integral to a nation's economic policy, both through their innovation and research (especially in science) and by preparing the future workforce (often framed in terms of developing 'human capital'). The demand from government policy (see, for example, the Leitch Review, HM Treasury, 2006) to prepare students for the 'knowledge economy' leads to universities being "increasingly pressured to produce graduates ready for the labour market" (Barnett, Parry and Coate, 2004, p. 148). As a result, according to HEFCE, universities have been transformed in recent years and are 'intimately involved in changes in the economy and society' (HEFCE, 2009b, p. 8).

However, although the sector as a whole has been encouraged to invest in the 'world class' ICT infrastructure that is required by a 'world class' higher education sector (Cooke, 2008), the role of technology in these changes is less clear. While there are a number of publications that provide collections of small scale case studies of effective practice with educational technology and describe significant impacts on teaching or learning (e.g. Ferrell *et al.*, 2007; JISC, 2004a), there are few indications of the impact of technology on the sector as a whole and it is unclear whether such case studies do more than provide exceptions to more usual and less significant use of technology. In addition, as Hanson (2009) notes, such case studies often reflect the experience of enthusiasts and early adopters rather than the majority of academics.

A significant attempt to support institutions in evaluating their practices with technology was the joint HEA/JISC e-learning benchmarking project. But although this provided useful guidance for individual institutions, it did not give an overall picture of the higher education sector and left "a need for a comprehensive view of the e-learning landscape" (Glenaffric Ltd, 2008, paragraph 7.1.4). The UCISA Survey of Technology Enhanced Learning for higher education in the UK (Browne *et*

al., 2010; Walker, Voce and Ahmed, 2012) addresses part of this data gap through a regular quantitative survey of the technology being used in the UK. Although this does not intend to evaluate the impact of technology on learning, it does provide a helpful overview of the current uses of technology and the institutional context for these. For example, the 2008, 2010 and 2012 surveys have consistently suggested that institutions considered that the most important reason to adopt new educational technology was for "enhancing the quality of learning and teaching" with "meeting student expectations" a close second.

The UCISA survey and its predecessors demonstrate a gradual increase in the use of technology with some tools becoming widespread throughout the sector. However, the surveys do not provide evidence of a revolution or transformation in teaching or pedagogy. This is similar to the situation found by national evaluations in other countries, for example, Sakamoto (2002) describes how, in Japan, despite government strategy and investment, the innovative uses of technology in some universities were not fully adopted throughout the sector. In the USA, a comparison of student surveys between 2002 and 2005 found that change was "evolutionary rather than revolutionary" (Jones *et al.*, 2008, p. 171). This study did find that there was a substantial increase in the number of university students who had taken at least one fully online course (27%) but the majority of these felt that they had learned less than they would have in a traditional face-to-face course.

However, despite the lack of evidence of 'transformative' technology use, two particular influences on the higher education sector have been used as a rationale for increasing the use of technology and will be considered next: the marketisation of higher education, and the impact of globalisation.

Marketisation

Many authors have remarked upon the increasing 'marketisation' of higher education whereby higher education functions as a market with increased choice for students about where to study and increased competition between universities on the basis of price as well as quality (see, for example, Brown and Carasso, 2013). Recent changes to university student funding in the UK have explicitly aimed to strengthen this higher education market and increase competition for students and funding. As state funding for higher education has decreased, universities have been encouraged to become more entrepreneurial and diversify their sources of income. Hence, efficiency and value for money are now a "central concern" for higher education (UUK, 2011). The long-term results of these funding changes are

not yet clear but some commentators see universities in "a fragile state" (Bradwell, 2009, p. 7).

In this context, technology can be seen as a potential method of increasing efficiency and reducing costs in higher education. A university introducing a new technology can have several ambitions relating to efficiency, e.g.: to reduce costs, speed and streamline processes, improve recruitment, expand globally, or achieve economies of scale. In a report titled "Efficiency and effectiveness in higher education", Universities UK recommend new ICT systems and facilities to reduce energy costs and carbon emissions (UUK, 2011). In addition, many other recommendations in the report, such as collecting more detailed data on the costs of education, implicitly rely on uses of technology.

In an attempt to provide evidence of any tangible benefits of e-learning, Ferrell *et al.* (2007) collected a range of case studies and extrapolated the benefits seen in these case studies to the wider student population of similar disciplines. By doing this, Ferrell *et al.* make a number of 'tentative' conclusions about the benefits of wider use of e-learning including a 10% improvement in pass rates, a 1% improvement in student retention (which Ferrell *et al.* calculate as worth £132 million), and doubling the participation rates of disabled students (calculated as worth £796 million). For Ferrell *et al.* "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." (2007, p. 25). However, such extrapolations are hard to justify and other researchers consider that the costs and benefits of e-learning are difficult to quantify and that "we cannot claim that teaching with technology reduces costs" (Littlejohn and Higgison, 2003, p. 11).

Universities have also seen rapid growth with the number of students at university doubling over 20 years (HEFCE, 2009b). Consequently, technology has been portrayed as a solution to the challenge of teaching larger numbers of geographically scattered students. For some universities, this has led to both increased numbers on campus and an expansion of distance learning courses. But as the number of students increases, "traditional forms of teaching come under mounting pressure to change" (D'Andrea and Gosling, 2005, p. 11) and while new technology may be seen as a possible solution to some of these pressures (e.g. Knapper and Cropley, 2000, p. 139), it is not without its critics:

> "technological changes and initiatives in internet and web-based education have been framed and fanned by the managerial transformations of universities. Quality teaching and learning strategies or outcomes have not

been the cause or impetus. The goal has been to save money and be efficient." (Brabazon, 2007, p. 10)

Concerns about efficiency at the expense of quality can also be found in relation to a second important influence on higher education: globalisation.

The impact of globalisation

'Globalisation' refers to the increase of cultural, economic and political networks of connection across the world, the intensification of communication between these, the interpenetration of economic and social practices and the emergence of global infrastructure (Cochrane and Pain, 2000). Globalisation is not a new topic for higher education but as increasing numbers of students and academic staff travel and collaborate internationally, universities have faced significant change (Turner and Robson, 2008). Universities are now seen as operating within an international context and face new competition from established universities and also commercial educators across the world. At the same time, the development of online learning can be seen as an opportunity for the sector to grow (Brindley, 2011). This has led to an expansion in international distance learning programmes at the same time as universities have actively promoted their campus courses to international students, leading to universities receiving over £5.8 billion per year from international activities (HEFCE, 2009b). However, the overall impact of globalisation on the higher education sector is unclear with no consensus "between those who see globalisation as a strong or weak force acting on Higher Education" (Turner and Robson, 2008, p. 4).

Universities have also faced increased global competition as some high profile universities have made their teaching materials more easily available online through OERs or 'Open Educational Resources' - freely available digital materials that can be used and adapted for teaching or research (OECD, 2007). In addition, some of these institutions have designed these materials to attract large numbers of students through Massively Open Online Courses (MOOCs) (McAuley *et al.*, 2010). Bradwell (2009) suggests that universities should respond to this competition by becoming "edgeless": embracing new forms of learning through technology that enable a university to reach students beyond their campus or usual demographic intake. For Bradwell, "Technology can help universities move from where they are now to where they need to be" (2009, p. 11) and in doing so, ensure efficient use of limited resources. However, online learning is not inexpensive and Brindley (2011) suggests that consortia of institutions are more efficient than individual universities. Others have been much more critical of MOOCs and OERs. For example, Knox

(2013) suggests an absence of pedagogy in OERs and notes the paradox that while OERs are often depicted as a way of empowering learners to overcome disadvantage and poverty, they are commonly discussed as a strategy for universities facing global competition in terms of marketisation and the commodification of learning. While Lane (2012) suggests that OERs are used by only a small proportion of universities and that despite the aim of using them to widen participation, OERs are most successful for experienced and confident learners rather than those new to higher education. And although a number of studies have investigated students' perspectives of MOOCs and the low completion rate of such courses, there has been little research into the views of those teaching on MOOCs (Liyanagunawardena, Adams and Williams, 2013).

In summary, as a sector, higher education has seen a gradual increase in the use of technology although this is best described as evolutionary rather than transformative. At the level of the higher education sector, the key issues that relate to the adoption of technology are to respond to political and economic demands, to improve efficiency, to respond to increasing student numbers, and both global and local competition. These issues provide the macro-level context within which individual institutions' technological innovations need to be understood and the chapter will now consider this at the meso-level context of the higher education institution.

Technology and the Institution

While the effects of globalisation, massification and marketisation are felt across the sector, Higher Education Institutions are diverse and differ greatly in mission, size, structure and resources. While the macro-level factors described above all have some, varying degree of influence on individual universities, their influence on the working practices of teachers is filtered through institutional policy and structures. Next, this chapter will explore these structures as meso-level factors (Selwyn, 2010) that can affect technology use.

As might be expected, there are great differences between how individual institutions use technology. Some universities have been quicker to adopt new technologies or ways of teaching than others but according to data collected for HEFCE, 37% of UK higher and further education institutions offer at least one distance/online course (White *et al.*, 2010). In total over 1000 higher education courses are delivered online, with over half of UK online and distance courses at postgraduate level.

Institutional policy and values

The importance of the institution and its own strategy and priorities can be seen in the policies of the Higher Education Funding Council for England (HEFCE). According to HEFCE's revised strategy for e-learning (HEFCE, 2009a), technology can help institutions to meet their strategic goals and priorities in a number of ways, including increasing efficiency, improving existing practices and enabling radical, positive change. HEFCE also claims that the use of technology can improve recruitment and retention (p. 5) and raise the international profile of the university through:

> "enhancing curriculum development and delivery, attracting overseas students, establishing campuses in other countries and in engaging with the Bologna process" (HEFCE, 2009a, p. 7).

For HEFCE, it is the role of individual institutions to decide their focus for the use of technology as "institutional contexts and strategies are key" (HEFCE, 2009a) and their 2009 revisions emphasise the role of institutions rather than national partner organisations as in their earlier e-learning strategy (HEFCE, 2005).

While institutional strategies and policies may be designed to accommodate or encourage the particular uses of technology, the way in which these policies are enacted will depend on the culture(s) within the institution. A university may wish to use technology to satisfy demands for efficiency (including reducing staff numbers), to raise the quality of teaching and learning, or to compete for home or international students. But the willingness to invest in technology or to adapt to new ways of working will depend on those working for the university. For some universities, strong leadership may be seen as a way of making these changes happen and Kidd (2010) identifies vision and leadership as a critical factor for the adoption of technology.

The terms 'managerialism' or 'new managerialism' are often used to refer to the adoption by educational institutions of organisational structures or practices taken from the private sector that are "orientated towards efficiency, economy and market responsiveness" (Becher and Trowler, 2001, p. 10). It refers both to the practice of making these changes and the ideologies underlying it (Deem, 2004). New managerialism marks a shift from traditional collegiate structures to more corporate styles of management although as D'Andrea and Gosling point out some reports of this change may be a little nostalgic (2005, p. 17). It may be seen as a response to the increasing demand for any organisation in receipt of public funding to account for it and demonstrate 'good value', and a desire for improved 'quality assurance'.

According to its proponents, the changes proposed under new managerialism are intended to improve efficiency, effectiveness and excellence through objective measures and continuous improvement (Deem, 2004). However, for some, such management strategies may be counter-productive and imply less freedom for academic staff or an "assembly line" approach to education. Deem and Brehony (2005) claim that new managerialism is concerned with power and dominance and their research found that while it was embraced by only a few academic managers, almost all drew on and used its language and general ideology. In a study of middle managers and junior academics, Barry, Chandler and Clark (2001) found resistance to the harshest forms of managerialism amongst academics and that this moderated some of its effects. Despite this resistance, Kolsaker (2008) argues that academics have become reasonably comfortable working within a managerialist regime and are "instrumental in sustaining them" (p. 522).

One aspect of managerialism is 'performativity': a "technology, a culture and a mode of regulation that employs judgements, comparisons and displays as means of incentive, control, attrition and change based on rewards and sanctions (both material and symbolic)" (Ball, 2003, p. 216). Thus, the performances of individuals or groups come to serve as measures of 'quality' or 'productivity' and stand for the 'value' or 'worth' of that individual or group (Ball, 2000). Within universities, this focus on what can be measured can lead to the creation of an "audit culture" (Apple, 2005). Becher and Trowler suggest that such changes have been "exacerbated in recent years by managerialist applications of information technology" (2001, p. 12). For some, technology can be seen as another way in which managers can monitor and control academic work, for example, through the archiving of course materials for future monitoring or through (possibly covert) surveillance of online activity.

As a result, performativity can influence teachers in quite subtle ways. Clegg (2011) notes how the use of email can entrench audit and managerialism though its visibility. She notes how 'Reply All' email messages can be used to publically demonstrate the writer's busyness or importance, while emailed disagreements are phrased with an awareness that emails can be archived and how those emails may be copied and interpreted by other readers.

According to Clegg, Hudson and Steel (2003), the conditions under which e-learning is introduced into education are shaped by managerialist agendas. As they have argued, a critical issue for teachers is who has control of the curriculum and teaching methods in higher education. New managerialist practices can take decisions about uses of technology out of the control of individual teachers as

institutional pressures for innovation can cause tension with individual's desire to proceed cautiously. They note how this can be compounded by pressures to 'perform' and report only positive outcomes of technological innovation rather than acknowledge difficulties or failures.

More broadly, however, Säljö (2010) argues that the capacity of digital technologies to "externalize human cognitive functions" (p. 61) has implications for definitions of learning as existing understandings of learning are "challenged by a performative and transformative view of learning and knowing" (p. 62). Barnett, Parry and Coate (2001) describe the 'performative shift' in education as an emphasis on the 'use-value' and outputs of learning rather than on knowledge for its own sake. In relation to technology, they see this shift in the increased use of computers to enable students to demonstrate new ways of 'doing' their subject. It also entails a view of students as the 'outputs' of higher education – a consequence of which is a desire to develop students' IT skills to improve their performance in the labour market. At the same time, Barnett, Parry and Coate (2001) identify another 'performative shift' in teaching towards greater use of webpages to provide information in order to improve efficiency and reduce face-to face teaching time.

Thus, to understand the role of technology in universities, institutional strategies and processes and the way that these are implemented and performed through different 'out-puts' need to be considered.

Virtual Learning Environments – an institutional technology

One technology that has been enthusiastically adopted by institutions is the Virtual Learning Environment (VLE) that provides a single point of access to resources such as course documentation or communication tools. According to Littlejohn and Higgison, it is the combination of different technologies that harnesses the "true potential of e-learning" (2003, p. 5) and potentially VLEs provide a way of combining ICT tools in an accessible form for students. While VLEs can be used to provide distance education, they can also be used flexibly alongside traditional face-to-face teaching (Heaton-Shrestha *et al.*, 2005). While early adopters created different VLEs for their departments or courses, between 2005 and 2008 the range of VLEs used by universities "vastly reduced" (Browne *et al.*, 2008, p. 14) as institutions provided corporate VLEs for staff to use and by 2010, almost all Higher Education Institutions were using a VLE (Browne *et al.*, 2010).

The UCISA survey (Walker, Voce and Ahmed, 2012) provides some indication of how institutions are using technology by describing the proportion of modules within each university that use technology in certain ways. This suggests that 39% of

modules use technology on a voluntary basis, e.g. with the VLE providing optional extra material for students. Only 18% of courses require students to use technology for communication and interacting with content and only 3% of courses are fully online. Therefore, even for many of the courses that do use one, the VLE has remained peripheral to students' experiences.

In addition, institutions set different expectations for how their VLE should be used. Some insist that the VLE must be used while others do not. Trowler (2008) suggests that their use and significance varies widely in different contexts as does the extent to which the use is monitored. This can lead to views of the VLE as a public space where academics can be monitored by their managers:

> "There is a sense that VLEs are the ultimate twenty-first century panoptican, where everything is visible, and for students or staff not to be seen in these places is a punishable offence" (Savin-Baden, 2008, p. 94)

For Savin-Baden, VLEs "contain" learning and creativity through structuring and managing learning and are "fraught with images that are deeply problematic and which seem to offer scaffolding, structure and safety, suggest stability and control" (Savin-Baden, 2008, p. 84). Stiles (2007) suggests that, rather than a single "orthodox" VLE, universities need a range of connected systems including those owned by students and that institutions should reconsider the role of the VLE in the future.

Institutional barriers to technology

It has sometimes been suggested that technology has not been used to its full potential in universities because university leadership or institutional structures have hindered it. This could be through omission - not providing the resources or support required, or by obstruction – putting in place structures or procedures that make it difficult to innovate or use new technologies. While some researchers have identified the competing pressures on teachers' workloads, Kidd (2010) also suggests that organisational support, adequate resources and suitable training are critical factors for technology adoption. A lack of any of these can be seen as 'barriers' to technology being adopted and each are discussed below.

Insufficient access to technology has been raised as a problem since the earliest uses of computers in universities and has continued to be of significant concern. In 2007, Brill and Galloway suggested that the two most significant barriers to technology adoption were poor classroom environment and limited availability of equipment. They discussed how issues such as poor room design, positioning of

screens, lighting and acoustics could all have a negative effect on the teaching and learning environment. They also noted inconsistency within institutions. For example, they report one teacher keeping two versions of teaching materials – one for rooms suitably equipped for a Powerpoint presentation and a second version of the same materials for use if Powerpoint was not available (p. 103).

While institutions have improved levels of access to certain resources, this will not be adequate if the technology does not function correctly. To address this, institutions have relied on support both within an individual institution or department and from national organisations such as JISC (Joint Information Systems Committee). Within institutional support, Beetham, Jones and Gornall (2001) identified eleven distinct support roles and twenty core activities carried out by those in these roles. Taken together, the large investments in technology and the teams to support it, mean that lack of access to suitable, working technology alone cannot be said to adequately explain the variations in the impact of technology.

Another potential 'barrier' to teachers' adoption of technology could be a lack of appropriate training. It has long been apparent to those wishing to introduce new technology for teaching that teachers not only need to be trained in the technical skills necessary to use new resources but also in suitable pedagogical approaches. For example, the Nelson report suggested that successful use of technology "will rest on the ability of the academic community to modify curricula and modes of teaching to take advantage of new technology where appropriate" (Nelson, 1983, 5.3.5). This was followed by a number of national initiatives to encourage the use of educational technology in the UK. For example, the Computers in Teaching Initiative (CTI) funded by the UK higher education funding councils in 1989, the Information Technology Training Initiative (ITTI) in 1991 or the Teaching and Learning Technology Programme (TLTP) that allocated £7.5 million over three years from 1992 to develop new methods of teaching and learning using technology. However, many such initiatives focused on a small group of early adopters in the hope that their experiences and knowledge would 'cascade' to the wider community in which they work. This "heroic" theory of change (D'Andrea and Gosling, 2005, p. 5) has not always proved effective as individuals battled against complex settings. An alternative is to provide (or mandate) training in new technologies for academic staff and as a result, according to Lynch, teachers have become "overwhelmed with the options for staff development and teaching skill development" (2002, p. 65). While training has been provided by universities, its effectiveness is not always clear and alternative methods of training may be more effective. For example, Lynch suggests

that mentoring is a particularly useful strategy for supporting teachers to use new technologies.

In addition, while there is now no shortage of internal and external training opportunities, these can have no effect if the people they are intended for have no time to attend them. Similarly, a lack of time to learn new technologies or to use them within already full teaching sessions will also reduce how much technology is used. Time and workload have become increasingly important issues for university teachers and a common rationale for introducing technology has been to reduce the pressures of time and workload through more efficient working. Often, when claims for the efficiency of technology enhanced learning are made, these are related to freeing up time for research (which is seen as a higher status pursuit than teaching). For example, when Littlejohn and Higgison discuss the potential extra time needed to use e-learning they do this in relation to time for research. Also, Brill and Galloway (2007) suggest that cultural factors at work in universities, such as an emphasis on research, can lead to a lack of emphasis on the importance of teaching and that this will in turn influence uses of technology. According to Schneckenberg (2009), this emphasis on research is a particular constraint on younger staff, who he believes are more likely to innovate with technology.

However, the effect of using technology on an academic's workload is not well understood (see Cooke, 2008) and Lynch suggests that research into workload when teaching online is "meagre" (Lynch, 2002, p. 74). Cooke (2008) suggests that universities need to create incentives to encourage e-learning and provide methods of reward and recognition to raise its status.

Overall, these factors: resources, training and workload, have been seen as institutional 'barriers' to using technology in teaching and the existence or perception of these as affecting a teacher's attitude towards using technology. However, as mentioned in Chapter One, such claims assume a deterministic view of technology whereby 'technology' is reified and expected to effect teaching once such 'barriers' can be removed. Therefore, while not having access to a certain technology (for example) will clearly prevent that technology being used, providing access should not be thought of as a way of allowing 'technology' to improve teaching.

Subject and departmental loyalties

While institutional policy and structures can be seen as a key driver for or barrier against the adoption of new technology, the departments within a University will have an important role in how policies are implemented. For Trowler, the

department is very significant in the life and work of an academic: "when people go to work at their university they go to their department" (Trowler, 2008, p. 20). Departments can be seen as separate entities that sometimes function quite separately to other parts of an institution and can operate with antipathy towards other departments or towards management (Trowler, 2008, p. 158).

This loyalty towards a department might be understood as a local manifestation of a wider subject loyalty. D'Andrea and Gosling comment that as academics move between institutions "some remain relatively aloof from which ever institution they inhabit" (2005, p. 6)

> "For most academics, an institutional loyalty is secondary to a disciplinary loyalty and a working relationship within the institution is framed through the deep, underlying epistemological structures of the knowledge fields" (Barnett, Parry and Coate, 2004, p. 142).

The epistemological structures discussed above have been classified by Becher (1989) across two dimensions: hard and soft, pure and applied. The resulting four categories (e.g. hard pure subjects) refer to the nature of knowledge addressed in that discipline. Neumann, Parry and Becher (2002) relate each category to the teaching and assessment methods used in the subject suggesting that particular groups of subjects can be expected to use particular pedagogic approaches. They suggest that more attention needs to be given to the different ways that technology may be suited to different categories of subject.

As a result, when considering the institutional context for teachers' thinking about and use of technology, it is also important to remember the departmental or subject context that, for some, may be of more importance than their institutional context.

Technology and the Individual Teacher

The constraints, opportunities and influences offered by the higher education sector and by particular institutions can affect the micro-level of individual teachers' use of technology. But a number of other factors also influence an individual's thinking about and use of technology. It is a cliché to say that technology impacts on all areas of modern life and, outside of the university, teachers will be found using a wide variety of technologies in the course of any day. Despite the fact that most UK higher education teachers are competent with technology (Cooke, 2008), Conole (2004) has claimed that technology has remained "marginal" for most academics – it is not central to their work and has not led to any major improvements in teaching.

Others support this view, noting the failure of technology to produce any radical change in teaching methods or student learning (Kirkup and Kirkwood, 2005). In contrast, Savin-Baden (2008) claims that the dependency of most academics on computers and the internet for writing and communicating has changed their ways of thinking and practising, while Weller (2011) claims that this may transform academic scholarship.

Claims for technology's ability to transform teaching often centre around one of two functions: to improve administrative efficiency or to improve the quality of teaching, and both of these will be discussed in the next sections.

Improving efficiency

A university teacher has many roles: they may also be a researcher, scholar, administrator, manager and advisor to students (D'Andrea and Gosling, 2005, p. 2). While these roles overlap and influence each other, they may also compete for time and priority and, as discussed above, institutional demands and increasing marketisation have led to perceptions of increasing workload and administrative responsibilities. However, it has been suggested that technology can reduce this burden by helping teachers to become more efficient.

Teachers may use technology to make more efficient use of their time in several ways, for example, to find and adapt resources, to prepare for teaching or through using a computer based planning tool. One strategy which has been claimed to improve both efficiency and also teaching quality is the creation and sharing of flexible, reusable resources or 'learning objects' (e.g. Littlejohn, 2003). Sometimes this is in the form of the Open Educational Resources (OERs) discussed above. However, universities have traditionally created their own learning materials and rejected materials "not invented here", so it is not clear that the desire, time and expertise exists to create and use such resources. Realising the benefits of resource sharing is also made more difficult when intellectual property rights are considered. HEFCE (2006) suggests that universities should ensure that any teachers using or creating resources that make use of materials created by a third party have obtained permission for this from the copyright holder. In response to this, some universities discourage the use of any third party e-learning materials in teaching (HEFCE, 2006, p. 16).

Also, the copyright status of resources created by teachers can be unclear. Generally, the university is the copyright holder of all materials created by a teacher in order to support a course at that institution. But once material has been published online, institutions may be free to hire cheaper staff to run the courses (see the

descriptions of the 'Diploma Mills' in Noble 2001). Finally, online resources and shared repositories potentially open up previously relatively hidden practices to a much wider audience of peers and managers and lead to "far greater scrutiny than ever before" (Littlejohn and Higgison, 2003, p. 3).

As well as directly teaching or supporting students, teachers are involved in planning and preparing, marking and moderating work. They may use technology for record-keeping or publishing course information, e.g. timetables or course outlines on a website. The use of email is one area that could be said to have made a significant difference to the work of higher education. For Brill and Galloway (2007), email provided new opportunities for interaction between the teacher and large groups of students outside of lectures and could overcome constraints of time and space. But while Hassini (2006) suggested that email can lead to richer learning experiences for students, a study by Osterlund and Robson (2009) of Teaching Assistants (graduate students employed to teach) noted that it was common to feel overburdened by email. As email can be accessed at home, new expectations for emails to be answered quickly have become ingrained (Jacobs, 2004). Trowler takes this further, suggesting that "the use of email has changed the nature of social relations in important ways" (2008, p. 33).

Improving teaching quality

The second area where technology is claimed to offer potential opportunities for teachers is in improving the quality of their teaching. Such claims can be presented from a determinist perspective where introducing a new technology is seen as inevitably leading to improvement or from more instrumentalist perspectives where teachers are seen to have access to neutral tools that they can use as they wish. Some of the key areas where these claims can be found are related to online learning, assessment, and the role of the teacher, and these will be discussed below.

It has been claimed that technology could be used to improve teaching and learning through the flexibility of technology to overcome constraints of time and space – enabling students to study online where and when they prefer. However, as Guri-Rosenblit (2005) points out, students enjoy attending a physical campus and interacting with their peers. Despite this, internet technology has blurred the line between on-campus face-to-face teaching and off-campus distance education (Burbules and Callister, 2000) as practices common in one became popular in the other through 'blended learning' initiatives. For example, wikis and blogs are now used by both online courses and those which are predominately taught face-to-face.

Some authors have claimed that 'Web 2.0' tools (such as these and other online publishing tools or social networking websites) that encourage active participation from their users have particular potential for learning in higher education (e.g. Boulos, Maramba and Wheeler, 2006). For example, Mitchell (2006) suggests that the "collaborative, creative nature" of Web 2.0 applications enables educators to increase the "interactivity, authenticity and social purpose" (p. 122) of learning opportunities.

However, Savin-Baden (2008) criticises the naive stance towards wikis seen in some reports, noting that wikis can be linear and relatively static too. Furthermore, Bennett *et al.* (2012) note that students in their study had limited familiarity with Web 2.0 tools and that some did not see value in using them. They suggest that the similarity between the creative, collaborative skills associated with Web 2.0 tools and the skills emphasised in higher education are superficial and that there can be a tension between the levels of participation expected when using Web 2.0 technologies and the requirements for individual authorship and assessment in higher education.

The tension between collaborative technologies and assessment is avoided in the case of technologies that have been designed to try to improve the quality of assessment. One example of this is the use of e-portfolios: personal web-based spaces designed to be used by students to store evidence or products of their learning. These may be monitored by academic staff and used as part of a formal assessment or they may be intended to be managed entirely independently by the student. But these too are not without limitations, a case study by Lopez-Fernandez and Rodriguez-Illera (2009) found that although e-portfolios positively influenced students' attitudes and self-efficacy, they did not have a strong impact on their learning. Students may also have concerns about being asked (or required) to use an e-portfolio. Tosh (2005) notes the need for students to 'buy-in' to their use and be motivated to use a portfolio, to have straightforward and reliable access to the technology, and for the portfolio to fit with other assessment practices. Others note that e-portfolios prompt the creation of a virtual identity where the power of an individual to structure their identity can be undermined by the database structure of the portfolio (McAlpine, 2005).

In each of these cases, the use of a technology can be seen to be related to different aspects of the context in which it is used. In the case of Web 2.0 technologies, this was the higher education culture of individual assessment and in the case of e-portfolios, the concerns of students. But it has also been argued that

technology can improve traditional practice by enabling more significant change and allowing teachers to take on a new and, it is argued, improved role in students' learning. As wider access to electronic sources of information has become available, the higher education teacher's role as 'knowledge gatekeeper' has diminished and this has led to claims that university teachers need to move from a "teaching-centred" to "learning-centred" or "student-centred" view of learning (e.g. Hartman, Dziuban and Brophy-Ellison, 2007). Universities have widely adopted the language of 'student-centred' learning and some make serious attempts to achieve this (D'Andrea and Gosling, 2005, p. 2). For example, UK government initiatives increasingly "focus on the practitioner as an active 'innovator' of new practices and techniques" (JISC, 2004a, p. 8 – note the use of the term practitioner as opposed to lecturer or teacher). JISC (2004b) suggests that when using technology, teachers "may need to develop new skills, embrace changes in the nature of their role and then reassess the pedagogies they employ" (p7) and Conole and Alevizou (2010) suggest that Web 2.0 tools are particularly suited for such constructivist teaching approaches, while Weller (2011) suggests that Web 2.0 tools can lead to profound changes in scholarly practice. This could represent a significant and challenging change to a teachers' role. For example, teachers may have less control over teaching content and may be expected to act more as a 'coach' or 'facilitator' (Ryan *et al.*, 2000). Such claims are in contrast to Savin-Baden's more critical perspective on Web 2.0 described above. However, any changes of role may relate to an individual's identity as a teacher and this will be explored further in the next chapter.

Examples such as these have led to frequent claims that technology is causing a major transformation in teaching and learning: even a "paradigm shift'' (Harasim, 2000), due to its ability to allow "new ways of talking to each other, new ways of learning, and new kinds of communities" (Littlejohn and Higgison, 2003). But improving teaching is far from straightforward. Whilst excellence in teaching is an aim shared by all universities, D'Andrea and Gosling (2005) suggest that "excellent teaching" is not well-defined and that approaches to teaching may just reflect the history and values of an institution. While the examples above demonstrate that changes may be more nuanced and subtle than the language of such claims suggests. In addition, it is also possible for technology to be adopted into the existing working practices of users without any there being any significant change to those practices or to their role. For example, Kirkup and Kirkwood (2005) describe how later adopters are more likely to use technology to replicate or supplement existing practices rather than experiment with the more adventurous approaches of innovators.

However, changes that could not be described as a 'paradigm shift' or 'transformation' can still be important. Price and Oliver (2007) use Activity Theory to identify three different levels of analysis. Whilst, at a 'strategic level', a teachers' aims or purposes for teaching may remain the same when they adopt a new technology, at the level of their conscious 'actions', the tools that they use to achieve these aims may be very different. Furthermore, at the level of 'operations' (the simple and often unconscious tasks that make up each action), the role of the teacher may be completely different. Price and Oliver (2007) also suggest that as such operational changes become routine, they may become invisible and, thus, successful teachers may be unaware of the changes to their practice.

Thus the introduction of new technologies has not had the transformational impact on teaching that had been hoped for and this may be, in part, due to individual technologies not being able to live up to the determinist expectations put on them. However, the gradual adoption and assimilation of technologies into existing practices is important and this can be seen in some of the examples of how technology is used in lectures.

Technology and lectures

According to Sheely (2006), lectures have been widely used for over 800 years. However, more recently, they have been supplemented by the use of presentation applications, such as Powerpoint, displayed via a projector. Similarly, Interactive Whiteboards, lecture podiums and tablet computers provide tools for interacting with and annotating slides on a projector. In a survey of teaching staff at a large US university, Brill and Galloway found teachers relied on a few "relatively low-end and well-established technologies" (2007, p. 99). In particular, there was high usage of overhead projectors (OHPs) and video cassette recorders (although the date of data collection is unclear). Interviews with a small group of these respondents found that the teachers felt their use of technology had a positive influence on their teaching.

There have been a number of contradictory studies suggesting that the use of Powerpoint will either aid or hinder learning (see Savoy, Proctor and Salvendy, 2009). Roehling and Trent-Brown (2011) found that in psychology classes, there was more use of Powerpoint in classes for lower-level undergraduate courses than in higher-level ones, however, students in the higher-level classes were more likely to feel that Powerpoint presentations helped them to make notes and maintain attention. However, such claims reflect the technological determinism discussed in Chapter One by suggesting that the technology itself can cause change. Similarly, we can see determinist views of technology in reports of the supposed benefits of

providing online lecture notes via a VLE to accompany lectures. For example, it has been suggested that greater use of such notes can lead to students gaining higher grades in assessments (Grabe and Christopherson, 2005) and Babb and Ross (2009) suggest that providing notes prior to lectures can increase attendance and participation in sessions although the authors note that they believe their study is the only one to find this.

Some teachers have recorded their lectures and made the recordings available via a podcast or even recorded a version of the material specifically for podcasting. It has been suggested that recordings of lectures provide students with opportunities to listen several times to the lecture and one study found that replacing a lecture with a podcast led to higher exam results (McKinney, Dyck and Luber, 2009). In addition, when university teachers create new online courses, they often begin by translating existing lectures to written or recorded lectures rather than adopting more innovative practices (Sheely, 2006). Sheely argues that, despite their limitations, lectures are central to the discourse around university teaching and have remained a persistent feature of university teaching despite the opportunities offered by new technologies.

The student context

Another important aspect of the context in which individual teachers work are the particular groups of students that they teach. Some authors see today's students as members of a 'digital generation' with different practices and expectations than those who came before them and it has been claimed that these students expect and demand (or will demand in the future) access to certain learning experiences or technologies (see, for example, Chin, 2004, Newland and Byles, 2013). However, this categorisation has been challenged for ignoring the significant variations between students (Jones *et al.*, 2010) and Margaryan, Littlejohn and Vojt (2011) suggest that rather than adopting new learning practices, students were influenced by the teaching approaches they experienced and expected 'traditional' practices. In addition, it is not clear that a strong demand for new learning technology actually exists amongst students. Early online courses suffered from low rates of student retention and while, in the USA, over 20% of university students take at least one fully online course (Allen and Seaman, 2008), some studies have suggested that these are less well evaluated than face-to-face courses (Rovai *et al.*, 2006). (Although other studies e.g. Kelly (2007) have found no difference between evaluations of face to face and online courses). Similarly, there are mixed evaluations of online resources within face-to-face teaching. For example, although universities increasingly offer e-books as a way of meeting demand from students,

the students themselves prefer to learn from paper copies of books rather than e-books (Woody, Daniel and Baker, 2010). In addition, Rowland (2008) shows that it cannot be assumed that students have the skills they need to use new technology, particularly the skills to find and analyse information online, or that they have clear ideas of how technology and learning could or should work together (JISC, 2007b).

So, despite the inconsistencies in how universities use technology, it seems that universities are, in fact, meeting their students' expectations for using technology (JISC, 2008). Students generally see online administrative tools and VLEs as sensible and user-friendly. They see technology as useful as long as it is not used poorly and they do not expect universities to use technology simply to "follow fashion" (Ellis and Goodyear, 2010, p. 50). It is also clear that university students do make extensive use of the internet (Wang and Artero, 2005) although this differs according to gender and subject discipline (Selwyn, 2008).

Conole *et al's* (2008) study of students' experiences of technology also noted differences between how technology was used in different subject disciplines. They suggested that students were comfortable and sophisticated technology users who expected access to information and tutors on demand. They found students made extensive use of technologies, were skilled in finding and manipulating information but found a "mismatch between institutions' perceptions of student use of technology and actual use" (p. 519). Lea and Jones (2011) also found that students were "adept" readers of complex texts and genres, however, they noted that students relied on institutional authority when deciding which texts were valuable and appropriate to use.

In a study of US students (Jones *et al.*, 2008), ICT was found to be central to student life and 84% had a positive opinion of the influence of the internet on their educational experience. But when Jones *et al.* compared surveys of students from 2002 and 2005 with their later data, they concluded that the changes were "evolutionary rather than revolutionary" (p. 171). Although there was a substantial increase in the number of students who had taken an online course (27%), only 27% of these felt the experience was comparable to a traditional course and 53% felt they had learned less than they would have face to face. The increase in enrolments can be seen as motivated by convenience rather than an affirmation of quality. Similarly, Concannon, Flynn and Campbell (2005) reviewed the responses to an online accounting course taught to 600 students. They found differences between how students preferred to study were partly dependent on personal factors and 81% of their survey respondents believed traditional lectures were more

effective than solely learning online. They suggest that peer encouragement and perceived tutor support were of primary importance.

While universities routinely provide computer rooms and other technology enhanced 'learning spaces' for students on campus, Savin-Baden (2008) notes a "marked contrast" between how students use these and how they use less formal environments outside of the university. As part of their research, Jones *et al.* conducted observations of open access computer rooms and these showed that the typical amount of time spent in these was just five minutes. The majority of students used them solely to check email and "kill time between classes" (p. 170).

In summary, while technology is an important part of student life, students are not demanding rapid adoption of the latest innovations and there are many differences between how students use technology in their life outside university and what they do when they are studying.

Conclusion

This chapter has considered the macro, meso and micro-level contexts within which university teachers use technology. At the macro-level of the higher education sector, marketisation, massification and globalisation provide a political and economic context within which technology is portrayed as a way to improve efficiency and respond to rising numbers of students. These sector-wide influences are interpreted at the meso-level context of the higher education institution through institutional strategies and policies. However, such policies have sometimes been shaped by managerialist agendas that have taken control of technology away from individual teachers. In this context, technologies can be seen as part of a 'performative shift' to focus on the 'outputs' and 'use-value' of learning in higher education. Institutions are also seen to put in place 'barriers' for those teachers who do want to use technology in terms of limiting access or training or through high workloads. At the micro-level of the individual teacher, the chapter has discussed how teachers may use technology for various purpose including to become more efficient or to improve the quality of their teaching and how this happens within in the context of the students that they teach.

Several common themes have emerged during the chapter. While it is clear that many different technologies are being used in universities and some, e.g. VLEs, are used by almost all universities, the adoption of these technologies is best described as gradual or evolutionary rather than transformative. While there are many examples of technology having a significant impact on teaching and learning, these

are "patchy" (Cooke, 2008) and Kirkup and Kirkwood (2005) conclude that the language of 'transformation' used in relation to technology in higher education is unhelpful because it makes anything less than transformation look disappointing.

Secondly, many of the claims made for the potential of technology to 'transform' education have assumed a technologically determinist position whereby technology is reified as a single, material entity with the ability to effect change and teachers or contexts are positioned as either 'barriers' or 'enablers' to this force. In contrast, this chapter has highlighted the wide range of global, national and local contexts in which teachers use different technologies and these uses are better understood as both shaped by and shaping teachers' thinking about technology. In particular the tendency in some research to ascribe the lack of impact of a particular technology to 'barriers' relating to deficiencies on the part of an institution of a teacher can be misleading and fail to take sufficient account of teachers' reasoned and pragmatic choices not to use technology.

Also, as can be seen from the research discussed so far, there are relatively few empirical studies of the use of technology that look beyond a single institution or case study. Therefore there is a need for research that investigates how technology is used by individuals in different institutional, subject contexts and how these may relate to each other.

Having considered the different contexts in which teachers work and use technology, the next chapter will consider research that has explored teachers' thinking about teaching and technology and how these beliefs might be influenced by the contexts in which they work.

3 Teachers' Thinking

The previous chapter has shown that university teaching is situated within individual, local, national and even international contexts. As a result, a number of different rationales can be given for using technology and various outcomes are hoped for when teachers adopt new approaches. However, rather than considering technology itself as 'determining' change or transformation, it is useful to consider the decisions that a teacher makes about using or not using technology and the beliefs that underpin these. According to Goodson *et al.*, "for most in the profession, teaching is a profound expression of individual commitments, beliefs and interpersonal styles" (Goodson *et al.*, 2002, p. 28). Hence, understanding these commitments and beliefs is vital in order to understand teaching.

Although this thesis is concerned with university teachers' thinking about teaching with technology, the body of work concerned with the use of technology sits within a wider tradition of research into teachers' thinking about teaching in general. Therefore, before discussing the literature that has investigated teachers' thinking about technology, this chapter will first summarise some important work from this wider body of research.

Research into Teacher Thinking

Whilst a unified coherent body of literature on teachers' thinking and beliefs cannot be said to exist, the literature can be most usefully divided into work considering the beliefs and thinking of school teachers, and the smaller body of work examining the beliefs and thinking of university teachers. While there have been far fewer studies into the beliefs and thinking of teachers in higher education than in schools (Hativa, 2000b), some researchers have suggested that they share "common elements" (Entwistle *et al.*, 2000) and Kane, Sandretto and Heath (2002) make a case for applying the research on school teachers to higher education teaching while acknowledging their "distinctive characteristics" (Entwistle and Walker, 2000).

The terminology of teacher thinking, beliefs and knowledge

Common to both of these literatures is a concern and, in some cases, a confusion, over terminology. The term 'beliefs' and related vocabulary such as, 'knowledge', 'attitudes', 'perceptions', 'cognition' and so on, are common in many fields of research and these terms are used by different researchers at different times to refer to various aspects of an individual's thinking. The lack of a single accepted definition or even clarity on the part of some researchers about the particular

definitions they are using leads Marland to write of a "terminological babel" (1989, p. 41) whilst Pajares (1992) and Kane, Sandretto and Heath (2002) have highlighted the particular tendency not to define these terms in educational research. For example, Ellis (2007) notes that the terms 'thinking' and 'knowledge' are often used interchangeably.

One important area of confusion centres around the terms 'knowledge' and 'belief' in the context of teachers and teaching. Within a philosophical tradition, these terms can be differentiated, with beliefs seen as statements thought to be true and knowledge as justified true belief. While Raths (1999) notes that some philosophers have shown dissatisfaction with these definitions they have been accepted by a number of researchers in education. However, this is far from consistent and within education, and educational psychology in particular, the terms can be found to be used much more loosely reflecting the subjective nature of much 'knowledge' about educational practice. This leads to disagreements and confusion within the literature. For example, rather than considering knowledge and beliefs as distinct, Alexander, Schallert and Hare define knowledge as "all that a person knows or believes to be true" (1991, p. 317) thus equating knowledge and belief and Kagan proposes that "most of a teacher's professional knowledge can be regarded more accurately as belief" (1992, p. 73). As a result, many researchers have used these terms interchangeably and in a review of literature, Kane, Sandretto and Heath (2002) claim that a range of terms including 'beliefs', 'understanding', 'perceptions', 'conceptions' and 'knowledge' may all be used to refer to statements thought to be true by an individual. Thus, Southerland, Sinatra and Matthews consider that "distinctions between knowledge and belief, complex and confusing at the theoretical level, seem to become hopelessly blurred at the empirical level" (2001, p. 348). Woolfolk-Hoy, Pape and Davis suggest that a solution to this confusion is to treat beliefs and knowledge as overlapping concepts "in keeping with precedents set by other researchers" (2006, p. 716).

In addition to the cognitive information signified by 'knowledge' and 'belief', some authors emphasise the emotional element of teachers' thinking and use terms such as 'disposition' or 'ideology' to highlight the value-laden nature of beliefs and knowledge (e.g. Katz and Raths, 1985; Kiraz and Ozdemir, 2006). This evaluative and emotional component of teachers' thinking can be seen most clearly in definitions of 'attitude'. Foddy (1993) notes that defining 'attitude' has been a long-standing problem within psychology research and illustrates this by referring to Allport's 1935 review of over one hundred definitions of 'attitude' and Dawes and Smith's review of the lack of agreement in 20,000 articles on 'attitudes' published in

the 1970s. According to Foddy, researchers have drifted towards more complex definitions in order to produce a definition that more closely correlates to observed behaviour but have never managed to reach a consensus. Although the wording of definitions varies within psychological texts, the majority contain elements relating to a cognitive and an emotional component (that varies in intensity). Thus an 'attitude' can be defined as "a relatively stable opinion towards a person, object or activity, containing a cognitive element (perceptions and beliefs) and an emotional element (positive or negative feelings)" (Banyard and Hayes, 1994, p. 375). Oppenheim (1992) also refers to a third component of 'attitude' - the *intent* to behave in a particular way. This division between cognitive, emotional and intentional elements is rarely maintained in educational research.

The assumption that attitudes are stable, internal mental states that underpin the evaluations expressed in attitude scales and through behaviour has been challenged by Potter and Wetherell (1986). From their discursive social psychology perspective, the act of completing an attitude scale is not the expression of a stable, internal mental state but rather an evaluative practice. As Potter expresses it in later work, attitudes are 'performed' rather than 'preformed' (Puchta and Potter, 2004). The concern for the practices whereby individuals construct theories to explain or to illustrate their behaviour can also be seen in other researchers' use of expressions such as 'personal theories' or 'private theories' (e.g. Churchill, 2006; Deaney, Ruthven and Hennessy, 2006).

Despite the confusion, each of these concepts is potentially useful in understanding how teachers think about what they do and, therefore, the literature relating to each of these is worth considering here. Therefore, following Woolfolk-Hoy, Pape and Davis (2006), this thesis will consider 'knowledge' and 'belief' as overlapping constructs and 'teacher thinking' will be used as an overarching term encompassing teachers' cognitive knowledge and beliefs, the emotional responses and evaluations related to these, the intentions arising from such values and the theories developed to understand them. This approach allows a wide range of relevant research to be considered while noting that different authors have used these terms in distinct, and possibly contradictory, ways.

School Teacher Thinking: An Expanding Construct

Over the last four decades, there has been a consistent interest in the beliefs and knowledge that school teachers have about teaching and learning and the ways in which they think about their work (see, for example, Ben-Peretz, 2011; Carlgren,

Handal and Vaage, 1994; Clark and Peterson, 1986; Day, Calderhead and Denicolo, 1993). As described above, researchers' definitions of 'thinking' and 'belief' have been "fairly loose" (Calderhead, 1987) and this has resulted in a considerable body of literature that refers to a wide range of aspects of teaching written by researchers from a number of different theoretical positions. The evolution of this work can be seen in the distinct phases of theorising about school teachers' beliefs that can be found within the literature. These phases are broadly chronological in nature, commencing in the 1970s.

1970s – the teacher as decision-maker

Early studies into teachers' thinking developed from ethnographic studies of the classroom, such as Jackson's 1968 'Life in Classrooms'. This body of research into "teacher thinking" was concerned with how teachers "exercise judgement, make decisions, define appropriateness, and express their thoughts in their actions" (Clark, 1980, p. 41). Throughout the 1970s, the metaphor of a "physician" was used to describe the role of the teacher who was seen as a "decision maker" in a "clinical relationship" with their students (Clark and Peterson, 1986). Calderhead's 1996 review of research into teacher thinking noted that studies during this period tended to contrast reflective 'pre-active' thinking (such as planning) with the interactive, spontaneous decision making that happened during teaching (Calderhead, 1996). However, by the end of the 1970s these theories were beginning to be criticised – not least because the "concept of decision-making was quite restricted in accounting for the mental life of teachers" (Calderhead, 1996, p. 710). It had also become evident that the model of teaching and the teacher held by the researcher affected the outcome of their research, as could be seen by analyses of contrasting studies (e.g. Clark, 1980).

1980s – the teacher as reflective professional

The next ten years saw a large increase in the number of studies into teacher thinking which, according to Ben-Peretz, Bromme and Halkes (1986), derived from a growing appreciation of the difficulties of attempting to change teaching. Over time the focus of research into teachers' thinking expanded to include attitudes and perceptions. For example, Clark and Peterson's 1986 work aimed to describe the "cognitive psychology of teaching" (p. 255) in order to understand the "mental life" of teachers and explain their actions. Clark and Peterson's Model of Teacher Thought and Action (1986) highlighted the iterative relationship between teacher beliefs and behaviour – moderated by the constraints and opportunities of the school context. This model does not present teacher behaviour as wholly dependent on individual

beliefs and thoughts, but constrained by structural constraints and in this sense teacher action is understood as a result of structural forces and individual agency.

The work of Schon (1983) on the 'reflective practitioner' was influential during this period and, by 1986, Clark could describe the dominant metaphor for teaching as the "reflective professional" and highlight the growing attention paid to constructivist theories and the contextual factors that influence teaching.

1980s-1990s – teacher knowledge and belief

This growing interest in context highlighted the non-linear and complex nature of teacher reflection and action; a notion reflected in the increased focus throughout the latter half of the 1980s on what Calderhead (1996) identifies as research investigating teacher's knowledge and beliefs. By this time, teacher 'beliefs' could be described as a "messy construct" (Pajares, 1992) and the wide range of vocabulary and constructs being used at that time can be seen in Pope's twenty-three groups of theoretical concepts used by researchers in the area:

teachers' understandings	teachers' cognitive activities
teacher constructs	image
decision strategies	personal practical knowledge
metaphors/beliefs	teachers' perspectives
practical knowledge	expert pedagogue
teachers' voice	professional craft knowledge
personal intentions	scripts/schema
teachers' cognition	subjective theories
teachers' conceptions	dilemmas
intuitive theories	routines
personal constructs	plans
knots/imperative constructs	

Table 3.1 Pope's Twenty Three Theoretical Concepts (1993, p. 22)

During the same period concurrent work highlighted the importance of teachers' professional knowledge. It was argued that it was important to define what it was that an effective teacher knew and as a consequence what a new teacher should be taught. This led to efforts to formulate a description of the professional knowledge base of teachers which could inform teacher education and be used to define professional standards for teachers. Working as part of a programme associated with defining such standards in the USA, Shulman (1987) identified a number of categories of teachers' knowledge: content knowledge, general pedagogical

knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners, knowledge of contexts, knowledge of educational aims.

One of Shulman's categories was 'pedagogical content knowledge' (often referred to as PCK) which refers to the knowledge of how a teacher can best convey a particular subject to their pupils. According to Grossman (1990, p. 16) a teacher's PCK comes from four sources: the "apprenticeship of observation" (Lortie, 1975) – this refers to the knowledge of teaching that a new teacher brings from their own experience of being a pupil; subject disciplinary background; teacher education; and teaching experience. By the end of the 1990s, this concept "had grown in influence in the UK" (Ellis, 2007, p. 37) and was widely used by researchers. It was also reflected in a range of studies that considered the impact of content-specific beliefs on teacher behaviour (Kagan, 1992). However, Shulman's claims at the time that PCK provided a previously missing element in understanding teacher knowledge is challenged by Kansanen (2009) who compares the concept of PCK to the much earlier conception of 'Fachdidaktik' in German pedagogic research.

1990s-2000s – teacher knowledge in context

Later work by Shulman and Shulman (2004) acknowledged that PCK was a strictly cognitive and individual construct and that a more comprehensive understanding was needed to recognise the wider influence of setting or community. In a review of research papers focused on teacher knowledge in a single journal between 1988 and 2009, Ben-Peretz (2011) identifies how, over this period, the definition of teacher knowledge broadened to encompass a much wider range of issues from outside the immediate school context, for example, globalisation or multiculturalism. Ben-Peretz notes how a narrow view of knowledge as "instructional competencies" expanded to "encompass teachers' narrative unities, as persons and professionals whose knowledge is found in their past experience, present mind and body, and their intentions for the future." (Ben-Peretz, 2011, p. 5). In particular, she draws on Connelly and Clandinin's term "professional knowledge landscape" to emphasise this wider view.

The loose chronology of thinking since the 1970s has resulted in a current field of work on school teacher thinking that acknowledges the highly contextualised and field-dependent nature of teacher knowledge construction and action. This is perhaps best summarised in Woolfolk-Hoy, Davis and Pape's (2006) 'ecological' model of teacher knowledge which is proposed as an "organizing frame" of "nested ecosystems" (p717). This 'ecological' approach follows Brofenbremner's Ecology of Family approach and allows Woolfolk-Hoy, Davis and Pape to emphasise the

various levels of context surrounding the individual teacher's sense of self, in particular the immediate classroom context, wider contexts of state and national policy, as well as cultural norms and values (see Figure 3.1). The model also identifies some sub-topics at each system level and Woolfolk-Hoy, Davis and Pape make it clear that they are selecting sub-topics suitable to their purpose – a review of active research in Educational Psychology, and they do not attempt to provide a complete map of teacher's knowledge at each of these levels of context.

Figure 3.1: Ecological Model of Teachers' Knowledge and Beliefs (Woolfolk-Hoy, Davis and Pape, 2006, p. 718)
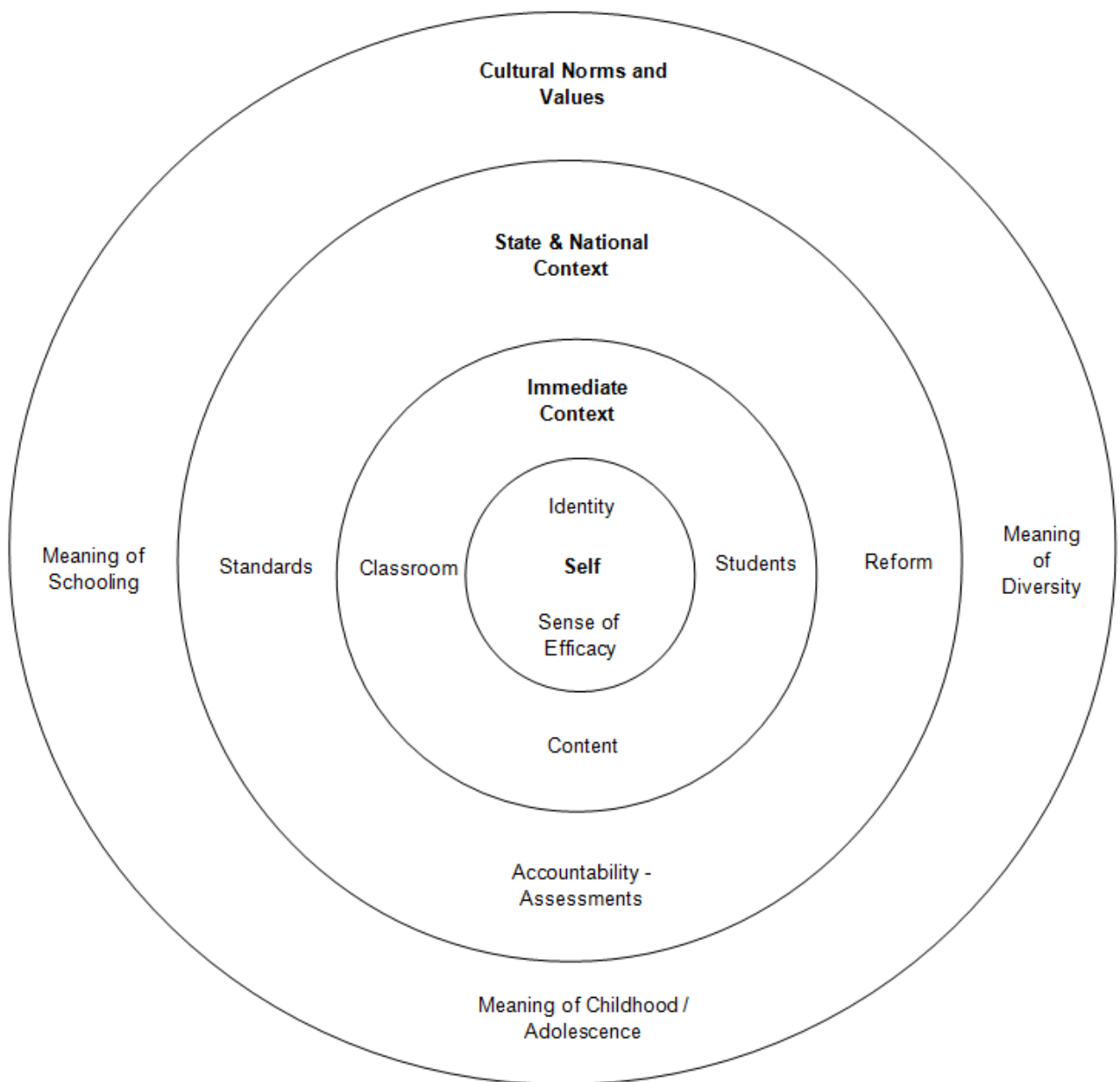
Although research into school teacher thinking has been characterised by continuing inconsistency over terminology, it has also seen a growing acknowledgement of the importance of context and a widening of the range of

different contexts that are considered pertinent to study. While Woolfolk-Hoy, Davis and Pape's ecological model is not a complete description of the contexts for teacher thinking it provides a useful initial frame for the analysis of teacher knowledge and beliefs.

Teacher Thinking in Higher Education

Unlike research into school teaching where there is a developing chronology of research over a forty year period, studies into higher education teaching have only appeared more recently. However, much of the research into school teacher thinking has parallels in higher education and as Entwhistle and Walker (2000) state "while teaching in higher education is bound to have distinctive characteristics, it also has elements in common with more general ways of describing teaching" (p. 343). For example, just as with school teaching, the existing literature conveys a perception of teaching as a professional, complex, cognitively demanding and creative activity (Hativa and Goodyear, 2002, p. 335). And, as discussed earlier, there are common confusions and inconsistencies in the terms used and how they are defined (Kane, Sandretto and Heath, 2002).

However, some of the concerns of researchers into school teacher thinking are less thoroughly explored within the literature on the higher education sector. For example, the distinction between teachers' thinking 'on action' and 'in action' is not thoroughly considered in the research into higher education (Kane, Sandretto and Heath, 2002). One notable difference is that much of the literature on higher education teacher beliefs has been written by those involved in staff development in higher education and has focused on improving the quality of teaching in universities. Hence there is often an explicit concern about how the beliefs of teachers may be changed in order that they may improve their teaching. Thus Hativa and Goodyear (2002, p. 2) state that "it is in the discourse of beliefs about teaching that we can find some of the opportunities for *radical* change" (authors' emphasis).

Several distinct dimensions of research into teacher thinking in higher education can be identified in the literature and must now be considered in more detail. These are: conceptions of teaching; academic and teacher identity; contexts for teachers' thinking.

Conceptions of teaching

One significant area of research in studies of higher education has been the use of a phenomenographic method to identify and investigate the 'conceptions of

teaching' held by teachers. Phenomenography is concerned with the conceptions with which people understand a particular phenomenon. Typically, researchers using phenomenographic methods attempt to describe an "outcome space" (Marton and Pong, 2005) through categorising and analysing conceptions and their relationships. The earliest use of the method was in an influential educational study by Marton and Säljö (1976) that suggested that students held either 'deep' or surface' approaches to learning (Entwistle, 1997) and since then phenomenography had been used to examine beliefs in a range of other contexts, notably health care.

Studies of teachers in higher education built on this earlier research into students' 'deep' or 'surface' conceptions of learning and sought to identify if teachers were encouraging certain student approaches by their teaching. A common strategy in these studies has been to determine the extent to which teachers viewed teaching (and student learning) in terms of a constructivist theory of learning and then look for connections between these beliefs about learning and teaching and the teachers' practice. A large number of such studies have used Prosser and Trigwell's (1999) 'Attitude to Teaching Inventory' (ATI). This inventory allows researchers to place teachers' conceptions of teaching on a dichotomous scale from teaching as knowledge transmission to teaching as facilitating learning. (Though Gibbs and Coffey (2004) claim that 'teacher-focus' and 'student-focus' should be understood as independent scales rather than as opposing poles on a single scale). Although the inventory has now been used with a wide range of university teachers, the initial research that was used to develop the ATI scale was carried out with undergraduate science teachers and Meyer and Eley (2006) point out that this limits the validity of the inventory. Meyer and Eley also claim that there were a number of flaws in the methods used to create the inventory and conclude that it is conceptually-limited.

Kember and Kwan (2000) differentiate between conceptions of good teaching (varying between transmission of knowledge to facilitation of learning) and teaching approaches (on a scale from content-centred to learning-centred). They suggest that these were related, i.e. teachers who held conceptions of teaching as transmitting knowledge were more likely to use content-centred approaches to teaching and those with conceptions of teaching as facilitation preferred learning-centred approaches. They also claimed that teachers' conceptions of teaching were stable but that they "suspect" that teachers might not use their preferred approach due to the teaching or learning environment in which they worked. Similarly, Trigwell suggests student-centred approaches are associated with teachers having a manageable workload, smaller and more uniform student groups and teaching 'soft' disciplines (Trigwell, 2012).

Another approach is that of Samuelowicz and Bain (2001) who generated a set of seven 'belief orientations' to categorise teachers according to their beliefs. These 'orientations' ranged from teaching-centred orientations (named as 'Imparting information', 'Transmitting structured knowledge' and 'Providing and facilitating understanding') to learning-centred orientations (named 'Helping students develop expertise', 'Preventing misunderstandings', 'Negotiating understanding', 'Encouraging knowledge creation'). Each of these 'orientations' was described in terms of the beliefs that they consisted of and Samuelowicz and Bain identified nine areas of belief (referred to as 'belief dimensions') that affected the 'orientation' of the teacher. These 'dimensions' were the teachers' beliefs about: desired learning outcomes, expected use of knowledge, responsibility for organising or transforming knowledge, nature of knowledge, students' existing conceptions, teacher-student interaction, control of context, professional development, interest and motivation. While this is a more complex construct than some others, it retains the distinction between teaching approaches based on beliefs about teaching as transmission and constructivist approaches.

There have been several criticisms of the phenomenographic research methods used in research into approaches to teaching (and studying). For example, McShane (2004) claims that phenomenographic studies underplay academics' subjectivities and insights. Ashworth and Lucas (1998) and Greasley and Ashworth (2007) provide detailed critiques of the phenomenographic method particularly in its application to students' conceptions of studying. Ashworth and Lucas suggest that the presuppositions of phenomenographic researchers are not sufficiently accounted for in their descriptions concluding that it is "unclear whose conceptions are being described" (p. 430).

One assumption noted by Devlin (2006) is that much research into teaching conceptions views student-centred teaching approaches as superior to teacher-centred approaches and advocates moving university teachers' thinking towards more student-centred conceptions. This is because it is thought that a student-centred conception can be associated with students developing 'deep' approaches to learning and hence higher achievement, however, Devlin claims that this assumption of superiority is untested. Eley (2006) studied how university lecturers planned short teaching events and concluded that general conceptions of teaching played no role in the specific, context-embedded decisions teachers made. In conclusion, Eley suggests that generalised conceptions of teaching are more likely to be results of reflection on teaching rather than determining teaching experiences.

Despite these criticisms, research into university teachers' 'conceptions' of teaching and the distinction between teacher-centred and student-centred pedagogical beliefs has remained a central component of research into higher education teachers' thinking and, as will be shown, a number of authors have applied these concepts to understand teachers' use of technology.

Academic and teacher identity

Another important aspect of research into higher education teachers' thinking are those studies looking at issues of identity and self. This emerged as a significant focus of research into school teachers' thinking in the 1990s, although (as in other aspects of teacher thinking research) the terms 'identity' or 'self' were often not defined or were defined differently in different studies (Beijaard, Meijer and Verloop, 2004). In their review of research in this area, Beijaard, Meijer, and Verloop identified four features of school teachers' professional identity: identity is an on-going process - dynamic rather than fixed; it relates both to a person and their context; it consists of sub-identities (that must not conflict); and that teachers have agency in how they form and express their identity.

These four features of professional identity can also be found in studies of the higher education sector. Although writing in a higher education context, Skelton (2012a) refers to school-based researchers to identify "key historical shifts" (p. 27) in conceptions of identity and describes how understandings of identity as a single, stable whole have been supplanted by conceptions of identity as a dynamic process whereby identities are formed and re-formed. Thus, identity can be understood as intersubjective and relational (see Kreber, 2010).

In parallel to Beijaard, Meijer, and Verloop's concept of sub-identities, Kreber (2010) describes how, due to their membership of multiple communities, academics construct multiple identities and that these contribute to an overall 'academic identity'. Researchers have suggested various definitions or components of an academic professional identity and Nixon (1996) notes that academics may have identities as researcher, teacher and/or administrator. In addition, Roche and Marsh (2000) note that academics' concepts of themselves as teachers are independent of their research self-concepts. Academic identity is believed to be influenced by many contextual factors including students' evaluations of teaching (Hativa and Goodyear, 2002) and Nixon (1996) suggests that the changes to the higher education sector seen over previous decades have had a profound effect on the professional identity of teachers with regard to issues of autonomy and status.

Henkel (2005) identifies three dimensions of academic identity: sense of meaning, values and self-esteem. For Henkel (2005), identity is "shaped and reinforced in and by strong and stable communities and the social processes generated within them" (p. 157). In terms of academic identity, Henkel claims that the relevant communities are the institution and discipline and discusses how the power dynamics of these changed in the late 20th century. However, Henkel's study focussed on scientists and an examination of UK research councils, hence her study has much to say about the importance of research to academic identity but little to say about teaching except where this has led to a loss of research identity.

Of particular concern for this thesis is an academic's 'teacher identity' although research into this is 'relatively scarce' (Nevgi and Löfström, 2013, p. 2). For Kreber (2010), an academic's teacher identity does not exist independently from their overall academic identity; however, she argues that it is plausible to explore and describe teacher identities separately.

Like academic identity more broadly, Nevgi and Löfström (2013) suggest that teacher identity is "rooted in the cultural context of the university" (p. 9) and relates to both the teacher's context and their discipline. For Nevgi and Löfström, teacher identity is manifested through teacher-student relationships and choice of teaching activities. In a study of teacher identity in a research-intensive university, Skelton (2012a) noted that teacher identities were highly complex and some individuals struggled to reconcile their teacher identity and the research culture of their university.

The 'values' aspect of teacher identity is explored further by Skelton (2012b) who shows how conflicts can occur between the values held by individual teachers and those held by others at different levels of the higher education sector. Skelton discusses five sites of conflict – dialogic teaching, independent learning, having time for students, use of large group lectures, being authentic in front of students. For Skelton, teachers demonstrated 'strategic compromise' – "accepting structural constraints beyond one's personal control whilst holding private reservations about their pedagogical impact." (p. 11). However, Skelton suggests that such conflicts can lead teachers to identify issues that become "potent sites for professional development" (p. 8). Skelton also notes that the conflicts that individuals are aware of are not always the sites of the greatest conflict.

In summary, teacher identity can be understood as an aspect of a broader academic identity that is influenced by context and discipline. It can sometimes come into conflict with other aspects of an academic's identity particular relating to

the competing demands of research and teaching. These demands, and other aspects of teacher identity, for example, values and relationships with students, may all potentially influence teachers' thinking about how they teach with technology.

Contexts for teachers' thinking

As the literature on professional identity has shown, a teachers' context is an important influence on their thinking and beliefs. Yet, D'Andrea and Gosling (2005) claim that much of the literature on teaching in higher education is dominated by a psychological paradigm that "ignores the importance of learning as a set of social practices" (p. 2). Also, while there are a number of studies into school teacher thinking that highlight the importance of wider context and culture on teachers' thinking (e.g. Hamilton's investigation of school culture (1993) or Broadfoot *et al.*'s (1987) comparison of teachers' views of professional responsibility in England, France or Spain), these influences have not been as widely discussed in relation to the beliefs and thinking of university teachers.

In order to address this, Trowler (2008) suggests adopting a sociocultural approach to researching higher education and summarises this in six propositions (pp. 17-18)

- Groups engaged in extended common projects develop recurrent practices, taken-for-granted knowledge and values
- Interaction with objects is socially mediated (they are both socially conditioned and configuring)
- Groups develop discursive repertoires that express and constrain discourse
- Groups develop unique ways of using tools and context-specific understandings
- Individual identities are mediated and conditioned by the social context
- Narratives of the past are a significant influence on the present

Some research has considered the role of context in higher education teaching. For example, Stark (2000) identified several contextual factors that affected teachers' planning. For Stark, teachers' plans represented a "key artefact" of their thinking and she suggests that the primary influences on these are subject-discipline culture and pre-existing individual beliefs. Hativa and Goodyear (2002) add teachers' own personal reflection on their work as an additional key influence. Stark also discusses a number of other potential sources of influence that did not appear to be as crucial in her study. These included institutional level factors, such as university mission, which were rarely mentioned, and resource level factors which tended to be taken for granted and only explicitly identified by teachers as an influence when they

changed. Stark did not claim that these factors did not influence teacher thinking but that they may do so in a subtle way that only appears visible when they change. Stark also suggested that despite the availability of advice on teaching from literature and peers, this was rarely sought or taken by teachers.

Some researchers understand context as constraints or 'filters' to belief. Norton *et al.* (2005) investigated if teachers' beliefs or intentions for student learning were influenced by their institution, discipline, experience, or formal teacher training. For Norton, teachers' intentions for student learning were a compromise between their beliefs and the context within which they were working. While in a study of lecturer's pedagogical constructs, Fanghanel (2007) identified seven 'filters' to teaching practice. At a macro level Fanghanel considered the institution, external factors, academic labour and the research-teaching nexus. At the meso level: department and discipline, and at the micro level – individual pedagogical beliefs.

However, in general, Ashwin (2008) argues that there has been insufficient focus on the issues of structure and agency in research on higher education. In particular, Ashwin notes that a number of factors can influence an individual without them being aware of this, including their biography, setting, and wider historical, social or political factors. He relates this to Bourdieu's concept of 'habitus' and Hymes' notion of the 'cognitive unconscious'. For Ashwin, this omission is a major weakness of research into higher education.

In the light of these findings, Woolfolk-Hoy, Davis and Pape's 'ecological' model of teachers' knowledge and beliefs described earlier can be adapted for university teachers (see Figure 3.2). This model emphasises the different levels of context that are relevant for an individual school teacher's knowledge and beliefs and the research discussed above has shown that a similar set of contexts are important in the higher education context. The central context ('Self') remains relevant and is unchanged while the 'Immediate Context' becomes that of the higher education institution rather than a school. The word 'classroom' has therefore been replaced by 'teaching context' to reflect the wider range of possible settings for teaching in higher education. The third context ('State and National Context') encompasses beliefs and knowledge about 'Standards', 'Accountability' and 'Reform' and these three elements remain relevant to higher education. However, given the context for these, the context had been renamed 'Higher Education Context'. The outer context ('Cultural Norms and Values') remains although the references to 'Meaning of Schooling' and 'Meaning of Childhood' have been changed to reflect the university context.

Figure 3.2: Ecological Model of University Teachers' Knowledge and Beliefs (developed from Woolfolk-Hoy, Davis and Pope, 2006)

Cultural Norms and Values

Higher Education Sector Context

Institutional Context

Identity

Self

Sense of Efficacy

Meaning of University Education

Standards   Teaching   Students   Reform

Meaning of Diversity

Content

Accountability - Assessments

Meaning of Learning
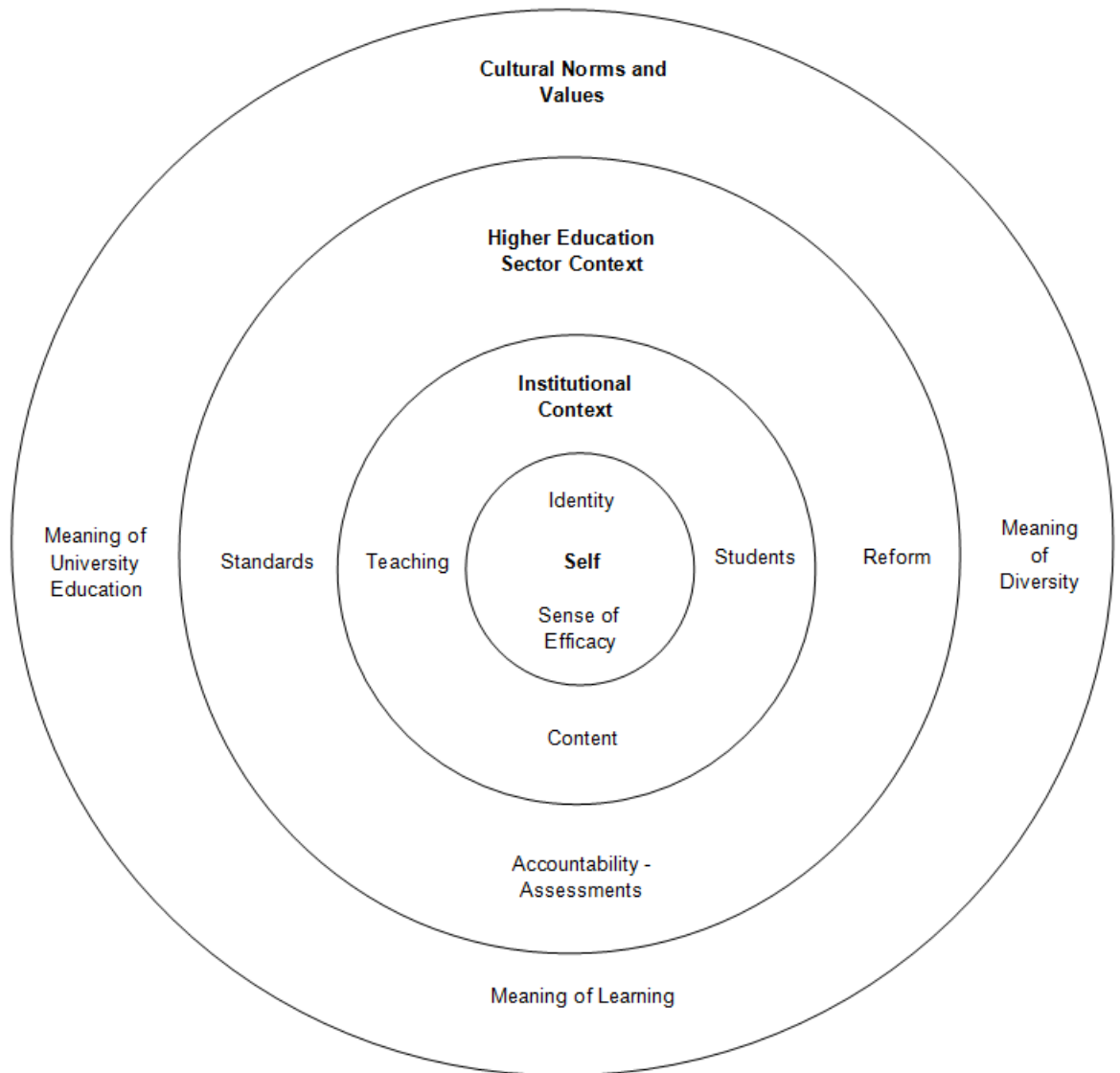
This model reflects the 'nested ecosystems' of university teaching and provides a frame for organising the different levels of context that may potentially influence a teacher's thinking about teaching and about technology. However, empirical investigation is needed to identify the extent to which this model accurately encompasses the knowledge and beliefs relevant to university teaching.

In addition, this chapter has so far considered teachers' thinking about teaching in general and now needs to relate this to the specific case of teaching using technology.

Teacher Thinking about Technology

This chapter has identified three significant areas of research into teacher thinking in higher education that are relevant to this project, these are: teachers' pedagogical beliefs (in the form of their conceptions of teaching); teachers' professional identity; and the role of context in teachers' thinking. It will now discuss the subset of this work on teacher thinking that has specifically addressed the use and role of technology in teaching.

In common with research into teaching in general, much has been written about teachers' thinking and beliefs about technology in the school sector and relatively little about the thinking and beliefs of teachers working in higher education. Therefore, this section will also consider some of the empirical research that addresses the beliefs of school teachers and what, if anything, can be learnt from this for higher education.

In addition, there has been much interest in the impact of technology on individuals and society more generally from other disciplinary backgrounds. As a consequence, another significant area of work has developed from the study of technology adoption that is not represented in the teacher thinking tradition. This work on attitudes towards technology has been widely used to investigate educational technology and also needs to be considered.

Therefore, the chapter will need to consider four particular areas: teacher attitudes towards technology; the relationship between pedagogic knowledge and technology use; the relationship between teacher identity and technology; and the role of context and culture in technology use.

Teacher Attitudes towards Technology

One important area of research has attempted to identify the different attitudes and perceptions that individuals may hold about technology. Some of these studies have considered attitudes towards technology in general, for example, confidence with technology, whilst others have looked at attitudes towards specific technologies. Each of these studies has supposed that attitudes are stable, mental states despite the critique from Potter (1998) that the expression of an attitude is an evaluative activity rather than the expression of a pre-existing mental state and the implications of this are discussed later in the chapter.

Several survey instruments have been created to measure the general attitudes towards technology held by students or teachers. For example, the Attitudes

Towards Computer Usage Scale (ATCUS) (Popovich *et al.,* 1987) was used to identify a positive correlation between the attitudes of undergraduate students and both the number of hours they spent using the computer and the number of courses they took. However, a 2005 study comparing the earlier results with a new cohort of undergraduate students found that although time spent using the computer was still a factor, number of courses was not (Popovich *et al.*, 2008). A second difference identified by this study was that the gender differences in attitude identified in 1987 were no longer evident.

Other researchers have considered how teachers value technology. Ottenbreit-Leftwich *et al.* (2010) describe teachers as decision makers making evaluations of how well technology can enable them to achieve their educational goals: "The more valuable they judge an approach or tool to be, the more likely they are to use it." (p. 1322). This is discussed by John (2005) in terms of 'congruence' suggesting that a high level of congruence between subject, learning focus and perception of the value of technology is needed if the technology is to be adopted.

There are several ways in which teachers might 'value' technology. Smarkola (2008) suggests that teachers valued technology because of two types of motivation – an internal motivation to enhance children's learning and an external motivation in response to beliefs about how employers and the wider population view technology. In addition, Ottenbreit-Leftwich *et al.*'s (2010) study of eight award-winning teachers identified two kinds of value beliefs. The first set were associated with professional needs (e.g. the value of technology to improve efficiency, create resources, facilitate organisation, etc.) and the second were associated with student needs (e.g. how much they valued technology to motivate, increase comprehension, etc.).

While it is worthwhile identifying individuals' evaluations of technology, such measurements are often used as the starting point for investigating the extent to which these factors influence or determine the use of technology. In particular, the question is asked as to whether the existence or otherwise of a particular characteristic can be used to predict or explain behaviour. According to Šumak, Heričko and Pušnik (2011), the most popular approach to investigating teachers' attitudes to technology has been that of Davis, Bagozzi and Warshaw's (1989) Technology Acceptance Model.

Technology Acceptance Model (TAM)

Davis, Bagozzi and Warshaw describe how they adapted Fishbein and Ajzen's (1975) 'Theory of Reasoned Action' (TRA) in order to explain computer usage. In the psychological literature there are a number of theories about the connection

between someone's beliefs and their actions. Although no particular attitude can be used to accurately and consistently predict behaviour, Azjen (1988) claimed that if an attitude is known specifically enough then reliable predictions of behaviour may be made - for Ajzen this means that four factors need to be known: target, action, context and time. However, others suggest that the relationship between attitude and behaviour is not a simple one (Hogg and Vaughan, 2005) or that we should not consider attitudes to be underlying mental entities (Potter and Wetherell, 1986).

The 'Theory of Reasoned Action' attempts to make sense of the relationship between beliefs, attitudes and behaviour. In this theory, attitudes are seen to influence behaviour but are subject to the constraints of 'subjective norms' consisting of beliefs about the social norms associated with a behaviour and the motivation to comply with these. In his later work, Ajzen was influenced by the work on self-efficacy by Bandura and added a third category of influences on behaviour: the individual's beliefs about their control of a situation. This extended version of TRA was named as the 'Theory of Planned Behaviour' (TpB) (Ajzen, 1988).

When applied to technology, Davis, Bagozzi and Warshaw suggest that two types of belief determine whether a technology is accepted and used: 'perceived usefulness' and 'perceived ease of use'. They define these as:

> Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance"

> Perceived ease of use is "the degree to which person believes that using a particular system would be free of effort" (1989, p. 320)

These are seen to be connected to behaviour in a similar way to TRA as can be seen in Figure 3.3.
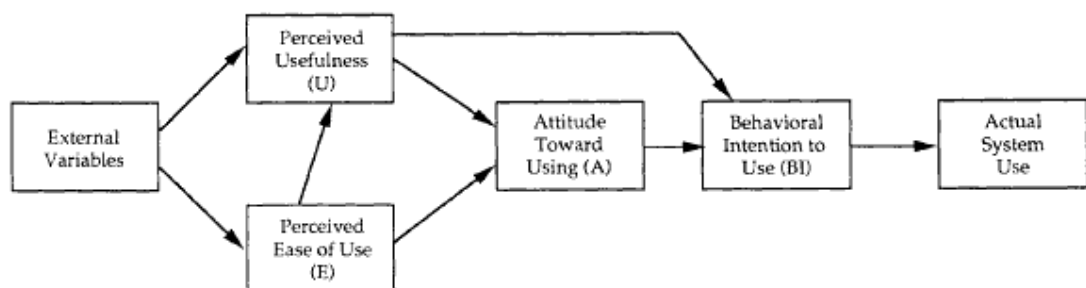
Figure 3.3 Technology Acceptance Model (Davis, Bagozzi and Warshaw, 1989)

A key difference between TAM and Ajzen and Fishbein's model is that Davis, Bagozzi and Warshaw did not include the 'Subjective Norm' to account for social

influences. They suggested that the scale used in TRA to measure the subjective norm was "weaker from a psychometric standpoint" (Davis, Bagozzi and Warshaw, 1989, p. 998) but also that the effect of the subjective norm on the behavioural intention was "difficult to disentangle" from any indirect effects via attitudes. However, later versions of TAM re-introduced social influences to the model.

There have been a number of attempts to extend and improve TAM. For example, TAM2 was a revision of TAM that intended to explain the influences on 'perceived usefulness'. Here the 'subjective norm' from TRA was re-introduced but as an influence on beliefs through "internalisation and identification" (Venkatesh and Davis, 2000, p. 189). Other influences on beliefs about 'perceived usefulness' were image, job relevance, output quality, and result demonstrability. Another difference to TAM is that there is no 'attitude' construct in TAM2 because beliefs are seen as having a direct influence on intentions. The role of attitudes in the TAM model has been debated with some authors (e.g. López-Bonilla and López-Bonilla, 2011) suggesting that a separate attitude construct is needed in the model while others (e.g. Teo, 2009) suggest that attitudes are implied within the model and do not need to be measured separately.

More recently, Venkatesh *et al.* (2003) reviewed eight models of technology acceptance: the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behaviour, a model combining the technology acceptance model and the theory of planned behaviour, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory. From these, they derived a "Unified Theory of Acceptance and Use of Technology" (UTAUT). As can be seen in Figure 3.4, UTAUT identifies four areas of influence on behavioural intentions: performance expectancy (beliefs about the extent that using the technology will help to improve job performance), effort expectancy (beliefs about the ease of use of the technology), social influence (beliefs about the extent to which important others believe he or she should use the technology) and facilitating conditions (beliefs about the extent to which the organizational and technical infrastructure exists to support use of the technology).

However, in order to account for an increasing number of modifying variables, these models have become increasingly complex and open to Potter and Wetherell's (1986) critique of Fishbein and Ajzen's original TRA that "there must come a point when it no longer becomes useful to continue stressing the underlying attitude" (p. 54).
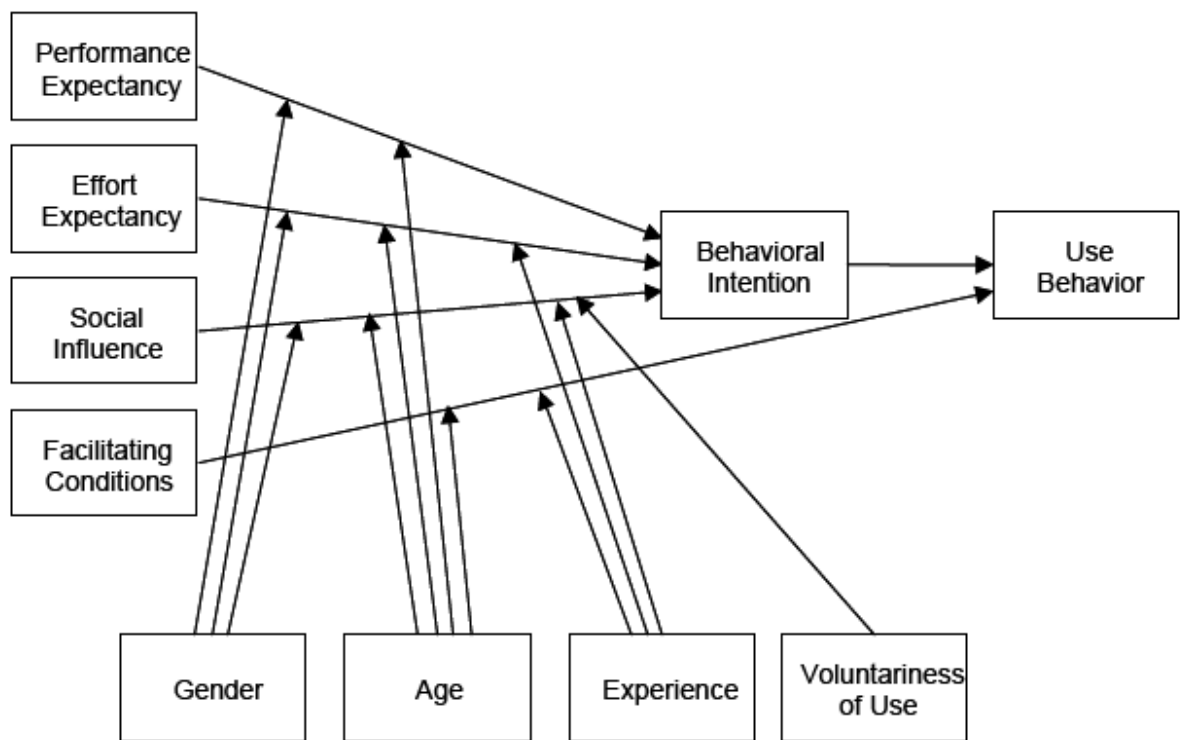
Figure 3.4 Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)

However, these models have been used to construct and refine quantitative questionnaires to measure the variables proposed in the models and to investigate how particular technologies are used. In particular, the original TAM has been widely used in education and other fields and some of these applications are discussed later in this chapter.

While some of the limitations of TAM relate to its use in particular contexts and are discussed below, one general criticism is that the model is concerned with 'acceptance'. The origin of the model was in organisations concerned with 'top-down' implementation of technologies and how these were received and used (Straub, 2009). Therefore, it could be suggested it is less useful for considering voluntary use of technology.

One attempt to explain individual, voluntary use of technology is Roger's (1962) theory of the 'diffusion of innovations'. This suggests that if we consider a particular technology then we can classify users into groups according to how quickly they adopted the technology. While the first users (the innovators and early adopters) are characterised by positive attitudes to technology, those who are slower to take up the technology (the 'late majority' and laggards) may be characterised by less positive attitudes to technology. However, the diffusion approach alone does not explain how these attitudes are constructed or what they consist of. Also, both this

approach and that of TAM are concerned with use or non-use (or high/low use) of a technology while much educational research is also concerned with the type of use of technology.

School teacher attitudes towards technology

A number of studies have applied the TAM model to show that perceived usefulness and perceived ease of use are important factors across a range of educational contexts including secondary school use of Learning Management Systems (De Smet *et al.*, 2012), elementary school use of interactive whiteboards (Shen and Chuang, 2009), etc. While versions of TAM are widely used, its successor the United Theory of Acceptance and Use of Technology model (UTAUT) is relatively untested (Straub, 2009). Although the TAM model has proved effective across a broad range of professions, Smarkola (2008) suggests that for studies of classroom computer use, the model needs to be extended to reflect this cultural environment. She suggests that an extended model including perceptions of external conditions can provide a deeper insight into teachers' beliefs and use of technology than TAM alone.

While the TAM approach considers whether teachers intend to use or not use a technology, other studies understand technology use as a process of adoption and implementation and identify stages in teachers' use. For example, Prestridge (2012) considers a developmental framework for the use of technology that moves from early uses to a developed constructivist use termed a 'digital pedagogy'. According to Frank *et al.* (2011), teachers require different sources of knowledge as they move through different stages of use. Frank *et al.* surveyed US school teachers and found that accessing professional development from outside their school was most effective for teachers starting to use a technology. As they moved to higher levels of implementation, it was more effective for teachers to develop their knowledge through their own experimentation as they adapted their use of the technology to their local context. Finally, those at the highest level of implementation were more likely to maintain their level of use if there were opportunities to share with and learn from colleagues. Frank *et al* labelled these three sources of knowledge as 'focus', 'fiddle' and 'friends'. However, such 'stage theories' of computer adoption are unsatisfactory as they assume all teachers pass through similar stages and they do not explain how individuals make progress (Windschitl and Sahl, 2002).

University teacher attitudes towards technology

University teachers' attitudes towards technology have also been a productive focus for research. Several empirical studies have noted that university teachers often

express generally positive attitudes towards technology (e.g. Brill and Galloway, 2007; Nicholson and Sanber, 2007). However, these studies also identified a minority of teachers who were less positive towards technology, for example, those who expressed a concern about the potential over-use or domination of technology (Nicholson and Sanber, 2007). In addition, it could be argued that the generally positive findings may be partly due to many such studies relying on self-selecting surveys or being of 'early adopters' of technology.

Teachers' attitudes may be communicated (sometimes unintentionally) to their students. Bakioglu and Hacifazlioglu (2007) asked university students for their opinions about their teachers' use of technology and this revealed that students perceived a wide range of attitudes amongst their lecturers. While some students spoke of lecturers' resistance to and fear of technology, or "devotion to habit" (p. 8) and suggested they needed further training, other students identified lecturers who were seemingly addicted to technology.

Given the range of attitudes observed, a key question for research in this area is the extent to which attitudes are reflected in practice. Teachers' attitudes are often assumed to affect how they use technology but the evidence for this is less clear. For example, Bothma and Cant (2011) describe a set of university teachers who were in favour of using a learning management system but did not actually use it. Studies using the Technology Acceptance Model have shown how perceptions of usefulness and ease of use are connected to intentions to use a technology but the connection between these intentions and actual use is mediated by a range of other factors. Šumak, Heričko and Pušnik (2011) analysed 42 research studies that used the TAM approach to investigate e-learning. They noted that there were more studies of e-learning acceptance of students than of teachers and that, on average, studies of teachers had smaller sample sizes. They conclude that the size of any effect of perceived usefulness or perceived ease of use varied between students and teachers and between different technologies.

Attitudes towards a particular technology (or innovation in general) can be compared not only to the use (or lack of use) of technology but also to the way in which the technology is used. Nicholson and Sanber (2007) analysed the reflections of eight lecturers involved in integrating technology within an Australian teacher education programme and concluded that the experiences of the lecturers and their goals for their programme differed. While some lecturers viewed computers as a tool for teaching and learning (possibly as a replacement for existing tools), others saw computers as a resource for all aspects of life.

Another aspect of a teacher's attitudes towards technology is their perception of any constraints preventing them from using technology or modifying their use. Bakioglu and Hacifazlioglu (2007) and Brill and Galloway (2007) both suggested that despite most lecturers in their studies having a positive attitude towards introducing technology, they felt constrained by a lack of equipment. Concerns about insufficient resources can also be found in Hodson *et al.*'s (2002) study of computer aided assessment. However, data collected by Hodson *et al.* suggested that lecturers were also concerned about increased workload and, despite the technology being introduced as a replacement for existing assessments, staff were concerned as to whether the new tool would do everything that the existing methods could. Hodson *et al.* categorised these issues as introductory (e.g. training) and management issues (e.g. resource, infrastructure).

Studies such as these see a teacher's context as a constraint on their intentions to use technology. However, a few authors have gone further and have shown how teachers may demonstrate cultural differences in their attitudes to and use of ICT (Sánchez-Franco, Martínez-López and Martín-Velicia, 2009) or how organisational cultures can help to explain differing attitudes towards teaching online (Stacey and Wiesenberg, 2007). In terms of gender, Zhou and Xu (2007) suggest that males feel more confident with technology and that females are more likely to be influenced by their colleagues about how to use technology. Based on the data from their survey of teachers at a single institution, Zhou and Xu also claim that males were more likely to be attracted to a technology and then apply it to their teaching than females who were more likely to start with their pedagogical needs. However, Lane and Lyle (2010) suggest that in their survey, gender differences in teachers' perceptions of barriers to technology disappeared once age and expertise were taken into account.

In terms of teacher thinking, this section has considered teachers' evaluations of technology and, in summary, the studies suggest that university teachers view technology broadly positively but that a minority have negative or ambivalent attitudes. Attitudes are seen to be related to teachers' intentions to use technology and while there is some evidence that attitudes are related to uses of technology, this is mediated by other factors. In addition, some research into teachers' attitudes provides evidence that perceptions about context can be an important influence although this is mostly seen in terms of barriers or constraints on use. In particular, the increasing complexity of models developed from the Technology Acceptance Model (as these are required to more fully account for contextual influences), seems to confirm Potter and Wetherell's (1986) suggestion that it becomes less useful to stress the importance of an underlying attitude. Indeed, the findings about teacher

attitudes towards technology are better understood as the outcome of teacher's evaluative activity rather than expressions of an underlying mental state (Potter, 1998). Thus teachers' attitudes towards technology cannot be disassociated from the context in which they make these evaluations and this is not sufficiently clear in the literature.

The Relationship between Pedagogic Beliefs and Technology Use

While teachers' thinking about technology, as described above, is important in order to understand teachers' use of technology, only to consider technology-related factors would provide a "rather limited view" (Hermans *et al.*, 2008, p. 1499) of the issue. Therefore, a key aspect of research into teacher thinking has been the search to identify the knowledge and beliefs that teachers hold. In terms of technology, two key areas are frequently encountered in the literature. First, the question of whether technology use is associated with particular pedagogic beliefs, namely a constructivist view of teaching and learning, and secondly whether there is a particular set of technology-related knowledge that teachers should acquire.

Research in both school and university settings has frequently considered teachers' pedagogical beliefs along a scale from learner-centred (characterised as constructivist and aiming to develop deep understanding) to teacher-centred (characterised by transmission of knowledge and aiming to develop recall). Technology use has been seen as both a consequence of these beliefs (an individual uses technology because of their beliefs) and as a driver to change these beliefs (an individual's use of technology leads them to re-evaluate and alter their beliefs). The following sections will explore these ideas further, first with reference to school teachers and then in the context of university teaching.

School teachers' pedagogical beliefs and technology

Much work has been done to explore the connection between school teachers' use of technology and the extent to which they hold constructivist beliefs about teaching and learning. For example, Bigatel (2004) suggests that the teachers who make effective use of technology are those whose beliefs are described as 'learner-centred'. This connection between constructivist pedagogy and effective practice with technology is a common theme (for example, see Becker and Ravitz (1999), Goodison (2003), Churchill (2006), Hermans *et al.* (2008), etc.). However, many studies investigating this connection have relied on teachers' self-reports of their practice and, using observations of teaching, Judson (2006) questioned whether

this relationship actually existed. Other studies have observed correlations between teachers' beliefs and their use of technology. Kim *et al.* (2013) found a strong relationship between teachers beliefs about knowledge and learning, their conceptions of teaching and their use of technology. They conclude that, in their observations, teachers who had student-centred beliefs demonstrated student–centred uses of technology. However, they note that "it was not examined if there were differences in technology integration practices among teachers due to individual differences other than teacher beliefs" (p. 83).

Some authors take this proposed connection further and suggest that in order to adopt new technology and practices, teachers *must* adopt constructivist beliefs. For Ertmer *et al.* (1999) teachers' (non-constructivist) beliefs about pedagogy can be seen as a barrier to the use of technology. For Ertmer *et al.*, two kinds of barrier prevent school teachers from using technology and they describe these as first and second-order barriers. First-order barriers are external to the teacher, e.g. lack of resources or time, while second-order barriers are internal, e.g. beliefs about teaching, about computers, established practices and "unwillingness to change" (Ertmer *et al.*, 1999, p. 54). The implication of this is that attempts to reduce 'first-order' barriers, e.g. by providing additional resources, will not automatically lead to changes in classroom practice. Ertmer *et al.* suggest that teachers' beliefs may "either reduce or magnify the effects of first order barriers" (p. 55) so that teachers with similar experiences of 'first-order' barriers can be expected to respond differently due to differences in their beliefs (the 'second-order' barriers). In a case study of seven US teachers in a single school, Ertmer *et al.* (1999) suggest that the teachers' beliefs about classroom practice affected how they interpreted the first-order barriers they faced and this in turn meant that although they faced the same barriers, these had different effects on their practice. For example, lack of time to use the computer was more of a barrier for those who saw technology as a supplement to the curriculum than for those who saw technology as a resource to reinforce or present the curriculum. Similarly, Churchill (2006) suggested that teachers needed to transform aspects of their beliefs or 'personal theories' that may 'impede' practice. Although Ertmer (2005) notes that, unlike changes to remove first-order barriers, changes to teachers' beliefs are seen as irreversible, difficult to achieve and risky for the teacher. As was briefly mentioned in the introductory chapter, in this discussion of the barriers that might 'impede' practice, there is an implication that once these 'barriers' are removed, the technology will be able to effect the desired change. Thus, such reports suggest an inappropriate determinist view of technology.

As a consequence of studies that stress the importance of transforming teacher pedagogical beliefs, some authors have created developmental models to capture how teachers' use of technology evolves over time. For example, Hooper and Reiber (1995) describe early familiarisation with a new technology and initial use developing into 'integrated' use of technology in teaching and culminating in learner-centred uses of the technology. While Ertmer *et al.* (1999) propose technology being used first to supplement the curriculum, then to reinforce the curriculum and finally to move beyond the curriculum. Such stage models allow researchers to assess types of use rather than frequency of use but also create a hierarchy of technology use with certain applications of technology presented as 'better' because they are associated with learner-centred practices.

Some researchers have found using technology to be a catalyst for change in teachers' pedagogical beliefs. In an influential survey, Becker and Ravitz suggested that there was a "truly causal" (1999, p. 381) relationship between technology use and teachers developing a more constructivist pedagogy. Similarly, Levin and Wadmany (2006) found that teachers' views of teaching, learning and of technology, were located on a continuum from transmission to constructivism and that changes in beliefs followed changes in practices. They also noted that teachers could hold seemingly conflicting beliefs simultaneously and suggested that belief systems are multi-faceted. For Levin and Wadmany, changes in beliefs were gradual and rather than giving up old ideas, teachers extended their repertoire of ideological ideas. However, the ability of technology to be such a catalyst has been challenged: Windschitl and Sahl (2002, p. 201) found that technology was "neither necessary nor sufficient" to initiate changes in teacher's pedagogic beliefs.

In contrast to many other studies, Dawson and Heinecke (2004) describe a group of teachers who espoused a constructivist teaching philosophy but used non-constructivist teaching strategies when using technology. They explained this by suggesting that the "images of technology" (p. 77) held by the group were felt to be incompatible with their constructivist teaching principles. This may imply that these 'images' or perceptions of technology can sometimes be as, or even more, important than pedagogical belief in influencing technological practices. However, it may also be the case that the key factor is the extent to which the perception of technology accords with the pedagogic beliefs of the teacher. As Veen (1993) points out teachers' beliefs are strong and slow to change and therefore teachers are more likely to adopt new technology if they can use it "in accordance with their existing beliefs and practices" (p. 139).

University teachers' pedagogical beliefs and technology

Just as a number of authors have claimed that school teachers' uses of technology are closely connected to their beliefs about learning and teaching, very similar views can be found in the higher education literature. For example, Bates and Poole (2003) suggest that choices about how technology is used are "absolutely dependent" (p. 25) on beliefs about the nature of knowledge, of the particular discipline, and of learning. For Bronack and Riedl (1998) this poses a problem because existing teaching practices "are often at odds with those to which the new media lend themselves" but "deeply rooted in the beliefs teachers hold about teaching and learning" (p. 1). Connections between pedagogy and how technology is used can be seen in many studies. For example, Newland and Byles (2013) claim that teaching using Web 2.0 technologies requires a different pedagogical approach to teaching in other ways. While Brown (2012) claimed that university teachers' perceptions of the potential of using Web 2.0 technologies could be classified according to those who perceived using Web 2.0 tools to have benefits for student-centred learning and those who perceived the benefits as being for content-centred teaching. However, Jones, Asensio and Goodyear (2000) identified that the participants in their study of networked learning shared a common constructivist educational philosophy. They also note that this is surprising given the range of pedagogical approaches associated with networked learning and despite their participants having different levels of teaching experience.

As discussed above, a common approach to measuring and investigating pedagogic beliefs is to consider the frequently-used dichotomy characterising teachers' pedagogic beliefs on a scale from teacher-centred to student-centred and compare this to technology use. Ferguson's (2004) study suggests that these two contrasting views of teaching and learning lead to different ways of using technology and she found that all the university teachers in her study could explain how the way they use technology fits with their philosophy of teaching. Other authors have suggested that there is sometimes a contradiction between teachers' stated beliefs and their observed practices and Ferguson's teachers were aware of how their use of technology was influenced by pressure from colleagues, students, institutions or publishers.

Another set of studies has looked at academics' 'conceptions of teaching' using the phenomenographic methods discussed earlier. For example, Ellis, Steed and Applebee (2006) identified conceptions of both blended learning and blended teaching which reflected a scale from encouraging surface to encouraging deep approaches to learning. They also identified a connection between the conceptions

held by the teacher and their approach to designing courses and activities. Roberts (2003) and González (2009) built on the work of Kember and Kwan (2000) and identified teachers' conceptions of online teaching along a scale from content-centred to learning-centred. González (2010) later extended these to identify conceptions of using elearning and suggested that teachers exhibit four different ways of conceiving elearning: for providing information; for occasional communication; for online discussion; to support knowledge building. He described how these four different conceptions of elearning are played out in terms of the role of the teacher, role of the student, amount of interaction, and the extent to which online and face-to-face elements are integrated. In later work, González (2012) investigated how approaches to e-teaching relate to a teacher's perception of their "teaching situation". Again, teacher approaches to e-teaching were characterised in terms of a scale from content-centred (information delivery focused) to learning-centred (communication, collaboration and knowledge building focused). However, González also identified seven elements of teachers' perception of the teaching situation: individual control, institutional strategy, technical support, pedagogical support, time required, teacher skills, student willingness and ability. He suggested that information-focused approaches were associated with teachers having a negative perception of their teaching situation while those with a student learning-focused approach were more likely to have a positive perception of their teaching situation. This study also identified a small group of teachers who had inconsistent perceptions of teaching in face-to-face and online settings. González suggests that this could be due to lack of experience (they were newer teachers) or to unsuccessful experiences with technology.

Inconsistencies between stated pedagogical beliefs and reported practices with technology were also found by Owens (2012). She also suggested that teachers' age or subject discipline had no impact on either their beliefs or practices but that obtaining a teaching qualification, gaining teaching experience, and specific training in the use of online learning environment were associated with increased student-centred online practices.

In a slightly different approach, Bain and McNaught (2006) suggest that although individual practices may appear to contradict a claimed belief, these may, in fact, be consistent once the context of the teacher's whole 'belief system' and teaching environment are taken into account. For Bain and McNaught, 'simple' dichotomies of belief about teaching are insufficient to understand how teachers interpret and make decisions about technology.

Steel (2003; 2006) develops this by exploring the relationship between beliefs about learning and teaching, and beliefs about the nature of technology (in her case the 'Blackboard' VLE). She studied how exemplary teachers at the University of Queensland understood their use of technology and suggests that the course websites that teachers construct are tangible representations of their beliefs and thinking. Similar to Ferguson (2004), the teachers in her 2006 study were able to explain to students their rationale for the use of the technology, implying some level of choice rather than a reaction to imposed requirements to use the system. For Steel, differing beliefs influenced course design and her case studies describe how one person's view of teachers as experts / students as apprentices led to different uses of the course website than another's view of teacher and student as collaborative partners.

Together these studies contradict the claims that only particular constructivist pedagogic beliefs encourage the successful adoption of technology (e.g. Lynch, 2002). Campbell (2005) suggests that it is the alignment between innovation and the teacher's 'core values' that is key. For Campbell, adopting technology may be an "intensely personal process" through which beliefs may be adjusted but only under particular conditions, including the existence of a social community where collaborative conversations occur and assumptions may be challenged.

However, just as for school teachers, the connection between technology and approaches to teaching is used as a rationale for organisations to introduce technology in order to force staff to rethink their pedagogical beliefs, as this claim relating to virtual learning environments illustrates:

> I've read many times that the VLE is a Trojan horse that gets staff to think about how they teach. Once you make the move into e-learning, it definitely makes you think more about your face-to-face teaching. (Alan Staley quoted in JISC 2004, p. 29)

Technology, Pedagogy and Content Knowledge (TPACK)

A different approach to understanding the relationship between technology and pedagogical beliefs can be found in the identification of Technology, Pedagogy and Content Knowledge (TPACK). This is a development of Shulman's concept of Pedagogical Content Knowledge (PCK) described earlier. TPACK was defined by Mishra and Koehler (2006) as the interaction between three bodies of knowledge: knowledge of pedagogy, knowledge of subject content, and knowledge of technology. They describe it as the "basis of good teaching with technology" (p.

1029) and the concept has been widely used in school settings and as a focus for staff development.

However, TPACK is a complex and increasingly contested construct. While PCK consisted of two bodies of knowledge (Pedagogy (PK) and Content (CK)) and one overlapping construct (PCK), TPACK adds a third body of knowledge (Technology (TK)) and three new overlapping constructs (TPK, TCK and TPACK). According to Angeli and Valanides (2009) the boundaries between these concepts are fuzzy and Cox (2008) found 89 different definitions of TPACK in the literature. In particular, Graham (2011) notes that is not clear whether TPACK refers to the combination of the three bodies of knowledge, or to something new that is more than the sum of its parts, or if it is just used as another term for 'technology integration'. In addition, Angeli and Valanides (2009) claim that TPACK is too general and simplistic and suggest that by not taking into account other potential factors e.g., teachers' beliefs and values, it may lead to errors and naïve conclusions.

There has been very little research into the relevance of TPACK for higher education teaching. One exception is the work of Rienties, Brouwer and Lygo-Baker (2013) who evaluated the impact of an online professional development course and concluded that it led to increases in participants' TPACK and technology use. However, it is not entirely clear that this study makes a distinction between TPACK and student-centred beliefs. As there were no available instruments for measuring TPACK in higher education, Rienties, Brouwer and Lygo-Baker developed their own instrument but note that "the focus of the questionnaire was shifted from the ability, knowledge and/or intentions to use technology (as in most TPACK questionnaires …) to the actual design and usage of technology-enhanced learning in the academics' practice" (p. 126). In the example questionnaire item provided, it appears that this use was associated with learner-centred practices. As a consequence, in this case, it is not clear that the TPACK construct is distinct from student-centred conceptions of teaching.

In conclusion, questions about the role of teachers' pedagogic beliefs have had a high profile in research into teacher thinking about technology. Research in schools has often claimed that effective practice using technology is dependent on teachers holding constructivist pedagogic beliefs and that not holding such beliefs is a 'barrier' to effective teaching. However, there is clear evidence that school teachers use technology in ways that are compatible with a range of different pedagogic beliefs and that such uses relate not only to the individual's pedagogic beliefs but also to their perceptions of the technology being used. In addition, technological

determinist claims that the use of technology 'causes' change in pedagogic belief or will inevitably lead to improved teaching are contradicted by research that highlights how these over-simplify the experiences of teachers.

Similarly, some research into university teaching has also suggested that a constructivist pedagogy or a particular set of technology knowledge is required to use technology effectively. Again, however, further evidence has shown that university teachers use technology in a range of ways that are compatible with different pedagogic beliefs and there has been a movement towards more complex understandings of pedagogic beliefs and away from simple dichotomies of constructivist versus non-constructivist beliefs. These more nuanced views of pedagogy have also tried to account for the contexts in which university teachers work and are better able to account for the inconsistencies in practice suggested by other researchers. In particular, case study research (such as that of Steel, discussed above) has been more successful in accounting for beliefs in their context than research using standardised scales of pedagogic belief or knowledge such as 'conceptions of teaching' or TPACK. Such case studies have also discussed individual teachers' values or roles and the chapter will now discuss how these and other aspects of teachers' identity relate to the ways that they think about technology.

Technology and teacher identity

As discussed above, an important theme in research into teacher thinking in higher education has been the study of academics' identities as teachers. A number of authors have considered how these ideas might be connected to uses of technology in teaching although McShane claims that we "know little of the subjective experiences of academics who teach using ICT" (2004, p. 5). A second aspect of teachers' self-concept is technology self-efficacy and this will also be discussed briefly.

The research discussed earlier noted how researchers conceive academic identity as multi-faceted and encompassing academics' sense of meaning, values and self-esteem. From this perspective, an academic's 'teacher identity' can be thought of as a sub-identity of this broader overall 'academic identity'. This sense of identity is seen to be shaped by both immediate communities and the higher education sector but it can also be affected by changes related to technology. According to Hanson (2009), there has been limited research into the impact of e-learning on academic

identities especially on those teachers who are not early adopters or successful users of technology, however some themes are common in the literature.

According to some authors (e.g. Littlejohn and Higgison, 2003; Lynch, 2002), in order to be effective users of technology, teachers must embrace the role of 'facilitator' or 'mentor' rather than that of the traditional lecturer. While such statements assume that the role of the teacher functions as a barrier to technology and that the technology will determine change once used 'effectively', such views are influential. In response, university teachers may view the imposition of technology and new roles or ways of teaching associated with this as a threat to their identity as a teacher. In particular, the introduction of new technology may be seen as a potential threat to a teacher's authority (Bakioglu and Hacifazlioglu, 2007) or as leading to a sense of loss of control, e.g. in online group work compared to face to face group activities (McConnell, 2000). Johnson (2012) suggests another potential loss of control: that of professional autonomy, if technology is introduced as a result of managerial coercion rather than professional choice.

Another threat to an academic's identity may come from the proliferation of online access to sources of knowledge. Lynch (2002) suggests that teachers may feel that they are struggling to keep up with the rush of new information. While Hanson (2009) takes this further and notes how, for some individuals, the status of their academic knowledge has been threatened by the growth in access to electronic sources and this had forced them to accede a position as 'knowledge gatekeeper'. Simultaneously, her participants reported a loss in teacher presence due to the nature of teaching online but also due to constraints of using electronic presentations compared to their previous practices. Hanson sees these changes as threats to teachers' 'ontological security' and notes how, when faced with such changes, her participants fell back on their identity as successful face-to-face teachers and used this to justify their reluctance to use elearning.

In these circumstances, self-presentation can become an important preoccupation for teachers. Goodyear (2002) describes how teachers spend a great deal of time thinking about and preparing their contributions to online discussions, but may not want this effort to show. He also notes how the pressure to keep up with discussions can be a source of anxiety for teachers.

Even teachers who are confident and enthusiastic about technology may feel the need to reassert their identity. McShane (2004) investigated how the experience of combining online and face-to-face teaching affected the 'self-concept' of lecturers. The five 'early adopters' in her study were optimistic about technology and had

chosen to use online resources without pressure from their institution or department (p. 6). These lecturers suggested that their uses of technology had positive aspects, e.g. strengthening their relationship with students, but also negative aspects, e.g. expanding the demands on their time. As they adopted online methods, the lecturers became more conscious of their planning and teaching decisions and also more aware of potential scrutiny of their work. McShane suggests that the lecturers made choices about how they combined electronic and traditional teaching methods based on their own particular values and beliefs. In particular, McShane suggests that their decision to retain lectures appeared to "reinforce their centrality in the teaching-learning process, and their control of the learning and learners" (p. 14).

In contrast, Clegg (2011) rejects the idea that technologies relate to academic identity in a simple way suggesting that there is little empirical data about their impact. In discussing her own use of email, Clegg shows how email not only "entrenches audit and managerialism" (p. 176) but also creates intimacy with distant colleagues and friends. The style and content of their emails shows Clegg and her correspondents writing in ways that display different aspects of their 'self' for different audiences but also reflect an awareness that emails can be archived and passed onto to other readers than they were originally intended for. Clegg resists a technological determinist view that would see academic identities changed by new technology but instead suggests a view of technology as embedded social practice that academics both work with and against.

In summary, both an individual's teacher identity and their broader academic identity are related to the local and national (and possibly international) context in which they work. Henkel (2005) has suggested that academic identity encompasses the three dimensions of sense of meaning, values and self-esteem, and each of these dimensions are reflected in the literature regarding technology. Technological developments may be perceived by teachers as potentially leading to a change in their role as a teacher or to the status of their academic knowledge and thus as a threat to the meaning of both their teacher and academic identity. It can also be associated with feelings of loss of control or authority and hence affect a teacher's self-esteem. Using new technologies may also raise questions for teachers about the value of their teaching, and their relationships with students or colleagues. As a result, teachers may respond with reluctance or opposition while working with and against technology.

Self-efficacy

Another relevant aspect of teachers' self-concepts is their belief in their competence with technology. This has been widely researched in the school sector where, according to Wozney, Venkatesh and Aprami (2006), teachers are more likely to be high users of technology if they believe they have the skills to use technology successfully and value the outcomes associated with this. They suggest that teachers need to believe that they will succeed in their own context if they are going to be willing to use technology. This is supported by Mueller *et al.*'s (2008) analysis of factors that could be used to discriminate between teachers who most fully integrate technology in their teaching. This found that the frequency that teachers had experienced 'positive' outcomes from using computers and the extent to which they were comfortable with technology were the most significant factors. Mueller *et al.* suggest highly specific positive personal experiences and seeing positive models of practice build teachers' confidence with technology. However, Mueller *et al.* also note that general teacher-efficacy was not a significant factor in their study and suggest that teachers need a feeling of efficacy relating specifically to technology rather than teaching more generally. Ertmer and Ottenbreit-Leftwich (2010) suggest that the connection between self-confidence and technology use is particularly true for new teachers, although Smarkola (2008) suggested that student teachers' high levels of confidence "was at odds with their limited knowledge of using computers" (p. 1210). Jimoyiannis and Komis (2007) suggest that providing opportunities for teachers to acquire IT skills is critical to strengthen beliefs about value of technology.

There have been fewer studies of teacher self-efficacy with technology in higher education although 'teacher skills' was one of the features of the 'teaching situation' that González (2012) considered to constrain teachers' attitudes to technology. However, Schneckenberg (2009) claims that "an inadequate level of eCompetence of the majority of faculty members is one reason for the slow adoption of eLearning in higher education." (p. 413). According to Buchanan, Sainter and Saunders (2013), the 'perceived ease-of-use' construct in the Technology Adoption Model is related to self-efficacy and in their study of internet use, internet self-efficacy was associated with use of educational technology.

The Role of Context in Teachers' Thinking About Technology

As was discussed above, research into school teacher thinking has been characterised by a growing acknowledgement of the importance of context.

However, this is not yet as well developed in studies of university teacher thinking where issues of structure and agency may be overlooked (Ashwin, 2008).

In the specific studies of teacher thinking about technology that have been discussed here, there is a contrast between the awareness of the importance of context that is apparent in some work on academic identity, and the more limited view of context seen in some work on teacher attitudes or pedagogic belief. This is more likely to see context as a factor that can either constrain or facilitate their practice. As such, context is often presented as a barrier or filter to teachers' preferred practice. For example, Lawrence and Lentle-Keenan (2013) discuss "institutional constraints" on teachers' use of technology. However, social contexts and institutional cultures can influence thinking as well as practice and Windschitl and Sahl (2002) point out that this is often ignored in studies of individual teachers' knowledge and beliefs.

Beliefs about technology and beliefs about teaching and learning exist alongside beliefs about the rest of a teacher's life and work. These wider beliefs include beliefs about technology (as part of a subject, as a phenomenon in society, etc.), about students (their interests, experiences, backgrounds, etc.), about teaching (the role of teachers, the purpose of education, etc.) and about their immediate context (school constraints, priorities, etc.). In fact, even those beliefs that are to do with technology can be seen to be "fashioned by the teachers' identity and participation in wider cultural and social spheres" (Loveless, 2003, p. 323).

Through case studies of school teachers, Windschitl and Sahl (2002) demonstrated that teachers'

> "choices about how to use technology in their classrooms emerged from different personal histories, unique ways in which they reconciled perceived institutional expectations for teaching with their own beliefs about students and learning, and varying access to settings in which one could learn about technology." (p. 175)

Teachers in their study made decisions about using technology based on a number of interconnected belief systems including: beliefs about learners' needs; beliefs about how learners used technology outside school; beliefs about what counted as 'good teaching' in their subject within the context of their school; and beliefs about the level of control offered by the technology (either for teacher or student dependent on their pedagogic beliefs).

For Windschitl and Sahl, teachers' individual beliefs are situated in the particular context in which they work. However, this is not a straightforward process:

> "Settings are not imbued with unambiguous meaning or messages that participants unproblematically appropriate. Rather, participants actively filter what is said and done in these situations through a system of beliefs and actively construct meaning from the circumstances in which they find themselves." (p. 200)

Windschitl and Sahl suggest that social and professional interactions with peers, pupils and also parents of pupils influence teachers' beliefs and mental models of how technology could be used in their teaching. For example, these interactions could function to transmit expectations for using technology or beliefs about learners in the school. So, although expectations for using technology were generated within the school, individual teachers reinterpreted these through participating in different settings both inside and outside of the school.

They conclude that taken together, the influence of institutional expectations, beliefs about learners, and the range of informal ways of learning about technology, means that models of teacher development through training courses will have limited effect.

The importance of teachers' previous experiences of teaching without technology are also believed to be important in higher education teaching. Gerbic (2011) argues that teachers' historical experiences of face-to-face teaching and learning "are reflected in their beliefs about teaching and deeply embedded in their practices" (p. 222).

Some authors treat teaching with technology as using a 'tool', so, for example, according to Trowler, the use of any tool, including technology, "is socially and historically conditioned" (2008, p. 32). He goes on to suggest that "pre-existing cultural characteristics" (p. 33) condition how technology will be used making it difficult to predict the types of use and impact that a particular technology might have on "practices, relationships, and ways of working" (p. 33).

Within higher education, much of the focus on context has considered the pedagogic beliefs and approaches associated with specific subject disciplines. For example, Leijen *et al.* (2008) conducted a survey and interviews with teachers of dance technique and choreography in higher education which aimed to identify any specific areas of their pedagogy where technology could be used productively. The teachers identified that technology could support students in learning how to reflect on their work.

Conclusion

In conclusion, this chapter has outlined key developments in studies of teacher thinking and beliefs with regard to teaching with technology and has set out the range of different beliefs and influences on beliefs that may be relevant to this study. It has defined 'teacher thinking' as an overarching term encompassing teachers' cognitive knowledge and beliefs (which are considered overlapping constructs), the emotional responses and evaluations related to these, the intentions arising from such values and the theories developed to understand them.

The chapter has shown how, as the field of research into school and university teacher thinking has developed, there has been an increased appreciation of the need to take account of context in order to understand teacher thinking in general, and in relation to technology, in particular. It has also shown how the range of different contexts that are considered pertinent to study has widened over time and has developed Woolfolk-Hoy, Davis and Pope's (2006) 'ecological model' of different levels of context to suggest how it may be applied to Higher Education (see Figure 3.2).

This review has also demonstrated that research on teacher thinking about technology has developed in very distinct areas. Research using or developing the Technology Adoption Model has considered when teachers use technology and related this to their perceptions of the usefulness and ease-of-use of the technology. However, researchers have not responded to criticisms that the attitudes such models seek to uncover are best understood as the performance of evaluative practice rather than consistent underlying mental entities. In addition, while the models have become increasing complex due to attempts to account for the social context for technology use, such evaluations of technology cannot be disassociated from the context in which teachers make these evaluations and this is not sufficiently clear in the literature.

At the same time, research into conceptions of or approaches to teaching has considered the relationship between pedagogical beliefs and use of technology. Despite claims that constructivist pedagogic beliefs are necessary for effective use of technology, other research evidence has shown that teachers use technology in ways that are compatible with a range of pedagogic beliefs. Also, research into pedagogic beliefs has increasingly attempted to account for the role of context in understanding teachers' thinking about pedagogy, for example, through case studies of university teachers.

The chapter also identified a growing body of work that has considered teacher identity as a sub-identity of a broader academic identity. This provides a different perspective on teacher thinking about technology, one aspect of which is that while teacher's attitudes and conceptions of teaching are considered by those researching them to be relatively stable, teacher identity is considered dynamic and related to context. In addition, work on teacher identity has drawn attention to some of the emotional and value-laden choices that teachers make in contrast to the accounts of technology use as cognitive decision-making and problem-solving that are common in other teacher thinking research.

Each of these research traditions has increasingly considered the context for a teachers' thinking about technology. While some researchers have considered context merely as a 'filter' to pre-existing beliefs (or attitudes), others have acknowledged how a teachers' context may also shape their thinking about teaching with technology. However, research that have used case study methods have been more successful in acknowledging and identifying relevant contexts than those which have used attitude scales (e.g. TAM), scales of pedagogic beliefs (e.g. conceptions of teaching) or knowledge (e.g. TPACK). Thus this thesis will not use such scales but will explore alternative approaches to exploring the role of context and belief in teachers' thinking about technology.

In particular, although this chapter has suggested some elements of a teachers' context that may be relevant to their thinking about teaching with technology, empirical evidence is needed to show which of these suggestions is indeed relevant or important. In particular, the role of the institutional context or subject discipline are less clear from current studies and warrant further investigation. While it is clear that such factors will not determine uses of technology, evidence is needed that can be used to make comparisons across contexts in order to identify if such differences can be found. This will form the first research question for the thesis: How is university teachers' thinking about specific technologies patterned by different characteristics?

Research into teacher identity has suggested that an individuals' context might shape their thinking about technology but has not provided an account of how this happens and how teachers' interpret this. Therefore the second research question will consider how do social and organisational contexts and experiences shape teachers' thinking about technology?

Finally, this review has noted different traditions of research that suggest teachers' thinking about technology are informed by their pedagogic beliefs, beliefs about

context, perceptions of technology and academic identity. But it is not clear from the literature how these relate to each other and if all are relevant. Also, the literature does not fully explore the emotional and value-laden nature of thinking about technology. Therefore the final research question will ask what aspects of teachers' beliefs, knowledge and identity inform their thinking about technology?.

In addressing these questions, the thesis will also need to respond to the recurrent critique of research in the field that many papers have studied the experience of enthusiastic and successful early adopters or 'expert users' and the applicability of these findings to other more 'mainstream' teachers is unclear. There is a clear need for research that attends to the voices of teachers who are less enthusiastic or are later adopters of technology and the thesis will need to address this.

Therefore, the next chapter will describe and analyse the methods through which these questions will be addressed.

4 Research Methods

Introduction

This chapter sets out the methods used in the research and identifies the key methodological issues that affected their choice and effectiveness. The chapter begins by stating the research questions for the study. It will then critically discuss the methodological approach that has been taken for this project and detail the specific methods, procedures and data collection instruments used in this research. Finally, the chapter will discuss key ethical considerations.

Research Questions

The overall aim of this thesis is to investigate teacher's thinking about teaching with technology in higher education and how this is formed and influenced by the social and organisational contexts that they are positioned within.

This will be achieved through the following research questions:

1. How is university teachers' thinking about specific technologies patterned by different characteristics? (E.g. demographics, institution or subject)

2. How do social and organisational contexts and experiences shape teachers' thinking about technology?

3. What aspects of teachers' beliefs, knowledge and identity inform their thinking about technology?

Methodological Approach

This study builds on an existing body of research into the uses of technology in higher education and research into the beliefs and thinking of teachers. As the previous chapters have shown, researchers working in these areas have used a wide range of methodological approaches and research designs. A number of studies have considered differences in technology use as pertaining to the individual teacher and explored how their beliefs about technology or learning influence attitudes towards and eventual use of ICT. Such studies have typically used qualitative interviews to design quantitative survey instruments to gather data about aspects of teacher thinking and decision making. For example, some studies have

focused particularly on teachers' beliefs about learning and teaching and related these to their reported use of technology.

Such surveys provide information about the differences in teacher beliefs and suggest some possible implications of these but often do not attempt to explain the differences that have been found or how these beliefs have been formed and imply that a high level of agency is maintained by the individual. Also, Trowler (2008) claims that such approaches to studying higher education can obscure the impact of context. Therefore, to explain the relationship between technology and individual teacher beliefs, we also need to take account of the social and cultural contexts within which these individuals are working (Windschitl and Sahl, 2002). Therefore, this research seeks to take a sociocultural approach to exploring how teachers' use of technology and their beliefs about technology interact with their context.

> "The task of sociocultural analysis is to understand how mental functioning is related to cultural, institutional and historical context" (Wertsch, 1998, p. 3)

The research follows Trowler (2008) in understanding university teaching as operating within multiple cultures that interact dynamically. In particular, it is recognised that individual teachers operate within departmental, institutional and subject disciplinary spheres and each of these can potentially influence a teacher's practice with technology.

While remaining mindful that research into higher education teaching has been criticized for a concentration on qualitative methods at the expense of quantitative techniques (Gill, 2009), the present research project takes a mixed methods approach to gathering data. There has been a growth in the popularity within educational research of mixed methods approaches that combine quantitative and qualitative data (Denscombe, 2007a) and these have been used to investigate several aspects of technology use in higher education, for example, Bakioglu and Hacifazlioglu (2007) combine survey questionnaires and interviews to probe lecturers' and students' attitudes towards technology in lectures. Friesen (2009) suggests that a 'multivocal' approach should be taken to researching technology in education that encompasses different research approaches each with their own possibilities and viewpoints rather than trying to combine them into one unified approach.

The data collection for the present project therefore consisted of two stages. The first stage was a quantitative survey of teachers in higher education. This aimed to address the first research question by probing how teachers reported using

technology and the beliefs that they held. The survey was distributed to a sample of university teachers in different subject disciplines, departments and institutions.

As well as providing data about the types of technology use and the perceptions of university teachers, the survey was also used to identify a sub-sample of teachers for the second stage of the research: qualitative multi-site case studies. The case study approach was adopted to provide a "rich and vivid description" (Cohen, Manion and Morrison, 2007, p. 252) of the topic being studied and case studies have previously been used to explore how university teachers' thinking changes over an extended period. For example, exploring how a higher education teacher's conceptions of teaching develop (Entwistle and Walker, 2000) or investigating how professional development interventions may influence the pedagogical beliefs of teachers (Hativa, 2000a). The purpose of these case studies was to probe more deeply into teachers' beliefs about technology and to investigate the second and third research questions.

A range of interview techniques was used to gather data for the case studies, including semi-structured interviews about participants' beliefs about and uses of technology and detailed interviews following the 'episodic interview' method (Flick, 2009, p. 185). These interviews generated narrative biographies of teachers' uses of educational technology and a more detailed picture of teachers' beliefs. In addition to describing beliefs and key events, the use of biography enables specific events relating to technology use to be put into their local and societal context (see Erben, 1998). The interviews were complemented by a 'talk aloud' stimulated recall technique following Steel (2003; 2006) who created case studies of teacher beliefs about teaching using websites through a combination of techniques including stimulated recall and interviews.

Having provided an overview of the research rationale, this chapter will now consider some of the main methodological issues arising from the research in more detail – starting with the choice of specific research methods.

Survey

Surveying as a research approach

A survey allows researchers to gather information about a population through questioning a sample of that population. In particular, a cross-sectional survey captures data about the population at a particular time and provides a relatively straightforward way of gathering data about attitudes, values and beliefs (Robson,

2002). Surveys can be used to provide consistent, reliable, standardized data that can be generalized, however they cannot be used to identify causal relationships unless repeated and have limited explanatory power (Cohen, Manion and Morrison, 2007). For surveys investigating attitudes and beliefs, Foddy (1993) suggests that respondents to surveys may not always report their attitudes accurately so that the responses will be affected by the characteristics of those taking part, however, self-completion surveys do allow anonymity, which, according to Robson (2002), can encourage respondents to answer honestly. Also, if attitudes are considered to be 'performed' in social contexts rather than 'preformed' (Puchta and Potter, 2004), then questions of accuracy become irrelevant as variation is the expected outcome as respondents perform different activities.

Self-completion surveys are considered by many researchers to be cost effective but Sapsford (2007) notes that the lack of interviewer involvement in conducting the survey means that there is no guarantee of the quality of attention that each respondent gives the survey. According to Sapsford, self-completion surveys typically have a lower response rate than face-to-face surveys and this can make it difficult to judge whether the sample is representative of the wider population. However, it should be acknowledged that populations vary in accessibility (Cohen, Manion and Morrison, 2007) and in this case, the intention was to gather information about a diverse and geographically scattered population that would be difficult to access by other means.

Online survey methods

The traditional methods for distributing a survey are either through a self-administered postal questionnaire (Wellington and Szczerbinski, 2007) or through face-to-face questionnaires administered by the researcher. However, recent advances in technology have made it common to distribute questionnaires electronically by email or via an online or web-based survey.

A key advantage to online surveys is their cost. The expense of administering a face-to-face survey combined with the logistical difficulty of approaching teachers meant that this method was not suitable for a population of university teachers. The costs of a postal survey, while still far more expensive than an online survey, could be justified if there were evidence to suggest a higher quality response to the survey. Rea and Parker (2005) claim that other advantages of web-based surveys are that they enable data to be collected rapidly, permit easy follow up via email, and allow for confidential and secure data collection. Furthermore, Wright (2005) suggests that the use of automated surveys can save time for the researcher and

Sapsford and Jupp (2006) claim that web based surveys can make some difficult to access populations more accessible.

There is some evidence that online surveys have lower response rates than postal surveys. Bryman (2008) notes that early research into email surveys found high response rates but later studies showed these declining. He suggests that the early novelty of email surveys and the "growing antipathy" (p648) towards unsolicited emails may explain this. Research comparing response rates of web-based surveys (as opposed to email surveys) and paper surveys has provided mixed results. Some studies, e.g. Cobanoglu, Warde and Moreo (2000), found that online surveys had a higher response rate than postal surveys, however, a meta-analysis of 45 experimental comparisons by (Manfreda *et al.* (2008)), concluded that web surveys yielded an 11 per cent lower response rate than other surveys. This may not apply to all survey populations, though. Barrios *et al.* (2010) compared the response to web surveys and postal surveys from a population of PhD holders. They concluded that in surveys of subjects with a high educational background the response rate to web questionnaires was significantly higher than to postal questions. Some researchers have attempted to improve the response rate to web surveys by offering post-completion incentives (often based on prize draws), however Sánchez-Fernández, Muñoz-Leiva and Montoro-Ríos (2012) suggest that these are not effective.

Some authors have suggested that web surveys gain a higher quality of responses than postal surveys. Bryman (2008) suggests that online surveys tend to have fewer unanswered questions and Denscombe (2007b) claims that they gain more detailed responses to open questions than postal surveys. Rea and Parker (2005) suggest that this may be because web-based surveys are efficient and convenient for respondents, thus allowing them time to consider their response. In particular, Barrios et al (2010) noted that the responses to their web survey of PhD holders contained fewer unanswered questions and longer responses to open-ended questions than the response to a postal survey.

Population coverage and sampling

According to Sapsford and Jupp (2006), surveying online could be considered to be methodologically problematic in terms of sampling and in relation to the generalizability of the results. Fan and Yan (2010) suggest that there are two challenges to web survey sampling: coverage error and sampling error. Coverage error is an issue raised frequently in critiques of online surveys, i.e. that they can only be completed by those with access to the internet, which tends to be a biased

sample of the population in terms of education, wealth, age and ethnicity (Couper, 2000). However, in organisations where employees are expected to be familiar with email and the internet there will be a very high level of internet access. If this is the case, then web surveys are particularly useful for specialized populations and, in the case of university teachers, email contact may, in fact, be preferred over contact via post (as was the case for Barrios *et al.*'s survey of PhD holders).

Sampling error refers to the fact that not all members of the sample will respond to the survey and there are two important factors that affect the ability of a web survey of higher education teachers to reduce the sampling error: access to a contact list of university teachers and self-selection of participants.

Access

If there was to be any likelihood of providing a representative sample, the survey for the present study needed to be sent to potential participants that, in this case, constituted a cross-section of university teachers. However, given this population, a full sampling frame would be impossible to obtain. While lists of teaching staff were available from institutional websites and other sources, it was considered that unsolicited emails may be automatically rejected due to the increasing use of aggressive spam-blocking tools (Fan and Yan, 2010) or be poorly received.

Universities themselves hold lists of email addresses for staff and the use of such lists would allow for a probability-based sample of teachers. However, there are a number of problems associated with gaining access to such lists. Where a reliable email list is available, a 'gatekeeper' must nonetheless be found who is willing to let the list be used for the research. However, there is a possibility that the gatekeeper will act as 'moderator' and may be unwilling to allow emails to be sent to all members of the organisation.

Gaining access to a sample may take a significant amount of time and be very challenging (Wright, 2005). Even after taking time to explain the purpose and potential benefits of participation, the researcher's request may be rejected. One of the reasons for a gatekeeper to be reluctant to distribute a survey is a perception that teachers suffer from 'survey overload'. Manfreda *et al.* (2008) suggest that "over-surveying internet users may negatively impact on their willingness to participate". Thus, surveys from external researchers may be rejected so that an institution can prioritise their own internal surveys. Wright (2005) suggests fostering "good will" by offering to provide survey results to the sample population, for example, through a study report.

The use of institutional email lists may also raise other potential problems. Wright raises the issue of lists containing multiple addresses for the same person or of participants making multiple responses to the questionnaire. One suggested solution to these issues is for the questionnaire to require an individual access code prior to completing the questionnaire however, according Wright (2005) this can significantly reduce the response rate.

Self-selection

While email invitations to participate in the survey can be sent easily, the 'ephemerality' of email (Thach, 1995) means that they can just as easily be deleted and ignored. In any group, some individuals are more likely to complete a survey than others and this self-selection bias can be seen as a major limitation of online survey research (Wright, 2005). This is a potential problem because if there are any differences between the respondents and non-respondents, the sample will not be representative. In particular, Rea and Parker (2005) suggest that those who do not use email or are not comfortable with web-based technology tend not to respond to online surveys. In this study, the focus of the survey is related to technology and any method that discourages low users of technology from completing the questionnaire will affect the results by providing a biased sample.

An important factor affecting response rate is 'topic salience'. According to Barrios *et al.* (2010) there is substantial evidence that the more importance that the members of a population ascribe to the topic of the survey, the more likely they are to complete it. Therefore, the problem of discouraging low users of technology is compounded because high users of technology are more likely to consider this a salient topic and respond. In addition, Kopcha and Sullivan (2006) suggest that teachers tend to over-report their use of ICT in response to surveys. Taking these considerations together, the sample is, therefore, likely to be skewed towards those university teachers who are more sympathetic towards technology and may over-represent the actual use of technology in teaching. However, as shall be seen later, the survey responses did in fact gather data from respondents who made little use of technology and evidence of both negative and positive attitudes.

Thus, despite all of the limitations described above, it was decided that an online survey provided the best compromise between gathering data from a large sample and avoiding a biased sample. It is important to note that as the sample was self-selecting, it is likely to over-represent those who are most interested in technology or teaching and learning and therefore likely to overestimate the frequency of use of technology and positive attitudes towards technology. This restricts the extent to

which statistical analyses of the sample can be generalised to the complete population of university teachers or even to other employees of the sampled universities. While a probability sample would have been preferable for improving the generalizability of the data, such a sample would not have been possible given the difficulties of reaching this population. However, the sample provided detailed data about the contrasts between high and low users of ICT (even if not a reliable indicator of their relative numbers) and these contrasts may have potential to be generalised.

Survey Design and Development

The first stage of the data collection was to survey the technology uses and beliefs of teachers in a range of universities. The survey was intended to collect quantitative data about teacher' use of a range of technologies, perceptions of the impact of the technology on their work, influences on their use of technology and general demographic information.

Development of survey instrument

There are many different methods for creating online surveys including popular services such as Survey Monkey (www.surveymonkey.com). Fan and Yan (2010) suggest that there are over 300 different survey software products available and that researchers should always pilot the tool and check the safety of their data before using it. For this research, Bristol Online Surveys (www.survey.bris.ac.uk) was chosen to host the survey. This was regularly used by the researcher's university and so easily accessible. The survey service was hosted at a UK university and could guarantee a good level of service, data protection and confidentiality as well as lending legitimacy to the survey amongst a population of university-based respondents. The website holding the survey was closed once data collection was completed, however, a printed version of the survey including all questions and possible responses can be found in Appendix A.

In order to address the research questions, the question items in the survey had to address the following key areas:

  i.   The participant's context and demographic details
 ii.   Their uses of technology
iii.   Their perceptions of technology

Context and demographic information

In order to investigate potential differences in uses of and beliefs about technology, the survey collected some basic information about the individual and their career in higher education. This consisted of questions about gender (question 12), age (q13), career in higher education (q14 and 15), employment status (q17) and qualifications (q18 and 19). The survey also asked about job title (q16) following the example of surveys from the Higher Education Statistics Agency (HESA). However, HESA note that job titles, in particular the term 'senior lecturer', are used differently by pre-92 and post-92 institutions and advise caution in analysis of this variable. These questions were asked at the end of the questionnaire so that more substantive questions were asked first to encourage respondents to complete the questionnaire (Gorard, 2003).

A key variable to investigate was the institution in which participants worked. To do this, copies of the survey were created for each institution, thus enabling the survey to mention the participant's institution in the web address and survey title and provide a small degree of personalisation.

Another key variable was subject discipline. Given the huge number of course titles and department names and the inconsistencies in the use of these between universities, it was decided to provide a limited number of categories for participants to select from (q1). The subject categories used were taken from the UCAS and HESA Joint Academic Coding System (JACS2) implemented in 2007/8. During the distribution of the survey, one potential respondent emailed to inform the researcher that they would not be completing the survey due to 'psychology' not being included in this list. HESA classifies psychology (coded in terms of a degree subject as C800) as part of the 'Biological Sciences' subject grouping, however, if this perception is widespread, the survey could potentially exclude some psychologists.

The survey also asked questions about participants' perceptions of the importance of teaching and research (q2 and q3) due to the weight given to these perceptions in studies of academic professional identities. As some technologies are claimed to be particularly appropriate for some kinds of teaching, participants were asked about the level at which they taught undergraduates (q4) and the group sizes that they taught most commonly (q5). The decision to focus the survey on the teaching of undergraduate students was made because undergraduates make up the majority of students in higher education and in order to build upon existing studies of undergraduate teaching. Respondents were also asked how satisfied they were with the teaching methods they used (q7d).

Uses of technology

The survey asked about both general use of technology and the use of specific software tools. Likert-type scale items were used to find out how strongly teachers agreed with a set of statements about their use of technology for teaching and preparation for teaching (q6a-b). They were also asked to compare their use of technology with others in their department, their university or who teach the same subject as they do (q6c-e). All scale items used a 5-point scale from 'strongly agree' to 'strongly disagree' plus an additional 'don't know' response. It was felt important to maintain a 'neutral' category on the scale so that the results did not misrepresent the strength of response through forcing participants to give a positive or negative opinion. A 5-point scale was used rather than a 3-point scale to allow participants to give an indication of the strength of their agreement (or disagreement). It would also have been possible to use a 7-point scale, however, this would invite participants to give a level of precision in their response that may not be appropriate and was not required to address the research questions. There are several limitations to such scales including that is it not possible to specify exactly what 'strongly agree' means in relation to 'agree'. Therefore, one person's response of 'agree' may in fact represent as strong an opinion as another person's 'strongly agree' (Foddy, 1993). A second limitation is that the scale is not linear and the interval between strongly agreeing and agreeing may be completely different from the interval between neutral and disagree (Cohen, Manion and Morrison, 2007). Finally, such questions may force participants to respond in categories that do not entirely represent their opinions. Foddy (1993) suggests that there may be some 'respondent-centred bias', for example, the tendency of some participants so respond positively rather than negatively and of others to remain neutral.

As a very wide range of technologies are currently used in higher education, the survey used both a set of Likert-type scale questions asking how frequently participants used popular technologies (q8) and an open question (q9) that allowed respondents to name other technologies that they use but were not specifically mentioned in the previous question. The list of popular technologies was based on the results of the 2008 UCISA survey of Higher Education Institutions (Browne *et al.*, 2008). In addition, one further tool was included: 'Slideshow presentations e.g. Powerpoint' as other literature suggested that Powerpoint was commonly used (and this was confirmed in the pilot survey). As these terms may not have been familiar to all survey respondents, the survey software allowed the creation of a 'More Info' button with definitions of each term. Where possible these definitions were taken from JISC (2009) 'Effective Practice in a Digital Age'.

Perceptions of technology

A range of questions were asked to discover participants' beliefs and perceptions about technology. According to Gillham (2007), questions about beliefs and attitudes are the most difficult to write and to answer and so each was carefully trialled. One set of Likert-type scale questions asked about general attitudes towards technology including whether it enhances learning (q7a), the expectations of others for them to use technology (q6f-g), their confidence with technology (q7b), and whether they wished to use more technology in their teaching (q7c). Other questions asked about their perception of barriers to their use of technology (q7e-h). The four potential 'barriers' to using technology mentioned in these questions were those identified by Bingimlas (2009). Respondents were also asked about their perceptions of the impact on their teaching of the specific technologies mentioned above (q8).

Two open questions were used to prompt participants to explain their decisions whether to use technology. The first asked for participants to comment on the factors that influence their decisions (q10) and the second asked for comments on how they make these decisions (q11). Open questions allow participants to give more detailed answers and the additional freedom can reduce any potential bias that may be caused by the limitations of closed responses. While open questions require more complicated analysis than simple closed categorical questions, they are useful when intended to help explain a statistical pattern rather than create one (Gorard, 2003). However, difficulties may arise because respondents are likely to provide many different responses, may give irrelevant information and because such questions demand more effort from the participant (Oppenheim, 1992).

These questions were intended to identify both influences and processes related to participant's thinking about whether or not to use technology. However, the factors described in response to the first question were often so influential that they dominated the response to the second question too.

The survey concluded with an invitation for volunteers to take part in the second stage of the research (q21).

Piloting the survey instrument

A draft version of the survey was created and distributed for in-depth evaluation by a group of university teachers. This pilot was intended to assist the development of the survey questions and ensure that these were clear and could gather the data required effectively. As the survey was not intended to generate an attitude scale or a battery of scale items, it was not tested for scale reliability or validity. Seven

detailed responses were received from respondents based at a range of universities and from a variety of subject disciplines. The pilot sample included teachers employed on grades from lecturer to professor and with a range of ages and experiences in higher education. The draft version of the survey, which has been highlighted to show changes made as a result of the pilot, can be found in Appendix B.

Rea and Parker (2005) insist that online questionnaires must be as user friendly as possible with clear instructions for the respondent. The pilot sample identified a number of questions that some pilot respondents felt were unclear and suggested several changes to the wording of questions and the multiple choice answers. Pilot respondents also identified some issues specific to their context – for example, the word 'studio' was added to the question about teaching methods and practical workshops in response to a comment from an arts lecturer.

It was important to signal in the introduction to the survey how long participants could expect to take to complete it as Crawford *et al.* (2001) found that, unsurprisingly, respondents were more likely to respond to a survey that they expect to take 8-10 minutes to complete than one that would take 20 minutes. Crawford *et al.* also found that those expecting a survey to take 8-10 minutes were more likely not to complete a longer survey so the pilot sample were asked to say how long the survey took to complete. Rea and Parker (2005) suggest that the optimum length for web-based surveys is completion within 15 minutes and the final survey took between 10 and 15 minutes to complete.

Survey administration

Once the survey had been piloted, a final version of the survey was created. This was then copied to provide a unique survey for each institution that took part that could be accessed through a weblink sent via email. As described above, the most reliable method for contacting a large sample of university teachers was through university mailing lists and access to such lists needed to be made through an appropriate 'gatekeeper'.

For this survey, the most appropriate potential gatekeeper was the individual who was responsible for either teaching and learning or e-learning in their university. To encourage participation, gatekeepers were sent a link to the survey to evaluate it and also promised a summary of the results for their institution. Two methods were used to contact potential gatekeepers: an email requesting assistance was sent to the 'Heads of E-learning Forum' (HELF) email list and individual emails were sent by identifying the appropriate contact from university websites. The contact via

HELF was particularly successful as these requests arrived from a known source rather than an unsolicited email. In total, 95 institutions were approached and representatives from 27 institutions agreed to disseminate the survey. A further 16 representatives replied but declined to take part and 52 did not respond to the request. Those institutions who responded but were not willing to participate gave understandable reasons for this, for example: having recently carried out an internal survey along similar lines, or a worry of survey overload or email overload.

For some institutions, after a gatekeeper had agreed to distribute the survey, further steps were required to gain permission to send a whole staff email or to get approval to participate in the research. It also became clear that institutions used different methods to contact their staff. While many sent out a whole staff email (with some able to target only academic staff), others were only able to announce the survey through online announcements (e.g. via their VLE). These were invariably far less successful than approaches via email and as a result there was a great deal of variation in the response rate with over 20 per cent replying at some institutions while others only received a few responses.

Response rate

The survey was administered in the second half of 2010, resulting in 795 responses from teaching staff within 27 Higher Education Institutions. Details of the response for each institution can be found in Appendix C. As described above, there was wide variation in the response rate. University F had the highest number of responses (116) and an overall response rate of 12% while University B had the highest response rate (26%) with a smaller number of responses (51). Where university gatekeepers were able to email all staff an initial invitation and a reminder and where they could provide an indication of the total number of eligible academic staff, response rates could be calculated as being above 12%. In contrast, institutions that were not able to email all staff gained very low responses including universities R, D, Z, and AA that each gained less than 5 responses. The overall response rate does compare well with other online surveys of academics – Brown (2012) surveyed academics at her own university about the use of web 2.0 tools and achieved 74 usable responses from a population of 4250.

However, calculating an overall response rate was not straightforward as it was difficult to know the exact overall size of the population. Very few institutional gatekeepers were able to tell how many teachers had received the survey as bulk email systems were unable to provide a figure for the number of emails sent out. For surveys where the full sampling frame cannot be identified, the frequency of

nonresponse is hard to define or unknowable (Couper, 2000). In addition, where this figure was known, it may have included academic staff who do not teach undergraduates and so were not eligible to complete the survey. In some cases, the email had to be sent to all staff to ensure all academic staff were included, and as a result, many of the recipients of the invitation email would have been support or administrative staff who would not have been eligible.

An alternative method for calculating the population size would be to use institution payroll numbers. However, these would also have been inaccurate as they include academic staff who do not teach undergraduates and, according to one university administrator, payroll lists double count anyone who has a dual contracted role paid from different budgets and can significantly over-estimate staff numbers. Similarly, national data collected by HESA (Higher Education Statistics Agency) includes staff who do not teach undergraduates and, in addition, reports only the 'Full Person Equivalent' (FPE) number of staff rather than the number of individuals.

Overall, although the total response rate is unknown, the survey did gain a large number of responses and the data allows for comparison of demographic groups within the survey responses. However, the data cannot be said to be representative of the UK higher education sector and, as a result, it would not be appropriate to use advanced statistical methods to make inferences about the sector based on this data.

Demographic characteristics of the survey sample

Table 4.1 shows the composition of the sample. Questions relating to demographic details were in the final part of the survey and some respondents chose not to give this personal information.

Table 4.1: Demographic Characteristics of Sample (n=795)

		n	%
Gender	Male	335	47%
	Female	381	53%
Age	Under 30 years old	23	3%
	30 - 39	145	24%
	40 - 49	235	33%
	50 - 59	255	36%
	60 and over	56	8%
Subject Discipline	Subjects allied to Medicine	107	15%
	Business & Administrative Studies	94	13%
	Education (including Teacher Education and Education Studies)	89	13%
	Creative Arts and Design	67	10%
	Social Studies	63	9%
	Mathematical and Computer Sciences	41	6%
	Biological Sciences	34	5%
	European Languages, Literature and related subjects	33	5%
	Historical and Philosophical Studies	28	4%
	Engineering	27	4%
	Medicine and Dentistry	23	3%
	Physical Sciences	19	3%
	Mass communications and documentation	19	3%
	Architecture, Building and Planning	17	2%
	Technologies	16	2%
	Linguistics, Classics and related subjects	14	2%
	Law	12	2%
	Eastern, Asiatic, African, American and Australasian Languages, Literature and related subjects	2	0.3%
Time working in Higher Education	0-2 years	46	7%
	3-5 years	121	17%
	6-10 years	195	27%
	11-15 years	131	18%
	16-20 years	99	14%
	Over 20 years	121	17%

Time working at current institution	0-2 years	96	14%
	3-5 years	166	23%
	6-10 years	218	31%
	11-15 years	103	14%
	16-20 years	64	9%
	Over 20 years	66	9%
Job Title	Professor (including Head of Department)	51	7%
	Reader	24	3%
	Senior Lecturer (including Principal Lecturer)	455	63%
	Lecturer	136	19%
	Other	54	8%
University focus	Teaching-focused	504	65%
	Research-focused	64	8%
	Teaching and Research are considered equal priorities	207	27%
Full or Part time	Full time	585	82%
	Part time	128	18%
Permanent or Temporary Contract	Permanent	671	94%
	Temporary	42	6%
Highest qualification	Doctorate	297	42%
	Masters degree	311	44%
	Bachelors degree	70	10%
	Other	36	5%
Teaching qualification	Yes	499	71%
	No	202	29%

Comparing the sample to national statistics for UK Higher Education Institutions provided by HEFCE via the online Higher Education Information Database for Institutions (HEIDI), shows that this sample provides a good cross-section of the demographic groups represented in the higher education workforce. The sample is well balanced for gender as, nationally, 44% of academic staff are female. The sample also has a good distribution of ages. Compared to the HEFCE data, the sample is slightly weighted towards academics over 40, however there is a good range in all age categories.

Some subject groups are small in comparison to others so in the analysis of the survey data, subjects have been combined to ensure more even categories. This was done by considering the HEFCE 'subject groups', combining the 'STEM'

subjects (Sciences, Technology, Engineering and Mathematics) and joining Design and Creative Arts to Architecture and Planning in a wider 'Design and Arts' category. Table 4.2 shows how the proportions of the new subject groups in the sample relate to the proportions of those subjects in the UK higher education sector.

Table 4.2: Subject Group Proportions

Subject Group	Proportion in Sample	Proportion in UK Higher Education (HEFCE data)
Administrative, business & social studies	24%	19%
Design and Arts	12%	10%
Education	13%	9%
Humanities and language based studies	14%	10%
Medicine, dentistry and health	18%	25%
Science, Technology, Engineering and Mathematics	19%	27%

In the data for current job role, 7% of respondents are professors compared with 9.6% of UK academic staff. There is also a very high proportion of 'senior lecturers' which reflects the different uses of this title mentioned above. The sample is slightly skewed towards full-time staff on permanent contracts. 18% of the sample were employed on part-time contracts compared to 35% of academic staff nationally. Similarly, nationally 34% of academic staff are on fixed term contracts, however, a number of these will not be involved in undergraduate teaching, for example, those on contracts associated with specific research contracts.

Overall, the balance of age, gender, subject and universities ensures that this is a representative sample to address the research questions.

Data analysis

Once the survey was completed, the raw data was downloaded from the survey software and imported into SPSS for analysis. Initially, univariate analysis of the data was conducted by generating frequency tables in order to identify any features of the reported uses of technology or beliefs held. Despite the sample consisting of 795 responses, the frequency of responses to some categories of some questions was low and, in these cases, categories were combined. Such combinations were clearly noted in the analysis of the data, for example, the combination of subject groups described above. An exception to this was the analysis of data by institution. Here, it would not make sense to combine categories and so institutions with low responses were excluded from this aspect of the analysis. As is common in web surveys, some survey responses were incomplete and in such cases, Schofield's advice is that "records of individuals who have made only partial, or even nil, response should never be dropped from a data set" (2006, p. 51) in case the non-responding participants have some factor in common. This advice was partly adhered to: partial responses were included but nil responses provided no data about any factor of the non-respondent and so were excluded.

Results were presented as simply and clearly as possible with simple percentages and frequencies for single variable analysis and cross tabulations for bivariate analysis. Where appropriate, descriptive statistics were calculated and compared to various demographic factors (for example, age, gender and subject-discipline) using the chi-squared statistic to test for their significance at both the 5% and 1% level. Where ordinal data had been collected, Spearman correlation coefficients were also calculated. However, given the nature of the sample, these statistics were seen as indicative rather than generalisations to the wider population. The non-probability nature of the sample precluded more complex statistical analysis as the sample did not meet the assumptions required for such tests (Gorard, 2006).

The qualitative responses to the two open questions in the survey were coded to identify frequently occurring themes. An open coding approach was used to identify key issues and to calculate how frequently they arose.

Case Studies

Multiple case studies as a research approach

While the survey provided a broad picture of university teachers' uses and perceptions of technology, the case studies were designed to provide a more detailed examination of these beliefs and how they were shaped. Thus, the data collected built on the survey's findings in relation to the first research question and provided evidence to address the second and third.

While the term 'case study' has a range of meanings (e.g. see Bassey, 1999), Yin (2003) suggests that it involves empirical enquiry within a 'real-life' setting. The cases being studied need to be defined and bounded clearly and, in this study, the cases being investigated were the teaching practices of individual teachers. Although these are clearly bounded cases, it is important to recognise and take account of the fact that each individual functioned within a wider social context outside the bounds of the case. In fact, the strength of a case study to recognize that "context is a powerful determinant of both causes and effects" (Cohen, Manion and Morrison, 2007, p. 252) is helpful in making sense of the data collected. The case study approach allowed for a detailed description that could portray the complexity and richness of the contexts within which each individual worked. According to Yin, explanatory case studies are "the preferred strategy when 'how' or 'why' questions are being posed" (2003, p. 1) and are useful when the research question is about contemporary events outside of the control of the researcher.

A 'collective' case study (Stake, 1995) can be used to investigate a particular topic through comparing multiple cases and Yin (2003) claims that multiple-case study designs are likely to be stronger than single case studies. They have also been commonly used to study educational innovations such as new technology in schools (Yin, 2003). However, multiple case designs are more costly and time consuming than single case studies.

A common criticism of case study research is that it provides limited opportunities for generalisation. While some cases may be intrinsically interesting and important or unique, the cases studied here were selected to provide a range of perspectives rather than for their uniqueness. In this instance, it is not possible to make statistical generalisations or suggestions about the whole population of university teachers. However, it is possible to suggest theoretical propositions or explanations that may appeal to the "naturalistic generalisation" (Stake, 1995) of the reader or to "analytical generalisation" (Yin, 2003) that expands or generalises theory. Yin

(2003) suggests that multiple cases should not be thought of in the same way as multiple respondents to a survey - where the aim is to produce a representative sample (he calls this 'sampling logic'). Instead, he suggests that multiple case studies should follow a 'replication logic' where the findings from one case are compared to other cases that are carefully selected either to predict similar results (literal replication), or predictably different results (theoretical replication).

Case study data collection methods

Yin (2003) suggests that case studies should draw on multiple sources of evidence and in order to collect sufficient high quality, detailed data, three one-hour interviews were conducted with each participant. A series of interviews provides participants with time to become more comfortable with the research process and the researcher, and to reflect on their own experience and understanding of their beliefs. It also provided the researcher with opportunities to feedback any analysis or transcription of previous interviews and invite comment from the participants.

Despite these advantages, interviews have a number of limitations as a research technique. They are time-consuming for researcher and participants (especially where geographically distant) and arranging mutually convenient interview times and places was sometimes problematic. Another potential concern is the problem of interviewer bias where the presence or comments of the interviewer influence the outcomes of the research. To minimise the likelihood of interviewer bias, interview participants were selected who worked in different places to the interviewer and had no personal connections.

Each of these interviews was carried out face-to-face with all but two participants. These two participants preferred to be interviewed over the telephone and only their third interview was conducted in person. Telephone interviews share many of the advantages of face-to-face interviews, however, it can be harder to gain a rapport with the interviewee and the lack of visual cues can be a disadvantage (Robson, 2002). While this mode of interviewing was less preferable, it was the only way of securing their participation and the telephone interviews were successful in addressing the research questions.

Each interview had a specific focus and approach. The first interview was a semi-structured interview that explored participants' perceptions and beliefs about technology and their context. The semi-structured interview approach is flexible (Robson, 2002) and allowed the interview to be tailored to the participant's own experience and context. Uniform questions were used to gain factual information and these were complemented with open questions and prompts to encourage

interviewees to share their opinions and beliefs. While gathering useful data in itself, the interview also raised a number of issues or questions that the participant may not have considered before, thus preparing for more detailed responses in subsequent interviews.

The second interview sought to generate narrative biographies of teachers' engagement with technology through an 'episodic interview' method (Flick, 2009). Dhunpath (2000) claims that in narratives, events are always placed in their context and this was particularly useful as the intention of the interview was to identify significant events, influences or individuals that had affected how participants used technology. It also allowed investigation into how participants' perceptions and beliefs about technology had changed over the course of their career. 'Narrative inquiry' is claimed to reduce the influence of the researcher's expectations on the interviewee's responses (Nelson, 1993) and has been used in a number of studies of school teacher thinking, for example, Kelchtermans (1993).

The final interview was intended to analyse participants' thinking about their use of technology for a specific purpose or event. It used the 'stimulated recall' technique where participants are invited to choose a particular technology or resource and to demonstrate it while 'talking aloud' to explain how and why they used it. This activity allowed the participant to describe how their use of technology came about and how it related to their teaching context.

'Talk aloud' techniques are frequently used to investigate the experience of using technology and several studies have used such techniques to evaluate the use of educational technology (e.g. Cotton and Gresty, 2006). These studies usually involve the participants verbalising their thoughts while using the particular technology and are referred to as a 'concurrent verbal protocol'. In contrast, stimulated recall is a 'retrospective verbal protocol' where participants are asked to recall their thinking with the help of a resource (in educational studies, this is often a video recording of the participant teaching). An advantage of stimulated recall is that it allows participants to explain their decision-making.

Stimulated recall was used by Steel (2003) to investigate Australian university teachers' thinking about course websites. Steel suggests that the academics' websites provided evidence of their 'knowledge-in-action' while the stimulated recall task allowed them to reflect on the decisions they had made in designing it. According to Steel, the 'think aloud' approach reduces interruption to the participant's thinking and minimises interviewer bias.

A major criticism of stimulated recall is that the thoughts verbalised during the stimulated recall task are the participants' thoughts after the event (in this case, after the design or use of the resource) and may be considerably different from their thoughts during the event or represent a later rationalisation of the event. Also, as with other interview techniques, the participants may try to present themselves more favourably. Lyle (2003) suggests that although there are significant limitations to this approach, it also has considerable potential.

Interview schedule design and development

Each interview schedule was piloted with a university teacher to ensure that it gathered appropriate data within the available time. The pilots confirmed the content of the questions, the methods of recording and transcribing the data, and the intended methods of data analysis. Key outcomes of the pilot interviews are described below and the final interview schedules and sample transcripts can be found in Appendix D.

Interview 1 - How is technology used?

This interview addressed the first two research questions and provided the context for subsequent interviews and exploration of the third research question. It followed a semi-structured format with key questions addressing different aspects of practice and prompts to follow each of these. The first questions asked about the participant's role and university context. These were followed by questions about how they used technology in their professional life and the reasons for this. Later questions focused on exploring potential barriers to the participant's use of technology and their beliefs and attitudes about technology and its significance.

These questions were supplemented with questions from a study of computer use adapted from Flick (2009, p. 189):

- What does technology mean to you? What do you associate with the word technology?
- What parts of your teaching are free of technology?
- How did you use technology in your last lecture/seminar/tutorial?

The pilot interview confirmed that the questions were suitable for a one-hour interview and prompted comments that addressed the research questions. Following the pilot, a number of minor changes were made to the order of the questions and prompts to provide a more logical sequence through the interview. In addition, the questions about other people's expectations of the participant were originally combined with a question about barriers to technology use. These were

separated as it became clear that expectations could be a driver for technology use as well as a barrier.

Interview 2 - How did you come to use technology in these ways?

The second interview followed Flick's episodic interview technique (2009) in order to elicit a narrative of technology use from the participants. It began with a 'generative question':

Today I am interested in the past and hearing about your experiences of being a learner and being a teacher and how technology may have played a part in this or not. I am interested in the different experiences you have had and what you think has been important to you as a learner or teacher at different times in your life. And if technology has played any part in this.

This was then followed with prompts introduced in phases to ensure that participants gave sufficient information to create a chronological account of their uses of technology. These prompts asked about participants' earliest experiences with educational technology as both learners and teachers and about how the role of technology had changed over their career. It prompted participants to identify significant events, technologies or influences on their use of technology and probed their current thinking about technology and how this related to their ideas about teaching and learning more generally. The final section of the interview asked participants for their thoughts about future uses of technology and their use of technology outside of teaching.

The prompts included both opportunities for participants to recount further details and questions intended to provoke reflection and encourage more theoretical accounts of the significance of the events discussed.

Testing the interview schedule identified that the initial generative question needed to suggest a starting point for participants' responses and as a result the phrase "Why don't we begin with your own experience of technology as a learner" was used when necessary.

Interview 3 – 'Talk aloud' stimulated recall

For the third interview, participants were asked to choose a piece of technology that was significant to them in their teaching and to demonstrate it. A series of prompts were used to encourage participants to discuss its use and the context in which it was used. They were also asked to describe how they came to use the technology and to evaluate it.

The second part of the interview was used to gain the participants' reaction to points raised by other interviewees. A number of statements and questions that had arisen in earlier interviews were put to participants for their opinion.

The pilot interview confirmed the importance of ensuring that participants had sufficient notice prior to the interview to enable them to choose a technology to discuss.

Interview co-ordination

The final survey question asked for volunteers to be interviewed and this generated a list of potential participants. From this list, three institutions were chosen that had a large number of potential participants across a range of subject disciplines and with a range of experiences with technology. These universities chosen were spread across the UK and varied in terms of size, physical location and campus, student intake, and subjects taught. However, all three universities were post-92 institutions as none of the pre-92 institutions taking part in the survey provided a sufficient range of volunteers for interviews.

Potential volunteers from these were contacted to explain the content, purpose and timing of the interviews. While several volunteers decided not to proceed with the interviews, eleven teachers agreed to take part. Interviews were arranged at times and places convenient to the participants (usually, an office at their own university) and conducted over a six month period during 2011.

Interview participants

The interview participants were chosen to provide an indicative picture of the variety of types of university teacher responding to the survey in terms of age, gender and from a wide selection of subject disciplines. The group was also designed to include both high and low users of technology and some that had provided strong opinions in response to the open survey questions.

Table 4.3 Interview Sample

	HEI	Subject discipline	Gender	Age	Role	Contract	Highest qualification
A	1	Nursing	Female	40 - 49	Senior Lecturer	Full-time permanent	Masters degree
B	2	Psychology	Male	50 - 59	Senior Lecturer	Full-time permanent	Bachelors degree

C	2	Biological sciences	Male	40 - 49	Senior Lecturer	Full-time permanent	Doctorate
D	2	Education	Male	50 - 59	Professor	Full-time permanent	Doctorate
E	3	Education	Female	30 - 39	Senior Lecturer	Full-time permanent	Doctorate
F	1	Law	Male	30 - 39	Lecturer	Part-time permanent	Masters degree
G	3	Childhood Studies	Female	40 - 49	Lecturer	Full-time temporary	Masters degree
H	3	English	Female	40 - 49	Senior Lecturer	Full-time permanent	Doctorate
I	2	Subjects allied to medicine	Female	40 - 49	Senior Lecturer	Full-time permanent	Masters degree
J	1	Creative arts & design	Female	50 - 59	Reader	Full-time permanent	Doctorate
K	3	Biomechanics	Male	30 - 39	Senior Lecturer	Full-time permanent	Doctorate

As can be seen from Table 4.3, each of the six subject groupings identified in the survey data was represented in the interview group. The proportion of male and female teachers was similar to that in the survey data and the most popular age groups were all represented. There was only one interviewee on a part-time or temporary contract but this reflects the survey sample. The range of job titles and qualifications matched the range seen in the survey although there were slightly more interviewees with doctorates than might be expected and, in order to include both a reader and a professor in the sample, these groups were also slightly over-represented. Overall, the group of interviewees provided a good sample of different university teachers and contexts to investigate the research questions.

Data analysis

Data from the interviews was fully transcribed and imported into Nvivo for analysis. At this stage, any reference to individuals or institutions was anonymised. Analysis of the interviews began after the first interview with each participant so that any tentative initial conclusions could be raised and discussed at subsequent interviews.

Flick (2009) suggests a 'thematic coding' approach to analysing multiple case studies. In this approach, a multi-stage procedure is followed which begins with the creation of a short description of the key features of each case that will be refined further during the analytic process. The next stage is a deep analysis and coding of a single case. This is intended to result in a thematic structure that can be used to underpin the analysis of the subsequent cases and can be modified when new or contradictory elements emerge from these cases. Flick claims that this approach increases the comparability of interpretations while remaining sensitive to the contents of each individual case.

The analysis of the first case began with an initial open coding that aimed to name words, phrases, sentences or paragraphs through a close reading of the text. Charmaz (2006) suggests that the purpose of this initial coding is to "mine early data for analytic ideas to pursue in further data collection and analysis" (2006, p. 44). The coding intended to construct analytic rather than descriptive codes (Gibbs, 2007). Care was taken to ensure that the categories identified were not just summaries of the questions asked in the interview but were generated through a careful reading of the responses as Schmidt (2004) notes that interview participants may take up the interview question in different ways and that aspects related to particular questions are often taken up later on in the interview.

This stage was similar to a grounded theory approach where the codes are created by defining what was found in the data rather than applying preconceived categories to the text. However, in contrast to the grounded theory approach, for this study, the codes created through the analysis of the first case were then related to the project's research questions and the theoretical background of the topic to create a set of analytical categories to use in the next stage of coding. For example, the research questions suggested that codes were required relating to cognitive beliefs about technology; emotional responses to technology; individual, departmental, subject and institutional contexts; and formation of beliefs about technology. Miles and Huberman (1994) suggest that it is important that codes should have a conceptual and structural order and so relationships between codes were identified and the codes were organised in three groups relating to the three research questions (see Appendix E).

The initial categories were then refined and developed through application to the initial case and continuously through the coding of the remainder of the cases as required. All interview transcripts were coded three times and an example coded extract can be found in Appendix F.

Once all the interviews had been coded, key themes were identified through collecting all of the data relating to each code. These themes were then used to structure the analysis of the data, as will be seen in later chapters.

Ethical Considerations

Researchers need to take full account of the rights and interests of those participating in their research (Denscombe, 2002) and the research approach followed the British Educational Research Association's (2004) Revised Ethical Guidelines for Educational Research. In addition, full ethical approval was given through the ethical approval procedures of the Institute of Education and the researchers' employer (University of Chichester). In particular, the following key issues of informed consent, data protection, confidentiality and misrepresentation were considered.

Informed consent

Participation in the research was entirely voluntary. All participants were fully informed of the purposes and intentions of the research at the outset of the data collection and gave their initial consent. Participants were also free to withdraw from the research at any point during the research process and were reminded of this before taking part in the interviews.

Obtaining informed consent from survey participants was achieved in two stages. Participants were invited to take part in the survey by email and this email provided information about the survey and research project in order to enable participants to give informed consent. To take part in the survey, they then had to click an email link to the survey and those who did not consent could choose not to open this link.

However, as the email invitations were sent by institutional gatekeepers on behalf of the researcher, it was not possible to guarantee that the full research information was included in the emails distributed. Therefore, a second explanation of the research was given on the opening page of the survey to ensure that participants understood the voluntary nature of the survey and actively gave consent to participate (see Appendix A).

In comparison, obtaining informed consent to participate in the interview stage of the research was relatively straightforward: participants were sent an electronic copy of the Research Information Sheet and Interview Consent form (see Appendix G) in advance of the first interview. The forms were signed and collected at the start

of the initial interview so that participants had an opportunity to ask any questions about the process.

Data protection

The research methods described above produced various forms of electronic documents (e.g. survey responses, interview recordings and transcripts) and these were used in accordance with the Data Protection Act (1998). In particular, all data was stored on password-protected devices.

Confidentiality

The responses to the survey were anonymous. The exception to this was where a respondent chose to volunteer to take part in the interview stage of the research, in which case, they were asked to provide an email address. These email addresses were removed from the raw data before it was analysed to ensure anonymity.

All analysis (and any future reports) of the research ensured that the identity of the interviewees was kept confidential. Interviewees were assigned a single letter code to be used in this thesis or any future publications and lists of interviewees were kept separately from transcripts of interviews.

Piper and Simons (2005) note that descriptions of a participant's context can often reveal clues to their identity and so all descriptions of individual cases were carefully checked to ensure that they did not inadvertently give too much identifying detail.

Misrepresentation

The data from the interviews was used to draw conclusions about teachers' beliefs and practices and, wherever this refers to an individual, effort were taken to ensure that these conclusions were discussed with the interviewee to ensure that they were accurate reflections of their beliefs or understandings. Interview transcriptions were sent to participants so that they could check them for accuracy or to clarify anything they felt was unclear but also so that they could retract any statements they wished.

Conclusion

This chapter has set out the research questions for the study and discussed the mixed-methods approach used to investigate them. By combining both an online survey and a detailed multi-site case study, the approach generated data that address the research questions effectively. The next five chapters analyse the results from the data collection beginning with the responses to the survey and followed by chapters considering the case study results relating to context, identity,

pedagogic beliefs, and change. These results will then be brought together in Chapter Ten and discussed with reference to the literature.

5 Survey Results

This chapter analyses the responses to the online survey of university teachers' perceptions of technology in their teaching. The survey describes the attitudes towards teaching with technology and the reported use of technology of 795 university teachers of undergraduate students and provides evidence of how these teachers' thinking about specific technologies was patterned by institutional and subject differences (Research Question 1). It describes a group of people who were engaged and interested in teaching and learning in general and were broadly positive about the use of ICT in their teaching. The survey found large variations in the responses to different technologies and two groups of technology were identified – 'core' technologies, such as presentation software, that were used frequently, even when teachers felt that they were not having a positive impact on learning, and 'marginal' technologies, such as blogs, that were used much less frequently and only where they fitted the pedagogic approach or context. The results highlight differences between universities but rather than there being 'leading' universities that were the highest users of all technologies, institutions tended to be heavier users of some technologies than others. Similarly, subjects could be associated with particular technologies rather than being consistent users of technology in general.

The chapter will begin by considering teachers' attitudes towards and uses of technology in general before focusing on responses to particular technologies. Finally, it will discuss a range of factors that may influence uses, attitudes and beliefs.

Attitudes towards and use of technology

University teachers reported widespread use of technology with 87% of respondents reporting that they used ICT in most of their teaching and 96% claiming that they used ICT to prepare for most of their teaching. There was no statistically significant variation in these results according to the demographic background of participants, the subject they taught or the institution where they worked (see Tables H1 and H2 in Appendix H).

The high levels of reported use were matched by participants' very positive attitudes towards technology with 97% agreeing that appropriately used technology could enhance teaching and learning in their subject and 66% strongly agreeing. Again, there were no statistically significant differences in the strength of response according to gender, age, subject taught or institution.

While teachers reported high levels of confidence in the use of technology in their subject (87% agreed they were confident and 38% strongly agreed), this did vary according to gender: 44% of males strongly agreed compared to 33% of females (χ^2=8.991, df=1, p<.01 – see Table H5). There was also a relationship between confidence and subject taught (χ^2=16.908, df=5, p<.01) with teachers in science, technology, engineering and mathematics subjects most confident and those in medicine, dentistry and health the least. (It is worth noting that there was also a relationship between gender and subject taught: 68% of medicine, dentistry and health respondents were female and 64% of teachers in science, technology, engineering and mathematics were male). Teachers on permanent contracts were likely to be more confident than those on temporary contracts (χ^2=3.964, df=1, p<0.05) as were teachers with a doctorate (χ^2=5.775, df=1, p<0.05). There was also a relationship between confidence and institution (χ^2=15.689, df=8, p<.05) with academics at University O more than twice as likely to strongly agree than those at University J.

The survey also investigated teachers' perceptions of any potential 'barriers' to using technology in teaching. As Table 5.1 shows, respondents were most likely to consider 'lack of time' to be a barrier to their use of technology. Both 'availability of resources' and 'access to technical support' were related to institution. Agreement that the availability of resources were a barrier ranged from 10% at one institution to 65% at another (χ^2=47.176, df=8, p<.01). Perception of access to technical support as a barrier (χ^2=25.381, df=8, p<.01) ranged from 19% to 57% (at the same institutions as for 'availability of resources'). Neither 'lack of time' nor 'lack of training' were significantly related to institution (see Table H6).

Table 5.1: Barriers to the use of technology in teaching

Barrier	Agree or Strongly Agree that this is a barrier
Lack of time	65% (474)
Lack of training	33% (239)
Availability of resources	32% (237)
Access to technical support	31% (227)

These issues were developed further in response to an open question about factors that influence decisions to use technology where 152 respondents mentioned time as a factor and identified three different aspects to this. The first was 'time to learn'

(45) - these respondents felt that they did not have sufficient time to learn about what new technologies exist or how to use them, for example:

> Lack of time to research what others are doing and so inspire my own imaginations (which is limited). [1] *(#722, Female, 50-59, Education, Uni G)*

The second was 'time to prepare' materials to use (44):

> …the amount of time involved in preparation of material is key as I do not have much to spare - this is probably the biggest issue. *(#660, Male, 40-49, Business & Administrative studies, Uni B)*

And the third was 'time to use' technology once it was prepared (14):

> … Whether I have time to implement it. *(#418, Female, 30-39, Linguistics, Classics and related subjects, Uni V)*

However for a few individuals, pressures on their time had the opposite effect and encouraged them to use more technology, for example, where restrictions on face-to-face teaching time led to content being delivered online or where there were opportunities to save time by creating resources that could be re-used.

> Lack of clinical placement time for students has made me use a Blackboard learning package instead *(#18, Female, 50-59, Subjects allied to medicine, Uni F)*

> If it saves me time (especially through reuse in the future) and improves the audio-visual aspect of my presentation, then I will use it. *(#443, Male, 30-39, Creative arts & design, Uni W)*

Access or availability of resources was also frequently mentioned and featured in 91 responses. As this quotation shows, access can vary within universities as well as between them.

> There are some lecture theatres and teaching spaces that are better equipped than other with appropriate technology. Often I am timetabled in a room that doesn't give many opportunities to use technology in the right way. *(#684, Female, 30-39, Subject not provided, Uni G)*

However, availability is not sufficient. 33 respondents spoke of the need for the technology to be reliable too.

---

[1] All quotations used in this chapter are presented verbatim except for minor spelling corrections for ease of reading.

> Poor quality technical infrastructure makes me wary of using any technology at this institution. *(#246, Male, 50-59, Subject not provided, Uni M)*

> Primarily the technology has to work, planning a session around an unreliable tech is the same as not planning it. *(#359, Male, 30-39, Linguistics, Classics and related subjects, Uni S)*

As a result, some respondents described how they looked for ways to avoid the perceived failings of their institution's technology.

> I try to use those [technologies] outside of the organisation - quality and reliability are higher. *(#311, Male, 50-59, Mathematical and Computer Sciences, Uni O)*

Only 26 responses mentioned technical support as an influential factor with one other comment mentioning pedagogic support:

> When attempting to use new technologies it is important to learn how to do so in a supportive environment and have empathetic technical support. *(#664, Female, 50-59, Education, Uni B)*

And only 17 responses mentioned training:

> I need more training to know what technologies are out there and how they can be used. There is very little support in my current department to promote use of alternative technologies. *(#650, Female, Under 30 years old, Social studies, Uni B)*

However, 49 responses mentioned that the respondents felt that their level of knowledge or skills influenced their decisions about technology and some of these may relate to perceived training needs.

Specific technologies

However, beneath these statistics about technology in general was wide variation in the popularity of specific technologies (see Figure 5.1) and attitudes towards them.

Figure 5.1: Percentage of teachers using specific technologies frequently ('All of the time or 'most of the time')
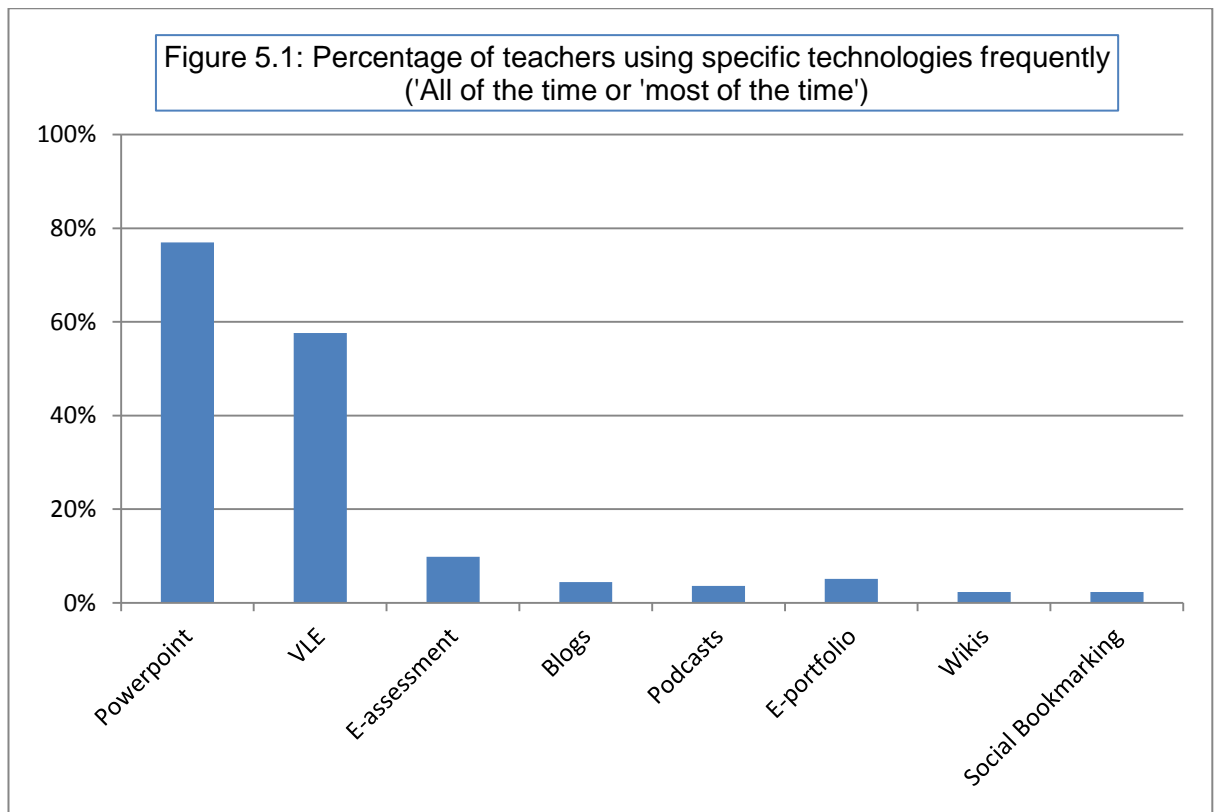
From the responses, there appears to be two broad groups of technologies. Slideshow presentation software (e.g. Powerpoint) and Virtual Learning Environments (VLEs) could be described as 'core' technologies. They are both reported as being widely used across all institutions and subject areas although the frequency of use in each of these varies. The use of the other technologies could be described as 'marginal' – they are widely used in some specific situations (maybe related to institution or subject) but are not widespread and when they are used this is often infrequent.

Common to all of the technologies was a statistically significant relationship between reported use and a teachers' general confidence with technology and no apparent differences with regard to gender. However, there were a number of differences between technologies at individual, subject and institution level.

'Core' technologies

Presentation software has become a feature of many university lectures and almost all respondents reported making some use of slideshow presentations, e.g. Powerpoint, in their teaching with 77% of teachers using it frequently and only 3% of respondents claiming never to use such software. (The question used the term 'slideshow presentations' rather than just 'Powerpoint' in acknowledgement of the use of other similar software by other software companies, for example, Apple Keynote or Prezi,.)

There was a highly significant relationship between the subject that a teacher taught and their use of presentation software (χ^2=53.125, df=5, p<.01). For example, less than half of those teaching Design and Arts used presentation software frequently compared with 86% of teachers working in Education (see Table 5.2). Given the nature of the presentation tool, as might be expected, there was a relationship between the frequency that a teacher taught large group lectures and their use of presentation software (χ^2=22.568, df=2, p<.01) and, conversely, those who taught more practical workshop based sessions were less likely to use presentation software (χ^2=9.248, df=2, p<.05).

Table 5.2: Technology and subject – 'Core' technologies

	Administrative, business & social studies	**Design and Arts**	**Education**	**Humanities and language based studies**	**Medicine, dentistry & health**	**Science, Technology, Engineering and Mathematics**
Use ICT in most teaching	91%	78%	90%	84%	91%	88%
Frequently use presentation software **	83%	48%	86%	67%	84%	79%
Frequently use a VLE	55%	54%	62%	67%	53%	59%

*For all tables: *significant at 95% level, p<0.05; **significant at 99% level, p<0.01*

Although there were no significant differences in the use of presentation software with regards to the institution where a teacher worked, other aspects of their working context were important. There was a significant relationship between the use of presentation software and perceptions of both students' expectations (χ^2=18.048, df=1, p<.01) and colleagues' expectations of a teacher to use ICT (χ^2=9.791, df=1, p<.01) with, in both cases, higher expectations related to increased likelihood of using presentation software.

For Virtual Learning Environments (VLEs), there were no significant differences between VLE use in different subjects, but institution was a highly significant delineating variable (χ^2=41.074, df=8, p<.01) with the percentage of teachers making frequent use of a VLE ranging from less than 24% in one university to almost 80% in another.

There was a very strong relationship between whether teachers perceived each technology to have a positive impact on their teaching and their reported frequency of use. For example, 84% of those who thought presentation software had a positive impact on their teaching reported that they used it frequently compared to 44% of those who did not agree that it had a positive impact (χ^2=79.867, df=1, p<.01; Spearman's correlation = 0.403, p<.01). Similarly for VLEs, 75% of those who agreed that VLEs had a positive impact on their teaching used the VLE frequently compared to 21% of those who did not agree (χ^2=155.7, df=1, p<.01; Spearman's correlation = 0.488, p<.01).

Some respondents provided a more detailed explanation as to why they thought particular technology had a positive or negative impact on their teaching. In response to the open questions, 45 participants identified particular benefits of using presentation software, for example:

> …to create a powerpoint 'script' to support my lectures... *(#345, Gender not provided, 50-59, Education, Uni R)*

> readily available, easy to use at a simple level, transferable *(#120, Male, 50-59, Engineering, Uni F)*

> I teach a lot of large groups of 100+ and have to put across a lot of information/ideas in a short time. Using ppt presentations and DVDs helps me to do that. *(#656, Female, 60+, Education, Uni B)*

However, presentation software also inspired the strongest negative opinions of any technology and 18 respondents expressed a negative attitude towards this type of software. Some recognised that they used it because it was familiar:

> Familiarity, I use Powerpoint because I've always used Powerpoint - sometimes I like to challenge myself by NOT using Powerpoint. *(#78, Male, 40-49, Subjects allied to medicine, Uni F)*

Two responses referred to Powerpoint's origin as a marketing tool:

> Powerpoint is good to sell cars, but a blackboard/whiteboard leaves time for the info to sink in... slow is good. *(#156, Male, 30-39, Creative arts & design, Uni J)*

Respondents held contrasting views regarding two aspects of using presentation software: the extent to which it encourages or discourages interaction and the

extent to which it provides a stimulus for teaching. These are illustrated in the following quotations:

Powerpoint encourages interaction:

> I like to use ppt it gets the students attention and allows more interaction *(#252, Male, 30-39, Business & Administrative studies, Uni M)*

Powerpoint discourages interaction:

> My experience and feedback from students is that act of watching powerpoint presentations produces an unthinking passivity that militates against discussion, engagement and active critical thought. *(#723, Female, Age not provided, Social studies, Uni G)*

Powerpoint as a stimulus:

> After some resistance, I find that Powerpoint works well with my type of (easily distracted) students. The conversation can veer off for a while and the slides bring us all back on track in the nick of time. The PP slides are published on our VLE in advance, so students can print these up to help them with their note taking. *(#106, Female, 50-59, Creative arts & design, Uni F)*

Powerpoint as a negative stimulus:

> There is nothing more dull than watching and listening to a lecturer talk through dull slides filled with bullet points. This is not proper teaching. *(#42, Male, 50-59, Business & Administrative studies, Uni F)*

For both presentation software and VLEs, whatever the reasons for their views, there were a number of teachers who used the technology frequently but did not think it had a positive impact on their teaching and therefore must have used it for reasons other than enhancing their teaching.

'Marginal' technologies

As shown above, reported use of the other 'marginal' technologies was low (see Chart 5.1). This group included common 'Web 2.0' technologies such as podcasts and blogs that have a high profile in education literature and are widely supported in universities but appear to have a low uptake amongst academics.

For each of these technologies, apart from e-portfolios, there was a significant relationship between the reported use of the technology and the respondent's institution (see Appendix H, Tables H3a-h). For example, teachers at University A

were more than 4 times as likely to use podcasts as those at University M (χ^2=30.187, df=8, p<.01).

Reported use of some technologies was also related to the subject being taught (see Table 5.3). There was a highly significant relationship between the use of blogging and the subject taught (χ^2=21.879, df=6, p<.01). Blogs were most popular in design and creative arts and least popular in administrative, business and social studies. In addition, the more teachers taught large group lectures, the less likely they were to use blogging (χ^2=6.982, df=2, p<.05) while the more they taught small group seminars, the more likely they were to use blogging (χ^2=12.612, df=2, p<.01).

Table 5.3: Technology and subject – 'Marginal' technologies

	Administrative, business & social studies	Design and Arts	Education	Humanities and language based studies	Medicine, dentistry and health	Science, Technology, Engineering and Mathematics
Use e-assessment*	47%	41%	53%	46%	50%	62%
Use blogs**	20%	46%	35%	33%	20%	26%
Use podcasts	35%	30%	39%	28%	33%	31%
Use e-portfolio**	20%	43%	36%	19%	38%	29%
Use wikis**	15%	36%	31%	27%	21%	21%
Use social bookmarking*	12%	23%	22%	19%	11%	11%

There was also a highly significant relationship between the use of e-portfolios and the subject being taught (χ^2=23.109, df=6, p<.01) with e-portfolios being most popular in design and arts subjects and in medicine, dentistry and health but least popular in humanities and language-based subjects. Teachers were more likely to use e-portfolios, the more often they taught small groups (χ^2=18.468, df=2, p<.01) or practical workshops (χ^2=8.570, df=2, p<.05) and less likely to use e-portfolios, the more often they taught large group lectures (χ^2=10.569, df=2, p<.01).

The subject taught was also related to the use of wikis (χ^2=20.574, df=6, p<.01) with teachers in design and arts being most likely to use wikis and those in administrative, business and social studies being least likely to use a wiki.

For the 'marginal' technologies, there was a different pattern of responses regarding perceptions of impact from the 'core' technologies. Across all six technologies, there was a high proportion of 'neutral' responses and, perhaps unsurprisingly, those who used each technology were mostly positive about its impact on their teaching while most of those who did not use the technology responded 'don't know' to questions about its impact.

However, unlike for presentation software and VLEs, this group of technologies did not have many teachers using the technology despite having doubts over its impact on their teaching. While presentation software was used frequently by 44% of teachers who did not think it had a positive impact on their teaching, none of this group had more than 2% of those who thought it did not have a positive impact using it frequently. It is possible that perceptions of impact on teaching may have been a greater factor in decisions about using these technologies than it was for the 'core' technologies.

At institutional level, different institutions were associated with different technologies but there were no 'leading' universities that were the highest users of all technologies. For example, while University M was the biggest user of presentation software and e-portfolios, it was the lowest user of podcasts. Conversely, Universities B and F both appear several times in the list of the lowest three users (but not in every category) and never in the highest three users (see Table 5.4).

Table 5.4: Highest and lowest institutional users of specific technologies

Technology	Highest Users	Lowest Users
Slideshow presentations	M,O,A	B,G,W
Virtual Learning Environment (VLE)	W,A,J	Y,B,M
E-assessment	O,J,Y	A,G,B
Blogs	A,G,W	M,B,F
Podcasts	A,G,O	Y,F,M
E-portfolio	M,J,A	Y,W,B

Wikis	G,O,W	Y,F,B
Social Bookmarking	O,A,G	M,Y,F

Many different technologies are used in universities and the choice of which to include in this survey was guided by those identified as most common by the UCISA survey (see Chapter Four: Development of Survey Instrument, p87). However, other technologies are also significant for university teachers and the survey gave respondents an opportunity to list other technologies that they used in their teaching but had not been listed in any of the survey questions. There were 239 suggestions in response to this, suggesting a very wide range of other technologies. 50 responses referred to subject specific resources (e.g. music production equipment, clinical healthcare simulation). 37 referred to the use of video – in some cases these referred to specific equipment e.g. DVDs, but most just referred to showing video. In addition, 12 respondents mentioned 'youtube' as a significant technology.

Other frequently mentioned resources were websites (14), interactive voting systems (13), web 2.0 resources (12), online texts (10), screencasts (10), web conferencing (10), email (6), interactive whiteboards (6). Second Life, despite being well represented in the literature on e-learning, was only mentioned once. Some older technologies were also mentioned, including overhead projectors (4), celluloid film (2) and blackboard and chalk (1).

The low numbers of responses mentioning each of these suggests that the survey included the correct technologies to investigate the research questions, however, it may be the case that some important technologies were not mentioned more often because frequent use had led to them becoming 'taken for granted' by respondents and, therefore, not remarked upon.

Expectations to use technology

The survey used a range of open and closed questions to identify different factors that might influence participants' perceptions of technology. One such factor was the expectations of colleagues and students: 76% of respondents thought that their undergraduate students expected them to use technology in their teaching and 70% thought that their colleagues expected them to use technology in their teaching. Both of these were significantly related to a teacher's reported use of ICT (Spearman's correlation = -0.292, $p<.01$ for students' expectations and Spearman's correlation = -0.251, $p<.01$ for colleagues' expectations).

Several factors were related to a teachers' perception of others' expectations of them (see Table H4 in Appendix H). There were significant relationships between the perception that students expected a teacher to use technology and their job title (χ^2=12.056, df=4, p<0.05), contract (χ^2=8.047, df=1, p<0.01), and institution (χ^2=17.725, df=8, p<0.05). While there were significant relationships between the perception that colleagues expected a teacher to use technology and subject (χ^2=16.600, df=5, p<0.01), having a doctorate (χ^2=4.221, df=1, p<0.05) and institution (χ^2=23.663, df=8, p<0.01). It is notable that these relationships were different for student and colleagues expectations. The only variable to feature in both lists was institution but it is not the case that some universities had higher expectations for both and the two were not significantly correlated. The relationship to institution could be because students or staff at some institutions expect more or because teachers' perceptions are different.

Respondents' comments about the expectations of students, university managers and wider society were often phrased fairly negatively and sometimes suggested that respondents felt a lack of agency over their teaching methods:

> It is virtually mandatory. We do not have a choice whether to use technology or not. It is imposed by the technophiles. *(#401, Female, Age not provided, Subject not provided, Uni V)*

There were 39 responses that mentioned the influence of university structures or management and the influence of these could work to promote or constrain use of technology as these contrasting quotations demonstrate:

> VLE demanded by the university as part of its widening access agenda and teaching and learning strategies *(#458, Female, 60+, Education, Uni W)*

> Prevented by a lack of time and institutional (i.e. senior management) recognition for the need to such technologies. *(#584, Male, 30-39, Subjects allied to medicine, Uni I)*

But managerial pressure and institutional innovation could have unintended effects that run counter to their original intentions:

> Our head of department 'encourages'/tries to force us to use certain new technologies without any real benefit to us. He wants us to podcast all of our lectures. Hardly anybody does it. This kind of compulsion puts me off. Also the university switch from webct to moodle does not inspire confidence. Why

invest in something that will be mothballed. *(#304, Male, 30-39, Historical and philosophical studies, Uni O)*

And some expectations arose despite institutional structures:

…There is little or no strategic leadership here although it has become an expectation that we use the VLE for a variety of purposes. *(#287, Male, 40-49, Social studies, Uni N)*

Student expectations were mentioned as potential influences in 32 responses. However, teachers' responses to these varied. Some respondents questioned whether students made full use of technology while others commented that meeting these expectations could have a negative effect:

Increasingly students demand to be 'given' information and not to have to think for themselves. The more technology is used the more they see it as info provided, instead of info to think about. We are having a lot of difficulty with students who are reluctant to acknowledge the difference between school/college work and university work… *(#694, Female, 60+, Mass communications and documentation, Uni G)*

Only 11 comments referred to colleagues as an influence and all but 3 of these combined their response with comments about other expectations too. Colleagues can be seen as sources of "encouragement" or of "pressure". However, a second open question asked how teachers make their decisions to use technology and in response to this, an additional 34 respondents mentioned their colleagues.

There were also other sources of expectation. Five comments suggested that a wider sense of expectation influenced them.

It seems to be the fashion *(#173, Male, 60+, Business & Administrative studies, Uni J)*

And this was supported with another 21 comments that suggest that external factors affected teachers' decisions to use technology, whether through observing "the 'latest technical craze' in the student population" *(#427, Female, 50-59, Physical sciences, Uni W)* or through adapting technologies used by graduate employers (8 responses) or because students were "digital natives" (7 responses). Not all respondents welcomed the use of popular technologies in to academic life:

> … I think social networking sites should be for leisure. University should be part of the world of work… *(#598, Female, 50-59, Mass communications and documentation, Uni A)*

Expectations from students, colleagues, managers, or prospective employers provide one possible explanation for why some technologies are used despite the user believing that they might have a negative impact on student learning. The quotations suggest that this expectation may take the form of an explicit requirement ("we do not have a choice") or an implicit assumption ("the fashion").

Improving teaching

Respondents mentioned a number of other factors that they believed influenced their use of technology and attitudes towards it. These included the design of the technology (75 responses) and particularly its ease of use (46 responses). Teaching context was important in 37 responses in terms of both group size and location and 27 responses referred to the respondents' personal enthusiasm for technology. However, a particularly important influence was the extent to which respondents believed that technology might improve teaching and learning for their students. Some teachers discussed whether technology would enhance learning (or not) in general terms, some discussed the match between technology and their subject's specific learning intentions, while others discussed their decisions about teaching.

As the next quotations show, teachers set different thresholds for decisions about whether or not to use technology: some will use technology only when it makes a significant impact on teaching or learning while others (more rarely) consider if it will benefit any of their students.

> My decision is made on whether the learning process will be significantly improved by using technology in my teaching. *(#118, Female, 60+, Education, Uni F)*

> If the technology seems likely to benefit a majority of students, and if it is affordable, easy to use, does not require significantly greater time to use it, then I'll use it. *(#544, Male, 30-39, Historical and philosophical studies, Uni Y)*

> I believe it is important to experiment with them to see if they enhance the learning experience of ANY students and my final decision is not based necessarily on enhancement for ALL students. *(#754, Male, 50-59, Subject not provided, Uni G)*

But not all teachers felt that technology could have a positive impact on learning and 5 respondents questioned this.

> … I am not convinced that increasing the use of technology is beneficial to overall quality The more you use technology the more other students skills decline e.g. actively searching for material, interpersonal skills and accessing different forms of material such as books … *(#411, Female, Age not provided, Subject not provided, Uni V)*

Whether or not technology would enhance student learning was felt to be related to the subject being taught or the particular intended outcomes of a teaching session and 91 responses referred to these. Some respondents taught subjects which they felt demanded particular uses of technology (e.g. as part of the design process on an Architecture degree) or limited their use of technology:

> As a practical based subject employing ICT can often be a challenge *(#257, Male, 30-39, Creative arts & design, Uni M)*

While others commented on the type of teaching that they wanted to achieve:

> Improving ease of access to teaching materials to students. Changing the teaching approach from "knowledge delivery" to "knowledge application" meant I needed to find ways to deliver the knowledge prior to the face-to-face teaching sessions. *(#585, Female, 30-39, Subjects allied to medicine, Uni I)*

While this quotation implies that a change in pedagogy required technology, others believed that their choice of pedagogic approach prevented them using more technology:

> Range of choice is limited by the student-led nature of the learning approach. We use a facilitation, rather than transmission, model based on reflection and extensive formative assessment. *(#368, Male, 60+, Business & Administrative studies, Uni T)*

Some respondents approached teaching as a "pedagogical problem" that may sometimes be solved with technology *(#127, Female, 40-49, Business & Administrative studies, Uni J)* and 115 responses gave an indication of the process through which they decided which technologies to use. There were four main approaches: continuing with what was already known; trial and error approaches; using evidence and research; or cost/benefit analysis.

The most popular approach was for teachers to choose to use the technologies that they had used before or were most familiar with (60). While this could be a sensible and strategic approach, some respondents were apologetic, implying that maybe they believed this wasn't good enough:

> I am afraid that I just use those I am already familiar with. *(#593, Female, 50-59, Education, Uni A)*

While others were holding on to current practices because they felt constrained in some way:

> In a nutshell: (i) I become familiar with a technology and then use it in my teaching. This is very limiting, and frustrating when I become aware that others are using it far more expansively. (ii) Please, please someone invest in turning this round - show me how good it can be, how to use it, then set me free. *(#20, Male, 40-49, Engineering, Uni F)*

The second approach was one of trial and error experimentation with new technologies (24). This requires more confidence with using technology and is not always successful. Therefore, some individuals found that support from other colleagues was important in encouraging them to try new approaches.

A third approach (17 respondents) involved considering evidence whether from academic research, professional sources of advice, or personal studies:

> I draw on research and best practice from a variety of areas and then best fit to the work I am completing. *(#288, Male, 40-49, Education, Uni N)*

Finally, 14 respondents took an analytical approach weighing up the costs (in terms of time, economic cost and effort) or available support against the benefits to students or staff.

> I will review any aspects of it which are appropriate to my teaching, ultimately if they are accurate and beneficial (plus cost effective) I will utilise them. *(#161, Female, 50-59, Subjects allied to medicine, Uni J)*

Discussion

The survey data suggests that the majority of university teachers surveyed reported making frequent use of technology and held generally positive attitudes towards it. But it also confirms the importance of avoiding reification and considering 'technology' as a single, undifferentiated material thing. In fact, an individual is likely

to hold very different opinions about different types of technology and exploring perceptions of specific technologies is more productive than assuming a general attitude towards 'technology'. Although 87% of the university teachers responding said that they used ICT in most of their teaching, this does not mean that they use a broad range of technologies as many may use only presentation software presentations frequently. It is also worth noting that the statistics given here provide the reported use of particular technologies and Kopcha and Sullivan (2006) suggest that lecturers over-report their use of technology. Therefore, the relatively low reported use of many of these technologies may reflect an even lower level of actual use.

The survey identified two groups of technology. The 'core technologies' group consisted of slideshow presentation software and virtual learning environments. These were widely used by the sample across all institutions and subjects and although the frequency of use of each technology was correlated with the teacher's perception of the impact of that technology, there were exceptions. Some of those using these technologies frequently did not consider them to have a positive effect on learning. It appears that for, at least, some of this minority, institutional rules or expectations require them to use technology in ways with which they are not comfortable. This will be explored in more detail in the next chapter.

The second group of 'marginal technologies' were used less frequently and included e-assessment, blogs, podcasts, e-portfolios, wikis and social bookmarking. While these are mainly newer technologies and may still be finding their niche in university teaching, age is not the defining factor between the two groups. In fact, e-assessment tools have a much longer history in university teaching than VLEs. These technologies were much less likely to be mandated by institutions or departments and, as a result, the reported use of these was more likely to reflect the individual's attitude towards them.

Many teachers present their decision to use or not use technology in terms of a decision about whether or not the particular technology will enhance learning. But, as discussed above, this seems less true for the most commonly used technologies. In addition, teachers understood different things by 'enhance' and set different thresholds for the amount of positive impact that would make it worthwhile changing their practice.

As a result, the following indicators of 'core' or 'marginal' technologies can be used to distinguish between them. 'Core technologies' are those which many teachers feel they have no choice but to use whatever their perception of the impact on

student learning (and as a result of this, they are frequently used and their application becomes a significant part of the teachers' role). The 'marginal technologies' are those which the majority of teachers feel they can choose whether or not to use them or how often to use them and are peripheral to their role. Considering these indicators suggests that other technologies may also be 'core technologies' in addition to those identified in the survey data. As discussed earlier, technologies that are 'taken for granted' may not be remarked upon by teachers but may still be 'core' to their role. For example, the use of email may be one such technology although further data would be required to confirm this.

The review of literature suggested that to make sense of university teachers' thinking about technology, the overlapping contexts of institution, higher education sector and wider culture should be considered as well as individual beliefs. This survey provides some evidence of the ways in which these contexts relate to teachers' beliefs and reported use of technology. In addition, the results suggest that departmental or subject/discipline context are also important.

At an individual level, teachers reacted to new technologies either by directly evaluating it (by experimentation or through research) or by weighing up the relative benefits against any costs. The strongest element to 'weigh' appeared to be 'time'. Teachers considering adopting a new technology have to consider finding the time to learn about new technologies and how to use them, invest time in preparing materials to make use of the technology and then find time to use them with students. But teachers are also aware of the context in which they work including the size and characteristics of particular teaching groups, the ease of use, access and reliability of resources, their own personal confidence, skills and enthusiasm for technology.

At institutional level, the survey has shown that different universities were associated with different technologies. Except for presentation software (which is used in most if not all institutions), for each technology it is possible to find large differences in frequency of use between universities. But there were no 'leading' universities that were ahead of the others in frequency of use of all technologies. Institutions are likely to provide resources (e.g. equipment, training) and policy directives for a small number of particular technologies and the choice of which ones varies between universities. Managerial policy directives or expectations were frequently raised by respondents and it is clear that mandates to use technology are effective in forcing some teachers to use technology though it is far less clear that

the intended benefits that presumably underlie these directives are achieved. In fact, the negative reactions to such managerial policies are apparent.

Institutional managers also make decisions about how to use resources and these affect the attitudes towards access to technology and technical support. There are also other institutional differences in how teachers perceived other people's expectations of them. These suggest that not only managerial influence but also the expectations of colleagues in their department and students are important to teachers.

At a subject level, it was clear that many teachers claimed that their subject and indeed, the particular content or intended outcomes of the topic they are teaching at the time, were a major influence on whether or not they use technology. But the survey did not find that there were some 'technology-friendly' subjects and some 'anti-technology' subjects. Rather, that for specific technologies, the subject being taught was closely related to the likelihood of that technology being used. For example, presentation software was used widely but there were notable differences between subjects. This may reflect different preferred pedagogic approaches found in particular subjects. There was also a positive relationship between frequent use of presentation software and the frequency of teaching through large group lectures and it may be the case that those subjects that prefer large lectures find presentation software useful while those who teach mostly practical workshops have less use for it. In contrast, the reported use of blogging, e-portfolios and wikis showed the opposite pattern of use to that of presentation software. In fact, teachers in design and arts subjects were the least likely to use presentation software but the most likely to use blogs, e-portfolios or wikis. Finally, these subject differences did not apply to all technologies – there were no significant differences for VLEs, e-assessment, podcasts or social bookmarking.

As Becher and Trowler (2001) have pointed out there are often greater differences between specialties within one subject discipline than between similar specialties in different subjects. Here this is magnified by grouping subjects together for analysis. However, there were frequent connections between common teaching arrangements (e.g. lectures, seminars, etc.) and specific technologies and this may imply that particular subjects or specialties that are taught in certain ways are more likely to use some technologies rather than others.

Teachers' uses of technology are affected not only by those around them but also by other, possibly more distant, influences. Several of the teachers responding to the survey wrote about the technologies used in the workplace, particularly for those

subjects that were aimed at those hoping to join a particular profession, while others referred to the technology used by students in their lives outside the university.

Conclusion

This chapter has presented the results of a survey of 795 university teachers and provided new data about their attitudes towards teaching with technology and reported use of technology. As discussed in Chapter Four (p84-87), the survey responses are not generalizable to all university teachers and may over-represent teachers who are more sympathetic towards teaching with technology. In addition, the majority of institutions surveyed were 'post 92' 'teaching-led' institutions.

However, despite these limitations, the survey has suggested that those teachers surveyed evaluated technology generally positively but that their perceptions varied for different technologies. It has identified two groups of technologies: 'core' and 'marginal' that are perceived differently by teachers. A limitation of the survey questionnaire was that it asked about a selection of different technologies and further work is needed to identify how other technologies fit into these categories.

Overall, the data suggests that individual teachers operate within department and institutional cultures that may demand or value certain practices and at the same time they have beliefs and expectations relating to their subject discipline (or specialism) and to technology. Teachers make sense of these, possibly conflicting, influences when they decide what they want to do. In a number of responses, teachers wrote about the appropriateness of technology, in particular whether it was appropriate for the content being taught, the context for teaching and the students. These judgements about appropriateness are made against a background of multiple influences and reflect a range of personal beliefs and perspectives which will be explored through the case studies in the following chapters.

6: Technology use in context

This chapter sets out the results of the qualitative interview data regarding the social and organisational contexts that shape teacher's thinking about technology (Research Question 2).

In the earlier discussion of teacher knowledge and beliefs about technology, it was suggested that the categories suggested by Woolfolk-Hoy, Davis and Pape (2006) could be adapted for university teachers (see Figure 3.2). Four categories were suggested: 'Cultural Norms and Values', 'Higher Education Sector Context', 'Institutional Context', and 'Self'. As the previous chapter has shown, data from the survey suggested that departmental context and subject-discipline context are also important and need to be added to these categories. The interview data provides further evidence to support this but also suggests how these contexts are interpreted in relation to teaching with technology. In addition, it suggests a further category of 'Professional Context' is very significant for some individuals. The chapter will consider how each of these categories relates to the case studies of university teachers in order to discuss how each of these contexts may affect an individual's thinking about technology in their teaching.

Cultural Norms and Values

All of the interview participants made some reference to the social and cultural environment in which they worked. In particular, participants were aware of how technologies were part of their lives and the lives of their students both in educational contexts and more widely. They discussed this in terms of a digital culture and were concerned about how this affected them.

'A digital age'

Participants were keenly aware of the extent to which technology was used in everyday life both by themselves and by their students and this was reflected in comments which drew on a discourse about a 'digital age' in which rapid developments in technology could not be ignored. For example:

> We're sending our students out into a, into a digital age aren't we. This is, this is the world they're going to live and work and move in and while I think we can be too reliant on digital resource and gizmos and flash applications, there's no going back, we can't smash the machine, it's here and we have to keep up with it. (H)

As this quotation shows, Interviewee H acknowledged an increasing and unavoidable role for technology without over-emphasising its importance. This view was shared by other interviewees who accepted new technologies but were unconvinced about their impact:

> it's not like technology makes my life worse or better I wouldn't say, I just think it's just kind of part of what's there. (E)

Those who viewed technology in terms of a wider cultural phenomenon believed that such developments demanded a response but that this could be challenging. One participant referred to the concept of 'digital natives' when describing their own position in this culture:

> I am not only immigrated to this country I am immigrated to the new technology as well. (G)

Others felt pressured by the perceived advance of technology and felt that they were unable to keep up with new developments (E) or that they were required to use new technology in order to keep their research current (K). In contrast, some developments such as the range of resources available on 'YouTube' were welcomed (J) and using technology could enable participants to be confident in the currency of their teaching methods in this digital culture (I).

This positive scepticism towards digital technology in general was reflected in participants' views of specific technologies. For example, Interviewee H, who taught English literature, raised concerns about the growing use of e-readers but did not want to be too quick to completely reject them:

> Kindles and ebooks worry me a bit…I don't want to be all luddite about them. But I hate the idea of it. (H)

However, the limits of the 'digital age' discourse could be seen in the contrast that some participants observed between the ubiquitous presence of technology in students' lives outside of university with their apparent reluctance to use technology as part of their education:

> They are often on their Iphones…so they are using but it is just this [technology for learning] that is different. (A)

Teachers perceived a disparity between students' digital social lives and their study practices and a similar tension was perceived between teachers' digital social lives and their teaching. A particularly clear example of this can be found in participants'

comments about social media. At least one participant at each of the three universities in this study had attempted to use Facebook with some students but these experiments had mostly ended or been put on hiatus at the time of the interviews. A number of different problems were identified with the use of Facebook but a key issue was the way in which social networks overlapped between personal and professional lives and led to ethical dilemmas about work/life balance, professionalism (D) or supporting vulnerable students (H). These dilemmas demonstrate a potential for conflict between teachers' digital lives and their responsibilities at work and, as will be seen in the next chapter, this can be a challenge to their self-concept and identity.

Although some teachers wished to use social networking as part of their teaching, this could prove incompatible with students' digital lives and participants identified a difference between how students viewed technologies for "life" and for "work" (A) and respected this (H). Activities using Facebook that were led by students were described as more successful than those led by university staff and less likely to raise ethical questions (D). Interviewee J described a Facebook group created by and for first year students on her degree course:

> My first years set up a page on Facebook that they set up, I didn't, and that makes it very different. It's their site, they organise it. (J)

In addition to these conflicts between how teachers and students wished to use social networks, participants believed that living in a technology-rich culture had the potential to re-shape social interaction and were concerned about this. This was currently only manifested in minor ways, for example, the use of abbreviations from text-messaging appearing in assignments or emails (E) and increased use of mobile phones in taught sessions (E). But some were concerned about the future impact on students or society in general:

> The social factors are disappearing … I feel that it is going to be very much individualised … people will communicate like the new generation has, only via Facebook and mobile phones ... And emotional aspect of it is going to be huge, the emotional impact on them. (G)

This concerned reaction to digital culture could be seen as a rationale for limiting the use of technology in teaching and for maximising opportunities for individual face-to-face interaction. However, others saw an opportunity to respond to social changes through how they used technology in their teaching

> We can't stop that tide … we're never going to get rid of that, we're never going to persuade students that Facebook is a shallow and unreal medium ... We can rage against that but we won't stop it and what we need to do with IT that we're using in education is show how it can be used usefully. (H)

Thus, the discourse of an unavoidable 'digital age' was reflected in teachers' perceptions of technology in their teaching and could be conceived of as both an opportunity and a challenge. Participants noted the limits of students' willingness to use the technologies that they associated primarily with their social lives for educational purposes and this was mirrored in similar concerns by teachers about their own digital lives. A positive scepticism towards new technologies was accompanied by concerns about the prevalence of these in social interactions and these views could affect the choices teachers made about technology.

Teaching in public

Teaching in higher education has always involved public communication but university teachers have previously had a reasonable amount of control over what aspects of their work are published more widely. Some participants believed that developments in technology for communicating and publishing information have changed this and made their role more public than before. This was demonstrated in how accessible they felt they were to students and in the level of control they had over how their work was shared.

Email was mentioned as an example of a technology that makes teachers more accessible and participants commented on inappropriate use of email when other forms of communication would be more suitable (D). This could come from staff or from students:

> I get a lot of students send me stuff and say can you look at it and I think, I don't know whether it's a cultural thing, where they want feedback more often or whether it is just because they can ask you for feedback more easily, you get a lot of can you have a quick look at this, there is no such thing as a quick look is there. Because they don't have to come and find you they can just send it. (E)

In this example, email was seen as removing the burden of effort from the student (they do not have to find the teacher) and increasing the burden on the teacher (who now has more work to look at). While, in this example, the teacher is portrayed as having little control over events, in other circumstances, teachers used technology for their own purposes in order to communicate more effectively.

Interviewee H described how she had presented module information in an innovative online format to produce something that looked "more contemporary, more professional."

Issues of control about what, when and how communications are shared were particularly significant. Participants were aware that digital materials could be shared easily and that once teaching materials were online, they lost control of how these were used or distributed. Some interviewees were concerned about what students might do with their teaching materials, especially video recordings of lectures. While there were some clear examples of students behaving inappropriately and filming themselves misbehaving on campus (C), more common was a concern about surrendering a choice about what may happen:

> Actually I'm on show enough as it is, it's a public facing enough job as it is, we expose a lot of ourselves, and actually I would like the choice not to be, not to be all over the internet, thank you. (H)

In this case, the concern was that lectures intended for a particular audience at a particular time could be published more widely outside of the teacher's control. But some participants went further and were concerned about being misrepresented:

> not all students are very mature, and they may actually do their own mash up remixes for that kind of stuff … and they can go onto Youtube. So they can go onto the equivalent of rate your own professor and they can be taken, clips out of context, so I think there are lots of extra ethical issues around it, copyright issues. (J)

For these interviewees, the potential publication and re-use of materials they have created or recordings made without their knowledge was a threat resulting from a digital culture of sharing materials. Ironically, this could cause the most problems for those who had benefitted most from the easy availability of online materials by drawing attention to their own use of copyrighted materials:

> all those images are just downloaded from Google, i.e. I don't have copyright for any of them, well that's not quite true, I have copyright for some of them but on the whole, most of them are just downloaded from Google. So if the powerpoint file got onto the web and someone then said, well hang on a minute, that's my picture, I'd probably have more concerns about that. (C)

Anxieties about losing control over teaching materials or recordings reflect both a perception of the possibilities offered by digital technology and a concern about self-

presentation and privacy. These influences relate to the cultural context in which teachers live and work and their perceptions of the role of technology in their lives outside of teaching and in the lives of their students. These concerns were important and affected how participants explained students' use or non-use of technology and were used to justify decisions about teaching.

Professional Context

Two of the interview participants worked in subjects related to medicine and taught students who were employed by (or hoped to become employed by) hospitals. For these participants, their professional context and, in particular, the National Health Service (NHS), influenced both what and how they taught. These teachers needed to work in partnership with employers who were in turn subject to the wider demands on the health sector, for example, to make efficiency savings in line with government priorities. This had a very clear impact on their teaching and how they used technology. For example, Interviewee A discussed courses commissioned by NHS trusts for their staff:

> The commissioners … are looking at using technology in order to save staff release time coming into the university, it's cheaper.

She described how courses for NHS employees had had to reduce their face-to-face contact time by 25% in response to the demands of the commissioners. Because such courses were a major source of income for the department, the university responded by ensuring that 25% of each course was online. In turn, Interviewee A had had to replace face-to-face sessions with online activities even though she felt that "they lower the level of learning". A similar situation arose at a different university, where some specific training courses were being re-written as e-learning packages:

> To address some of the problems that we have got in practice with the NHS which is strapped for cash and resources at the moment and obviously releasing staff to be able to come and do their training with us has been problematic for the last few months. (I)

The Trusts could also affect teachers' use of technology in other ways, for example, by requiring Powerpoint materials to be published online, or by restricting the use of technology on hospital premises due to patient confidentiality (A).

A similar challenge was faced by Interviewee G, who, although not working with the NHS, taught a course that required government accreditation and needed to meet very specific requirements. Part of this included four compulsory day-long sessions:

> Designed by the Government, a Powerpoint presentation being sent to us and I cannot really change this. It's very directed from central Government. (G)

In each of these situations, the context in which these professional courses were being taught had a direct impact on the teaching methods used and the control of the teachers over their use of technology. While the professional context was not relevant for all teachers, for those it did affect, it was very important and could take precedence over other factors, such as the effectiveness of a particular teaching approach.

Higher Education Sector Context

Interview participants were aware of the challenges facing the higher education sector and discussed how these affected how they used technology. The most significant issues raised were about economic factors and competition.

Economic drivers

Only one participant (J) did not raise the economics of higher education during their interviews. At the time of the interviews, UK universities were increasing tuition fees and there was some uncertainty about how students would react to this and whether it would lead to a change in expectations. Interviewee H noted that, increasingly, education was being viewed as a "product" with students desiring better "value for money".

These economic drivers could be perceived as limiting the use of technology. Interviewees B and H suggested that student demand for 'value' might be manifested in a desire for greater face-to-face 'contact-hours' and limit the use of some technologies. There was also a perception that universities were trying to maximise the amount of money they received while reducing expenditure on teaching (F, K). For Interviewee K this was the biggest restriction on his use of technology and Interviewee I described how in previous years they had supplied students with mobile devices for use on placements but had stopped this for financial reasons.

But economic drivers could also been viewed as encouraging technology use. Interviewee B suggested that students might in fact demand more resources and

use of technology in the future. While other interviewees thought that technologies were being introduced to save money, for example, using video conferencing when meeting international students (D), or by posting information online in order to reduce the money spent providing hand-outs (A, E, F). While Interviewee E suspected the move to reduce hand-outs was driven by financial imperatives, she also acknowledged other possibilities, such as environmental concerns. Interviewee A, who was under particular economic pressures due to the demands of the NHS (see above) noted a difference between the technology that she was forced to use outside of the classroom for financial reasons and the technology that she chose to use in the classroom to motivate her students. And Interviewee C noted how a desire to save money was sometimes amalgamated with responding to wider imperatives towards online distance learning:

> There is certainly a drive to go down the distance learning line as well but I wonder whether it is all for what I think are the best reasons. You do kind of think whether a lot of it is kind of financial drivers (C)

Similarly, Interviewee G felt that this tendency towards online learning was growing and would continue to increase.

Participants were not entirely convinced that increased use of technology would necessarily bring the financial benefits that institutions desired. Interviewee D referred to the McKinsey report suggesting that online learning was expensive and Interviewee F felt that the majority of her colleagues had "quite a cynical attitude" towards this. At one of the universities visited, there was a particular initiative to create a separate commercial business running online courses. This was seen as a managerial decision and provoked some anxiety from participants. It was felt that those departments or individuals who had made the most progress towards putting their course online were now at risk of losing those courses to the new company (C) and Interviewee D raised questions about how this might affect staff contracts and the reputation of the university.

The interviews suggest that teachers were very aware of the impact of sector-wide economic drivers on their institution. Although none of the participants claimed that they were using technology in particular ways because of these drivers, they did believe that some of the things that they had been asked or required to do were caused by economic considerations rather than pedagogical decisions. As such, economic influences did influence teachers' thinking and how they explained the decisions an institution had made.

Competition

With universities facing increased financial challenges, institutions may desire to strengthen their position in the face of competition and having the latest technology could be viewed as a potential selling-point. Thus, technology could be used to try to portray the university as 'modern' and 'cutting-edge' and there was a perception that institutions "don't want people to think that other institutions are further advanced than us" (K).

However, this was not consistent and another interviewee at the same university as Interviewee K felt that institutional expectations were low:

> I think [University name] as a whole is a little bit old school isn't it and they are just quite pleased if you manage to do it (E).

Where participants believed that their institution had a desire to be 'cutting-edge', there were some concerns about this:

> I think there is this environment that we should be doing it, certainly all these other universities are doing it therefore we have got to do it … but I think maybe people are not aware that a lot of people are then jumping out again (C)

Another participant suggested that not all universities were capable of being at the forefront of technological developments and that they may be naïve about the quality of their online learning material. While some institutions had the resources to create professional materials, not all institutions could achieve this and were left with "amateurish looking podcasts" (J). This could create risks for an institution and Interviewee C referred to the demise of the UK E-university as a sign that students did not want to learn online and that experimenting with online education could be unsuccessful.

As with economic drivers, sector-wide competition was considered to affect institutional decisions about technology rather than directly influencing an individual's own decisions about technology. However, these factors were important because they were used by participants to explain and rationalise the uses of technology that they felt were encouraged or imposed on them. In some cases, an individual could resist adopting a technology if they felt that sector-wide drivers were the cause of the introduction of that technology.

Institutional Context

Sector-wide issues affected universities in different ways and the decisions that university managers made influenced how teachers taught and used technology. Sometimes these were indirect effects, for instance, Interviewee B felt that semesterisation had changed the pressures on students and technology offered a way to help students with this. While others were more direct - Interviewee C noted how increasing the amount of material provided online for students, particularly Powerpoint files and lecture recordings, had initially reduced attendance at sessions but a new, stricter university policy the following year had reversed this trend. However there were two key areas that were frequently mentioned as directly affecting teachers' use of technology: institutional policies and the provision of resources or support.

Policy

Participants from all three universities referred to university-wide policies that mandated either particular uses of technology or a general move towards greater use of technology (C). At one university, these took the form of a set of "minimum standards" for the use of the VLE in each module (I). As a consequence, some interviewees felt they had little control over which technologies they used but did have control over how they used them (A). Another suggested that they could ignore policy but that eventually it would be discovered:

> I suppose I could turn up tomorrow and not use anything in my sessions. So, I would probably have complete control for maybe two years before someone would get through to an external examiner feedback which would then get through to an annual monitoring and then come back to me. (K)

Mandatory university technology policies were not always welcomed. Interviewee A disagreed with her university's policy that a Powerpoint slideshow had to be posted online for every taught session because she believed this was about using technology for its own sake rather than because it provided any benefit. While Interviewee E described her experience of having to adopt a university-wide online assessment tool as "a pain in the bum".

Institutional expectations were not always clear to teachers and some of the things that were regarded as university policy were "unwritten rules". Interviewee A spoke about expectations being passed orally rather than in writing and Interviewee D went further, suggesting that:

A message hasn't come to all of us, it's only when you try and do something different that you realise you are not allowed to do it (D)

Interviewee E suggested that one reason for this could be that institutions were "hesitant to commit formally to one way or another". A specific example of this was given by Interviewee G. She had used Facebook to communicate with students at a previous university but when she suggested this at her current institution she was discouraged from doing so rather than prevented:

They didn't use the word allowed, it was used 'not suggested'. So I am not using it. (G)

Even when they were clear what the 'rules' were, not everyone followed them. While some kept to the bare minimum required (K), others did not. Interviewee D said that he knew about his university's requirement to post materials online but that he chose to "break" this rule and challenged the value of the requirement:

So, do I care? No. We'll have to have a public academic debate about their value which no-one ever wants to do. (D)

Some interviewees felt that their institution did not monitor whether rules were being followed. Interviewee A described how, despite a university directive to use the Turnitin plagiarism detection service, after a year it was discovered that many teachers were not using it and "half the faculty don't know how to use it". Also, some policies were believed to be counterproductive. For example, Interviewee D discussed how restrictions on all-staff emails reduced communication and how online learning might not lead to the financial savings desired.

The mechanisms for how technology policies were created and disseminated were not always straightforward. Universities had different structures and some participants had been involved through E-learning groups or Teaching and Learning groups in discussing aspects of university policy. While these involved consultation with staff, some felt that those who would be using the technology did not make a great enough contribution:

Sometimes a lot of these, the directives that come on the uses of technology come from people who are not currently engaged with students (K)

And even those on such groups were not always satisfied with the pace of change (D) or the process involved:

My feeling is it is almost people are being bulldozed…now that I am on some of those committees you kind of see how a lot of this stuff becomes University policy. Yes. I think there is quite a lot of kind of steam-rollering going through. (C)

For some interviewees, university policies translated into institutional attitudes towards technology. For example, Interviewee C contrasted the willingness to experiment seen at a previous university with the much more rigid approach at his current institution.

Institutional services

While the universities required the use of certain technologies through institutional policies, they also provided certain resources and services. University technical support was well regarded (A, G, H) and Interviewee B noted that there had been key individuals in his institution's central services that had supported his use of technology. Staff training was also well received (A, G, H) although this tended to focus on the technical skills of using technology and Interviewees A and I desired more training about how to use technology for learning. However, perceptions of support for students could be different:

It's difficult when I get students who have got problems with basic IT to know how to, where to guide them to to be honest. (I)

Some of the technologies provided centrally by universities were problematic. Interviewee A described how for her professional development courses she had to use the online 'groupspaces.com' service because the university VLE could not enrol students unless they were taking a course with academic credits attached. Similar issues were faced at another university (G) and those who had worked at more than one university discussed the differences in the resources available and the particular initiatives promoted by their employers (B).

Participants had a number of complaints about university infrastructure. For Interviewee A, uploading documents to the VLE took so long during office hours that she had taken to uploading materials between 10 and midnight or 5am and 7am and the amount of time taken to log on to systems was a complaint at all three universities (e.g. A, C, H). Others noted that institutional technology was not reliable, for example:

Probably quite an important reason why I don't maybe engage as fully as I, it's not that I don't think some of the things are useful, it's that they are not

completely 100% reliable, because, partly that's because of the University infrastructure isn't there to completely support it. (C)

University computers were felt to be restricted and controlled in ways that hampered individual's use of technology for their teaching. In one interview, Interviewee A wished to discuss a file from her VLE, however, her office computer could not open the types of files that she uses with students.

I can only do it at home. [laughing] I know, you just sort of get used to it really, that's awful. (A)

Interview B referred to this as the "lock down phenomenon":

I think some universities have gone a little bit over the top to lock down what you can use and whilst I fully appreciate no university's IT structure could go we'll support anything you want to use, there is a tendency here and in other places, we are not alone, to say here are a set of proprietary things that we sanction. (B)

Interviewees C, G and K also mentioned that concerns about licensing prevented staff using freely available and legal software by putting restrictions in their way. For Interviewee D, access restrictions had created a "totally burdensome and impossible system" with no clear lines of authority.

At an institutional level, individual universities could set their own policies and put in place the services that managers thought were appropriate. These could form barriers to an individuals' use of technology (e.g. unreliable technology) or encourage use through mandated policies. However, these factors also affected teachers' perceptions of the amount of control that they had over their teaching and what they were permitted to do. It appears that these policies were not always clearly stated and that some expectations were informal and that others were simply ignored.

Departmental Context

As well as being influenced by the institution in which they worked, participants were also aware of the influence of their immediate departmental managers, colleagues and the students they taught.

It was not always easy to differentiate between the requirements of department managers and those of university managers as often one was enacted via the other. And just as for institutional policy, departmental requirements were sometimes

implied rather than explicit (A). However, one participant did contrast their university's enthusiastic approach to technology with their department's "little bit technophobic" attitude (E).

Departmental management was discussed positively and immediate managers were portrayed as encouraging staff rather than pushing them towards technology (G, H, I) and allowing teachers individual freedom in how they used technology (E, F, K). In those cases where participants were making greater use of technology, they were encouraged to share their practice with technology with others in their department (for example: B, G and H) and some interviewees gave examples of how their colleagues influenced their use of technology (e.g. E). For Interviewee A, this had been a positive experience of a colleague sharing some of their research with her. In contrast, Interviewee C had been dissuaded from trying out a particular technology after seeing the problems a colleague had faced:

> All we ever get from him is how the technology has failed, how this has happened, that's happened, it's a complete technological disaster (C)

For two participants (I and K), their departments had employed support staff to support various aspects of using technology and this was felt to be very beneficial.

These responses suggest a 'collegial' departmental culture that gently encourages rather than forces technology use, however, this was not entirely the case. Interviewees did not appear to have a particularly detailed knowledge of what others in their department were doing with technology although Interviewee A felt that others in her department were struggling with the same challenges she was. And working alongside other colleagues was not identified as having had a particularly strong impact on any participants. For Interviewee H, teaching alongside a team of new or part-time members of staff had, in fact, meant that she was responsible for any uses of technology on that module.

Both Interviewees A and G noted the lack of opportunities for sharing resources and techniques amongst those in their department. When materials were shared, interviewees took each other's ideas but made significant changes to materials (C) and the departmental culture was not one where sharing resources was always welcome:

> Somebody came to me and said you do realise people are taking your stuff and copying it and I said it doesn't matter. I'm a teacher it's, everyone can use my stuff, it really doesn't matter (A)

As well as there being limits to the amount colleagues shared ideas or resources within departments, there were also differences in how colleagues responded to innovative ideas. Interviewee B, an early adopter of technology, considered staff to have responded to his use of new technology in two distinct ways. Some had reacted positively and tried to find out more about what he had done while others had reacted negatively:

> There's another set of staff that go well you've just made it bloody worse for me now haven't you because now all my students are asking why don't they get podcasts from me. Well I'm not bloody setting podcasts. (B)

He went on to suggest that over time, attitudes and use changed as those staff who were initially reluctant eventually adopted technology or retired.

Although departmental managers and colleagues were not viewed negatively as forcing or preventing teachers' use of technology, they were also not viewed as particularly positive influences. Teachers' knowledge of their colleagues' practice was relatively limited although some believed that their technology use affected how others perceived them.

Students

Interviewees also discussed how their use of technology was influenced by the characteristics of the students that they taught. This could be considered part of the institutional context (if the teaching group was typical for the institution) or the departmental context (if the group was atypical for the institution). Sometimes the connection between group and technology was straightforward, for example, Interviewees B, D and F referred to using Skype to communicate with students abroad. However, there were wider issues relating to how students responded to the use of technology.

Although participants spoke of a 'digital age' described above, they also held perceptions about the particular groups of students they taught. Interviewees C, J, H and I felt that their students expected them to use technology and Interviewee H believed that these expectations were rising. But some participants made a distinction between what students expected and what they actually wanted or needed. Interviewee F thought his students expected him to use Powerpoint but were pleased when he did not use it. And Interviewee K felt that students wished to have resources which made work easier rather than those which would be most beneficial. Interviewee D managed his students' expectations by ensuring they

knew from the start not to expect any technology in his teaching and Interviewee E felt that her students had "high hopes and low expectations".

When teachers did provide the resources that they thought their students expected or had requested, there was a suspicion that students were not using the online resources that teachers were preparing for them (C), did not want to learn online (A), or did not want to communicate online if they could meet face-to-face (I). Interviewee A felt that students could be reluctant to use technology because of pressures on their time. While Interviewee B felt students wanted materials that were specifically designed for them and discussed his experience of recording a lecture for campus-based students and sharing it for online students:

> they didn't like it … because they weren't the audience, it wasn't for them. (B)

There was also a range of opinion about the IT skills that students possessed and how well prepared they were to use technology in their learning. Interviewee K's students were not as proficient as he expected, while Interviewee J's students were. Mature students were thought to need extra support to use technology and to feel less confident than younger students (A, G, I) but Interviewee I pointed out that even younger students had gaps in their skills:

> it is a mistake to assume that they come with IT skills and even some of the 18 year olds, they can use Facebook but you ask them to do anything else they are a bit stumped really. (I)

In contrast, Interviewee B challenged the notion that students' lack of IT skills was a reason not to use technology in teaching:

> Rubbish, … are you telling me that these middle-aged women that you're telling me can't use IT, they don't use the TV remote control, they don't drive a car with the ability to turn the radio on, they can't use an iron … Don't tell me they can't use Blackboard because it's actually a lot simpler than the iron we have at home. (B)

Some interviewees referred to those students who had particular learning needs (for example, dyslexia or other identified special needs) and used laptops to support this. But there was disagreement about whether online materials supported this by not drawing attention to those with special requirements (J) or if it would be better to print resources for these students (E).

Interviewees A, F and G taught some part-time students. Although online resources could be an advantage for part-time students because they could access materials when most convenient, these were often mature students and juggled study with work and home commitments (A). For Interviewee F, part-time students studying in the evening or at weekends required a particularly active learning experience and he considered Powerpoint something to be avoided in these situations as "the classic switch off tool". In contrast, Interviewee G used more technology to keep students' attention in evening classes:

> I use all the videos as well, short videos and podcasts again, same stuff but less me, less talking. (G)

Teachers' perceptions of their students and how they would respond to the use of technology was an important influence for some individuals. But the interviews have shown that teachers had different perceptions of their students' willingness and ability to use technology and that they responded to this is contrasting ways. For example, some may respond to the needs of part-time students by using more technology while another uses less.

Workload

Time was described as a "major factor" (C) in the decisions participants made about using technology and interviewees discussed struggling to fit using technology into their already busy working lives. Interviewees B, E, I and K spoke about the time it takes to learn how to use new technologies and how there were some technologies that they were aware of and thought would be useful but that they did not feel they had time to explore and learn how to use or in the case of Interviewees E and K, the time to go on a course to learn about.

Once a new technology had been explored and teachers had learnt how to use it, the next challenge was to find time to prepare materials or create resources to use in their teaching. Interviewee C described the "huge amounts of time" he spent finding appropriate images to use in his powerpoints while Interviewee D described not having as much time to create resources as he had had in the past. When faced with extra preparation, some interviewees chose to find alternative methods that would take less time (A, E). Interviewees A, G and J all described working at home in the evenings or at weekends in order to find time to prepare technology for their teaching. Certain technologies were thought to be particularly time-consuming, for example, podcasting (G) or uploading documents to a VLE (E) and the time spent managing emails was frequently mentioned (C, D,G, J and K).

In more general terms, interviewees spoke of weighing up the relative costs to their time against the potential benefits of a technology.

> It's not necessarily that some things are so simplistically good or bad. There are some things that are good but if the management of it is so difficult and so time consuming and that's absolutely the one thing that we just don't have here, time. So if the time benefits outweigh the kind of teaching benefits then I tend not to go down that line. (C)

Some technologies were adopted in order to save teachers' time (K). For example, Interviewee C discussed using a discussion board to answer student questions on a particularly large module and avoid being overwhelmed by emails. And Interviewee G spoke about materials being able to be easily modified for use in future years. But there was a concern from several participants (D, J, K) that initiatives to save time could end up wasting more time than they save.

However, these issues about time could also be statements about academics' priorities and Interviewee H suggested that time could be found if teachers felt strongly enough:

> So I could say, I haven't got time to do this but if you really want to do something you do find time, even in our busy jobs to do it. (H)

Subject-discipline Context

All of the interviewees made connections between the choices they made about technology and the particular subject that they taught. And, for Interviewees A and J, choices about technology were driven by the content being taught. Some felt that their subject was not a good match to technology, for example, Interviewee D compared what was needed in his field (Education) with the more visual materials required in a subject such as Art. And Interviewee H felt that those teaching humanities had "always had to struggle a little bit" where technology was concerned:

> We've had to look for the links at times and it felt almost as if it was being forced. (H)

A different problem was encountered in teaching Law where, for Interviewee F, the need for accuracy when discussing the wording of legal statutes meant that styles of teaching which used powerpoint as a stimulus for talking "off the slide" could be "dangerous", "very colloquial and weak".

Other participants felt that their subjects had a much more natural 'fit' to technology. For Interviewee I, who worked in a medicine-related field, technology was an important part of the professional practice that she was preparing students for and students needed to be confident users of technology. She used videos to provide practical demonstrations of clinical techniques for students and also required students to keep e-portfolios demonstrating their professional practice in a similar way to those kept by qualified professionals.

In other subjects, technology provided access to resources that had previously been unavailable, for example, scientific animations (E) or three dimensional images of the brain that could help students to learn complex concepts in psychology (B). Some participants used specific technology as part of the practice of their subject, for example, Interviewees E and K used advanced scientific equipment to take measurements with their students. These laboratory technologies were integral to teaching some aspects of science subjects but participants distinguished between these scientific technologies and technologies for teaching and learning.

However, even technologies that were not designed for particular subjects, e.g. discussion boards, were more successful in some disciplines. Interviewee E had found using these unsuccessful in her physiology teaching but she mentioned a colleague teaching psychology who had used them successfully. This was supported by Interviewee B at a different university:

> Psychology I think is in a bit of a lucky position in some ways, people have got lots to say and they are happy to say it. I think, and I hear around the University how do you get these discussion boards to work, we can't get them to work and to be honest I just say it's purely luck of the draw that we have got a subject that people just like talking about. (B)

Another way in which participants' use of technology was related to their subject-discipline was through training or attendance at subject events. Interviewee C described how he first adopted powerpoint as a result of attending an academic conference. Interviewee A had had an eighteen months secondment to a professional body that had strongly influenced her preferred method of teaching and there was a clear connection between her subject context and the professional context discussed earlier.

Sub-specialisms

Whether or not they felt that their subject was a 'natural' match to technology, participants were able to identify particular topics within their subject which were

more or less likely to be taught using technology. For example, Interviewees E and H could both identify different parts of their teaching that used more or less technologies or used them in different ways. The differences due to these 'sub-specialisms' seemed to be even more important to interviewees than more general conceptions of how well a subject 'matched' technology.

Participants connected their use of technology in a particular sub-specialism to their understanding of the type of learning or forms of knowledge that they were teaching. For example, Interviewee K explained that he used less technology for areas of his subject that were:

> More cerebral in content and require people to generate their own ideas and thoughts on things (K)

This association between more frequent use of technology and subject areas that were more factual was a recurring theme. Interviewee I used technology to "reinforce the practical elements of the course, and some of the physics as well because that scares the daylights out of most students" and also for "fact based modules". Some participants felt computerised multiple choice assessment was a technology that worked in subject areas where students needed to learn a set of specific facts or understand certain vocabulary but not in others (B, I). Interviewee C taught courses that related to two particular specialisms: ecology and genetics, and there were minor differences between his uses of technology in these sessions. For example, while most of his powerpoints relied heavily on images, those for a module on molecular DNA evolution were more text-heavy due to the amount of new vocabulary and names he felt students should learn. However, he felt that there should be a greater difference in how he used technology. In particular, he thought that there were opportunities to use technology more when teaching about DNA, for example, by using online resources. However, he did not feel that he had sufficient time available to make this worthwhile.

Those areas of a subject that were less likely to use technology were sometimes those related to relationships or interpersonal communication. Interviewee I said that an experiment with discussion boards to address content about professionalism had led to "very superficial" responses and that she felt that sort of topic was better covered in a classroom setting. Similarly, Interviewee A gave the example of a management course which involved students discussing confidential scenarios based on their work. She mentioned examples of students raising issues about bullying or becoming upset in sessions and did not feel that she could deal with such issues through online communication. Interviewee E also mentioned areas of

her work that related to developing communication or interpersonal skills and believed these were best done without technology. In this case, the similarities between the sub-specialisms relating to interpersonal skills were greater than the differences between the overall subject being taught and these participants perceived technology as less appropriate for their teaching.

Level of work

This connection between type of learning and use of technology was also seen in how participants used technology at different levels of study. As students moved through each year of undergraduate study and into postgraduate work, the content and expectations became more complex.

Interviewee I described how she used online assessments with first year students but not with second and third years. She explained that these assessments worked well for "testing underpinning knowledge" but she did not think they could test "the complexity of questions" necessary for second and final year work. She continued:

> When I reflect on where we tend to use technology it probably is mostly in year 1. We don't use it very much in year 3, I don't know why. Perhaps we use it more for getting across the key concepts, help reinforce those rather than for everything further up the chain. Yes I think that is probably how we tend to use it more, more to reinforce the knowledge that they need to have to underpin everything else (I)

She also suggested that third years needed to be more self-sufficient and have less need for technology that imparted information. This intention to use technology to "impart information" was shared by others. Interviewee J described Powerpoint as more useful for first years than final year students and used in only a rudimentary way with postgraduates. Interviewee C was considering whether to develop an online module but was clear that he thought this would be suitable for first years only:

> I think it becomes less appropriate in second and probably very, maybe inappropriate third year (C)

Again, he explained this in terms of the need to develop students' critical thinking later in their degree in contrast to the requirement for first year students to learn facts.

Interviewee H also made more use of technology with first year students than other groups but for different reasons. She used her year one VLE page as a "sort of a

shop front or an enticing academic playground to help draw the students in". As they moved into their second and final years and had settled into the course, she became less reliant on moodle and used it in a "purely academic" way.

In contrast, Interviewee G had a different view. She felt that technology became more important for final year students as they were required to study more independently and therefore online communication and access to resources were more useful. However, with regard to Powerpoint, a similar pattern to Interviewee J could be seen with generally shorter Powerpoint slide shows being used as students progressed through the course.

Teachers' perceptions of their subject or sub-specialism within that subject related to their pedagogical beliefs about teaching and to their beliefs about their students and this connection will be explored in a later chapter. Here, it is important to note how these levels of context are related to each other and how a teachers' thinking about one aspect (e.g. their students) can affect their thinking about another (e.g. their subject) and that these combine to inform decisions about technology.

Conclusion

The interview data support the results of the survey by demonstrating some of the reasons that underlie the institutional and subject/disciplinary differences seen in the quantitative analysis. However, it extends the survey findings by highlighting aspects of the wider contexts in which university teachers work that were not apparent before. This includes both how teachers see their lives and work as being affected by the increased significance of digital technologies in their lives and also, for some, the professional context in which they work and teach.

Combining the results from both survey and interview data suggests a more subtle and complex picture of the contexts for university teachers' thinking about technology. Therefore, the nested contexts suggested by Woolfolk-Hoy, Davis and Pope (2006) can now be revised and adapted to reflect the contexts most important where teachers' thinking about technology is concerned (see Figure 6.1). As this chapter and the previous one has shown, two additional categories: 'Departmental Context' and 'Subject/Discipline Context', are significant. 'Departmental Context' can be thought of as a nested within the 'Institutional Context' of an individual, while 'Subject/Discipline' transcends individual institutions and connects academics working in similar fields in different universities throughout the higher education sector. Finally, the interviews showed how 'Professional Context' was important for some individuals. This was closely connected to 'Subject/Discipline Context' but

was characterised by drivers and influences outside of higher education, for example, the health sector and thus is shown in the diagram as intersecting with wider societal contexts. The addition of the 'Subject/Discipline' and 'Professional' contexts are particularly significant because they change the nature of the original diagram. Although Woolfolk-Hoy, Davis and Pape proposed a nested structure of context, the data from this research has identified contexts that intersect with other contexts without being wholly contained within them. This reflects how university teachers may view themselves as members of a subject tradition (or profession) that transcends any individual institution that they belong to.

Figure 6.1: Ecological Model of University Teachers' Knowledge and Beliefs about Technology (developed from Woolfolk-Hoy, Davis and Pope, 2006)
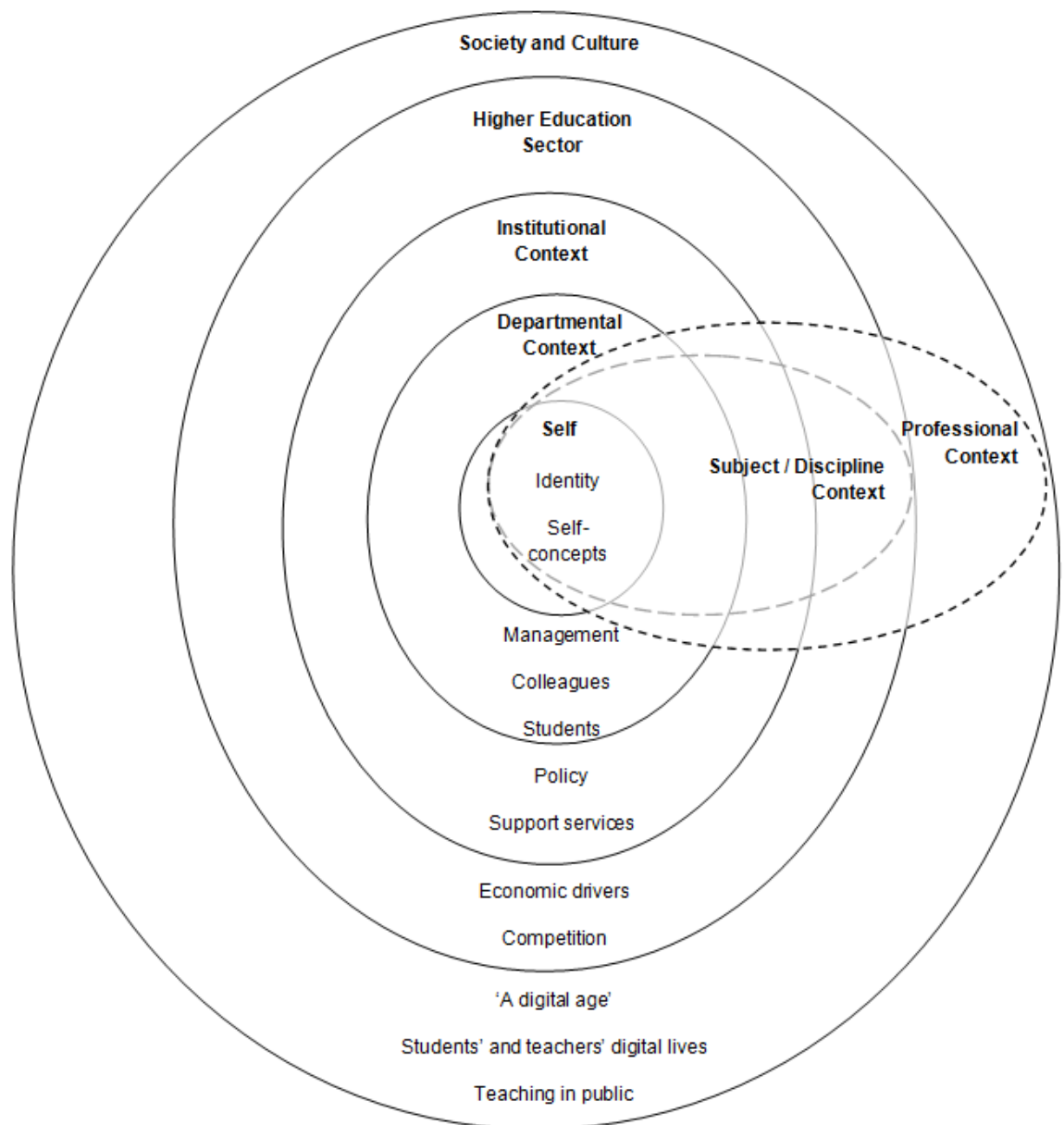
From the analysis of the interview data, a number of significant issues were identified as being important to teachers' understanding of and thinking about technology at each level of context. Each of the issues identified within this chapter are represented in the subheadings within the level of context in Figure 6.1. Within the 'Society and Culture' context, these were a 'digital age' reflected in students' and teachers' digital lives and the phenomenon of teaching in public. At the Higher Education Sector level, economic drivers and competition between universities were thought to be significant, while at Institutional level, university policies and provision of services were influential. Departmental management, colleagues and students were also important influences on teachers' thinking about technology. While Subject/Discipline was important to all, Professional Context was only relevant to some teachers (e.g. those working with the NHS) but was highly significant to those it did affect. At the centre of these is the individual teacher and the next chapter will explore the data regarding participants' individual self-concepts about teaching with technology and how this related to their professional identity.

7: Teacher Identity

The previous chapter has shown how multiple overlapping contexts influence teachers' decisions about using technology. At the centre of these are the individual teachers and their beliefs about teaching, technology and themselves. While the next chapter will consider an individual's pedagogical beliefs, this chapter will consider teachers' professional identity and how this related to their use of technology (Research Question 3). As the examples below show, where technology is concerned, teachers' professional identity is also related to aspects of their personal identity and how they view themselves as users of technology.

All interview participants held views of themselves as teachers and these were expressed and performed across different aspects of their practice. They thought of themselves as having specific teaching styles and unique personalities that they wished to share with their students (with varying degrees of success). These self-images were related to their use of technology in several ways, including the extent to which technology allowed them to teach in their preferred style and how it reinforced or restricted their ability to build and maintain relationships with their students. For some, how they used (or did not use) technology was a central part of their identity as a teacher and this was related to their attitude towards and confidence with particular technologies.

Teaching style

Several participants believed that they had a particular teaching 'style' and were able to describe and justify this. For example, Interviewee F felt that he had developed a particular style over the four years he had been teaching. He characterised his style as consisting of highly structured teaching sessions supported by very detailed notes for both him and his students. He believed that developing this structure had enabled his teaching to become more active and dramatic while ensuring students' detailed understanding of the topic. He also believed that this style of teaching was most effective without using technology.

In contrast, technology played a central role in some other participants' teaching styles. Interviewee C described his teaching style as "image focused" and he spent a great deal of time finding suitable images for his Powerpoint slides. He created very long Powerpoint files with many images to discuss rather than a great deal of text and explained that this gave him more flexibility to respond to students' questions and comments. As this example shows, these personal teaching styles

could be very closely connected to uses of technology and in this case, the opportunities to source images online had reinforced and helped to produce this teaching style.

A dislike of text-heavy Powerpoints was common. Interviewee H also provided very "image heavy" Powerpoint slides and acknowledged that this was a personal preference

> I don't like very text heavy Powerpoints for myself. So we've all got different styles, haven't we. (H)

For Interviewee H, this aspect of her teaching style had to be kept in balance with an "anxiety about covering every angle". This was achieved through comprehensive VLE pages and providing separate lecture outlines to accompany her Powerpoint slides. She contrasted this with a colleague's more pared down and streamlined teaching style.

Interviewee B described his teaching style as "chaos and madness" and suggested that individual teachers needed to find their own style of teaching. This was also reiterated in the way that Interviewees J and I both justified their use of technology in terms of things that worked for them while acknowledging that this might not be the case for others. Interviewee B gave some examples of the connections between technology and teaching style in terms of the technologies that he did not use. He suggested that:

> Certain things suit your own style and certain things don't suit it and you have to get to know what those are. If you are not an orator then podcasting is not for you, it's just not a way of doing stuff. I don't get on particularly well with blogs, mostly because I find them gossipy rather than, I just, it's not for me. (B)

In these examples, technology was discussed not as a generic solution to problems (as can be found in some policy documents) but rather as a personal choice that may or not be appropriate for anyone else.

Other participants described their teaching style in terms of 'habits'. Interviewee E thought that technology offered variety through options to teach in different ways. However, she believed that her actual use of technology was led by habit. She did not feel she had sufficient time to think about how to teach differently unless something went wrong and she was forced to take a different approach. Although she wanted to "break free from Powerpoint" to provide more variety for students she

did not do this. Similarly, Interviewees G and I spoke of using Powerpoint through habit while Interviewees A and J had a particular routine and way of setting out their VLE pages. Interviewee K acknowledged that it was difficult to break out of these habits and associated this difficulty with the expectations of other people:

> So sometimes when I think the best path is probably not to use technology, sometimes I still end up doing it because of, it is very difficult to change people's mind-set and expectations in certain ways. (K)

As well as habits of using particular technologies, there were also habits relating to when they used them. For instance, Interviewee A had found herself caught in a habit of working on her online activities late at night. Having technology habits seemed to Interviewee G to make life easier while Interviewee C felt that if something seemed to be working he was unlikely to find the time to consider alternative approaches and would keep to what he already knew.

Technology was also seen to have had a role in changing teachers' personal teaching styles. Interviewee J described how she had become "a very different type of lecturer" since the introduction of Powerpoint:

> I used actually to script my lectures with almost like a film script so with pauses and timers on the pages and these days I have got everything on Powerpoint and I actually ad lib around them and I found it frustrating at first, Powerpoint, it was not as detailed but on the other hand I think in many ways it is much more realistic to what people can actually absorb during a lecture. (J)

Interviewee J described a habit of using Powerpoint in a particular way. She described a "visual language" of layout and colour-coded words in her Powerpoint slides to "visually distinguish between what is the main point and what I want to say about it" (J). Sometimes she coloured terms relating to a particular concept being discussed in the lecture and did not always explain this to students. At other times, she included rhetorical questions and "cliff-hangers" to keep students thinking over coffee breaks,

The differences between individuals' teaching styles became particularly visible when teachers had, for whatever reason, to use a colleague's resources (most commonly, a Powerpoint presentation). For example, Interviewee K described finding teaching using a presentation that a colleague had prepared difficult because he would have taught the content differently. This emphasises the personal

and individual nature of decisions about teaching even when comparing those who teach exactly the same subject.

Teaching as performance

An important aspect of several teachers' individual style was their view of teaching as performance. Interviewee F taught part-time while practising as a barrister and transferred the skills from this profession into his teaching:

> And given the day job is obviously entertaining the juries, the job is entertaining the troops in the student context. (F)

Although Interviewee F was clear about the differences between these contexts and did not treat his students as if they were a jury, he did believe that the communication skills and ability to engage his listeners that were vital to his success as a barrister were usefully transferred to his teaching. The transfer of experiences outside of teaching was also important to Interviewee J who had previously been a DJ. This was reflected in how she spoke about her teaching as performance.

> Particularly those really big lectures you do sort of present them as a sort of mini-production, but the only problem is that you only do one time and you have to wait a whole year to improve it. If you're in theatre you do one night then the next night you do it again and you make it better. So yes I always feel there is a bit of a pressure there to get it right first time round. (J)

Her concern to "get it right" and produce a good performance manifested itself in her use of technology. While she did not think that teaching as performance was a new phenomenon – she described teachers who had been "quite flamboyant with their use of blackboards" – she did feel that something was different when working with technology. She discussed the contrast between Powerpoint slides and fully written lecture notes in terms of playing records:

> When you are a DJ you bring a certain amount of records with you but you never know until you actually playing your records which ones you are really going to play because you can see what will excite people, what will just not feel relevant at the time and so with the Powerpoint I do actually have quite a bit of, at first I thought no I don't have any flexibility, but actually because I only put the main points there, it gives me flexibility to ad lib and nevertheless not to lose track of all the main points that I need to cover during the session. (J)

156

Thus, Interviewee J had changed her perception of Powerpoint and now felt that it was supporting her performance through allowing her space to "ad lib".

Interviewee B described how his view of the teaching "performance" had changed over his career. Early in his career, he had believed that students wanted a "perfect performance" and this feeling of student expectation had affected his teaching. However, as he had become more experienced and older, he felt that he could "get away with an awful lot more as an old man than you do as a young man" and "played to that" believing that if he was "personable" then students would "forgive you almost anything". In terms of technology, this was reflected in his desire to share his personality through his use of technology as will be shown later.

Concerns about performance could also lead to a teacher abandoning the use of a technology. Interviewee D described having previously used Powerpoint in order to appear up-to-date and "flash" when promoting courses but stopped this after becoming convinced that "flashness" was associated with insincerity. He had become embarrassed by his Powerpoint presentations and had come to believe that they no longer had any impact because everyone else was using Powerpoint too.

Just as for teaching style, participants portrayed decisions about how well a technology would support their 'performance' as a personal choice but a choice influenced by perceptions of their students and a concern about how they would be viewed by others.

Personality and teaching

Some participants were clear about how this 'performance of teaching' related to an individual teacher's personality:

> You have to teach to your personality and if you don't, if you try and be something you're not, then I think you will fail. (B)

Enthusiastic teachers who shared this enthusiasm with their students were contrasted with "boring" lecturers without personality (B) and sharing your personality was seen as more important than using technology:

> That's what good lecturing is about. It's not about using technology, it's not about creating good lecture notes and so on and so forth, it's about being you and letting the students know that you are being you. (B)

Good teachers were believed to enthuse their students through sharing their personality and participants implied that they were performing their personality when

157

teaching. For some, technology aided them in sharing and performing their personality while for others, technology hampered their ability to share their personality with students. For example, Interviewee A felt that her personality was not reflected in her online teaching:

> Because the whole point of my teaching is, a lot of it is the personality, the enthusiasm you have for your subject and I can't get that enthusiasm over online and I find that really frustrating. (A)

For Interviewee A, the activities she set online did not communicate her passion for the subject she taught and she felt that despite her efforts, her teaching could become boring.

Other participants identified technologies that helped them to share some of their personality. For example, Interviewee I believed that videos could share a teacher's emphasis and intonation and benefit students, and Interviewee B described how the ability to use intonation when using audio recordings for marking allowed him to say things that he would not have written down when marking. He believed that through technology, his enthusiasm and excitement were able to be shared with his students. For example, he thought that they could see that he loved searching and finding resources and was enthusiastic about his teaching. This was important because he wanted students to know that he cared about their learning and progress and he felt that

> Technology helps enormously with that sense of caring. (B)

Interviewee H also discussed using technology to communicate her care for students. In this case, a VLE page for final year students was intended to create a "sense of community"

> I'm trying to make it quite a homely space, familiar space…give the page a personality, make it an extension of what you do with students in your lectures, make it warm, make it welcoming, make it fun (H)

She described how she tried to help final year students "release their anxiety about final assessments" by baking for each other and reflected this on her VLE by posting photographs in a "cake hero of the week" gallery.

Interviewee J spoke about how she tried to make her VLE page welcoming through its orange colour scheme:

I thought orange is just warm, it is welcoming and warm but still bright and sunny. So I just thought it gives a glowy feel to it and it's just, I just thought it will make people feel warm and comfortable. (J)

In contrast, Interviewee K shared a different aspect of his personality in his VLE page:

It looks a little bit like this desk. So there's like, there's files everywhere and the content of all those are fine but it's not prettily designed or anything. There's logic and there's method in there but no flowers or anything like that. (K)

He did not make a conscious effort to make the page unattractive but equally did not try to make the site appealing. He contrasted this to other colleagues:

But I've seen, especially some of the females that theirs just look like lovely, ideal home exhibitions of pictures and images and different colours. I just think, what on earth is that, just get the files up there. (K)

However, the relationship between personality and use of technology was more complex than this and could involve balancing different aspects of an individual's character. While Interviewee B found it easier to be relaxed when communicating via technology, other aspects of his personality also affected which technologies he used. For example, he felt that he was "too disorganised to be someone who could effectively use an e-portfolio" (B). Another aspect of Interviewee B's personality was that he considered himself (and many others) to be "fundamentally lazy". As a result, he liked the concept of making learning as easy as possible and gave the example of a podcast that could be listened to while "lying on my bed with my eyes shut and learning – how good is that". However, he also reported spending very long periods of time creating complex e-learning resources and said that once something interested him he would want to do that and nothing else until he got bored. He described his personality as the "antithesis of a completer/finisher" and looked for "quick wins". He also said that he liked getting positive feedback from students and suggested that "if you're the first one in there with something new, you usually get the plaudits".

Interviewee C also expressed his enthusiasm for his subject through his teaching:

I think it's fascinating, I think it's interesting, bugger the students. I'm enjoying myself, what couldn't be fun about this. (C)

He shared this enthusiasm and other aspects of his personality through technology, for example, through light-hearted emails and announcements. These were intended to engage students and he contrasted them with the emails he had received from other module leaders that were matter-of-fact and terse. The emails were an extension of the "outrageous" jokes and comments that he liked to use in his teaching sessions even though he sometimes wondered if he went too far. As module emails were automatically copied to his line manager, he knew that his manager was reading these messages too and had commented on them, but he tried not to worry about anyone sharing or misinterpreting his emails:

> I probably, almost certainly, purposefully choose not to think about it because I think if I did ...I wouldn't be as silly, I would be more self-conscious, I think, of what I said (C)

The extent to which an individual believed that they could express their identity through technology was an important aspect of how satisfied they were with their use of technology in their teaching. Those who felt that technology hampered the communication of their personality or warmth were more reluctant to use technology, while those who were more comfortable with their ability to share their identity through technology were happier to continue using it.

Technology and personal relationships

Sharing their personality through their teaching was one way that teachers built relationships with their students. However, several participants thought technology was having a negative effect on interpersonal relationships for both teachers and students. Interviewee E expressed a fear of over-using technology at the expense of personal relationships and some participants believed that increased use of technology would have a detrimental effect on students' interpersonal skills (E and K). Interviewee A noted how students' comments were received differently via email or discussion boards than face-to-face exchanges, while Interviewee G believed that only using technology to interact with students would reduce both the "warmth" of her relationship with her students and the emotional impact of her teaching. The belief that technology could affect interactions with students also applied to interactions with teachers. For example, Interviewee D spoke of the distancing effect of colleagues in the same building conversing via email rather than in person.

While all participants valued the use of technology to communicate with students, they identified problems associated with this. Interviewee J made it clear that she did not believe that email or online communication could replace face-to-face

contact and was concerned that students had unrealistic expectations for instant replies to emails. Interviewee K suggested that, even though he knew it was counter-productive, he could not resist checking and answering his emails too frequently. As a result, he blamed himself rather than the technology for wasting his time. While Interviewee G also found electronic communication very time-consuming

> It is very easy to get into the circle when you don't notice that you are working over 10, 11, 12 hours a day so I had to remind myself, no today you are not going to do your emails. (G)

In such cases, using technology provided increased flexibility about where and when to work but also made them more accessible. This was even more the case for Interviewees A and J, who were contacted by students through their mobile phones:

> I often get called by a student at 11 o'clock at night or 2 o clock on a Saturday afternoon that sort of thing. So that can be, which I don't mind too much. It can be, infiltrate your personal life a bit. (A)

In these situations, participants had to manage their personal lives and their role as a teacher. These different aspects of their identity were important and participants differentiated between how they used technology in the different parts of their life. For Interviewee A, technologies were used at home to make life easier and quicker however, in her teaching, technology was there make things more interesting. As a result, she was particularly keen not to adopt Twitter:

> There is no way I am going to get onto Twitter and start twittering and that sort of thing, I think that technology is taking over your life …and I don't want them tweeting me, absolutely not, no. (A)

Participants also acknowledged that students saw technology differently when studying compared to in other parts of their life. This was particularly clear in the use of Facebook which according to Interviewee A was seen by students as very separate from technologies used by the university. Some participants were able to make use of Facebook in their work, for example, Interviewee J's students had created their own course page and kept ownership of this. She described becoming frustrated when students asked questions to peers on Facebook but did not approach her. Eventually she joined the page to answer the questions but felt that she was "actually breaking a barrier" although the students did not seem to mind this and were grateful for the answers she gave. As leader of the course, she came

161

to see her presence on Facebook as advantageous because it provided the students with a sense of her presence even though she did not directly teach them. She wondered how long this would last though:

> So for them Facebook works, I mean I am sure it is generational thing and it might not work after 5 years but for this generation that works. (J)

Other participants had found Facebook more problematic. For Interviewee H, early experiences of using social networks through MySpace had been successful and enabled her to create "a relaxed, fun, sense of a holistic relationship". However, she started to be aware of problems relating to her professional and personal roles. In terms of her professional role, she was able to see students' personal messages that she would have preferred not to know about.

> I was also seeing things that I didn't want to see and … was having a hard time separating what I really wanted to use social media for from my professional role. And I felt increasingly uncomfortable with that actually, where you see, on the news reel, fights between students, God, do I intervene, what do I do, you've seen a student posting late at night in real distress, I've seen that, is it part of my role, what do I do? (H)

As mentioned above, Interviewee H's use of technology reflected her care for her students but in this case, there was a conflict between her responsibilities as a "caring professional" and her own personal life. Similarly, she found her own personal use of social media was affected because if she wanted to use Facebook while on leave or late at night, a student could see her and contact her. Students were also aware of the distinction between their personal and professional lives and Interviewee H and her colleagues had identified that some students did not want their university teachers so closely connected with their life outside of study and were communicating a sense of "back off here…this is not the space for you to enter". (H)

However, not all interviewees spoke in terms that implied that technology was determining changes in relationship. Interviewee B believed that any decline in interpersonal skills was not a result of using technology in university teaching:

> It's naïve to believe that they come to university to learn social and interpersonal skills. They're getting that from their friends, from Facebook, that's not what we teach them (B)

In contrast to views of technology as either a 'tool' or a 'force', this quotation emphasises that technology is used within social structures and practices both inside and outside higher education. Teachers recognised the role of technology in their lives and the lives of their students and how adopting certain technologies for teaching can blur the boundaries between work and home.

Relationship to technology

A different aspect of each participant's identity as a teacher was how they viewed themselves as users of technology and the importance that they ascribed to technology. For some participants, the way that they used technology was a significant part of their identity as a teacher. These individuals held generally positive attitudes towards technology and were willing to try new innovations (I) or described themselves as 'early adopters' of technology both in teaching and in other areas of their life (B and H). However, enthusiasm for technology did not imply an uncritical acceptance of innovation:

> I've never been one who buys into the idea it must be good because it's technology. It's got to be well thought through and sometimes it's got to be a reflection that was an amazing mistake and go back to square one and start again, think it through again. (B)

In fact, at some point in their interviews, almost all participants stressed the continuing value of traditional, non-technologized ways of teaching and this was expressed just as strongly by the 'early adopters' as by those less likely to be the first to adopt new technology. The majority of participants had a positive but not uncritical view of technology, for example, Interviewee K described himself as "cautious" and others were willing to try new technologies but were fairly sceptical about their benefits (C, D). Interviewees C and E both said that they did not want to become too reliant on technology because they valued other approaches and Interviewee J was very sure that she would retain her face-to-face teaching in the future. Interviewee H summarised these discussions:

> I don't think online learning is ever going to replace in anyone's mind the importance of face-to-face contact but if we can dance between the two then we'll be alright. Most students don't want a purely online learning experience, they want to be there, they want to meet people, they want to see a real teacher … I could be wrong, I could be playing this back in ten years' time groaning ironically but I don't think technology's ever going to chase us out of our jobs. (H)

The nuanced nature of these attitudes can also be seen in the ways that participants wished to be seen by others. Those most enthusiastic about using technology recognised that not everyone else was as keen as they were but did not want others to be forced into using something that they had no enthusiasm for (B). While those who were most sceptical about the benefits of adopting technology were keen not to be characterised as "luddites":

> I hope I don't come across as a luddite for technology because it has a lot of use but I think it has its limits as well. (F)

> I'm not a technophobe at all. (D)

A number of reasons were given by participants for their attitudes towards technology. Interviewees B and H, who were quicker to adopt technologies, remarked on the excitement of trying something new and Interviewee B felt that it gave him an "edge". He noted that when he used something new, his students would ask other teachers why they were not doing the same and he would then be criticised by colleagues. He also mentioned being curious (as did Interviewee G). Interviewee H was keen not to fall "behind the times" both because of how this might be perceived by students and because of her responsibilities for learning and teaching within her department. Some participants mentioned the influence of courses they had taken, either about teaching in higher education (G and H) or about e-learning (A).

Some participants preferred to delay adopting new ideas until they were established and "proven". Interviewee C discussed Second Life as an example of a technology that had been promoted in his university and eagerly adopted by a few individuals who later stopped using it. He considered this an example of colleagues becoming excited by an innovation because it was new rather than it having any great potential.

Some views of technology were related to participants' thinking about the changing role of technology. Technology was thought to be advancing quickly and constantly (B) and had become hard to keep up with (E). Interviewee E saw technology as an unavoidable part of modern life but felt that she had become more discerning in her use of it. Similarly, Interviewee A had initially been reluctant to use technology and, at first, would only use it when "absolutely necessary" but she believed that it had become more and more necessary and, as a result, technology had now become a personal interest for her. Although she was still concerned that:

Sometimes we are doing things just for the sake of it being online rather than because it would be better online (A)

Participants' responses often demonstrated that they thought about technology as a tool with properties that could be used to participants' advantage. Occasionally this was made explicit:

It's just another tool like a car or a hammer or whatever. (E)

But more often, discussion about technology focussed on attributes of the particular technology and these were used to justify a view of technology as beneficial. For example, technology was believed to be valued by students (B) and particularly useful for supporting new students (H, I). It was believed to benefit assessment practices through allowing self-assessment quizzes (A, F, I), audio marking (B) and online marking (G), improving self-evaluation (G), and formative feedback and monitoring of e-portfolios (I). Some individuals believed that technology could provide a "richer" experience for students (I) or that it could encourage student discussion and peer learning (B).

As well as helping to justify a beneficial view of technology, the idea of technology as 'just another tool' could be used to justify a view of technology as having limited benefit:

I think it's a tool rather than an end…So I think there is a positive role for it but I think it isn't the end of education as we know it. It's a means to an end and I think understanding that is crucial for all people. (F)

One attribute of technology that was viewed positively was the flexibility of technology and this was identified as aiding teachers to vary the activities they used, to access information in a range of ways and to communicate more effectively. But alongside this perception of the flexibility of technology, interviewees also expressed a perception of technology as restricting and gave specific examples relating to particular technologies. For Interviewee A, the use of Powerpoint restricted her teaching because the slides that structure this type of software provide a rigid timetable and content that had to be covered. VLEs (G and J), online message boards (B), and website publishing procedures (D) were all felt to have restricted what participants wanted to achieve.

In these examples, the view of technology as a tool to be used as teachers wish, is replaced by a view of technology as a force to restrict teacher's practice. Other examples of this view of technology can be seen in descriptions of technologies that

were believed to waste time (D) or to alter the content of teaching (see earlier). But as shown above, this was not the only view of technology expressed by participants. Some emphasised social structures and practices while Interviewee J discussed the relationship between teaching and technology in terms of media and suggested that the format of a communication affected the content of that communication.

Confidence

Participants' relationship to technology was related to how confident they were about their own IT skills. Confidence in these skills varied but most participants were generally confident (A, B, C, D, F, H, I, K) with some moderately confident (E, G, J). This confidence encouraged some to try new activities with students (B), although, even for these participants, not knowing how to use technology could be embarrassing and Interviewee B spoke of relief at finding others who also did not know how to do something.

In contrast, Interviewee E was less confident and compared herself unfavourably to others. She felt that she only used the technologies that she was very familiar with but had heard of other technologies that she felt she would have used if she had had more support. This could even lead to avoidance of technologies that she was not confident with. Not knowing what was possible was frequently mentioned (E, C, F, G and H) as new technologies seemed to be encountered "by accident" (H). And once teachers became aware of a new technology, it was not always clear what to do next:

> What's frustrating me is I want to watch someone else using technology in that way and I don't know where to go. And I want, I want to see how that's being used (H)

Interviewee J described having skills in some areas of technology but not others. She was able to use Powerpoint skilfully:

> In the past I would actually be up to really, really early in the morning trying to make it look good and playing with the formats because it was kind of a new thing for me. I am not that bothered anymore now about that. And I know it better now. (J)

But was not confident editing video clips to use in her teaching:

> I suppose I should just get better skilled now into doing video editing on the computer and I just haven't found time to skill myself in that. It just seems that little bit more complicated to me, but maybe not, maybe it is just me. (J)

166

She was concerned about the different skills involved in online publishing and said that she would need acting lessons or elocution lessons before teaching in front of a camera to avoid appearing amateurish.

Interviewee G found using technology time-consuming but rather than attributing this to the technology itself, she blamed her own skills and expected tasks to get faster as she improved.

> I have to sit in the library for hours and hours … but then it's not always working. So that's an issue for me, that's an issue, but I just need to be more skilled probably. (G)

Some interviewees felt that they learnt about technology on their own initiative through experimenting and trying things out (A, B). However, this can be time-consuming too, and one of the reasons for a perceived lack of confidence and skills was that participants did not feel that they had sufficient time to learn and practise using technology. Concerns about time were common even for those most enthusiastic towards technology (H) and, as discussed in the previous chapter, a desire to save time could be a motivation for experimenting with new technology (K). This lack of time was also blamed for participants feeling that they did not know what other technology might be available and useful for them (C).

Some of the interviewees described how they found alternatives to avoid some of the problems that they faced with university IT systems and it was not just the most confident teachers who were doing this. Interviewee J spoke about her problems with the structure of her university VLE and how she had avoided them. While Interviewee G spoke about not following her university's rules about the use of portable data storage devices after an update to the university system had caused the loss of many of her teaching resources.

Interviewees A and B worked at different universities but both used the same VLE in their institutions and had both faced difficulties with the discussion boards built into it. They both responded to these problems by finding an alternative discussion board to use instead. Although the VLE was chosen by the university, the problems were not solvable by the university and rather than accept this or choose not to use the discussion boards, these more confident participants looked for a different resource to use.

Sometimes the solution to a technological challenge was not found by an individual but came about due to their knowledge of their university's structures and how to use these to their advantage. Interviewee D spoke about going "round the system"

to find individuals who could work quickly to solve his particular problems rather than use the normal university services. In this case, the influence and 'social capital' that this individual possessed, due to his experience and role as a professor, gave him the confidence and resources to explore an alternative approach.

Conclusion

This chapter has identified several ways in which teachers' use of technology was related to their professional and personal identity. These included the ways that teachers expressed a personal teaching style, held particular views of technology, 'performed' their teaching, communicated their personality through their work and built relationships with their students. Thus, there is an important relationship between an individual's teacher identity and their thinking about technology.

The interview participants believed that they had particular teaching styles and that these styles affected which technologies they used and how they used them. Unlike some institutional policies, teachers did not consider technologies as universal 'solutions' to problems. As a consequence, they were able to justify using or not using particular technologies in terms of their teacher identity. In these cases, using technology in teaching was seen as a matter of personal choice rather than as necessary to accrue particular outcomes and participants often implied that they had a great deal of agency in these choices.

However, the connection between teaching style and technology was not a one-way relationship. When new technologies were introduced, they were believed to affect teaching styles either through supporting existing approaches or by constraining them. As a consequence, some participants thought that technologies, e.g. Powerpoint, had led them to becoming a different type of teacher. In other words, these teachers expressed deterministic views about technologies and how they had affected both themselves and their students. These views of technology will also have affected how those teachers responded to new technologies and how they thought about their use and potential.

While technology was central to some participants' identity as a teacher, all resisted being defined by this and challenged categorisation as either a 'technophobe' or 'technophile'. Rather all saw themselves as critical users of technology albeit with varying degrees of caution. For some participants, particular uses of technology had become habitual. These habits could reduce teachers' willingness to change their teaching methods as there was little incentive to abandon or change successful practices.

Several participants described their teaching in terms of a performance and decisions about using technology were influenced by the extent to which the technology would support their performance and how it would be viewed by their audience of students. A key aspect of this teaching performance was the extent to which individuals felt that they could express their personality and care for students through using technology. While some individuals believed that they could share their personality when teaching with technology, others did not and this was an important factor in how satisfied they were about using technology. Teachers who feel that technology might hamper the communication of their personality or warmth will be reluctant to use technology and this is often overlooked in the literature on technology adoption. In addition, using technology could lead to teachers facing challenges to their identity as teachers who care for their students. Social media, such as Facebook, could challenge the boundaries between teachers' home and work lives and prove an uncomfortable experience for teachers.

In contrast to the previous chapter, this chapter had emphasised the personal nature of decisions about teaching and some teachers appear to have had a great deal of personal agency. However, the influence of different contexts, for example, previous employment, perceptions of students, working context and role, continue to be referred to and need to be considered alongside issues of personal identity to gain a fuller understanding of teachers' thinking about technology. In addition, teachers' pedagogical beliefs are also relevant to their understanding of themselves as teachers and will be considered in the next chapter.

8: Pedagogic Beliefs and Technology

As the previous chapters have shown, in considering the beliefs and knowledge that inform teachers' thinking about technology, teachers' beliefs about the technologies they use, their context and their identity as a teacher all need to be explored. However, as discussed earlier, much research on this topic has considered the influence of teachers' pedagogical beliefs on their use of technology, particularly focusing on the extent to which they hold constructivist views of learning.

Therefore, this chapter will now consider participants' pedagogic beliefs before discussing how these beliefs relate to their thinking about technology (Research Question 3).

Pedagogic beliefs

As discussed in earlier chapters, several authors have discussed pedagogical beliefs in terms of a continuum between teacher-centred orientations towards teaching (characterised by a focus on content coverage and the transmission of knowledge) and student-centred orientations (focussed on encouraging deep understanding of a subject and a constructivist view of learning). However, participants in this study held beliefs about teaching and learning that did not always fit neatly onto this continuum.

Some beliefs about teaching and learning were held by all participants, for example, all believed that good teaching involves motivating students and inspiring positive attitudes towards their subject. A second common belief was that both learning factual content knowledge and being able to understand and apply that knowledge were valuable. Although none of the participants focussed solely on the transmission of factual information, most identified aspects of their subject that required particular facts to be acquired.

However, underpinning these common ideas was a great deal of variation and the most important aspect of this was that although all participants aimed to develop students' understanding as well as knowledge, they had different beliefs about how best to do this. Some believed that it was best to set activities to develop student understanding as part of their teaching activities. Some believed it was best to deliver content directly and then set tasks to encourage further understanding, while

others believed that their high quality direct teaching could inspire students to further independent learning and understanding.

Teaching for understanding

Interviewees A and G expressed pedagogical beliefs that were closest to the characterisation of a 'student-centred' orientation and described setting group activities to develop student understanding as an integral part of their teaching.

Interviewee A had a strong belief that good teaching was about enabling understanding and enthusing students and she contrasted this to

> a more didactic approach of just standing in front of a Powerpoint and reading it off or telling people something (A)

She believed that her role was to "facilitate learning" and she described this in terms of assessing students' knowledge and adding to it. While she identified subject "content" that she needed to "deliver", she believed this had to be accompanied by checking students' understanding of the content. She used group work and scenario discussions to find out what students could do and then saw her role as being to add to the knowledge students already possessed and to help them to "delve deeper" into the subject. She referred to the terms "deep" and "surface" learning during the interviews and defined "deep" learning in terms of students critically analysing views and being able to discuss their learning.

Interviewee G believed that engaging and motivating students was vital in order for them to develop their understanding of the subject matter. As shown in the last chapter, she was sometimes constrained in her choice of teaching approach by external requirements, but she valued interactivity and group work and tried to involve students in a variety of different activities. She acknowledged that some aspects of the subject she taught were important but "dry", saying, "I try to make it very interesting but it's boring". For Interviewee G, learning should be an "emotional experience" and she believed that students would remember sessions that had had an emotional impact.

Teaching to inspire independent learning

In contrast to Interviewee A and G, other participants sought to develop students' understanding by engaging them during direct teaching in such a way that they would be inspired to think independently.

For Interviewee D, good teaching and learning was "learning which imparts knowledge and understanding". He identified an unwelcome increased emphasis on the processes of teaching and learning in recent years and stressed the importance of subject content. In his descriptions of his teaching, Interviewee D emphasized the need for students to be engaged and listening. He felt that students had become increasingly dependent on their teachers and did not read enough or think for themselves. As a consequence he saw his lectures as an opportunity to challenge their thinking:

> I want to tell them what to think and provoke them into thinking… you only have an hour sometimes with students and you have got to make an impact, intellectual impact on them and try and change the way they think. (D)

Interviewee F believed that for his subject, law, gaining knowledge of the materials he taught required repetition and learning by rote. He felt that this was under-rated and stressed the importance of this even when it was mundane. Interviewee F described his approach to teaching as "chalk and talk" and for many this might be seen as the antithesis of "active learning". However, this was not the case for Interviewee F who saw "active" in terms of his ability to engage students with the content he was delivering. He made a strong contrast between his "active" teaching style and "passive" lecturing that "churned" out information without engaging students. This "active" teaching involved being enthusiastic, physically active (in terms of gesture and eye contact) and responding to student questions. He believed that this encouraged "thought and conceptual processing from students".

Interviewee J connected her research and teaching:

> I think if you haven't got any content, there is nothing to teach and this is where we differ from doing sixth form teaching is that we actually teach things that are fresh and new and up to date and not from textbooks, preferably. (J)

For her, good teaching involved an awareness of the different audience that she was communicating to, in terms of social background and academic level. Good learning involved interaction with material and making it "your own one way or another", hence she valued making students independent and passionate about their subject. Interviewee J discussed and rejected an "injection model" of teaching and noted that "what is in the head of the teacher does not necessarily literally translate into the head of the learner".

Balancing content and understanding

For the majority of participants, student understanding and content knowledge was finely balanced and developed either simultaneously (B, H) or at different times (C, I) with some identifying tensions in finding this balance (E, K).

Interviewee B believed that it was most important that teachers convey their personality and enthusiasm for their subject to their students. While he gave many examples of different ways in which he had delivered information to his students, Interviewee B stressed the importance of what students were expected to do with this information, for example, through discussions or tasks. He wanted students to have opportunities to learn from their mistakes and considered this "powerful learning". So, although most of the examples that he shared began with the transmission of information they were followed by activities to deepen understanding. And throughout all of these, he tried to share his love of his subject.

Interviewee H described how her views of teaching and learning had developed over her career from an initial focus on imparting information to "empowering" her students. She believed that she did this through leading by example, connecting students to the content of her subject and "leading them out" - giving them the confidence to teach themselves. For her, teaching had become less about the "input of knowledge" and had changed from a focus on "me" (the teacher) to a focus on "them" (the students). She valued students making mistakes and having space to "find their own way". However, she felt that she still provided too much information for students and needed to "leave them something to find out for themselves".

For Interviewees C and I, the balance between knowledge and understanding was related to the level of study. Interviewee C believed that the purpose of his teaching was to communicate "information, learning, understanding". He was proud that his lectures covered a large amount of content (reflected in large numbers of Powerpoint slides) but also tried to balance the amount of facts with challenges for students so that they would manipulate the information. He discussed expecting much more critical understanding from his final year students than his first year students who were expected to "regurgitate" information "with clearly a level of understanding but … not a huge level of critical understanding". While he discussed how he had considered changing his teaching so that gaining knowledge was left as the responsibility of the students, he believed that the particular students that he taught desired information and facts and that it was more difficult to "get them to think for themselves" than it might be with other more able students.

Similarly, Interviewee I saw delivering essential knowledge as a more important part of her first year curriculum rather than that of later years. As students progressed she saw her role as being to provide material that would stimulate students and "provoke enough interest" that they will want to find out more and take more responsibility for their own learning. Sometimes this was encouraged through particular activities, for example, final year students were required to teach some content to first year students.

Interviewee E and K experienced tensions between their beliefs and practices. Interviewee E described her development as a teacher as moving from a "one size fits all" approach to a recognition of the differences between learners and a greater appreciation of the process of learning. While Interviewee D felt he could provoke independent learning through lectures, Interviewee E disliked giving large lectures:

> It is bad in its design where you've got a lot of people, one person and loads of stuff to deliver in a small amount of time. (E)

Although she stressed the importance of content knowledge in some aspects of her subject, she believed that good teaching was about developing learners through "effective interactions and transfer of knowledge". She valued:

> Variety, enthusiasm, application, enjoyment. Attention to detail, thoroughness, attention to the individual. Yes, just consideration of a whole range of things so the timing of information, the type of information, the intensity of the approach and delivering stuff in a way that is accessible really. (E)

Interviewee K described good teaching and learning as occurring when a student took on the main points of a teaching session. He felt that good practice in teaching varied depending on the context for teaching, in particular, the size of the group but noted how his intentions sometimes did not translate into practice:

> I always wanted to do it as a sort of an interactive session so if they don't get something hopefully they will butt in and say I don't understand that particular bit, we can then discuss that. But 9 times out of 10 this particular type of lecture just ends me explaining it all and they slowly try to get their heads around what's happening. (K)

Interviewee K differentiated between students receiving information and processing or understanding that information. He discussed the process of learning and believed that his role had changed over his career from supplier of information to

teaching students how to access information. While he felt he could offer students advice on the process of learning, he believed that decisions about how to learn were now in the hands of the students. However, he questioned whether students had the necessary skills to do this or even realised they needed to. For Interviewee K, student-centred learning was about students choosing the process of their learning while he was responsible for selecting the content to be learnt. He valued "hands-on" learning in terms of student participation in classes and his availability to students outside of classes.

Overall, we can see that participants all wished to inspire their students and develop understanding and enthusiasm for their subjects. However, they had different beliefs about how to achieve this and all had to find a balance between communicating knowledge that they believed was essential for students to acquire and developing independence and understanding.

Technology and pedagogic beliefs

Given the beliefs about teaching and learning described above, this chapter will now discuss how these beliefs were related to participants' thinking about technology. In particular, it will explore how participants associated technology with their beliefs about the need to engage and motivate students, how they thought about technology and teaching and the relationship between technology and student learning and understanding.

Using technology to engage and motivate

Although all participants believed it was important to engage and enthuse their students, they did not all agree that technology would aid this. Those interviewees who used technology regularly did believe that it increased the engagement of students in their sessions and, for many, this was the most important property of technology:

> First and foremost I think it has the potential to make learning exciting. I'm not sure it actually does an awful lot more than that to be honest (B)

Participants suggested that technology could engage students' interest by making the content of sessions more interesting. As a result some participants used certain technologies for this reason alone, particularly if the content was felt to be something students might find difficult (E) or when they wished to help new students settle into a course. Interviewee H described using her VLE to create "a sort of a

shop front or an enticing academic playground" of interactive and fun activities to engage new students.

Those participants who believed that technology did aid them to engage students were able to explain how it helped them and these reasons related to the participant's perceptions of the affordances of the technologies. For example, the most frequently discussed benefit of technology was the ability to produce strong visual images. This was believed to help teachers present content in an attractive manner and thus motivate students (E). Interviewee G felt that in her subject she could use memorable pictures that had an emotional impact on students (although she wondered how ethical it was to try to provoke an emotional reaction from students with such images). Interviewee C discussed the images that he used in his Powerpoint presentations. While some of these were directly relevant to the content of his sessions, others were there "just to make it a bit more kind of engaging, just to break up the text". Similar comments were made about the use of video clips which could be relevant to the topic being taught or just entertaining or amusing (B).

Another way that participants believed that technology was helping to keep their students engaged during their teaching was by enabling them to vary their teaching approach. Interviewees A, B, E, G and J spoke about needing to break up their sessions into smaller sections:

> We were taught the golden rule: every 20 minutes change the activity… sometimes I will do Powerpoint just for two minutes … sometimes it just takes the edge off and then we will try something else. (A)

Interviewees B, E, G and J used video clips to keep students' interest or to stimulate conversation. Interviewee J suggested that very short clips of no more than two minutes were most effective because they inspired a "heightened awareness" amongst students. Other participants believed that technology could motivate their students through online discussions that could stimulate students to learn from each other while having fun interacting (A) or because technology meant that students were less able to hide and not engage with activities (B). However, Interviewee E said that she was careful not to over-use any activity because otherwise "it loses its shininess" (E). She felt that it was the novelty of technology that motivated students:

> The students that we have are so used to accessing information through technology and they find it interesting and exciting and it's a way in which they like to engage with information compared to like giving them a book and asking them to read it. They find that less stimulating I'd say. (E)

While most participants valued the ability of technology to engage their students, this was not always the case. Interviewee K believed that his current students needed more stimulation than those he had taught three or four years ago and, as a consequence, felt that he had to intersperse factual information within a series of activities to keep them interested and entertained and that if he did not do this, students would not see his teaching as current or relevant. He suggested that he used "things that would look good to students…because it will stimulate them a little bit more." (K)

However, not everyone agreed that technology could motivate students. Interviewee F did not use Powerpoint and one of the reasons he gave was that it did not do enough to engage students. And even those who believed that technology could engage students, recognised that this was not sufficient on its own.

> I don't like it when people only go, they liked it, because actually if they learned nothing from it but they liked it then we shouldn't be doing it. (B)

Interviewee K went further and made a distinction between technology stimulating students and students being motivated to learn:

> It can't make you take responsibility, it can't be a substitute for the learning experience either, for actually going out there and engaging in material so I'm sure it can be a stimulus for all those things but it can't actually do that. (K)

While Interviewee D described a Powerpoint he had seen where the images used had no purpose except to look pretty and questioned the value of trying to engage students though visual images:

> The groups I teach are more interested in the content, they don't need to be entertained by the material…I don't really see what people think, people think they are doing a great job, passing your time, making it less boring. (D)

So, although many participants believed that technology could help maintain student engagement, this did not automatically imply students were learning. Therefore, the next sections need to consider what uses of technology participants did associate with effective teaching and learning.

The role of technology in teaching

Interviewees described using (or choosing not to use) technology in the context of face-to-face teaching sessions and online activities. As discussed above, all participants could identify some aspects of their teaching that required students to

acquire factual knowledge (although the extent to which this was important varied between subjects and individuals) and several participants believed that technology was more suited for teaching factual content than for teaching that 'facilitated learning'.

The previous section noted how technology was used to motivate students through more effective and professional visual presentation. But some participants went further and suggested that better presentation brought other benefits for teaching. Despite the well-publicised critique and controversy about 'learning styles' and 'visual, auditory or kinaesthetic' learners (see, for example, Coffield *et al.*, 2004), several participants used this language to suggest that students were 'visual' learners who needed visual stimuli (A, E, G and I) and would complain if they did not see it (H). Visual images were believed to reinforce information in different ways (I) and to enhance understanding of difficult to understand concepts (B, E and K). They could be useful for provoking thought (E and G) or providing a "real-life" context (K) for a topic. Some participants related how they spent a great deal of time choosing the correct images for their presentations (C) while for Interviewee H, "nothing is just there for decoration". However one interviewee questioned the use of diagrams in teaching believing that they "only make sense to people who already understand the material" (D).

Not all aspects of technology were thought so professional. Interviewee D found video clips and video conferences within his university "amateurish" and while Interviewee B agreed, he felt that students did not mind if resources were not of professional production quality. Technology was sometimes used to appear "flash" (D and H) but Interviewees D and K questioned whether enhanced visual impact actually aided teaching or whether it was only done because the teacher was able to do it (K).

> I think it's more about the image - it feels good rather than it has any real value. (D)

Some participants associated certain technology with introductory material. Interviewees C and I both felt that the content of their first year undergraduate modules could be taught online while modules in later years were unsuited to online teaching methods. This was because they both believed that online methods were best suited for acquiring factual knowledge and, as discussed earlier, that there was a greater proportion of this for students to learn in their first year. However, Interviewee I suggested that there was "no real driver to provide distance learning" as students preferred face-to-face teaching. Interviewee J also used more

technology with introductory courses but, in this case, it was because she believed this helped students structure their learning and contrasted this to more advanced students who would be expected to structure the content for themselves.

Where participants spoke about the technologies that they believed did benefit learning, they often identified technologies that provided access to knowledge via the internet or allowed them to manage learning content. Such technologies could be used to access information before, during or after face-to-face teaching sessions.

Before sessions, participants valued using technology to develop their own knowledge and to prepare for teaching. All interviewees described using the internet and academic databases to ensure their knowledge was up-to-date or to find resources and this was thought to be a key advance and time saver (K). Online sources were not just academic though: Interviewee J described a range of sources including searching the internet for visual images, using Wikipedia for starting points, and using Amazon's automatic book recommendations to help create reading lists. And Interviewee E described accessing other university websites to find out what other academics were teaching.

Easy access to information was also believed to be of benefit during teaching sessions and Interviewee A even suggested that "internet access must be the most useful tool ever in the classroom". Interviewees described both planned and unplanned uses of the internet during their teaching. For example, using an online video clip of experts in their field to provoke discussion (F) or a student asking a question only for a peer to find the answer using their mobile phone (H). Interviewee J believed that this created a "flexible space" that enabled her to "ad lib" with students and respond to their comments by looking up relevant resources in her sessions or tutorials. Similarly, Interviewee E described unplanned use of technology where she responded to students' difficulties by finding alternative explanations or images online during her teaching.

Sometimes technology was used to provide students with opportunities to revise and revisit the content of face-to-face teaching sessions and this was believed to extend students' learning (B, E, H and I). For example, Interviewee I used a video resource and interactive simulation that students could explore after her sessions and hoped that the resources would prompt students to remember the content covered in her sessions. Participants generally did not mind that not all of their students accessed the resources that they provided online (C, G and H) as these were additional activities and "not integrated with our learning" (H), although

Interviewee E expected her students to know what was there if they needed it. For some, the resources that they created or suggested provided extra information that could cater for the most able students (A and B). While Interviewee C saw his Powerpoints and lecture recordings as an opportunity for absent students to catch up or for students with dyslexia to repeat sessions.

Sometimes technology was used to provide students with alternative ways to learn. Interviewee B demonstrated how he made multiple versions of files for his students including Powerpoints, narrated Powerpoints, podcasts and video recordings. He believed that he had a "duty" to provide these to meet the needs of students:

> We have now got such a variety of learners with such a variety of different ways in which they want to engage in stuff that I think it is important. (B)

For Interviewee B, the range of possible formats was an example of the power of technology and he felt that the fact that students preferred different formats was sufficient justification for providing as many alternatives as possible:

> We also have an evaluation marker which is, was it better? I think that's the wrong question. Was it as good is all it needs to be. Because if it is providing only an alternative that word only shouldn't even be there. I think that's a really important thing and we underplay the, no, it's not better learning, it's an alternative way of learning.

For most participants, using technology was an addition to their existing teaching practices and its role was to revise or extend students' learning rather than replace traditional teaching methods. As such, for most, the use of technology could be seen as marginal to their teaching practices. It was much less common for participants to create resources to cover topics that they had not covered in their face-to-face teaching (B and G) and some were keen not to replace face-to-face teaching with online activities:

> I am quite keen that these things don't replace face-to-face teaching but that they enhance or give a student a resource where they can tap into again (I)

Interviewee B described experimenting with providing Powerpoint slides as an alternative to attending a lecture. This was not successful and he blamed this on the slides:

> I suddenly realised I wasn't quite sure whether the technology was for my benefit or for their benefit. Powerpoint was clearly for my benefit, they were

my aide memoire and they were actually no use to you if you hadn't been to the lecture.

This quotation raises a common perception that the role of Powerpoint presentations was as an aid for the teacher rather than the student. Presentations were frequently referred to as a "crutch" for the lecturer (E, F) or as security (C). However, Interviewee B compared this to earlier practices and concluded that for him, Powerpoint provided less of a crutch than the detailed lecture notes he wrote out when he first started teaching.

Technology as distraction

Alongside the belief that technology can engage students, many participants also expressed a belief that technology can distract students from learning. Sometimes the distraction arose from the teachers' use of technology, for example, Interviewee C believed that too much animation in Powerpoint could detract from teaching and Interviewee H believed that providing detailed lecture notes after sessions discouraged attentive listening and selection. Interviewee F described the "danger of Powerpointery" as "flicking across slides, reading out the contents of the slide" and believed that this could distract from the content of the teaching and be confusing for students. Another example of this, he suggested, was when the version of the Powerpoint on screen differed from that provided for students.

For others, distractions arose from the students' use of technology during teaching because, according to Interviewee D, teachers were "too frightened to say to the students switch it off". Interviewee E described an incident involving students with laptops:

> My last lecture of the term two of the lads just watched the tennis the whole time… they weren't interrupting anyone else and I just thought well they are adults ... I am not sure why they have come but they just sat there and watched the tennis for the hour. Whereas if people are disrupting, I have seen it where someone has got a laptop and …others are paying attention to what's on their screen (E)

Technology distraction could also be a problem for teachers, Interviewee F suggested it was quite common for lecturers to lose their place because they were distracted by the technology they were using.

Technology as changing content

Some participants were concerned that technology had had a significant impact on the content of their teaching. While Interviewee G felt that Powerpoint enabled her

to plan her sessions so that she covered more content, other participants believed that using technology reduced the amount of content that they could cover. This concern related to several different technologies. For example, Interviewee J believed using Powerpoint had reduced the amount of content that she could cover in her teaching. While Interviewee E believed that no longer providing paper hand-outs (by offering online hand-outs instead) had meant that there was too much content in her lectures for students to manage and she would need to make a "big reduction" to the content or reinstate paper hand-outs. Others were weighing up future decisions: for Interviewee C, online databases were an important aspect of research in his subject but he believed that by using these in his sessions he would be unable to cover as much content as he wished to. He discussed his options in terms of either teaching the "realities" of his subject or covering the content:

> They will have one tenth of the actual content, that's the issue and I don't know how to get round that…There is very little kind of academic kind of factual learning there but it takes up quite a lot of time. (C)

Interviewee K felt that over the previous ten years he had drastically reduced the amount of content he covered in his teaching sessions. While a major driver for this was a belief that students knew less when they started university, he also wished to encourage students to access electronic sources. A third reason for reducing the content was that he felt that the integration of images and videos in his Powerpoint slides had led to a decrease in factual content and an increase in "sort of entertainment content".

Interviewee H, whilst recognising that there was a balance to be found between educational value and entertainment value, had a more positive perception of how her teaching had changed:

> Where I used to think in a far more abstract sense about my lectures, these days I almost see them because we're working with visual elements and thinking how to present that visually all the time…they've become less like essays in that sense. So yes, I'm seeing the lecture visually even as I'm thinking conceptually about it. (H)

In contrast, Interviewee D believed that the bullet points used in Powerpoints had replaced serious thinking and saw developments in presentation technology as part of a wider "shift from content to process full stop in teaching".

It is a distraction from the content. But that's nothing to do with the technology that's what I am trying to say, it's not the fault of the technology. I think there is a different psychological difficulty for students and staff when their work looks pretty and is rubbish. (D)

These collections of beliefs about technology and content provide dilemmas for teachers about their practice. While those whose pedagogic beliefs focused on inspiring student thinking through their direct teaching were most likely to be concerned by the distractions of technology or its impact on the content of teaching, these concerns were also raised by others and reflected in participants' practice.

The role of technology in student learning

All participants wished their students to develop understanding of their subject but there were differences in how well they thought technology supported this. For example, Interviewee K used various technologies to collect and analyse data for his research but felt that the increased speed of analysis came at the expense of hiding the process from students and compromising their learning.

The strongest views about student-centred learning were held by Interviewee A and she believed that there was a tension between these views and certain technologies, in particular, the highly structured nature of Powerpoint. On the other hand, she viewed student access to resources on the internet as "liberating". She differentiated between two contexts for technology use - in the classroom, she used technology to make teaching more interesting, outside of the classroom she used it because she had to for financial reasons. She believed that she could not "deliver content" through online teaching methods because without face-to-face sessions she could not check students' understanding. While she was forced by her department to teach some sessions online, she valued face-to-face experiences more highly. She felt that her students learnt more from each other when they were working online and more from her when they were in the classroom together. She used online quizzes and discussion boards, but considered these less effective that face-to-face teaching:

If it's in class it's even better because I can then explain, find out why and explain a bit more (A)

Interviewee A defined 'e-teaching' as posting information online and distinguished between this and 'e-learning'. As described above, she believed that teaching should be about facilitating student learning through group work and she believed that this role was restricted both by using Powerpoint in face-to-face teaching and in

online teaching. She believed that technology did not help her to facilitate learning, but that it was just an aid to vary her teaching and thus engage learners. She gave an example of videoing students and giving feedback but differentiated between the technology and the 'facilitating' which was done by her in her feedback and discussion of the video. In terms of online activity, she believed that students learning online received less from her as tutor and that as a result their learning was less "deep".

Participants did believe that improved access to information online benefitted their students (F). For Interviewee G, advanced students were expected to rely more on independent study and the ease of communication and access to materials provided by the internet supported this. For others, this was extended to include podcast recordings of their teaching (C and G) or access to a wider community of practitioners in their subject (H). Participants thought that this improved access and the ability to store and share documents with students were the most valuable functions of the university VLE (H). In fact the VLE was described as a "big noticeboard" (E) for posting information rather than as a two-way medium. This perception of the purpose of the VLE contrasts with that of much of the literature and will be explored further in Chapter Ten. While information can be shared without using a VLE, the existence of the VLE was thought to have raised "the bar of expectations" (H) leaving teachers to keep pace with the expectations of students. Participants did not believe that all students were making good use of these documents but that the existence of online resources removed some of the excuses for not accessing materials (B).

However, several interviewees (A and I) believed that their students information-finding skills were poor, sometimes surprisingly so. They responded by ensuring that they taught students how to access key sources in their field, usually early on in their courses. In contrast, Interviewee J related how her use of technology was changing. While in the past she would share links to useful websites with students, she now saw that as "old-fashioned" because "links are everywhere".

There was also a negative perception that this improved access to information was leading to "information overload" (F). Interviewee I believed that some university teachers were contributing to this through text-heavy Powerpoints, lecture recordings or overwhelming amounts of material. When faced with such information, several participants believed that their students showed a lack of discernment in their reading of online sources (B, E, H and I). Interviewee E believed that there was

a link between ease of access and discernment with increased access reducing students ability to discern quality.

In these circumstances, Interviewee F believed that the role of the expert was to hone down and lead students through this information and develop students' understanding of their subject so that they had a "good conceptual principled basis for approaching the subject". Interviewee I also believed that teachers had a responsibility to teach students how to become critical readers.

Some participants were concerned that technology was encouraging students to become over-dependent on their teachers. Providing Powerpoints or notes in advance was believed by some to discourage attendance (D, E, F, H, I, J) and Interviewee C thought that the availability of podcasts of his lectures could reduce students' engagement in sessions. While Interviewees D, E, I and K believed students could become lazy and unwilling to make the effort required to search for information that was not on the course VLE or a search engine. Interviewee H suggested that this could make students "passive" consumers of information and teachers "service providers". Interviewee K responded by only putting the "bare minimum" of information online:

> There are people who go completely over the top and do all singing and dancing [VLEs] as well. I don't see, whilst it looks good, I don't really see that as necessarily helping the students. (K)

Interviewee K did not think that technology was to blame for this situation and noted that there have always been students who cheated or asked others for answers. However, he believed that technology "facilitates that and brings that out in a lot more people" (K).

Interviewee B questioned the benefit of sharing texts and creating an online "dumping ground" while Interviewee F and H both saw this as a way of "covering one's own back with a Powerpoint" (F) and explained that this was not sufficient to teach a subject. Similarly, Interviewee D resisted posting materials online in order to "make the students get proactive in some way and demand it" (D).

For Interviewee B, creating repositories of materials and making these exciting and engaging was necessary but just the start. He stressed the need for teachers to move into a new "phase" that considered the "e-pedagogy" of how to use these materials:

> A lot of places, a lot of people have now produced some really good stuff. But if you don't use the right pedagogy behind it, you might as well have not bothered almost. (B)

This pedagogy, according to Interviewee B, was about the conversations around the materials that push students beyond the resources they are given. However, he expressed a more sceptical view that much use of online repositories was actually "almost reinforcing the materials are God idea", and that for universities, "e-pedagogy" was not financially important. (B)

Conclusion

The results of this study show that participants' pedagogical beliefs were varied and did not fit neatly onto a continuum from teacher-centred to student-centred beliefs. Rather they held some common beliefs, for example about the importance of engaging students, and some diverse beliefs about how best to develop students' understanding of their subject.

In turn, these beliefs did not map neatly onto particular uses of technology in teaching. While it appears that the participant with the strongest beliefs about student-centred teaching found it most difficult to reconcile these beliefs with teaching practices using technology, there was no evidence of a strict relationship between pedagogic orientation and beliefs about technology for teaching. Pedagogic beliefs were important but did not determine how teachers taught. Instead, particular beliefs about pedagogy were mediated by beliefs about technology.

Some of these choices about how or when to use technology were underpinned by beliefs about the attributes of particular technologies. These beliefs were nuanced and reflected complex positions and understandings of the unintended effects of technology, for example, how increased sharing of material via a VLE may go hand in hand with increasing student dependence on such resources and a resulting lack of independence. Participant's beliefs about each technology were often ambiguous – the question of whether a certain technology engages or distracts learners is answered with "both" and teachers' practices illustrate their attempts to maximise engagement while reducing distraction.

In many of the cases discussed in this chapter, technology was seen as a tool for teachers to use (or not) as they wished and decisions about teaching with technology were thought of as rational, informed decisions. Throughout the chapter,

there are examples of technologies that were thought to be 'under control' – teachers could use them as they wished to suit their own purposes and in line with their knowledge and beliefs about learning. In contrast, some other technologies were thought of as 'externally controlled' – these were forced on teachers by their institution or department and teachers believed that they had to use them even if this conflicted with their own beliefs

Finally, a few technologies were thought of as 'out of control' and had unwelcome effects. For example, technology was believed to be affecting teaching, teaching content, student engagement and activity and personal relationships in ways that teachers had little control over. This raised concerns for teachers (for example, about students' digital literacy skills) and dilemmas about how to use technology in their teaching.

These examples show how teachers perceived themselves as having different degrees of agency with regard to different technologies. The 'out of control' technologies were viewed in a technologically determinist manner and believed to have unavoidable effects while the 'under control' technologies were thought of as neutral tools to be used as the participants wished. Finally, the discussion of 'externally controlled' technologies reflected a perception of managerialist work practices. Participants could hold a combination of these perspectives simultaneously about different technologies.

The previous chapters have explored how the contexts in which teachers work and an individual's teacher identity are related to their thinking about technology. This chapter has shown that a teacher's pedagogical beliefs are also relevant. While some research has focused solely on the pedagogy aspect of teacher thinking, the data here have shown how this alone is insufficient to understand an individual's thinking about teaching with technology. Indeed, pedagogic beliefs are closely related to the 'meaning' aspect of teacher identity and how teachers understand their role and make sense of their relationships with students. However, before these connections are explored further, the next chapter will explore how teacher thinking about technology develops or changes over time.

9: Teacher Thinking And Change

This chapter will address the second research question: "How do social and organisational contexts and experiences shape teachers' thinking about technology?" The previous chapters have shown the influence of multiple, overlapping contexts on teachers' thinking about technology and how these relate to teacher identity and pedagogic beliefs. Throughout these chapters, participants have described times when they have adopted (or consciously not adopted) new technologies, sometimes by choice and sometimes not. They have also discussed events or influences that have challenged or changed their thinking about technology.

This chapter will explore these moments of change further and explore the factors that participants thought significant at these times. The first part of the chapter will discuss two significant influences on teachers' thinking about technology: how university teachers learn to use technology in their teaching; and their reflections on their experiences of using technology as a learner and a teacher. It will contrast formal and informal learning and successful and unsuccessful experiences with technology and consider how these relate to the contexts individuals worked in, their professional identity and their pedagogical beliefs.

In the second part of the chapter, three specific moments when change occurred in teachers' use of technology will be explored. These moments were associated with changes to structures and contexts, adopting a new technology, or ceasing to use a technology and together they demonstrate the multiple competing influences on teachers' thinking about technology.

Learning to teach with technology

In their interviews, participants spoke about learning to teach and learning to use technology in their teaching. They identified a number of ways in which they had learnt and, while most had had experience of several of these, one or two tended to dominate each individual's discussion of their learning. Formal learning experiences (for example, training courses and educational qualifications) were particularly influential on Interviewees A, G and H. Informal learning from colleagues was particularly important for C, I, K and H (again) and, in the case of K and H, this was also associated with teaching themselves. Interviewees B and D were also predominantly self-taught. Interviewees F and J were influenced by their own

experiences as a learner while Interviewee E described her learning in terms of reaction to change happening around her.

Formal learning about technology

All three universities provided formal opportunities to learn how to use technology in teaching. This included short and long training courses, departmental presentations, academic conferences, and occasionally one-to-one training on particular technologies that participants wanted to use (G and I). Some participants (e.g. Interviewees E and I) actively looked for and attended courses that would develop their use of technology for teaching while others (e.g. Interviewee F) had not had any opportunities to attend such courses.

Some of these courses were very well received and led to changes in teaching practices (H). For example, Interviewee A's Masters degree had included some activities taught online using a discussion board and her experience of this was very positive. When a proportion of her group had not engaged with the task, this led her to consider how to involve all students when she was teaching and had changed the way that she used positive feedback in discussion boards.

However, not all formal learning was successful and courses could be unsuccessful for reasons of relevance, challenge, or context. It was important that participants felt that the content of courses was relevant to the subject they taught and the methods that they used and participants did not always feel that this was the case (for example, with courses about Twitter or Second Life). In addition, some courses focused on providing technical skills rather than developing teaching:

> We get a lot of how to put teaching materials online but not how to use it to enable true learning I suppose. We don't get any of that. (A)

In this case, although the content was relevant to the task, it did not address the issues that were most important to Interviewee A.

Sometimes, technology courses were felt to focus too much on technologies that happened to be fashionable at the time. For example, the virtual world, Second Life, was described as a technology that had been heavily promoted but then fell out of popularity. For Interviewee C, this was both a vindication of his decision not to invest any time or effort in that particular technology, and also, a warning not to be too quick to adapt other new and popular technologies.

Other courses were felt not to be challenging enough when they focussed on things that participants already knew (E and K) or too challenging if they presented

technologies that appeared unreliable or difficult to use (C). For example, Interviewee C described attending a demonstration of new software:

> Even though clearly the session was being done to promote kind of technology and teaching, it definitely made me think no, it put me off, absolutely put me off. (C)

Interviewees' context could also affect the success of a course and some described choosing not to attend courses because they were too busy. In other cases, a new technology could be successfully introduced but participants' initial enthusiasm was lost if there was no opportunity to use the new technology (E) or if the training was not followed up regularly (H).

Where training courses were successful, they usually led to small, incremental changes in practice. However, there was one exception to this: Interviewee G described her experience of a formal training course as enabling her to understand blended learning and she called this experience "life-changing". This training had been relevant to her teaching and her needs at the time, had been pitched at the appropriate level for her learning and there had been opportunities for her to put what she had learnt into practice.

Informal learning about technology

Postgraduate courses about higher education teaching can only introduce the technologies available at the time, for example, Interviewee J recalled learning about how to use overhead projectors and video on her course. So, as new technology had been introduced over her career, she, like other participants, had tried to keep up by attending some short formal courses but also through a range of informal strategies for learning. The most common strategy for participants was self-teaching (A, B, G, I, J, K). This could be through trial and error experimentation (G and I) or through a planned research project (A). Interviewee B and K both described enjoying learning new technologies although Interviewees A and K both mentioned that they taught themselves because they did not want to have to wait for formal training to become available.

A second source of informal learning was from peers and all participants described learning about uses of technology for teaching from their colleagues (although this was more limited for Interviewee F, who taught part-time). This was sometimes organised by departments through opportunities to share good practice (C, G, I) or departmental meetings (C), but could also be through spontaneous conversations (C, D, E, F and I) or by actively asking for advice (J, K). Some participants also

spoke to colleagues in other departments about how they were using technology (E, H) and this could inspire participants to explore further (B).

However, this form of learning could be limited because participants had only a limited knowledge of how their colleagues taught and there was little sharing of resources or ideas within institutions (A, K). For example, Interviewee H wanted to see effective use of iPads but did not know where to look for it. None of the participants' institutions appeared to have an effective method for enabling teachers to share practices.

Informal learning about teaching with technology could take place slowly over a long period. Interviewee B suggested that there had been three stages in his use of technology. He described the first stage as using the technology as a 'dumping ground' for teaching materials. The second stage was focussed on 'how could we make stuff interactive …exciting… but it's still about content'.

> I hope we are now moving into phase 3. Which is ok, it's still a dumping ground, now how do we teach it through this medium? What's the e-pedagogy that needs to be behind the materials? (B)

His three stage framework suggests how Interviewee B's thinking about technology developed gradually over his career rather than through obvious events or interventions. He described his use of technology as evolving "without any real thinking about…because I was exploring with what might be done" until he developed a "more settled view" about which technologies to use.

These gradual changes in practice might not be immediately recognised. For example, Interviewee B discussed how he had changed from initially writing full lecture scripts to using Powerpoint slides as an aide-memoire. While this change happened gradually over a number of years, he described realising he had made this change as a sudden occurrence.

For several participants, informal learning had been more significant that formal learning about technology. However, institutions or departments could have done more to enable the opportunities for such learning to occur.

Training to teach

So far, this chapter has considered how participants learnt about teaching with technology but, as the previous chapter has demonstrated, general pedagogical beliefs also influenced how teachers used technology. As with learning about technology, both formal and informal learning had influenced participant's

pedagogical beliefs. For some participants, these beliefs had been influenced by their training to teach in higher education. Some interviewees (A, G, H, and J) discussed taking a formal postgraduate qualification in teaching and learning in higher education. While these are not a formal requirement in the UK, they have become common and are compulsory for new staff in some institutions. For Interviewee H, this course had been particularly important and had led to teaching and learning becoming a higher priority for her career. For others, these courses drew attention to particular aspects of teaching and learning (G).

Interviewee A felt that that her course "could" have influenced her views of teaching and learning but did not reflect on the effectiveness of the course very highly. However, at the time of the interview, she was studying for a Masters degree in Education and was finding this more influential. For her, a more formative experience had come earlier in her career when she had been trained to "facilitate groups" in order to deliver a leadership training course.

Interviewee F did not have any formal teaching qualification and although he wanted to gain one, he taught part-time and his other commitments prevented him doing this. So, instead, he had read some "very basic books about teaching" to develop his expertise. Other participants also referred to informal learning about teaching and some (B, E, H and K) described how their understanding of teaching had changed gradually over time.

These 'evolving' ideas about teaching could be related to the belief, discussed earlier, that the role of the teacher was changing from information provider to "empowering" or "enabling" students (H). Interviewee K discussed this in terms of the extent to which he controlled how students learnt and how students coped with their choices:

> Whereas it was me then deciding the learning style that the students would have, now it is up to them to decide how they learn but they don't have those skills to know that. It is not chosen for them anymore, they choose their own path and, it's very hard to get across to them that that is their job now…I think it's completely flipped around. (K)

In contrast, other participants discussed their pedagogical beliefs in terms of a consistent tradition. For example, Interviewee D felt that his conceptions of teaching were "consistent over time since 399BC". Tradition was also important to Interviewee F who spoke about face-to-face teaching in terms of a tradition going back to the "beginning of education" that had not "fundamentally changed for

thousands of years". However, he also described developing a teaching style over time. He related this to improvements in his own understanding of his subject as his ideas became clearer and he was able to hone and simplify his teaching. A different tradition had been influential for Interviewee J, who described a move from highly scripted lectures to greater reliance on improvisation. She traced her ideas about teaching to her early experiences of Montessori education as a child.

These examples of formal and informal teaching development explain how some of the pedagogical beliefs described in the last chapter are rooted in teachers' experience of learning to teach. These beliefs are influenced by the opportunities teachers had to learn and the context in which they work however, universities and departments could do more to encourage and enable opportunities for informal learning and collaboration.

Reflecting on experiences with technology

As mentioned above, a common mechanism for informal learning about technology was experimentation or 'trial and error' and participants spoke about how they had learnt from their early experiences with technology and from both successful and unsuccessful experiences.

Early experiences with technology

Both early experiences with technology as a learner and as a teacher had influenced participants' thinking about technology. For most interviewees, studying at university had not involved significant use of technology but had been characterised by lecturers reading out notes to a class (A).

> So my genetics lecturer sat on a chair for three hours and spoke. That was it, didn't move. (E)

In contrast, some participants had had positive experiences as a learner at university that had inspired their own teaching (B). While Interviewee J noted how some of the practices that she had experienced through teachers using slide carousels or overhead projectors (OHPs) had been transferred to practices with Powerpoint. The interview data reflects the fact that the participants had experienced higher education at a time when technology was less common than today. It remains to be seen whether academics entering teaching in the future will view technology differently and if the practices that students experience now will have any significant effect on future teachers' thinking.

However, many participants had attended courses or presentations more recently and had some experience of learning using technology through these. This often involved Powerpoint presentations as the main form of technology used (A). This was usually described in negative terms, for example, as just reading off bullet points (A), being distracting (C and D), boring (D), passive (F), or containing too much text (I). Interviewee F described Powerpoint as having a negative effect on lecturers:

> …the style of even fairly competent lecturers being absolutely ruined by it, you know, just not doing their job. And being more concerned to ensure the technology was working and that they got through all the material and I think, also, that feeling of satisfaction that they had of, oh good, I've done my job, when, in fact, quite the contrary, they hadn't done their job… it's a great deal less dynamic that you would want it to be. (F)

These experiences as a learner were complemented by participants' early experiences as teachers in higher education. Those participants who had been teaching for the longest remembered using blackboards, slides and later OHPs when they began teaching. As shown in Chapter Seven, the way in which teachers could express their personality when using technology was important and the 'performance' aspect of teaching was part of some teachers' early experiences. Interviewee J discussed this with reference to writing on a blackboard:

> there was quite a lot of gesture and the blackboard was part of that gesture and people were quite flamboyant with their use of blackboards and later with their use of whiteboards really. (J)

Interviewees B, C, E, H and K recalled using OHPs and then replacing these with Powerpoint as the technology in their teaching rooms developed. Interviewee B recalled his early use of Powerpoint and his, in hindsight, over-enthusiasm for including special effects and sounds in his presentations. Participants' experiences of adopting technology could also be related to the social environment that they lived and worked in. Interviewee H described her early explorations with technology in the late 1990s as having "a real pioneering sense…it felt like being in on a new club". She also believed that this enthusiasm reflected both her youth at the time and the excitement of "riding the wave of something new".

For those who had more recently begun teaching in higher education, Powerpoint had been a feature of university teaching from the start of their career. Although some had seen using this as optional (F) and Interviewee A recalled feeling that the

Powerpoint slides she had been given restricted her opportunities to use group-work and later discarded them.

Successful experiences with technology

For some participants, their successful experiences of technology had encouraged them to continue to use technology, particularly if that success was confirmed through positive student feedback (B, C, H). Such experiences could also encourage participants to think about their practice more carefully, for example, Interviewee B described how a successful experience affected him:

> I started to think about the way in which I was using technology more about how that helps them and who's the audience and what's that for and what's the buy in that they are going to have. (B)

While formal student evaluations were recognised as being a potential driver for change (E) and, as shown above, confirmed decisions to use technology, participants rarely reported students requesting them to change how they used technology. In fact, only one participant described how they were considering changing how they used technology as a result of a student's evaluation (H). In contrast, it was more common for participants to describe how their successful teaching was well-evaluated and had led to other teachers changing their practice (B, C). In these cases, the 'student voice' seemed to confirm teachers' choices and its impact on teaching was mediated by other teachers rather than directly influencing change.

While successful experiences encouraged participants to continue using certain technologies, they did not necessarily encourage participants to try new technologies. In contrast, once a particular technology was successfully established, there may be little reason to innovate and try something new:

> I suppose another factor is I'm reasonably happy with the Powerpoint, podcast combination and to try to do something different, I think it would need to be a relatively big increase because it would take quite a lot of effort to use it, learn it, get au fait with it (C)

Moreover, sometimes choosing not to use technology could be successful and encourage continued non-use. Interviewee D described being asked for Powerpoint slides in advance of a lecture:

> And I said, well there aren't any, so you can't have them and you're not having my notes. As a consequence I had more people in my session than

anybody else's. Everybody else who had got the notes, people just left their session or didn't turn up. (D)

Thus, successful experiences of using technology for teaching could lead teachers to reflect on their teaching and to continue successful practices. However, these experience may not necessarily encourage further new uses of technology and non-use of technology could also be successful and, therefore, likely to be repeated.

Unsuccessful experiences with technology

Interviewees also described a number of experiences where using technology had not been successful. The most common were occasions when the technology in their teaching rooms had failed. Sometimes this had led to a session being cancelled (C), to delay and inconvenience (G) or to a perception that they had lost credibility in the eyes of their students (K). But although these events were frustrating, they did not lead to the technology being abandoned altogether and appeared to have had no long term effect. And while some (e.g. Interviewee C) remembered teachers keeping backup overhead slides in case of problems, this practice had now died out. Similarly, other problems with established technologies, e.g. email (C, D and J), were treated as annoyances and exceptions.

In contrast, problems with less well-established technologies were more likely to affect decisions about their future use. For example, Interviewee K had taught an online module whilst on sabbatical but felt that this had involved twice as much work for him and that students had not engaged as he had expected. As a result, he was not keen to teach this way again. Negative experiences could have a long-lasting effect and Interviewee B suggested that "some people have got long memories" where unsuccessful institutional use of technology was concerned.

However, less-established technologies were not always abandoned if unsuccessful and it mattered whether teachers attributed the lack of success to the technology or to other factors. For example, several participants discussed how their initial enthusiasm for discussion forums had turned to disappointment with the lack of response from students (E, H and I). However, rather than blaming these problems on the technology, Interviewee H questioned her own skills at managing online discussion and Interviewee E felt this was a product of her own lack of experience. As a result, they reflected on how they could improve their use of forums in the future.

Interviewee B had had a range of reactions to the problems he had faced when experimenting with technology. In some cases, he learnt from the mistakes by not

attempting a particular teaching strategy again. For example, he recalled offering students the choice of whether to attend lectures or just read slides on a VLE. Although many students chose not to attend they "then wrote in their evaluation that they regretted that". And when his department's videos of lectures for online students were not well received, this feedback led to him adopting other approaches to narrating Powerpoints that were aimed specifically at these students. For Interviewee B, these "disasters" were presented as leading to important lessons learnt. His attitude was that:

> students don't even mind if it fails, they really appreciate that you've tried to do something a little bit different for them. (B)

Interviewee B's responses reflect his professional identity as a 'caring professional' trying to do his best for his students and building relationships with them. But it also reflects his context and the freedom he had to take risks and experiment, in contrast to other participants who felt more constrained by their context.

Moments of change

So far this chapter has shown how formal and informal learning and both successful and unsuccessful experiences with technology can influence a teacher's thinking about their teaching. It has also shown some of the ways that these are connected to teachers' contexts, identity, and pedagogical beliefs.

However, these influences can be hidden and only become visible when teachers are dealing with change of some kind. In these moments of change, teachers can find themselves facing conflicts between their beliefs and their practice or proposed changes to their practice. Such events highlight even more clearly the multiple competing influences on teachers' thinking about technology.

The second part of this chapter discusses three particular 'moments' where participants identified changes that were important to their thinking or practice. These were changes in their context, experiences of adopting a new technology and experiences of giving up an old technology. The chapter will discuss each of these moments and provide a detailed example from the case studies that demonstrates how teachers dealt with conflict and competing demands.

1: Changing contexts and structures

Chapter Six demonstrated how multiple overlapping contexts affected teachers' thinking about technology and the interviews demonstrated how changes to any of

these contexts could lead to conflicts between existing practices or beliefs and new or proposed practices.

One set of changes related to the macro-level of technology use in society. As discussed earlier, participants drew on a discourse about an unstoppable 'digital age' that they had to respond to (A) and although Interviewee B felt that this had not always been a change for the better, he suggested that teachers had no choice but to try to keep up. Thus, participants presented themselves as responding to technological change but not always welcoming it.

These changes had a momentum that was associated with a rise in expectations:

> The bar of expectations is raising with it so this is normal, standard expectations now isn't it. So, it's keeping pace, it's keeping pace with the culture they're used to and it's creating expectations of its own, of course. (H)

As a result, participants could rarely identify if their use of technology was more influenced by any one factor than another. This can be seen in the way that Interviewee H questioned whether her use of technology was actually a result of her pedagogy developing:

> or whether that's simply because the technology's present around us and can't ignore it, I'm not sure (H).

In terms of the higher education sector, some participants discussed what the effect of increasing university tuition fees might have on students' expectations of teachers (B and G). For Interviewee H, this was part of a broader change in how university teaching was being re-defined as a "product". She suggested that online resources became a demonstrable "package" of this product but provided a danger of teachers becoming "service providers" and students becoming passive consumers. As a result, teachers were positioned as forced to respond to this whether or not they welcomed these changes.

Another important context for teachers' work was their university and participants discussed times when their institution had changed its expectations for using technology and, in some cases, times when they had moved to a different institution. Sometimes, institutional demands conflicted with an individual's beliefs about technology, for example, Interviewee I described a university 'push' to create recorded module introductions but was resisting this because she believed that not all modules needed to be "homogenous":

> I think it is important to use it if you as a tutor think it is going to add something, not just because somebody thinks it's the way you should do it. (I)

And while Interviewee B adopted new technologies eagerly, he was aware that not everyone felt the same and believed that compelling use could have negative consequences

> I think that the danger of the way universities are forcing it at the moment is that if it's being used badly by people who don't want to be doing it, it will get as much of a bad press as it gets a good press and that's not good for the use of technology. (B)

Moving to a new institution did not necessarily mean that teachers' practices changed. For Interviewee B, changing institution made little difference because he would seek out the individuals "in control" of technology so that he could continue his previous practices. And Interviewee D felt although some things were a little more difficult to achieve at his current institution than at a previous university, no real change had resulted in how he used technology. While Interviewee C felt that his most recent change of institution had in fact been made smoother because Powerpoint had become "kind of a standard" across the sector. However, an earlier change of institution had happened as his teaching changed from using OHPs to using Powerpoint although Interviewee C saw this as happening "by chance".

Problems could occur though and Interviewee C suggested some of the potential difficulties that he might have had if his previous university had pioneered particular new technologies that he had relied on. This discussion served to justify Interviewee C's resolve to stick to well-established technologies. For Interviewee G, changing university had been more significant because of the improved availability of support at her new institution.

Changes to the context in which teachers work could lead to conflicts between their practice and their beliefs about teaching and technology. While not all such changes were significant, some drew teachers' attention to issues that had not previously concerned them, as the example below demonstrates.

Example 1: Re-thinking beliefs in context

In one instance, it is clear from the sequence of interviews how teachers' beliefs are re-interpreted depending on their context. In his first interview, Interviewee C discussed the possibility of teaching the first year of one of his courses online:

I am quite keen to develop an online module (C – Interview 1)

Although, at this point, Interviewee C had a very positive attitude towards online teaching, by the time of his second interview this had changed substantially. Between the two interviews, his institution had announced plans to create a separate business unit to run online courses and several departments believed that this would put their jobs at risk. Although this change did not affect Interviewee C directly, it represented a major change to the context in which this university approached online learning. The impact of this on Interviewee C's attitudes towards online teaching were clear:

About the last time we met, I was thinking I am quite keen to almost pioneer an online module. Why would I? Because now by doing that I would be putting my job on the line. So I think I will leave that to somebody else now. Because, I mean, it would be just be more work and I have got plenty of work to do. So I think that will completely change the way that people do things. So it came completely out of the blue, so people are still I think genuinely in shock. (C - Interview 2)

As well as affecting current decisions about using technology, the concern about job security could now also provide a confirmation of earlier decisions not to adopt online teaching and a warning against future choices:

So in a sense I think we are quite grateful that we haven't gone further down that line to be honest. I think that will completely and utterly, because of the University's response, that will completely and utterly change the way that we do any online stuff now. So in a sense that has kind of thrown a bit of a spanner in the works for the attitudes (C – Interview 2)

The interview quotations imply that Interviewee C believed that his change of attitude was shared by others at his institution:

I think there is a lot of people now thinking now, I'll press the pause button there for the time being until we kind of see what happens. (C – Interview 2)

This sequence of interviews shows that while Interviewee C's underlying perception of the benefits (or otherwise) of online learning had remained consistent, his perception of institutional technology initiatives had had a crucial effect on his attitudes towards online learning. The example shows the (presumably) unintended consequences of a university policy to increase and exploit online learning through a new business model, on individuals' thinking about and intentions to use

technology. It also demonstrates how a teachers' beliefs about pedagogy and learning must be understood within their university context.

2: Adopting a new technology

Several participants (B, E, G, H and I) remarked on the seemingly constant introduction of new technologies and there were a number of reasons why participants adopted these. Sometimes, teachers were required to use a particular technology and identified a rationale for this, for example, institutional targets and requirements (A), peer expectations (B), or financial imperatives. Some participants expressed concern that technology was being promoted as a way to save money at the expense of student learning (F, G).

> It's all been threatened and there is a quite a cynical attitude, not just by myself but by the majority of people that it may not be the best way of delivering education (F)

In other cases, new technology seemed to lead teaching developments (H) and Interviewee A described how the existence of technology could lead to change:

> I will use it if it is there. Does that sound odd? … But I won't purposely think I've got to use some technology therefore I will find something and put it in. I do it by accident. (A)

In these cases, participants had seen potential in some aspect of the new technology. For example, Interviewee B had been inspired after seeing images of the brain that he could use in his psychology teaching while others referred to the potential of discussion forums (H), audio marking (C) or improved data collection techniques (K).

When a new technology was being adopted, implicit or unacknowledged conflicts between teachers' thinking about teaching and their practices could become more visible. This is shown clearly in Interviewee H's discussion of her university's transition to a new VLE. She had used the original VLE successfully and had been an advocate for changing to a more sophisticated and powerful system. As she had collected a large number of resources to share with students, she expected the transition to be fairly straightforward and assumed it would be

> about packing stuff in virtual boxes and chucking them in a new house (H)

However, she discovered that the structure of the new VLE did not allow this and that the transition was both very time-consuming and forced:

a re-think about how we were using on-line learning (H)

In order to manage the introduction of the new technology, Interviewee H had to reflect on and develop her thinking about teaching with technology. Technology's role as a catalyst for such changes in teaching practices is sometimes presented as a rationale for introducing technology (e.g. JISC, 2004), however, re-thinking teaching was not the only possible outcome.

Participants' responses to new technology could be characterised by pro-active strategies or coping strategies. Interviewee G remarked on the need to be pro-active in order to make the most of an innovation and others found personal enjoyment in preparing and using new technologies (e.g. B and H) or tried to be discerning and not try too many new things (E). Sometimes responses were spontaneous, for example, Interviewee B described using his phone to record a plenary discussion, while Interviewees E, F and H described using the internet in sessions to respond to students' difficulties.

In contrast, some interviewees (A, E, F and G) gave examples of times when technology had been poorly introduced and the problems that this had caused. Participants coped with difficulties in different ways. Interviewee C described having to cancel sessions when the technology in a room did not work but later recording the lecture for a podcast to "salvage" the lecture.

Example 2: The transition to Powerpoint

The adoption of technology mostly commonly discussed was that of Powerpoint, specifically the transition from using OHPs to using Powerpoint presentations. Several participants reflected on their previous use of OHPs and identified the drawbacks of this technology including unclear images and poor contrast (K) and a sense of restriction (A), noise and inconvenience (E). But they also remembered some affordances of OHPs that they missed. For example, the ease with which they could be annotated (K) and that annotations could be projected, copied and shared (C). Some participants recalled teaching content that they had previously taught using OHP transparencies and converting these to Powerpoint slides. While some interviewees had found this unproblematic (J), others had encountered problems, for example, Interviewees C and K recalled difficulties replacing images that they had used and having to create their own.

However, when discussing their transition to Powerpoint, participants reflected on this experience in ways that uncovered elements of their thinking about teaching and technology that were not apparent in other contexts. For Interviewee K, the

transition was "a double edged sword" because the benefits of a more "professional" presentation were balanced against the time spent converting materials. But while many others have remarked on the investment in time associated with adopting new technologies, in this case the issue of time was also related to his perception of how his students spent *their* time and his thoughts about their responsibility:

> With all of the sort of new technologies it seems to be the teacher that seems to put more time into converting over than the learner. The learner, obviously, gets a lot easier ride each time in terms of their workload. Obviously that workload is supposed to be dissipated and spread out into other aspects of their learning but that doesn't really seem to happen due to the inherent laziness gene in most people I think. (K)

In this case, these reflections on the adoption of new technology have made visible perceptions and judgements about students' motivation and engagement. The discussion continued by contrasting the benefits of providing lecture notes or relying on students' own note-taking skills.

> Even now if you give them notes quite often they won't read them … whereas I guess if you had things that they didn't have, then obviously they would be noting that down then and would at least be reading it whilst they were writing so at least some of that might then be registered.

He concluded that while he understood the rationale for this practice, student autonomy meant that the benefits were lost on "probably a good two thirds of them". Interviewee K did not appear to believe that technology caused such behaviour but the change of technology drew attention to this aspect of his beliefs about students.

A very different perspective was provided by Interviewee H, who had initially been very reluctant to give up using the OHP but eventually converted all her teaching to using Powerpoint. She had not always found this straightforward and the act of transferring lectures from one format to another had highlighted differences in the way that she taught. In one particular case she noted:

> a feeling of strain between the lecture and what I was doing with the Powerpoint, …, it didn't come together that easily and although I can't put my finger on it, it felt strained, it felt, the Powerpoint felt somehow superfluous, sort of tokenistic.(H)

This observation lead to her discussing why this tension had arisen and she explained it in terms of the style and content of her teaching:

I remember thinking that actually, why isn't this working, I'm usually so quick with Powerpoints and I have fun with them and they feel natural. And I wonder if we're right in giving lectures differently now that we're using Powerpoint or using technology more, is the actual content of what we're delivering different? … it didn't feel interactive at all, it felt like, you know, I was really using the Powerpoint to put up a few illustrative key quotes from a speech I was delivering and it felt strained. … I remember now having a bit of crisis with that lecture, and thinking how do I make this more personal, how do I make it more interactive. Something perhaps in the visual emphasis of Powerpoint almost forces us away from that method of static delivery. (H)

In both of these instances, the transition to using Powerpoint (or the reflections on that transition) highlighted the interviewee's thinking about their teaching. In the case of Interviewee K, it demonstrated his perceptions of his students, while in the case of Interviewee H, she highlighted how it had drawn her attention to how she thought about visual and oral delivery of lectures.

3: Giving up an old technology

There were a number of reasons why participants stopped using a particular technology, sometimes participants changed their role and were now teaching different things (B, D) but, more commonly, participants described ceasing to use particular technologies when they were superseded by something new, for example, audio recordings (G), VHS video (E), vinyl records (J), CD and DVD data storage (K). In one case, Interviewee B described no longer using Second Life because of his personal opinions: it was "not really me".

But not all technologies were abandoned willingly. Sometimes, participants felt that a technology they currently used was reaching the end of its life even if it was still a useful tool. Interviewee H discussed how using YouTube videos in teaching sessions was "becoming a cliché":

I think some of the students perceive it as really lazy ... as I clicked out of Powerpoint … and into YouTube, I heard a young man about three rows from the back audibly groan 'Oh, YouTube, god'. And I felt like such a cheapskate, I really did and it's made me think. And now if I ever show a YouTube clip in a lecture and it's becoming less and less frequent, it's always with an apology, a sort of ironic, hey kids, look at me, I'm using new-fangled YouTube. They'll go urghh but you fronted it out with that. (H)

On other occasions, the loss of a technology had been both unwelcome and unexpected. Interviewee J described how she had found writing on whiteboards useful and had always written her contact details and key information on a board at the start of her sessions and left them there throughout her lectures.

> I walked into the same room that I have always been teaching in and it was like wow it's gone. Sorry guys I can't write my name on the whiteboard you will just have to wait for me to faff around and get this Powerpoint going so these people are just sort of staring and going well who's that then faffing around. (J)

While, in this case, Interviewee J was forced to stop using a technology because her institution removed it, in other cases, decisions to stop using a technology are more complex, as the next example will show.

Example 3: Giving up on social media

One example of a technology that some participants had chosen not to continue using were the functions of their VLE that enabled social communication.

In her earlier experiences of using a VLE, Interviewee H described using discussion forums to create a social space where students could communicate. This was intended to make the online module page "a space that the students can call their own". Initially, this worked well and students were willing to use the VLE to communicate and "get to know each other" and took some ownership of the discussions. However, this practice ended as first MySpace and later Facebook "exploded":

> From that point, that willingness declined and the sense of wanting to keep communication with other students, on the students' part, off-line and outside the VLE, got stronger and stronger and it's very hard to break through now. (H)

Although she wondered whether to persevere with this practice, Interviewee H also respected students' desire to separate their social communications and their learning and recognised that students had:

> an increasingly strong sense of where they will and won't put their social identities in view online. And I think we have to respect that really. (H)

When it first became clear that the VLE was no longer working as a social space, Interviewee H experimented with using Facebook but, as discussed in the previous chapter, this raised issues about her role as a teacher and conflicted with her own

205

use of social networks. But the desire to ensure that her students felt that the online resources were "speaking their own language" remained and at the time of the interviews, she was considering adopting Twitter as a tool to achieve this.

This example illustrates the range of factors that influence teachers' decisions about technology. The initial desire to create a social space reflects the professional identity of the teacher and her desire to build relationships with and between her students. However, maintaining her professional identity also led to her ending her experimentation with Facebook. Simultaneously, the wider context of developments in how students used technology in their lives outside of teaching was perceived as a reason for the failure of discussion forums and later Facebook as social learning spaces. The account demonstrates how this teacher had tried to respond to the ways her students used technology and be sensitive to students' digital lives and culture but how, in the end, this was not what the students had wanted.

Conclusion

This chapter has demonstrated the range of different influences on teachers' thinking about technology. Sometimes, these influences are straightforward and direct: for example, personal reflections on training or experience. However, sometimes they are subtle and only become visible when there are changes to the context in which an individual works.

Participants in this study had experienced significant change in how they used and were expected to use technology and to the contexts within which they taught. As this chapter has shown, these changes were influenced by their learning about teaching and about technology in formal and informal contexts and this learning was developed through both successful and unsuccessful teaching experiences.

While some participants (e.g. Interviewee B), could identify a pattern of progression in their thinking and use of technology, this progression did not fit the experience of all teachers. Rather, individuals followed different trajectories in developing their thinking which were influenced by their context and their personal beliefs about teaching and pedagogy. There was also an emotional element to their decisions about technology that sometimes reflected excitement and enthusiasm but, at other times, was characterised by frustration, disappointment or concern.

The interviews suggest that learning experiences and teaching experiences act dynamically on teachers' thinking and are refined through discussion and reflection. For this reason, individual experiences of success with one technology may not lead

to future choices to use a different technology and unsuccessful experiences may not lead to a technology being abandoned. In addition, several sources of conflict may arise when teaching with technology. These may be between a teacher's beliefs about teaching or technology and the context in which an individual works, or conflicts due to changes caused by adopting or discarding a technology. These appear to interact in different ways and with different effects on individuals' thinking about technology and intentions to use (or not use) technology.

The chapter has begun to show how the influences identified here relate to the other aspects of teachers' thinking discussed in earlier chapters and the next chapter will explore these connections more fully.

10: Discussion

As Chapter Three noted, research into teacher thinking about technology has developed in three distinct areas: studies into teachers' attitudes towards technology; research into conceptions/approaches to teaching that considers the relationship between teachers' pedagogical beliefs and their use of technology; and investigations of teacher identity. This discussion will consider how the findings of this study relate to these three bodies of work and consider how insights from all three areas might be combined to provide a fuller understanding of teacher thinking about technology. In particular, it will show the importance of a broader understanding of the contexts and cultures in which teachers work and how these influence teachers' beliefs about technology in their teaching.

The situated nature of teacher thinking about technology

Results from both the survey (Chapter Five) and case studies (Chapter Six to Eight) show that teachers' thinking about technology was varied and complex. Together they demonstrate how teachers' attitudes towards different technologies vary and how they are related to different elements of their context.

Attitudes towards technologies

In line with other studies, the survey and interview data suggest that the majority of university teachers made frequent use of technology and generally evaluated it positively. However, in line with the critique from Potter and Wetherall (see Chapter Three), it is important that we do not consider these results as expressions of a pre-existing mental state but rather as the outcome of evaluative activity. In addition, the results show that care needs to be taken not to reify 'technology' and consider it as a single, material entity. Although 87% of survey respondents said that they used ICT in most of their teaching, this did not mean that they used a broad range of technologies and there were large variations in use. Many respondents only used presentation software frequently and other technologies were used very infrequently. In addition, as Kopcha and Sullivan (2006) suggest that teachers over-report their use of technology, the relatively low reported use of many of these technologies may reflect an even lower level of actual use. As well as differences in reported use, an individual was likely to hold differing opinions about different types of technology and exploring an individual's evaluation of a specific technologies is likely to be more productive than investigating general 'technology attitudes'. This

was apparent in each case study and reflected in participants' enthusiasm and use for certain technologies and not others.

As shown earlier (p. 57-61), research using the Technology Adoption Model (Davis, Bagozzi and Warshaw, 1989) has demonstrated how a teacher's perception of the usefulness of a technology and of its ease-of-use can influence their intention to use that technology. However, the results of this study differ from this in two important ways. Firstly, although the survey did not use the Technology Adoption Model measurement scales, it did consider a number of factors that relate to teachers' perceptions of usefulness for teaching in the form of the extent to which participants believed that a particular technology would have a positive impact on learning. With regard to this, Chapter Five identified two groups of technology – a group of 'core' technologies for which perceptions of impact were not always important and a group of 'marginal' technologies for which they were.

The 'core technologies' group consisted of presentation software and virtual learning environments. These were widely used by the sample across all institutions and subjects and although the frequency of use of each technology was correlated with the teacher's perception of the impact of that technology, there were exceptions. A small number of survey respondents suggested that they used these technologies frequently but did not consider them to have a positive effect on learning. The interview data suggests a number of possible reasons for this. These include the perception that, for some of these respondents, institutional rules or expectations required them to use technology in ways with which they were not comfortable and the Technology Adoption Model fails to account for this.

A second group of 'marginal technologies' was also identified from the survey data. These were less frequently used and included e-assessment, blogs, podcasts, e-portfolios, wikis and social bookmarking. While these are mainly newer technologies and may still be finding their niche in university teaching, age is not the defining factor between the two groups. In fact, e-assessment tools have a much longer history in university teaching than VLEs. These technologies were much less likely to be mandated by institutions or departments and so teachers perceived themselves as having greater agency regarding their use and, as a result, the reported use of these was more likely to reflect the individual's evaluation of them.

The multiple contexts for teacher thinking about technology

Over time, researchers have added a range of other constructs to improve the accuracy of the Technology Adoption Model including constructs relating to a teachers' context. However, in these models, context is seen as a 'structural

constraint' (e.g. see Buchanan, Sainter and Saunders, 2013) which can be either an inhibiting or facilitating factor. Thus, context is seen as a filter that moderates the extent to which teachers can apply their perceptions of usefulness and ease-of-use in practice. A second major difference between this study and such research into technology adoption is that the evidence here provides an understanding of teachers' context as being more important than just 'structural constraints'. The data has shown that value-judgements about technology were inextricably linked to the contexts in which individual teachers worked. For example, interviewees discussed *their* students and *their* subject and the relevance of particular technologies to these. Schneckenberg (2009) has suggested that technology has not been more widely adopted due to "structural peculiarities of universities and cultural barriers, which are deeply rooted in the academic community." (p. 414). However, as we saw above, these results suggest that this statement is correct for some technologies, e.g. presentation software and VLEs, but not others. In addition, the results in this study suggest that the university and cultural influences that matter are not the ones suggested by Schneckenberg, who suggests that the priority given to research over teaching is key.

In their review of the literature regarding school teachers, Woolfolk-Hoy, Davis and Pape (2006) suggested that the relevant areas of knowledge and beliefs could be organised into four nested categories of knowledge. After reviewing the literature on higher education teaching, it was suggested that these might be adopted for university teachers with the four categories becoming: 'Cultural Norms and Values', 'Higher Education Sector Context', 'Institutional Context', and 'Self'. Following the analysis of the interview data, this was developed to reflect the contexts that were important for higher education teachers' use of technology. This data suggested three further categories: 'Departmental Context' that can be thought of as nested within the 'Institutional Context' and 'Subject-discipline Context' and 'Professional Context' that run across several categories. These multiple levels of context were represented in Figure 6.1.

Each of these contexts could be seen to have some influence on the ways that interviewees used (or did not use) technology. For example, a teacher's beliefs about how students use technology in their everyday lives affected how that teacher expected the students to use technology in their education and the kinds of technology that they might engage with. For some teachers, a desire to 'keep up' or provide learning that was 'relevant' motivated their exploration of technology. On the other hand, the realisation that once resources were available online, they were out of the teacher's control and could be shared or edited without their knowledge,

could be a reason for a teacher not to use certain technologies. In both of these examples, it was the teacher's *perception* of how the technology might be used that influenced their actual use, not necessarily any direct experiences of these events.

The different influences or imperatives arising from these contexts may align and strengthen each other or they may be in conflict. In this sense, the interviews provide examples of Trowler's (2008) 'multiple cultures' in action. Individual teachers operate within department and institutional cultures that may demand or value certain practices and at the same time they have beliefs and expectations relating to their subject discipline (or specialism) and their own personal history with technology or understanding of learning and teaching.

Contexts are not experienced in the same way by all individuals. Rather, particular aspects of a context are interpreted in the light of other contexts and individual beliefs. So, while all interview participants were aware of the use of technology by their students in their social lives outside of education, they responded to this in very different ways. While one individual might believe that they need to teach in a way that is relevant to students' digital lives, another may be concerned that these digital lives may have a negative effect on students' interpersonal skills. Neither of these beliefs is an unavoidable consequence of noticing the preponderance of digital technologies in students' hands, rather the first reflects an individual's beliefs about teaching (it should be relevant and engaging) and the second a belief about cause (that use of digital technology in education may effect a change in students' social competence). Therefore, it is the intersection and interaction of these contexts that is important to consider.

At the level of the higher education sector, participants were aware of the changing economic demands on universities and were concerned about how these might affect them. Several authors (e.g. Noble, 2001) have noted the role of technology in such developments and some participants in this study believed that these economic changes were representative of the broader marketisation and commodification of university teaching in which online resources became a demonstrable 'product' with teachers defined as service providers and students as passive consumers. Similarly, the 'performative shift' towards outputs of learning (Barnett, Parry and Coate, 2001) can be found in the interviewees' discussions of student concern for 'value' and in their manager's concerns for efficiency. The data shows how university teachers could be comfortable working in a new managerialist context (Kolsaker, 2008) but also how some chose to ignore university policy. It also

provides examples where teachers thought that they needed to provide certain 'outputs' (e.g. online materials) to demonstrate the quality of their work.

At an institutional level, Chapter Five showed that different universities were associated with different technologies. Except for presentation software (which was used in most if not all institutions), for each technology it was possible to find large differences in frequency of use between universities. But there were no 'leading' universities that were ahead of the others in frequency of use of all technologies. Institutions were likely to provide resources (e.g. equipment or training) and policy directives for a small number of particular technologies and the choice of which ones varied between universities. In recent years, organisations such as HEFCE have promoted policies that focus on institutional-level goals and strategies (HEFCE, 2009a) and some researchers (e.g. Kidd, 2010) have claimed organisational leadership and vision are essential for the successful adoption of technology. However, while managerial policy directives or expectations were frequently mentioned by respondents and it is clear that mandates to use technology were effective in forcing some teachers to use technology, it is far less clear that the intended benefits that presumably underlie these directives were achieved. In fact, the negative reactions to such managerial policies were apparent.

At a subject level, it was clear that many teachers claimed that their subject and indeed, the particular content or intended outcomes of the topic they were teaching at the time, were a major influence on whether or not they used technology. But the survey did not find that there were some 'technology-friendly' subjects and some 'anti-technology' subjects. Rather, that for specific technologies, the subject being taught was closely related to the likelihood of that technology being used. For example, presentation software was used more frequently in some subjects than others. There was a positive relationship between frequent use of presentation software and the frequency of teaching through large group lectures and it may be the case that those subjects that prefer large lectures find presentation software useful while those who teach mostly practical workshops have less use for it. In contrast, the reported use of blogging, e-portfolios and wikis showed the opposite pattern of use to that of presentation software. In fact, teachers in design and arts subjects were the least likely to use presentation software but the most likely to use blogs, e-portfolios or wikis. Finally, these subject differences did not apply to all technologies – there were no significant differences for VLEs, e-assessment, podcasts or social bookmarking.

These differences may reflect different preferred pedagogic approaches found in particular subjects. However, this should be treated with caution because, in the interviews, it became clear that teachers could identify sub-topics within their subject and may consider some of these to be more appropriate to be taught with some technologies than others. Also, the interviews showed that these differences may sometimes reflect other aspects of the teacher's context rather than pedagogical differences and that no assumptions should be made. In the case of Interviewee A, who taught nursing, her regular use of blogs could have been assumed to be an example of technology being used to support the reflective practices often identified in the literature concerning the teaching of nursing or health care professions (e.g. MacDermott, 2013). In fact, the interviews demonstrated that Interviewee A used blogs as a way of avoiding some of the problems with her institution's VLE discussion boards. The types of activity that she used the blog for were not those associated with reflective practice but, rather, her use of the blog demonstrated the impact of institutional constraints on her teaching. Other comments from Interviewee A demonstrated the importance of 'Professional Context' for some individuals. This goes beyond the academic subject discipline and provides a clear example of how decisions about teaching are related to wider societal concerns. In some cases (notably A and G), Powerpoint presentations from professional organisations were used to 'teacher-proof' (Philip and Garcia, 2013) accredited courses and the participants in this study described how they resisted these pressures.

Using a framework based on Activity Theory, Flavin (2012) claims that his research shows that 'disruptive' technology used to support teaching and learning impacts on the social elements of an activity system. He suggests an example of this is that students' access to online sources alters the role of the university as "gatekeeper to knowledge" (p.109). While the participants in this study also perceived their role as changing, this was not solely due to technology disrupting their teaching. In fact, access to online sources was welcomed and used productively by the teachers themselves. However, they were concerned about students' practices and perceived lack of skills. In other examples, rather than the technology acting on the social practices, the social practices themselves cause the 'disruption' to teaching. This can be seen in the use of social networks where teachers chose to use social networks to complement their teaching rather than disrupt it but students' use of these networks caused disruption. Technology use provides a focus in which potentially disruptive social practices at each of the contextual levels (societal, sector, institutional, subject, individual) may become visible. Because technology is

seen or used as a tool to further these practices and is intricately connected to practices such as social networking, it can be tempting for teachers to view these changes as either purely technologically or purely socially determined.

In summary, teachers held beliefs relating to technology, to their departmental and institutional context, to their subject discipline and profession, to the context for higher education and to wider culture and society. Their thinking about technology reflected a range of these contexts and to consider a single level of context without the others would provide a misunderstanding of teachers' thinking about technology. In addition, rather than understanding context as a constraint on teachers' pre-formed attitudes, the data provides support for the claim that these contexts contributed to the formation and shaping of these attitudes as they are 'performed' (Puchta and Potter, 2004).

Pedagogical beliefs in context

Another important topic in research into teacher thinking and technology is the study of teachers' pedagogical beliefs and Chapter Eight demonstrated the importance of context in understanding this aspect of teachers' thinking as well.

Although pedagogical beliefs are often discussed in terms of a continuum between teacher-centred orientations towards teaching (characterised by a focus on content coverage and the transmission of knowledge) and student-centred orientations (focussed on encouraging deep understanding of a subject and a constructivist view of learning), the participants in this study held beliefs about teaching and learning that did not always fit neatly onto this dichotomy. In contrast, they held some common beliefs, for example about the importance of engaging students, and some diverse beliefs about how best to develop students' understanding of their subject.

The interview analysis noted that interviewees believed that both learning factual content knowledge and being able to understand and apply that knowledge were valuable and that while none of the participants focussed solely on the transmission of factual information, most identified aspects of their subject that required particular facts to be acquired. Rather than holding a fixed conception of teaching, their understanding of teaching and learning differed according to the aspect of their subject being taught. The interviews also demonstrated variation in how individuals thought this was best achieved and that all had to find a balance between communicating knowledge that they believed was essential for students to acquire and developing independence and understanding. This contrasts with Kember and Kwan's (2000) claim that university teachers' conceptions of teaching were stable

but that their approach to teaching was affected by their working environment (see the discussion in Chapter Three, p 49). In this case, the approaches taken to teaching different aspects of a subject varied but the underlying conception of teaching each aspect also varied.

While a number of studies have emphasised the relationship between pedagogical beliefs and technology use (usually in terms of the dichotomy between teacher-centred and student-centred approaches), the pedagogical beliefs of participants in this study did not neatly map onto their technology use. While Bates and Poole (2003) suggest that uses of technology are dependent on beliefs about knowledge and learning, in these cases pedagogic beliefs did not determine how teachers taught. Instead, particular beliefs about pedagogy were mediated by beliefs about technology. However, this is not a case of inconsistencies between belief and practice as proposed by Owens (2012) and others, rather that teachers hold consistent positions once their perceptions of context and their other beliefs are taken into account. For example, two teachers who shared a pedagogical belief may have used technology quite differently because of the way that they thought technology could be aligned with their beliefs. This is in line with Ferguson's (2004) observations that teachers can explain their practices in ways that are consistent with their beliefs.

In fact, the more general literature on 'conceptions of teaching' in higher education has been criticised by Eley (2006) who has suggested that such conceptions play little role in the decisions that teachers make about teaching because they are more concerned with their immediate local context. This study provides further evidence of the importance of context over general pedagogical conceptions but considerably broadens the range of contexts that can be considered relevant where technology is concerned. For example, the case studies demonstrate how the use of technology (for example, social media) in wider society has now become part of the 'local' context for university teachers.

The interviews provide some details of how participants thought technology might affect student learning (see Chapter Eight). Several used technology in order to help motivate and engage students and for some this was their primary motivation for using technology. This perception of technology as being useful to motivate students could be seen to be related to participants' other beliefs about the affordances of technology, about the students they taught and about the nature of learning in higher education. However, these perceptions were nuanced and several participants felt that technology could be a distraction as well as a motivator. It was

also clear that there were differences between technologies with the same participant finding one technology beneficial while another detrimental to student learning. In a different example, participants discussed the usefulness of having their VLE as a repository of information. While this is considered a rather low-level use of technology in the literature (and some interviewees were aware of this), in fact, students having easy access to information or task instructions was useful to all teachers, whatever their understanding of how students learn and what they wanted students to do with that information.

Participants also discussed beliefs about how technology related to the teaching of specialisms within their subject. While Johnson (2012) found that the participants in his study perceived that their technology use was unrelated to pedagogy, this study demonstrates that, while this is the sometimes the case, the extent to which technology aligned with pedagogical beliefs varied according to technology and to sub-specialism. In common with work by Eynon (2008), participants viewed technology as more suited to some parts of their teaching than others and could identify areas of their subject that were less suited to being taught using a particular technology, for example, aspects that were confidential or aimed to develop inter-personal competences. As discussed above, rather than holding fixed conceptions of teaching, participants held multiple conceptions related to the subject they were teaching. The application of these differing conceptions can be seen in choices about when teachers believed technology to be useful or appropriate. For example, in contrast with research showing that the majority of online courses are for postgraduates (White *et al.*, 2010), some participants felt that online teaching was most appropriate for first year undergraduates because of the nature of the learning at that stage.

However, the participants in this study went further and suggested that the use of technology could change the content of their teaching. For some, technology could enable them to cover aspects of their subject that they would not have had sufficient time for in the past, while others felt that they covered less content due to the technology they used. In these cases, it appears that the opportunities offered by certain technologies made these teachers reconsider what they should be teaching in their courses. Despite the deterministic language used by interviewees to discuss this, the technology did not determine these changes but was associated with changes in the context for teachers' decisions (e.g. changes in the availability of information, or changes in student perceptions of teaching). This sometimes led to participants perceiving a tension between the technology and subject content.

Pedagogical beliefs, including understanding how students learn, beliefs about the purpose of teaching, and understanding how best to achieve these aims, are important considerations for teachers choosing when or how to use technology. However, these beliefs vary according to sub-specialisms within a subject even when these are taught by the same person, and are interpreted with regard to a teachers' context. In addition, the social practices associated with changing uses of technology, particularly by students, are an important part of a teacher's immediate context and can affect the content being taught. Classifying teachers as holding predominately teacher-centred, neutral or student-centred beliefs (e.g. as done by Ferguson, 2004) simplifies these beliefs and obscures their connection to context. This study found no evidence that this simplification was useful for understanding these beliefs or their impact on technology.

Teacher identity

The review of literature (Chapter Three) identified a number of studies that have investigated teachers' beliefs about themselves. Teachers' self-concepts were thought to be multi-dimensional (Roche and Marsh, 2000), influenced by discipline and institution (Henkel, 2005), by changes in the higher education sector (Nixon, 1996), and by students (Hativa and Goodyear, 2002). In addition, technology could challenge a teacher's academic identity if perceived as a threat to authority (Bakioglu and Hacifazlioglu, 2007) or as altering the balance of power between students and teachers (Hanson, 2009).

Each of these influences can be found in the interview data described in Chapter Seven. All participants held views of themselves as teachers which were expressed across different aspects of their practice and through their teaching styles. They wished to share their personalities with their students and this related to their use of technology in several ways including through the ways that they valued traditional teaching practices and their experiences of maintaining a healthy work/life balance. In common with the participants in Hanson's (2009) research, the interviewees in this study were aware of the potential displacement effect that students' increased access to online sources of information could have and had a similar desire to protect their successful face-to-face teaching relationship with their students. However, while Hanson's interviewees were not yet prepared for the 're-positioning' required as they adopted technology, some of the participants in this study were finding ways of sharing their personality through their uses of technology whether through their use of Powerpoint, the tone of their emails or the design of their VLE

page. For these teachers, technology could allow them to express their identity and share their enthusiasm and enjoyment of their subject.

The 're-positioning' resulting from students' increased access to information is related to the change of role from knowledge-giver to learning-facilitator proposed in the literature. In considering how academics see themselves as teachers, the connection between these roles and pedagogical beliefs is clear. In this sense, a teachers' pedagogic beliefs can be considered an aspect of their teacher identity as they relate to the 'meaning' aspect of identity in terms of how teachers understand their role and their relationships with students. However, considering this change of role in terms of teacher identity rather than beliefs or knowledge highlights the personal and emotional nature of these changes. And in general, considering teacher identity provides a different perspective on teacher thinking from the studies of attitudes towards technology or of pedagogical beliefs, by including an account of the emotional factors affecting technology choices in contrast to the views of technology adoption as rational decision-making and problem-solving.

While some studies (e.g. Littlejohn and Higgison, 2003) have suggested that technology can (or should) lead to a change in teacher role from provider of knowledge to facilitator, the evidence here reflects a number of other, more subtle, changes of role. For some, engaging with social networks has directly challenged their self-image as a "caring professional" by causing conflict between their responsibilities as a teacher and their personal use of social media. As this shows, an important facet of teacher identity is played out in an individual's relationships with their students. While some researchers (e.g. Hanson, 2009) have highlighted how some teachers have found using technology as weakening relationships with their students, the participants in this study were more likely to feel that their relationship and communications with students had extended beyond their working hours and intruded into other parts of their life.

Other participants discussed their relationship with technology and their views of technology as a 'tool'. The results here demonstrate differences in how teachers attribute the outcomes of using technology to teachers, technology itself or to students. For example, while several participants might find using technology excessively time-consuming, one may attribute this to the fault of the technology, another to their own skills being inadequate, and another to the university structures that required the use.

Some authors have suggested that teacher self-image may be associated with negative attitudes towards technology. For example, low technology self-efficacy is

claimed to be associated with lower use of technology (Buchanan, Sainter and Saunders, 2013). However, the survey data showed that university teachers had high levels of confidence with technology and while confidence was related to reported use of technology, the case studies demonstrate that technological skills are not a sufficient condition for using technology. The interviewees who used the least technology in their teaching were very highly skilled users of technology in other areas of their life and work. In addition, the participants who had the lowest opinions of their IT skills were using technology in much of their teaching. While early e-learning technologies required a high level of skill and an investment in learning new software, participants reported learning more recent technologies by themselves. It is possible that (at the very least for the 'core' technologies) the lower skill threshold now required to use educational technology may mean that teachers' IT skills will become less and less of a factor in technology use.

The data also supports earlier work (e.g. Nicholson and Sanber, 2007) that identified a minority of teachers who had concerns about the increasing use of technology. In these cases, however, it was clear that those interviewees who made the least use of technology did not wish to be considered a 'technophobe' or 'luddite' as these labels would not accurately describe their considered and thoughtful non-use of particular technologies. In addition, even those participants who were early adopters of technology were not uncritical and expressed a desire not to lose those aspects of face-to-face 'traditional' teaching that they valued.

Skelton (2012b) describes how conflicts can occur between an individual's values and those held by others in the higher education sector. Skelton proposes five potential areas of conflict and this study identifies several others that may arise when teaching with technology. These include potential conflicts between personal beliefs about teaching or technology and the context in which an individual works, challenges due to changes caused by adopting or discarding a technology, or challenges due to changing work structures. These appear to interact in different ways and with different effects on an individual's thinking about technology and intentions to use (or not use) technology. Skelton suggests that the greatest conflicts are not always the ones that teachers are most aware of and in these cases, it appears that some less visible tensions are only noticed when there is a change in the context or use of technology.

In light of these findings, teachers' thinking about technology can be seen to be both shaped by a teachers' identity but also to have a shaping influence on their identity. This can be viewed in either positive or negative ways. For some, success with

technology was an integral part of how they viewed themselves as a successful teacher, for another, the type of teacher they aspired to be led them to a particular position regarding technology.

A particular feature of the interview data was the extent to which using technology became part of the performance of teaching and an expression of teacher identity. Crook and Cluley (2009) have noted how the teacher voice on a VLE is often distant or even abrupt. However in this study, teachers' expressed their 'voice' through technology in a number of different ways, including the tone of emails and the layout and colour of VLE pages. This led to very personal decisions about technology and a view that certain technologies suited different teaching styles. This can be seen as both a rationale for choosing not to use certain technologies (because they do not fit a particular teaching style) but also as moderating claims about technology – this works for my teaching style, it might not work for you – and thus resisting attempts for top-down implementation of technologies.

Combining perspectives on teacher thinking

Taken together, the three aspects of teacher thinking discussed above: identity, pedagogical beliefs, perceptions of technology, and the multiple contexts in which they are situated provide a fuller understanding of teacher thinking about technology. While each provides a particular perspective on how teachers understand and make decisions about technology, combining them provides a more nuanced and contextualised description of teachers' thinking. This can be seen in teachers' historical experiences of teaching with technology and in their decision-making about technology.

Historical experience

Gerbic (2011) claims that teachers' strong historical experiences are reflected in their beliefs and embedded in their practices with technology; however, she does not give any examples of how this occurs. The examples in Chapter Nine address this omission by showing that participants had experienced major changes in how they used technology and how some of these continued to influence them. The interviews provide a picture of gradual change rather than instant transformation and suggest that changes were influenced by participants' learning about teaching and learning about technology in both formal and informal contexts.

The interviews also show how this learning was developed and reinforced through both successful and unsuccessful teaching experiences. While successful experiences encouraged participants to continue using certain technologies, they

did not necessarily encourage participants to try new technologies. In contrast, rather than encouraging teachers to become 'early adopters', once a particular technology is established and used successfully, there may be little reason to innovate and try something new. For this reason, categorising teachers as 'early adopters' can be misleading and unhelpful as it assumes that these teachers will continue to be amongst the first to use the next technology, and this is not necessarily the case. In addition, choosing not to use technology could be successful and encourage continued non-use.

Unsuccessful experiences could also be interpreted in different ways. Problems with using established or 'core' technologies were frustrating but they did not lead to the technology being abandoned altogether. Problems with less well-established technologies were more likely to affect decisions about their future use but, again, would not necessarily lead to them being abandoned if there was sufficient reason to expect them to work more effectively in the future. In contrast, problems with the first attempt at using a less well-established technology could lead to the experiment not being repeated although they may provide 'lessons' for the future.

Both successful and unsuccessful experiences of technology can affect perceptions and attitudes towards technology (e.g. usefulness or reliability of a particular technology), teacher identity (sense of self-efficacy, relationship with students) or, more rarely, pedagogical beliefs (e.g. through the success or failure of a type of learning activity). The interviews also suggest that no single event or factor can adequately account for the range of opinions and beliefs held by teachers but rather learning experiences and teaching experiences act dynamically on teachers' thinking and are refined through discussion and reflection. For this reason, individual experiences of success with one technology may not lead to future choices to use a different technology and unsuccessful experiences may not lead to a technology being abandoned.

Decision-making

A number of different accounts have attempted to explain or promote technology related changes in teaching, although many of these have concentrated on 'early adopters' of technology. The findings from this study suggest how university teachers view such changes in their practice and these vary from some of the proposed accounts in several ways. In particular, unlike in the majority of cognitive models of teacher adoption or integration (e.g. TAM), changes in technology use can be seen to be affected by teachers' emotional responses and may have an

affective consequence for teachers. This is a result of how such changes can affect a teachers' sense of self.

The survey data showed that many teachers present their decisions to use or not use technology in terms of a decision about whether or not the particular technology will enhance learning. This included considering potential benefits such as motivating students, improving communication, etc. However, while this is sometimes presented as a very simple choice ("Does it help learning?"), the actual decisions can be more complicated and related to many different aspects of a teachers' context. (Although, as discussed above, this seems less true for the most commonly used 'core' technologies). At an individual level, teachers claimed to react to new technologies either by directly evaluating it (by experimentation or through research) or by weighing up the relative benefits against any costs (for example, time). In addition, teachers are also aware of the context in which they work, including: the size and characteristics of particular teaching groups, the ease of use, access and reliability of resources, their own personal confidence, skills and enthusiasm for technology. But the wider context is important: for example, whether or not teachers believed that a particular use of technology would engage their students was related to the particular group they were teaching. And, for some individuals, their status within their university gave them the ability and confidence not to follow institutional policy.

From the interviews, it became clear that some of these choices were underpinned by beliefs about the attributes of that particular technology. These beliefs were nuanced and reflected complex positions and understandings of the unintended effects of technology, for example, how increased sharing of material via a VLE may go hand in hand with increasing student dependence on such resources and a resulting lack of independence. Participant's beliefs about technology are often ambiguous – the question of whether a certain technology engages or distracts learners is answered with "both" and teachers' practices illustrate their attempts to maximise engagement while reducing distraction. In addition, teachers understood different things by 'enhance' and set different thresholds for the amount of positive impact that would make it worthwhile changing their practice. Overall, uses of technology were seen as a matter of personal choice rather than as necessary to accrue particular outcomes.

In such cases, technology was seen by teachers as a tool to use (or not) as they wished and decisions about teaching with technology were thought of as rational, informed decisions. But these decisions to use (or not to use) a technology may be

affected by many conflicting influences which they may or may not be fully aware of. In addition, technology was also believed to be affecting teaching, teaching content, student engagement and activity, and personal relationships in ways that teachers had little control over. This could raise concerns for teachers and challenge their identity thus highlighting the emotional aspect of these decisions.

The interaction of these different influences can be seen in participants' use and perceptions of presentation software. As presentation software was the most widely used technology by participants in this study, it inspired a large number of comments in the survey. These included some expressions of hatred that were seemingly unrelated to subject, university, age, or other factors. The interviews explored histories of technology use with participants including their experiences with technology as a learner and as a teacher through their career, and several spoke very clearly about when they started to use Powerpoint. In these stories about adopting Powerpoint, participants discussed their individual beliefs about teaching and learning (how much information to give, when not to use Powerpoint, etc.), about meeting expectations (from staff or students), and about the affordances of the technology (e.g. for presenting engaging visual images). However, they also demonstrated how using Powerpoint influenced their role as a teacher and affected how they 'performed' in front of their students.

Conclusion

Each body of research into teacher thinking about technology has highlighted different aspects of the decisions that teachers make. Research considering teachers' attitudes towards technology has shown how teachers evaluate different technologies (although it has assumed that these evaluations represent underlying mental states). Studies into teacher conceptions and approaches have identified the role of pedagogical beliefs in teachers' reflections on teaching, and research into teacher identity demonstrates that teachers' perceptions of themselves are important aspects of their thinking about technology and that there is an affective dimension to decisions about using technology.

This study has developed these findings in several ways. It has shown the importance of considering teachers' perceptions of specific technologies or media. It has also shown how such evaluations are more important influences on decisions to use 'marginal' technologies than on more established 'core' technologies. In terms of pedagogic beliefs, it has confirmed that these are relevant to teachers' thinking about technology but also that they vary according to the content being taught

rather than being stable. In addition, both of these need to be contextualised and understood in terms of the multiple cultures that teachers inhabit. These differing contexts were illustrated in Figure 6.1 (p. 151) which shows how, as a result of the data analysis, the 'Departmental Context', 'Subject/Discipline' and 'Professional Context' categories were added to the model of teacher's thinking and beliefs about technology developed from the literature. In particular, the 'Subject/Discipline' and 'Professional Context' are significant because they alter the nested structure of the original diagram and show how these contexts reflect university teachers' membership of wider subject and professional communities. Such memberships can constitute sub-identities which form part of an individual's academic identity. While models of teacher knowledge (e.g. TPACK) suggest a body of knowledge about technology, pedagogy and subject content exists that teachers must learn in order to use technology effectively, these do not go far enough in acknowledging the much broader range of teachers' relevant beliefs and knowledge. In addition, they ignore how these interact with teachers' perceptions of their context to influence individuals' thinking about technology in their teaching. Finally, it has shown a number of ways in which teacher identity relates to the use of technology in teaching, for example, in regard to the way in which an individual views their role as a teacher or communicates with students.

Therefore, this study suggests that a fuller understanding of teachers' thinking about technology requires consideration of teachers' perceptions of technology, understanding of pedagogy and academic identity, which is understood to be dynamic and multi-faceted. Also, each of these exists within multiple contexts and only considering some of these risks misunderstanding the complex influences on teachers' thinking about their work. It also suggests that considering teachers' evaluations of technology and their pedagogic beliefs can be achieved through the case study approaches associated with research into teacher identity and that these provide a better account of the role of context than other research approaches.

11: Conclusions

This chapter will summarise the results of this study into university teachers' thinking about technology and discuss how these results relate to those of earlier research in this field. It will begin by demonstrating how the research has addressed questions raised by earlier work and built on this to provide a more comprehensive approach to understanding how academics think about their teaching with technology. It will show how the research has compared previously distinct approaches and the contribution that this makes to understanding teaching. The chapter will discuss aspects of teacher thinking that have not previously been fully explored by researchers and show how these are important for understanding the decisions that teachers make about using technology. It will discuss the limitations of the research methods used and identify opportunities for further research and investigation to build on these findings. The chapter will conclude by discussing the implications of this study for researchers, teachers, academic developers and university policymakers.

Contributions to knowledge

This study addressed three research questions that were under-explored in previous research. Each question will be discussed in turn.

How is university teachers' thinking about specific technologies patterned by different characteristics?

Teachers' evaluations of technology were important aspects of their decisions about the use of technology. However, both the survey and interview data have shown that technology should not be considered as a single entity. Teachers do not view all technologies as equal but value some more than others and consider some to be of more importance or relevance. In particular, it noted two groups of technologies: a 'core technologies' group that were widely used across subjects and institutions and a 'marginal technologies' group that were less frequently used. Teachers' attitudes were more important influences on decisions to use 'marginal' technologies than on decisions to use 'core' technologies.

While other studies have noted that the majority of university teachers hold broadly positive attitudes towards technology (e.g. Brill and Galloway, 2007), few studies have considered how this might vary according to the subject being taught or the institution where an individual worked. While there have been many small scale

studies of the use of technology in a single institution, this study contributes an account of teachers' thinking and reported use of technology from 795 teachers across a large number of institutions and subjects. In doing so, it found patterns of institutional and subject-discipline difference that had not been previously identified.

Data from the survey has shown that different universities could be associated with different technologies but that there were no 'leading' universities that were ahead of the others in all technologies. Also, it has shown that teachers believed that their subject discipline was an important influence on their use of technology. However, rather than there being 'technology-friendly' or 'anti-technology' subjects, different subjects were associated with using different technologies. In addition, the interviews identified that teachers believed that different 'sub-specialisms' within their subject had different aims and required different uses of technology.

The evidence also showed that individual teachers operated within department and institutional cultures that may demand or value certain practices and at the same time they have beliefs and expectations relating to their subject discipline and their own personal history with technology or understanding of learning and teaching. Teachers make sense of these, possibly conflicting, influences when they decide how they are going to teach. Thus contexts are not experienced in the same way by all teachers and the intersection and interaction between different aspects of their context is important.

The findings relating to this research question have been published in a recent article (Shelton, 2013).

How do social and organisational contexts and experiences shape teachers' thinking about technology?

As discussed in the literature review, research into school teacher thinking and, to a lesser extent, university teacher thinking has increasingly acknowledged the influence of an individual's context on their knowledge and beliefs. When applied to teaching with technology, some studies have seen an individual's context as a 'structural constraint' on the extent to which they can put their beliefs into practice (e.g. see Buchanan, Sainter and Saunders, 2013). The evidence in this study suggests that context is more important than this and is inextricably linked to the formation and shaping of a teacher's value-judgements about technology.

The participants in this study presented their decisions about using technology as a matter of personal choice and wished to use technology in ways that matched their personal teaching style. The study also showed that teachers understood different

things by the term 'enhance' and set different thresholds for the amount of positive impact that would make it worthwhile changing their practice. However, participants also spoke about technologies that they did not have personal choice or control over and the study identified technologies that participants believed were outside their control and were having unwelcome effects on their teaching. While teachers' personal teaching styles shaped how they used technology, some participants were also able to identify how using technology had shaped their approach to teaching.

Many studies of university teachers' use of technology have considered the experiences of enthusiastic early adopters using innovative technologies or methods (e.g. McShane, 2004). However, the majority of university teachers are not early adopters and hold a range of different perspectives on technology adoption. This study differed from those of early adopters by considering both teachers who were enthusiastic users of technology and those who were less keen. Consequently, the findings of this research differ from those earlier studies. For example, while Kidd (2010) found that the IT enthusiasts in his study wanted stronger institutional leadership, the participants here discussed both positive and negative reactions to institutional decisions. In addition, rather than focusing solely on current innovative uses of technology, this study has also considered more established 'core' technologies that have been used for a longer period. By doing so, it has shown that these technologies, while often overlooked, are worth further investigation.

As a result, the study has shown how previous experiences with technology have shaped participants' thinking about technology. Both successful and unsuccessful experiences could affect an individual's perceptions and attitudes towards technology, their self-image and, more rarely, their pedagogical beliefs. However, no single event was sufficient to account for the beliefs of any individual. Rather, a range of experiences and contexts interacted dynamically and were refined through reflection and discussion. As a result, the long-term consequences of a successful or unsuccessful experience were not always predictable. In particular, once a technology was established and used successfully, there may be little reason for a teacher to innovate and try something new. Therefore, the study has shown that categorising teachers as 'early adopters' can be misleading as it assumes that these teachers will continue to be amongst the first to use the next technology, and this is not necessarily the case.

The study also identified that all participants, including the most enthusiastic, presented a critical perspective on technology rather than an unquestioning

acceptance of technological progress and that even those who used technology the least did not want to appear as 'technophobic'.

By considering historical accounts of technology uses, the interview data provided evidence that instances of change in context, for example, through a change of institution, course or technology, could highlight and bring into view some aspects of teachers' thinking that was not as apparent elsewhere. In some cases, there was evidence of technology use as part of a process of self-presentation that was closely linked to the development of an individual's identity as a teacher.

What aspects of teachers' beliefs, knowledge and identity inform their thinking about technology?

In order to understand university teachers' thinking about using technology in their teaching, it is necessary to understand the knowledge and beliefs that underpin these decisions. However, the literature review noted that research into teacher thinking about technology had developed in several distinct areas with some researchers considering attitudes towards technology (e.g. using the Technology Adoption Model); some focusing on conceptions of or approaches to teaching and the relationship between pedagogical beliefs and use of technology; and others concerned with teacher identity. This study has found each of these areas to be valuable in understanding teachers' thinking and has contributed to each of them. However, it has also shown that to fully understand teachers' thinking about technology perceptions of technology, pedagogic beliefs and teacher identity need to be considered together rather than separately and that each of these is related to a teacher's context.

As discussed above, teachers held different perceptions of specific technologies and reported that these were important influences on their decisions about using them. In addition, the interviews demonstrate how teachers can sometimes hold ambiguous attitudes about a particular technology, for example, the potential for technology to both motivate and distract students. As the previous chapter showed, the study has also provided a critique of Technology Adoption Models that fail to account for the role of context in teachers' adoption of technology.

The second area of research considered teachers' pedagogical beliefs. This study has shown that these did influence teachers' decisions about whether and how to use technology. However, the results contradict assertions that pedagogical beliefs determine uses of technology (e.g. Bates and Poole, 2003) and show that pedagogical beliefs are mediated by beliefs about technology and interpreted with reference to a teacher's context. In addition, the data has also shown that these

beliefs varied according to sub-specialisms within the subjects that were being taught rather than being stable. Unlike other work in this area, this study suggested that classifying pedagogical beliefs from teacher-centred to student-centred over-simplified these beliefs and therefore was not useful for understanding their impact on a teacher's use of technology.

The third area of research considered teacher identity and, unlike the other two aspects of research into teacher thinking, exploring teacher identity emphasised the emotional and affective factors that influence teachers' thinking about technology. The case studies confirmed previous work that showed that using technology could sometimes be perceived as a challenge to a teachers' role (Bakioglu and Hacifazlioglu, 2007). However, while this has previously been expressed in terms of a challenge to the role of 'information-provider', the case studies also provided evidence of another challenge to participants' identities as teachers who care for their students. In addition, unlike the results of earlier studies (e.g. Hanson, 2009), the data showed that some teachers had found ways of using technology to help them express their identity. Several participants in this study held views of teaching as a performance that communicated their personality and built relationships with their students. The importance of sharing 'personality' through technology when teaching has been overlooked in the literature on technology in higher education and the evidence from this study suggests that those teachers who felt technology restricted the communication of their personality were reluctant to use it.

As noted above, each of these aspects of teachers' thinking about technology was related to teachers' contexts and the data has shown the multiple competing factors that influence teachers' thinking. In particular, it has shown how teachers' understandings of the place and value of technology in society and the economic pressures on the higher education sector are an important part of how they think about technology. The study has also expanded the range of contexts that should be considered relevant to teachers' thinking about technology and this was illustrated in Figure 6.1 (p. 151). This diagram shows how, as a result of the data analysis, the 'Departmental Context', 'Subject/Discipline' and 'Professional Context' categories were added to the model of teacher's thinking and beliefs about technology. In particular, the second and third of these are significant because they change the nested nature of the original diagram. These represent that the data have identified contexts that intersect with other levels of context without being wholly contained within them and reflect university teachers' membership of wider subject and professional communities. While the importance of subject/discipline and institution are discussed below, the relevance of a teachers' 'Professional

Context' has not been fully explored in previous studies. For a small number of individuals in these case studies, this was a crucial influence on how they made sense of their use of technology.

Overall, this study has shown that the aspects of teacher thinking that have been identified through these three research approaches are each important for understanding teachers' thinking about technology. However, as the research methods used by the three approaches are distinct and based in different and conflicting research traditions, methodological approaches are needed that enable researchers to study perceptions of technology, pedagogic beliefs and teacher identity using a single coherent approach. This study has found that the case studies frequently used in studies into academic identity are an effective way to do this.

Research limitations

This study used two different approaches to data collection: an online survey and detailed case studies. A significant feature of online surveys is that the respondents are self-selecting and in this case, the responses were likely to over-represent those who used and had positive attitudes towards technology. So, while there were a broad range of responses to the survey, it cannot be claimed to be fully representative of university teachers. Similarly, the survey was distributed via 'gate-keepers' in individual universities and there were inconsistencies in how willing these individuals were to email potential respondents repeatedly. As a result, it was not possible to provide an accurate indication of the response rate to the survey. In addition, a number of universities were not willing or able to take part in the survey. As a consequence of this, the majority of institutions were 'post-92' 'teaching-led' institutions.

A different set of limitations were associated with the case studies. In order to obtain the detailed responses needed, each participant was interviewed three times for approximately one hour and this meant that only a relatively small sample of case studies was possible. While effort was made to ensure that the sample of interviewees came from a range of subjects, experiences and institutions, the small size of the sample limited this range. Also, one interviewee was only able to be interviewed twice and did not respond to requests for a third interview or offer any reason for not completing the series of interviews. The interviews took place over a six month period and while there were some significant changes in participants' contexts and use of technology over that time, a study tracking individuals over a

longer period would identify patterns or developments in teachers' thinking as new technologies are introduced or older technologies abandoned.

In addition, as is common in studies of teachers' thinking, it may be the case that some of the questions asked participants to reflect on aspects of their teaching which they had not previously considered in any depth. Thus, the responses that were given could be, at least in part, a product of the reflections made during the interviews rather than a description of the decisions made before or during teaching. Finally, all interviewees were employed at post-92 'teaching-led' institutions and it is likely that this context is reflected in their identities as teachers.

Areas for further study

The survey provides a snapshot of teachers' thinking at a particular moment and it would be beneficial to repeat the survey in the future in order to trace the development of teachers' thinking about technology. In particular, it would be interesting to see whether the same technologies remain as 'core' or 'marginal' to teachers' work, and which become more or less important. Similarly, it would be interesting to note whether the institutional or subject differences noted are consistent over time or not. As described above, a longitudinal qualitative study tracking individuals over an extended period would also be useful for identifying patterns or developments in teachers' thinking as new technologies are introduced or older technologies abandoned.

A further survey would also provide an opportunity to investigate technology use across a wider sample of universities including a higher proportion of 'pre-92' and research-intensive institutions. The experience of this survey would also provide guidance for the most effective methods for institutional gate-keepers to publish the survey and reinforce the need for emailed reminders to gain a larger sample. It could also be expanded to identify what other technologies might be classified as 'core' or 'marginal'.

The survey was distributed in UK universities and as the survey showed the importance of context, it would be interesting to discover the extent to which similar aspects of context and culture were relevant to university teachers in different countries and higher education systems. For example, are the subject differences identified in the UK as significant in other cultures?

The study also raises questions about students' experiences of being taught using technology, for example, do the discipline and institutional differences identified

shape students' perceptions in similar or different ways? Also, do teachers' perceptions of their students' skills and expectations match those of the students themselves?

The interview participants were also currently working in 'post-92' universities and further interviews with academic staff in 'pre-92' universities would provide another perspective and may emphasise the relevance of research expectations on teaching. While this was mentioned in some literature, it was not a significant feature of the interviews in this study.

Similarly, while a small proportion of the survey respondents and one of the interviewees taught part-time, part-time academics make up an increasing proportion of higher education teachers. The survey and case studies provide some indications of how the experience of part-time staff may differ from full-time teachers but this is an area that would benefit from further investigation.

The 'talk aloud' stimulated recall technique was useful for gathering insights about teachers' intentions for using technology. There are a number of ways in which this could be developed including carrying out a 'concurrent verbal protocol' where teachers talk about their online teaching or preparation while doing it. During the interviews, differences between individual teaching styles became visible when teachers spoke about having to use resources created by their colleagues. This suggests an alternative method for investigating the implicit aspects of teaching. Asking a teacher to look at and discuss a resource (e.g. a Powerpoint presentation) that was created by someone else but used for a topic that they also teach, has potential to reveal insights into teaching and uses of technology that are implicit in their own work and otherwise invisible to the interviewer.

Finally, a number of participants spoke about their university or department's unwritten expectations for their use of technology. It would be worthwhile to identify more detail about what these expectations are, how widely they are perceived, how they develop and are communicated, and what effects they have on teaching practices. This might be achieved by interviewing focus groups of teachers from different departments and asking participants to identify uses of technology that are required or prohibited.

Recommendations

As a result of this study, a number of implications can be identified for researchers, university teachers, academic developers, and university policymakers.

Researchers

This study has shown that teachers' thinking about technology encompasses their perceptions of technology, pedagogical beliefs and teacher identity. Therefore, rather than using research models or approaches that focus on one of these aspects, it would be more productive to consider the ways in which these interact and develop over time, for example through case study approaches. In particular, more research is needed about the ways in which teachers are able to share their personality and care for students through technology and the consequences if teachers feel unable to do this.

Also, researchers investigating how university teachers use and think about technology need to consider a much broader range of contexts in order to avoid immediate or obvious contextual factors disguising other important influences. They should also avoid considering context as merely a 'constraint' on teachers' use of technology but acknowledge the interaction between context and teacher thinking. In particular, subject and institutional cultures need to be accounted for more frequently in studies of the use of technology in universities. Thus, researchers should develop models for understanding the adoption of technology that emphasise the situated nature of technology use rather than those proposed by the Technology Acceptance Model, or similar approaches.

This study has demonstrated the benefits of research designs that collect data from several universities for identifying institutional and contextual differences. Rather than continuing to focussing on small-scale studies, researchers should consider extending single institution case-studies of technology use or collaborating on multi-site research projects. Also, as well as investigating innovative uses of technology by early adopters, researchers should pay attention to the more established 'core' technologies and how these are used by a broad range of university teachers.

University teachers

All university teachers have to engage (or actively choose not to engage) with technology in their teaching. This can sometimes lead to conflict and have consequences for a teachers' identity or their beliefs about teaching and learning. This study has identified a wide range of contextual factors that influence teachers' decisions about how and when to use technology, although a number of these influences only became apparent when the context for a teachers' work changed.

Many of the teachers interviewed had little knowledge of the ways that others in their department or university used technology and would have welcomed opportunities to share and discuss their teaching practices more frequently. In

particular, teachers may find it beneficial to discover how their colleagues have been successful in using technology in ways that complement or express their personality or teaching style.

Teachers would also benefit from looking beyond their institution in order to gain a more detailed understanding of how those that teach their subject at different universities use technology. This would enable them to discover if there are alternative ways of aligning their specialism with the opportunities offered by technology.

Academic developers

Those who are responsible for supporting university teachers to use technology or for the introduction of new technologies need to be aware of the different contextual factors that may affect how an individual perceives a new technology and how they respond to this. In particular, when introducing new technologies, academic developers should ensure that teachers have opportunities to reflect on and discuss how the technology aligns with their preferred approaches to teaching their particular subject or sub-specialism.

The study also suggests that individuals' previous experiences with technology can affect how they respond to new technology being introduced. Therefore, it is useful for developers to be aware of particularly positive or negative experiences and bear these in mind when introducing innovative technologies.

When organising training opportunities for new technologies, developers and trainers need to be aware of the subject-specific needs and contexts for using technology and ensure that training sessions provide opportunities for these needs to be discussed and addressed.

University policymakers

The study raises questions about the influence of the institution on how technology is used. While university policy can mandate the use of technology (or of particular technologies), this may be counter-productive. Policies that force teachers to use technology in ways that they believe have a negative impact on their teaching will foster negative reactions and lead to avoidance of technology. University technology policy should therefore pay attention to disciplinary differences and contexts rather than the 'one size fits all' directives that participants in this study identified. Before recommending any particular technologies or practices, universities need to investigate the implications of these across different departments and individuals and show how recommendations can be adapted to meet different requirements.

Universities should also encourage departments to be aware of the potential for unwritten expectations to arise that could influence teachers' uses of technology. Where appropriate, they should take action to dispel unhelpful expectations or to formalise university requirements in a consistent and explicit way.

Conclusion

This thesis has shown how university teachers' thinking about technology is related to the culture and context in which they work and how in making sense of their use of technology, academics draw on multiple sources including understandings of the impact of technology on culture and society, perceptions of higher education and their institution, subject disciplinary backgrounds and their identity as teachers and academics.

As this chapter has demonstrated, this has implications for researchers investigating the adoption and continued use of technology in higher education, for teachers' understanding of the contextual factors that influence their decisions about how to use technology, for academic developers designing training and initiatives to promote the use of technology, and for university technology policies.

References

Ajzen, I. (1988). *Attitudes, personality and behavior*. Milton Keynes: Open University Press.

Alexander, P. A., Schallert, D. L. and Hare, V. C. (1991). 'Coming to Terms: How Researchers in Learning and Literacy Talk about Knowledge'. *Review of Educational Research,* 61 (3)*,* 315-343.

Allen, I. E. and Seaman, J. (2008). *Staying the Course: Online Education in the United States, 2008*: Sloan Consortium.

Angeli, C. and Valanides, N. (2009). 'Epistemological and methodological issues for the conceptualization, development, and assessment of ICT–TPCK: Advances in technological pedagogical content knowledge (TPCK)'. *Computers & Education,* 52 (1)*,* 154-168.

Apple, M. W. (2005). 'Education, markets, and an audit culture'. *Critical Quarterly, vol. 47, nos 1–2,* 47 (1-2)*,* 11-29.

Ashwin, P. (2008). 'Accounting for structure and agency in 'close-up' research on teaching, learning and assessment in higher education'. *International Journal of Educational Research,* 47 (3)*,* 151-158.

Ashworth, P. and Lucas, U. (1998). 'What is the 'World' of Phenomenography?'. *Scandinavian Journal of Educational Research,* 42 (4)*,* 415-431.

Babb, K. A. and Ross, C. (2009). 'The timing of online lecture slide availability and its effect on attendance, participation, and exam performance'. *Computers & Education,* 52 (4)*,* 868-881.

Bain, J. D. and McNaught, C. (2006). 'How academics use technology in teaching and learning: understanding the relationship between beliefs and practice'. *Journal of Computer Assisted Learning,* 22*,* 99–113.

Bakioglu, A. and Hacifazlioglu, O. (2007). Lecturers' and Students' attitudes Towards the Use of Technology in Lectures: No Taboos, More Thinking, *ISATT 2007 Conference*. Ontario, Canada.

Ball, S. J. (2000). 'Performativities and fabrications in the education economy: Towards the performative society?'. *The Australian Educational Researcher,* 27 (2)*,* 1-23.

Ball, S. J. (2003). 'The teacher's soul and the terrors of performativity'. *Journal of Education Policy,* 18 (2)*,* 215-228.

Banyard, P. and Hayes, N. (1994). *Psychology - Theory and Application*. London: Chapman & Hill.

Barnett, R., Parry, G. and Coate, K. (2001). 'Conceptualising Curriculum Change'. *Teaching in Higher Education,* 6 (4)*,* 435-449.

Barnett, R., Parry, G. and Coate, K. (2004). 'Conceptualising Curriculum Change'. In M. Tight (Ed.), *The RoutledgeFalmer Reader in Higher Education* (pp. 141-154). London: RoutledgeFalmer.

Barrios, M., Villarroya, A., Borrego, A. and Olle, C. (2010). 'Response Rates and Data Quality in Web and Mail Surveys Administered to PhD Holders'. *Social Science Computer Review,* 29 (2)*,* 208-220.

Barry, J., Chandler, J. and Clark, H. (2001). 'Between the Ivory Tower and the Academic Assembly Line'. *Journal of Management Studies,* 38 (1)*,* 87-101.

Bassey, M. (1999). *Case study research in educational settings*. Buckingham: Open University Press.

Bates, T. and Poole, G. (2003). *Effective Teaching with Technology in Higher Education*. San Francisco: Jossey-Bass.

Becher, T. (1989). *Academic tribes and territories : intellectual enquiry and the cultures of disciplines*. Milton Keynes, England: Society for Research into Higher Education : Open University Press.

Becher, T. and Trowler, P. (2001). *Academic tribes and territories: intellectual enquiry and the culture of disciplines*. Buckingham: Society for Research into Higher Education & Open University Press.

Becker, H. J. and Ravitz, J. (1999). 'The Influence of Computer and Internet Use on Teachers' Pedagogical Practices and Perceptions'. *Journal of Research on Computing in Education,* 31 (4)*,* 356-379.

Beetham, H., Jones, S. and Gornall, L. (2001). *Career Development of Learning Technology Staff: Scoping Study Final Report* Bristol: JISC.

Beijaard, D., Meijer, P. C. and Verloop, N. (2004). 'Reconsidering research on teachers' professional identity'. *Teaching and teacher education,* 20 (2)*,* 107-128.

Ben-Peretz, M. (2011). 'Teacher knowledge: What is it? How do we uncover it? What are its implications for schooling?'. *Teaching and Teacher Education,* 27 (1)*,* 3-9.

Ben-Peretz, M., Bromme, R. and Halkes, R. (1986). *Advances of research on teacher thinking*. Lisse, Netherlands: Swets and Zeitlinger.

Bennett, S., Bishop, A., Dalgarno, B., Waycott, J. and Kennedy, G. (2012). 'Implementing Web 2.0 technologies in higher education: A collective case study'. *Computers & Education,* 59 (2)*,* 524-534.

Bigatel, P. M. (2004). *Exploring the Beliefs and Attitudes of Exemplary Technology-Using Teachers*. Pennsylvania State University.

Bingimlas, K. A. (2009). 'Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature'. *Eurasia Journal of Mathematics, Science & Technology Education,* 5 (3)*,* 235-245.

Blin, F. and Munro, M. (2008). 'Why hasn't technology disrupted academics' teaching practices? Understanding resistance to change through the lens of activity theory'. *Computers & Education,* 50 (2)*,* 475-490.

Booth, S. and Hultén, M. (2003). 'Opening dimensions of variation: An empirical study of learning in a Web-based discussion'. *Instructional Science,* 31 (1)*,* 65-86.

Bothma, C. H. and Cant, M. C. (2011). 'Adopting learning technologies: from belief to practice'. *Educational Studies,* 37 (4)*,* 375-389.

Boulos, M. N., Maramba, I. and Wheeler, S. (2006). 'Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education'. *BMC Med Educ,* 6*,* 41.

Brabazon, T. (2007). *The University of Google: education in the (post) information age*. Aldershot: Ashgate Publishing.

Bradwell, P. (2009). *the edgeless university: why higher education must embrace technology*. London: DEMOS.

Brill, J. M. and Galloway, C. (2007). 'Perils and promises: University instructors' integration of technology in classroom-based practices'. *British Journal of Educational Technology,* 38 (1)*,* 95-105.

Brindley, L. (2011). *Collaborate to compete: Seizing the opportunity of online learning for UK higher education*. Bristol: Online Learning Task Force / HEFCE.

British Educational Research Association. (2004). *Revised ethical guidelines for educational research*. Southwell: BERA.

Broadfoot, P., Osborn, M., Gilly, M. and Paillet, A. (1987). 'Teachers' Conceptions of their Professional Responsibility: some international comparisons'. *Comparative Education,* 23 (3)*,* 287-301.

Bronack, S. C. and Riedl, R. E. (1998). Distributed Learning Environments: Pedagogy, Implementation, and the Early Adopter., *ED-MEDIA/ED-TELECOM 98 World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Telecommunications.* Freiburg, Germany.

Brown, R. and Carasso, H. (2013). *Everything for Sale? The Marketisation of UK Higher Education*. Abingdon: Routledge.

Brown, S. A. (2012). 'Seeing Web 2.0 in context: A study of academic perceptions'. *The Internet and Higher Education,* 15 (1)*,* 50-57.

Browne, T., Hewitt, R., Jenkins, M., Voce, J., Walker, R. and Yip, H. (2010). *2010 Survey of Technology Enhanced Learning for higher education in the UK*. Oxford: UCISA.

Browne, T., Hewitt, R., Jenkins, M. and Walker, R. (2008). *2008 Survey of Technology Enhanced Learning for higher education in the UK*. Oxford: UCISA.

Bryman, A. (2008). *Social Research Methods Third Edition*. Oxford: OUP.

Buchanan, T., Sainter, P. and Saunders, G. (2013). 'Factors affecting faculty use of learning technologies: implications for models of technology adoption'. *Journal of Computing in Higher Education,* 25 (1)*,* 1-11.

Burbules, N. C. and Callister, T. A. (2000). *Watch IT : the risks and promises of information technologies in education*. Boulder, Colo ; Oxford: Westview.

Calderhead, J. (1987). *Exploring teachers' thinking*. London: Cassell.

Calderhead, J. (1996). 'Teachers: Beliefs and knowledge'. In D. C. Berliner and R. C. Calfee (Eds), *Handbook of Educational Psychology* (pp. 709-725). New York: Macmillan.

Campbell, K. (2005). 'Conflict, risk and authority: female faculty members' stories of change'. *Technology, Pedagogy and Education,* 14 (3)*,* 309-328.

Carlgren, I., Handal, G. and Vaage, S. (1994). *Teachers' minds and actions : research on teachers' thinking and practice*. London: Falmer press.

Chandler, D. (1995). *Technological or Media Determinism*. [Online]. Available at: http://www.aber.ac.uk/media/Documents/tecdet/tecdet.htm. [Last accessed February 2014].

Charmaz, K. (2006). *Constructing grounded theory : a practical guide through qualitative analysis*. London: SAGE.

Charp, S. (1995). 'Editorial'. *THE Journal (Technological Horizons In Education),* (Feb).

Chin, P. (2004). *Using C&IT to Support Teaching*. London: RoutledgeFalmer.

Churchill, D. (2006). 'Teachers' private theories and their design of technology-based learning'. *British Journal of Educational Technology,* 37 (4)*,* 559-576.

Clark, C. M. (1980). 'Choice of a model for research on teacher thinking'. *Journal of Curriculum Studies,* 12 (1)*,* 41-47.

Clark, C. M. and Peterson, P. L. (1986). 'Teachers' thought processes'. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. xi,1037 p.). London: Macmillan.

Clegg, S. (2011). 'Academic identities re-formed? Contesting technological determinism in accounts of the digital age.'. *Contemporary Social Science,* 6 (2)*,* 175-189.

Clegg, S., Hudson, A. and Steel, J. (2003). 'The Emperor's New Clothes: Globalisation and e-learning in Higher Education.'. *British Journal of Sociology of Education,* 24 (1)*,* 39-53.

Cobanoglu, C., Warde, B. and Moreo, P. J. (2000). *A Comparison of Mail, Fax and Web-Based Survey Methods*. Paper presented at the Survey Research Methods Section, American Statistical Association.

Cochrane, A. and Pain, K. (2000). 'A globalising society?'. In D. Held (Ed.), *A globalising world? Culture, economics, politics* (pp. 5-46). London Routledge.

Cochrane, T. and Bateman, R. (2010). 'Smartphones give you wings: Pedagogical affordances of mobile Web 2.0'. *Australasian Journal of Educational Technology,* 26 (1)*,* 1-14.

Coffield, F., Moseley, D., Hall, E. and Ecclestone, K. (2004). *Learning styles and pedagogy in post-16 learning: A systematic and critical review*: LSRC.

Cohen, L., Manion, L. and Morrison, K. (2007). *Research Methods in Education (6th Edition)*. Abingdon: Routledge.

Concannon, F., Flynn, A. and Campbell, M. (2005). 'What campus-based students think about the quality and benefits of e-learning'. *British Journal of Educational Technology,* 36 (3)*,* 501-512.

Conole, G. (2004). 'E-Learning: The Hype and the Reality.'. *Journal of Interactive Media in Education (Designing and Developing for the Disciplines Special Issue),* (12).

Conole, G. and Alevizou, P. (2010). 'A literature review of the use of Web 2.0 tools in Higher Education'. [Online]. Available at: http://www.heacademy.ac.uk/assets/EvidenceNet/Conole_Alevizou_2010.pdf.

Conole, G., de Laat, M., Dillon, T. and Darby, J. (2008). ''Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology'. *Computers & Education,* 50 (2)*,* 511-524.

Cooke, R. (2008). *On-line Innovation in Higher Education*: DIUS.

Cotton, D. and Gresty, K. (2006). 'Reflecting on the think-aloud method for evaluating e-learning'. *British Journal of Educational Technology,* 37 (1)*,* 45-54.

Couper, M. P. (2000). 'Web Surveys: A Review of Issues and Approaches'. *The Public Opinion Quarterly,* 64 (4)*,* 464-494.

Cox, S. M. (2008). *A Conceptual Analysis of Technological Pedagogical Content Knowledge*. Brigham Young University

Crawford, S. D., Couper, M. P. and Lamias, M. J. (2001). 'Web Surveys: Perceptions of Burden'. *Social Science Computer Review,* 19 (2)*,* 146-162.

Crook, C. and Cluley, R. (2009). 'The teaching voice on the learning platform: seeking classroom climates within a virtual learning environment'. *Learning, Media and Technology,* 34 (3)*,* 199-213.

Cuban, L. (2001). *Oversold and underused : computers in the classroom*. Cambridge, Mass. ; London: Harvard University Press.

D'Andrea, V. and Gosling, D. (2005). *Improving Teaching and Learning in Higher Education: A whole institution approach.* Maidenhead: OUP.

Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989). 'User acceptance of computer technology: A comparison of two theoretical models'. *Management Science,* 35 (8)*,* 982-1003.

Dawson, K. and Heinecke, W. (2004). 'Conditions, Processes and Consequences of Technology Use: a case study'. *Technology, Pedagogy and Education,* 13 (1).

Day, C., Calderhead, J. and Denicolo, P. (1993). *Research on teacher thinking : understanding professional development*. London: Falmer Press.

De Smet, C., Bourgonjon, J., De Wever, B., Schellens, T. and Valcke, M. (2012). 'Researching instructional use and the technology acceptation of learning management systems by secondary school teachers'. *Computers & Education,* 58 (2)*,* 688-696.

Deaney, R., Ruthven, K. and Hennessy, S. (2006). 'Teachers' developing 'practical theories' of the contribution of information and communication technologies to subject teaching and learning: an analysis of cases from English secondary schools'. *British Educational Research Journal,* 32 (3)*,* 459-480.

Deem, R. (2004). 'Globalisation, New Managerialism, Academic Capitalism and Entrepeneuralism in Universities: Is the local dimension stilll important?'. In M. Tight (Ed.), *The RoutledgeFalmer Reader in Higher Education* (pp. 287-302). London: RoutledgeFalmer.

Deem, R. and Brehony, K. (2005). 'Management as ideology: the case of 'new managerialism' in higher education'. *Oxford Review of Education,* 00031 (00002)*,* 217-236.

Denscombe, M. (2002). *Ground rules for good research*. Maidenhead: Open University Press.

Denscombe, M. (2007a). *The good research guide: for small-scale social research projects*. Maidenhead: Open University Press.

Denscombe, M. (2007b). 'The Length of Responses to Open-Ended Questions: A Comparison of Online and Paper Questionnaires in Terms of a Mode Effect'. *Social Science Computer Review,* 26 (3)*,* 359-368.

Devlin, M. (2006). 'Challenging Accepted Wisdom about the Place of Conceptions of Teaching in University Teaching Improvement'. *International Journal of Teaching and Learning in Higher Education,* 18 (2)*,* 112-119.

Dhunpath, R. (2000). 'Life history methodology: ''narradigm'' regained'. *Qualitative Studies in Education,* 13 (5)*,* 543-551.

Dugger, W. E. and Naik, N. (2001). 'Clarifying Misconceptions between Technology Education and Educational Technology'. *The Technology Teacher*.

Eley, M. G. (2006). 'Teachers' Conceptions of Teaching, and the Making of Specific Decisions in Planning to Teach'. *Higher Education,* 51 (2)*,* 191-214.

Ellis, R. A. and Goodyear, P. (2010). *Students' Experiences of E-Learning in Higher Education: The Ecology of Sustainable Innovation*. Abingdon: Routledge.

Ellis, R. A., Steed, A. F. and Applebee, A. C. (2006). 'Teacher conceptions of blended learning, blended teaching and associations with approaches to design'. *Australasian Journal of Educational Technology,* 22 (3)*,* 312-335.

Ellis, V. (2007). *Subject knowledge and teacher education : the development of beginning teachers' thinking*. New York: Continuum.

Ely, D. P. (2002). 'The field of educational technology'. In M. A. Fitzgerald, M. Orey and R. M. Branch (Eds), *Educational Media and Technology Yearbook, 2002* (Vol. 27, pp. 75). Englewood, Co: Libraries Unlimited.

Entwistle, N. (1997). 'Introduction: Phenomenography in Higher Education'. *Higher Education Research & Development,* 16 (2)*,* 127-134.

Entwistle, N., Skinner, D., Entwistle, D. and Orr, S. (2000). 'Conceptions and Beliefs About "Good Teaching": an integration of contrasting research areas'. *Higher Education Research and Development,* 19 (1)*,* 5 - 26.

Entwistle, N. and Walker, P. (2000). 'Strategic alertness and expanded awareness within sophisticated conceptions of teaching'. *Instructional Science,* 28*,* 335-361.

Erben, M. (1998). *Biography and Education - A Reader*. London: Falmer Press.

Errington, E. (2004). 'The impact of teacher beliefs on flexible learning innovation: some practices and possibilities for academic developers'. *Innovations in Education and Teaching International,* 41 (1)*,* 39-47.

Ertmer, P. (2005). 'Teacher Pedagogical Beliefs: The Final Frontier in Our Quest for Technology Integration?'. *Educational Technology Research and Development,* 53 (4)*,* 25–39.

Ertmer, P. A., Addison, P., Lane, M., Ross, E. and Woods, D. (1999). *Examining Teachers' Beliefs about the Role of Technology in the Elementary Classroom* (32).

Ertmer, P. A. and Ottenbreit-Leftwich, A. T. (2010). 'Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect'. *Journal of Research on Technology in Education,* 42 (3)*,* 255-284.

Eynon, R. (2008). 'The use of the world wide web in learning and teaching in higher education: reality and rhetoric'. *Innovations in Education and Teaching International,* 45 (1)*,* 15-23.

Fan, W. and Yan, Z. (2010). 'Factors affecting response rates of the web survey: A systematic review'. *Computers in Human Behavior,* 26 (2)*,* 132-139.

Fanghanel, J. (2007). *Investigating university lecturers' pedagogical constructs in the working context*. London: HEA.

Ferguson, P. (2004, October 19-23, 2004). *Faculty Beliefs about Teaching with Technology*. Paper presented at the Association for Educational Communications and Technology Chicago, IL.

Ferrell, G., Kelly, J., MacMahon, C., Probert, S., Quentin-Baxter, M. and Riachi, R. (2007). *CAMEL Tangible Benefits of E-Learning Project - Final Report*. Bristol: JISC.

Fishbein, M. and Ajzen, I. (1975). *Belief, attitude, intention, and behavior : an introduction to theory and research*. Reading, Mass.: Addison-Wesley Pub. Co.

Flavin, M. (2012). 'Disruptive technologies in higher education'. *Research in Learning Technology,* 20.

Flick, U. (2009). *An Introduction to Qualitative Research (4th Edition)*. Sage Publications: London.

Foddy, W. (1993). *Constructing Question for Interviews and Questionnaires: Theory and Practice in Social Research*. Cambridge: Cambridge University Press.

Frank, K. A., Zhao, Y., Penuel, W. R., Ellefson, N. and Porter, S. (2011). 'Focus, Fiddle, and Friends: Experiences that Transform Knowledge for the Implementation of Innovations'. *Sociology of Education,* 84 (2)*,* 137-156.

Friesen, N. (2009). *Re-Thinking E-Learning Research: Foundations, Methods and Practices*. New York: Peter Lang.

Garrison, R. D. and Anderson, T. (2003). *E-learning in the 21st Century: a framework for research and practice*. London: RoutledgeFalmer.

Gerbic, P. (2011). 'Teaching using a blended approach – what does the literature tell us?'. *Educational Media International,* 48 (3)*,* 221-234.

Gibbs, G. and Coffey, M. (2004). 'The Impact Of Training Of University Teachers on their Teaching Skills, their Approach to Teaching and the Approach to Learning of their Students'. *Active Learning in Higher Education,* 5 (1)*,* 87-100.

Gibbs, G. R. (2007). *Analysing Qualitative Data*. London: Sage.

Gill, J. (2009). 'Practise what you preach'*. Times Higher Education*.

Gillham, B. (2007). *Developing a questionnaire 2nd Edition*. Continuum: London.

Glenaffric Ltd (2008). *Review of the 2005 HEFCE Strategy for e-Learning*. Bristol: JISC.

Goddard, R. and Rudzki, R. (2005). 'Using an Electronic Text-Matching Tool (Turnitin) to Detect Plagiarism in a New Zealand University'. *Journal of University Teaching & Learning Practice,* 2 (3).

Gonzalez, C. (2009). 'Conceptions of, and approaches to, teaching online: a study of lecturers teaching postgraduate distance courses'. *Higher Education,* 57 (3)*,* 299-314.

González, C. (2010). 'What do university teachers think eLearning is good for in their teaching?'. *Studies in Higher Education,* 35 (1)*,* 61-78.

González, C. (2012). 'The relationship between approaches to teaching, approaches to e-teaching and perceptions of the teaching situation in relation to e-learning among higher education teachers'. *Instructional Science,* 40 (6)*,* 975-998.

Goodison, T. (2003). 'Integrating ICT in the classroom: a case study of two contrasting lessons'. *British Journal of Educational Technology,* 34 (5)*,* 549–566.

Goodson, I. F., Knobel, M., Lankshear, C. and Mangan, J. M. (2002). *Cyber spaces/social spaces : culture clash in computerized classrooms*. New York, N.Y. ; Basingstoke: Palgrave Macmillan.

Goodyear, P. (2002). 'Teaching Online'. In N. Hativa and P. Goodyear (Eds), *Teacher Thinking, Beliefs and Knowledge in Higher Education* (pp. 79-102). Dordrecht: Klewer.

Gorard, S. (2003). *Quantitative methods in social science*. London: Continuum.

Gorard, S. (2006). *Using everyday numbers effectively in research*. London: Continuum.

Grabe, M. and Christopherson, K. (2005). 'Evaluating the advantages and disadvantages of providing lecture notes: The role of internet technology as a delivery system and research tool'. *The Internet and Higher Education,* 8 (4)*,* 291-298.

Graham, C. R. (2011). 'Theoretical considerations for understanding technological pedagogical content knowledge (TPACK)'. *Computers & Education,* 57 (3)*,* 1953-1960.

Greasley, K. and Ashworth, P. (2007). 'The phenomenology of 'approach to studying': the university student's studies within the lifeworld'. *British Educational Research Journal,* 33 (6)*,* 819-843.

Grossman, P. (1990). *The Making of a Teacher: Teacher Knowledge and Teacher Education*. New York: Teachers College Press.

Guri-Rosenblit, S. (2005). ''Distance education' and 'e-learning': Not the same thing'. *Higher Education,* 49 (4)*,* 467-493.

Hamilton, M. L. (1993). 'Think You Can: The Influence of Culture on Beliefs'. In C. Day, J. Calderhead and P. Denicolo (Eds), *Research on teacher thinking : understanding professional development* (pp. 242). London: Falmer Press.

Hanson, J. (2009). 'Displaced but not replaced: the impact of e-learning on academic identities in higher education'. *Teaching in Higher Education,* 14 (5)*,* 553-564.

Harasim, L. (2000). 'Shift happens: online education as a new paradigm in learning'. *The Internet and Higher Education,* 3 (1-2)*,* 41-61.

Hartman, J. L., Dziuban, C. and Brophy-Ellison, J. (2007). 'Faculty 2.0'. *Educause review,* (September/October 2007)*,* 62-76.

Hassini, E. (2006). 'Student-instructor communication: The role of email'. *Computers & Education,* 47 (1)*,* 29-40.

Hativa, N. (2000a). 'Becoming a better teacher: A case of changing the pedagogical knowledge and beliefs of law professors'. *Instructional Science,* 28*,* 491-523.

Hativa, N. (2000b). 'Teacher thinking, beliefs, and knowledge in higher education: An introduction'. *Instructional Science,* 28*,* 331-334.

Hativa, N. and Goodyear, P. (2002). *Teacher Thinking, Beliefs and Knowledge in Higher Education*. Dordrecht: Klewer.

Heaton-Shrestha, C., Edirisingha, P., Burke, L. and Linsey, T. (2005). 'Introducing a VLE into campus-based undergraduate teaching: Staff perspectives on its impact on teaching'. *International Journal of Educational Research,* 43 (6)*,* 370-386.

HEFCE (2005). *HEFCE strategy for e-learning*. Bristol: HEFCE.

HEFCE (2006). *Intellectual property rights in e-learning programmes*. Bristol: HEFCE.

HEFCE (2009a). *Enhancing learning and teaching through the use of technology: A revised approach to HEFCE's strategy for e-learning*. Bristol: HEFCE.

HEFCE (2009b). *Higher Education in England: Achievements, Challenges and Prospects*. Bristol: HEFCE.

Henkel, M. (2005). 'Academic Identity and Autonomy in a Changing Policy Environment'. *Higher Education,* 49 (1/2)*,* 155-176.

Hermans, R., Tondeur, J., van Braak, J. and Valcke, M. (2008). 'The impact of primary school teachers' educational beliefs on the classroom use of computers'. *Computers & Education,* 51 (4)*,* 1499-1509.

HM Treasury (2006). *The Leitch Review of Skills: Prosperity for all in the global economy - world class skills. Final Report.* London: HMSO.

Hodson, P., Saunders, D. and Stubbs, G. (2002). 'Computer-Assisted Assessment: Staff Viewpoints on its Introduction Within a New University'. *Innovations in Education and Teaching International,* 39 (2)*,* 145 - 152.

Hogg, M. A. and Vaughan, G. M. (2005). *Social psychology*. (4th Ed.). Harlow: Pearson / Prentice Hall.

Hooper, S. and Rieber, L. P. (1995). 'Teaching with technology'. In A. C. Ornstein (Ed.), *Teaching: Theory into practice* (pp. 154-170). Needham Heights, MA: Allyn and Bacon.

Jackson, P. W. (1968). *Life in classrooms*. New York: Holt, Rinehart and Winston.

Jacobs, J. A. (2004). 'The Faculty Time Divide - Presidential Address'. *Sociological Forum,* 19 (1).

Jimoyiannis, A. and Komis, V. (2007). 'Examining teachers' beliefs about ICT in education: implications of a teacher preparation programme'. *Teacher Development,* 11 (2)*,* 149-173.

JISC (2004a). *e-Assessment Glossary [Extended]*. Bristol: JISC.

JISC (2004b). *Effective Practice with e-Learning*. Bristol: JISC.

JISC. (2005). 'Innovative Practice with eLearning: Case Studies: Promoting active learning'. [Online]. Available at: http://www.jisc.ac.uk/uploaded_documents/ACF10EB.pdf.

JISC (2007a). *Effective Practice with e-Assessment*. Bristol: JISC.

JISC (2007b). *Student Expectations Study*. Bristol: JISC.

JISC (2008). *Great Expectations of ICT: how Higher Education Institutions are measuring up*. Bristol: JISC.

JISC (2009). *Effective Practice in a Digital Age: A guide to technology-enhanced learning and teaching*. Bristol: JISC.

John, P. (2005). 'The sacred and the profane: subject sub-culture, pedagogical practice and teachers' perceptions of the classroom uses of ICT'. *Educational Review,* 57 (4)*,* 471-490.

Johnson, D. R. (2012). 'Technological Change and Professional Control in the Professoriate'. *Science, Technology & Human Values,* 38 (1)*,* 126-149.

Jones, C., Asensio, M. and Goodyear, P. (2000). 'Networked learning in higher education: practitioners' perspectives'. *Alt-J,* 8 (2)*,* 18-28.

Jones, C., Ramanau, R., Cross, S. and Healing, G. (2010). 'Net generation or Digital Natives: Is there a distinct new generation entering university?'. *Computers & Education,* 54 (3)*,* 722-732.

Jones, S., Johnson-Yale, C., Millermaier, S. and Pérez, F. S. (2008). 'Academic work, the Internet and U.S. college students'. *The Internet and Higher Education,* 11 (3-4)*,* 165-177.

Judson, E. (2006). 'How Teachers Integrate Technology and Their Beliefs About Learning: Is There a Connection?'. *Jl. of Technology and Teacher Education,* 14 (3)*,* 581-597.

Kagan, D. M. (1992). 'Implications of Research on Teacher Belief'. *Educational Psychologist,* 27 (1)*,* 65-90.

Kane, R., Sandretto, S. and Heath, C. (2002). 'Telling Half the Story: A Critical Review of Research on the Teaching Beliefs and Practices of University Academics'. *Review of Educational Research,* 72 (2)*,* 177-228.

Kansanen, P. (2009). 'Subject-matter didactics as a central knowledge base for teachers, or should it be called pedagogical content knowledge?'. *Pedagogy, Culture & Society,* 17 (1)*,* 29-39.

Katz, L. G. and Raths, J. D. (1985). 'Dispositions as goals for teacher education'. *Teaching and Teacher Education,* 1 (4)*,* 301-307.

Kay, H. (1979). 'Keynote address. Educational technology 20 years on - Sheffield revisited.'. In G. T. Page and Q. Whitlock (Eds), *Aspects of Educational Technology XIII - Educational Technology Twenty Years On* (pp. 11-18). London: Kogan Page.

Kelchtermans, G. (1993). 'Getting the story, understanding the lives: From career stories to teachers' professional development'. *Teaching and teacher education,* 9 (5-6)*,* 443-456.

Kelly, H. F., Ponton, M. K. and Rovai, A. P. (2007). 'A comparison of student evaluations of teaching between online and face-to-face courses'. *The Internet and Higher Education,* 10 (2)*,* 89-101.

Kember, D. and Kwan, K.-P. (2000). 'Lecturers' approaches to teaching and their relationship to conceptions of good teaching'. *Instructional Science,* 28*,* 469-490.

Kidd, T. T. (2010). 'Butterfly under a pin: Exploring the voices and stories told of faculty who adopt ICT's for teaching and learning practices'. *Education and Information Technologies,* 15 (3)*,* 155-170.

Kim, C., Kim, M. K., Lee, C., Spector, J. M. and DeMeester, K. (2013). 'Teacher beliefs and technology integration'. *Teaching and teacher education,* 29*,* 76-85.

Kinash, S., Brand, J. and Mathew, T. (2012). 'Challenging mobile learning discourse through research: Student perceptions of Blackboard Mobile Learn and iPads'. *Australasian Journal of Educational Technology,* 28 (4)*,* 639-655.

Kiraz, E. and Ozdemir, D. (2006). 'The Relationship between Educational Ideologies and Technology Acceptance in Preservice Teachers.'. *Educational Technology & Society,* 9 (2)*,* 152-165.

Kirkup, G. and Kirkwood, A. (2005). 'Information and communications technologies (ICT) in higher education teaching—a tale of gradualism rather than revolution'. *Learning, Media and Technology,* 30 (2)*,* 185-199.

Kirkwood, A. and Price, L. (2013). 'Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review'. *Learning, Media and Technology,* 1-31.

Klobas, J. (Ed.) (2006), *Wikis: Tools for Information Work and Collaboration*. Oxford: Chandos Publishing.

Knapper, C. and Cropley, A. J. (2000). *Lifelong learning in higher education*. (3rd Ed.). London: Kogan Page.

Knox, J. (2013). 'Five critiques of the open educational resources movement'. *Teaching in Higher Education,* 1-12.

Kolsaker, A. (2008). 'Academic professionalism in the managerialist era: a study of English universities'. *Studies in Higher Education,* 33 (5)*,* 513-525.

Kopcha, T. J. and Sullivan, H. (2006). 'Self-presentation bias in surveys of teachers' educational technology practices'. *Educational Technology Research and Development,* 55 (6)*,* 627-646.

Kreber, C. (2010). 'Academics' teacher identities, authenticity and pedagogy'. *Studies in Higher Education,* 35 (2)*,* 171-194.

Lane, A. (2012). 'A review of the role of national policy and institutional mission in European distance teaching universities with respect to widening participation in higher education study through open educational resources'. *Distance Education,* 33 (2)*,* 135-150.

Lane, C. A. and Lyle, H. F. (2010). 'Obstacles and supports related to the use of educational technologies: the role of technological expertise, gender, and age'. *Journal of Computing in Higher Education,* 23 (1)*,* 38-59.

Lawrence, B. and Lentle-Keenan, S. (2013). 'Teaching beliefs and practice, institutional context, and the uptake of Web-based technology'. *Distance Education,* 34 (1)*,* 4-20.

Lea, M. R. and Jones, S. (2011). 'Digital literacies in higher education: exploring textual and technological practice'. *Studies in Higher Education,* 36 (4)*,* 377-393.

Leijen, Ä., Admiraal, W. F., Wildschut, L. and Robert-Jan Simons, P. (2008). 'Pedagogy before technology: what should an ICT intervention facilitate in practical dance classes?'. *Teaching in Higher Education,* 13 (2)*,* 219-231.

Levin, T. and Wadmany, R. (2006). 'Teachers' Beliefs and Practices in Technology-Based Classrooms: A Developmental View'. *Journal of Research on Technology in Education,* 39 (2)*,* 157-181.

Littlejohn, A. (2003). *Reusing online resources : a sustainable approach to e-learning*. London ; Sterling, VA: Kogan Page.

Littlejohn, A. and Higgison, C. (2003). *E-learning: A guide for teachers*. York: LTSN.

Liyanagunawardena, T. R., Adams, A. A. and Williams, S. A. (2013). 'MOOCs: A systematic study of the published literature 2008-2012'. *The International Review of Research in Open and Distance Learning,* 14 (3)*,* 202-227.

López-Bonilla, L. M. and López-Bonilla, J. M. (2011). 'The role of attitudes in the TAM: A theoretically unnecessary construct?'. *British Journal of Educational Technology,* 42 (6)*,* E160-E162.

Lopez-Fernandez, O. and Rodriguez-Illera, J. L. (2009). 'Investigating university students' adaptation to a digital learner course portfolio'. *Computers & Education,* 52 (3)*,* 608-616.

Lortie, D. C. (1975). *Schoolteacher; a sociological study*. Chicago,: University of Chicago Press.

Loveless, A. (2003). 'The Interaction Between Primary Teachers' Perceptions of ICT and Their Pedagogy'. *Education and Information Technologies* 8(4)*,* 313-326.

Lyle, J. (2003). 'Stimulated recall: a report on its use in naturalistic research'. *British Educational Research Journal,* 29 (6)*,* 861-878.

Lynch, M. M. (2002). *The Online Educator: A Guide to Creating the Virtual Classroom*. London: RoutledgeFalmer.

MacDermott, S. (2013). Using a blog as a tool for reflective learning in nurse education, *5th International Conference on Education and New Learning Technologies*. Barcelona, Spain: EDULEARN13 Proceedings.

Manfreda, K. L., Bosnjak, M., Berzelak, J., Haas, I. and Vehovar, V. (2008). 'Web surveys versus other survey modes: A meta-analysis comparing response rates'. *International Journal of Market Research,* 50 (1).

Margaryan, A., Littlejohn, A. and Vojt, G. (2011). 'Are digital natives a myth or reality? University students' use of digital technologies'. *Computers & Education,* 56 (2)*,* 429-440.

Marland, P. and Mitchell, J. (1989). 'Research on teacher thinking: the next phase'. *Teaching and teacher education,* 5 (2)*,* 115-128.

Marton, F. and Pong, W. Y. (2005). 'On the unit of description in phenomenography'. *Higher Education Research & Development,* 24 (4)*,* 335-348.

Marton, F. and Säljö, R. (1976). 'On Qualitative Differences in Learning: I—Outcome and Process'. *British Journal of Educational Psychology,* 46 (1)*,* 4-11.

Mayes, T., Morrison, D., Mellar, H., Bullen, P. and Oliver, M. (2009). *Transforming Higher Education Through Technology Enhanced Learning*. York: HEA.

McAlpine, M. (2005). 'E-portfolios and Digital Identity: some issues for discussion'. *E-Learning,* 2 (4)*,* 378.

McAuley, A., Stewart, B., Siemens, G. and Cormier, D. (2010). *The MOOC model for digital practice*. [Online]. Available at: http://davecormier.com/edblog/wp-content/uploads/MOOC_Final.pdf. [Last accessed July 2013].

McConnell, D. (2000). *Implementing computer-supported cooperative learning*. (2nd Ed.). London: Kogan Page.

McKinney, D., Dyck, J. L. and Luber, E. S. (2009). 'iTunes University and the classroom: Can podcasts replace Professors?'. *Computers & Education,* 52 (3)*,* 617-623.

McShane, K. (2004). 'Integrating face-to-face and online teaching: academics' role concept and teaching choices'. *Teaching in Higher Education,* 9 (1)*,* 3-16.

Meyer, J. H. and Eley, M. G. (2006). 'The Approaches to Teaching Inventory: a critique of its development and applicability'. *British Journal of Educational Psychology,* 76*,* 633-49.

Miles, M. B. and Huberman, A. M. (1994). *Qualitative Data Analysis: an expanded sourcebook (2nd Edition)*. London: Sage.

Mishra, P. and Koehler, M. J. (2006). 'Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge'. *Teachers College Record,* 108 (6)*,* 1017–1054.

Mitchell, P. (2006). 'Wikis in education'. In J. Klobas (Ed.), *Wikis: Tools for Information Work and Collaboration*. Oxford: Chandos Publishing.

Monahan, T. (2005). 'Just Another Tool? IT Pedagogy and the Commodification of Education'. *The Urban Review,* 36 (4)*,* 271-292.

Mueller, J., Wood, E., Willoughby, T., Ross, C. and Specht, J. (2008). 'Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration'. *Computers & Education,* 51 (4)*,* 1523-1537.

Nelson, D. (1983). *Report of a Working Party on Computer Facilities for Teaching in Universities*. London: Computer Board for Universities and Research Councils.

Nelson, M. H. (1993). 'Teacher Stories: An Analysis of Themes'. In C. Day, J. Calderhead and P. Denicolo (Eds), *Research on teacher thinking : understanding professional development* (pp. 242 p.). London: Falmer Press.

Neumann, R., Parry, S. and Becher, T. (2002). 'Teaching and Learning in their Disciplinary Contexts: A conceptual analysis'. *Studies in Higher Education,* 27 (4)*,* 405-417.

Nevgi, A. and Löfström, E. (2013). 'Visualisations as a means for exploring academics' teacher identities'. *International Journal for Academic Development,* 1-12.

Newland, B. and Byles, L. (2013). 'Changing academic teaching with Web 2.0 technologies'. *Innovations in Education and Teaching International,* 1-11.

Nicholson, M. and Sanber, S. (2007). *Integrating ICT into pre-service teacher education programs: Challenge and response*. Paper presented at the ISATT 2007 Conference. Ontario, Canada.

Nixon, J. (1996). 'Professional identity and the restructuring of higher education'. *Studies in Higher Education,* 21 (1)*,* 5-16.

Njenga, J. K. and Fourie, L. C. H. (2010). 'The myths about e-learning in higher education'. *British Journal of Educational Technology,* 41 (2)*,* 199-212.

Noble, D. F. (2001). *Digital diploma mills : the automation of higher education*. New York: Monthly Review Press.

Norton, L., Richardson, J. T. E., Hartley, J., Newstead, S. and Mayes, J. (2005). 'Teachers' Beliefs and Intentions concerning Teaching in Higher Education'. *Higher Education,* 50 (4)*,* 537-571.

OECD (2007). *Giving knowledge for free: the emergence of open educational resources*. Paris: OECD.

Oliver, M. (2011). 'Technological determinism in educational technology research: some alternative ways of thinking about the relationship between learning and technology'. *Journal of Computer Assisted Learning,* 27 (5)*,* 373-384.

Oppenheim, A. N. (1992). *Questionnaire Design, Interviewing and Attitude Measurement (2nd Edition)*. Continuum: London.

Oppenheimer, T. (2003). *The flickering mind : the false promise of technology in the classroom, and how learning can be saved*. (1st Ed.). New York: Random House.

Osterlund, K. and Robson, K. (2009). 'The impact of ICT on work-life experiences among university Teaching Assistants'. *Computers & Education,* 52 (2)*,* 432-437.

Ottenbreit-Leftwich, A. T., Glazewski, K. D., Newby, T. J. and Ertmer, P. A. (2010). 'Teacher value beliefs associated with using technology: Addressing professional and student needs'. *Computers & Education,* 55 (3)*,* 1321-1335.

Owens, T. (2012). 'Hitting the nail on the head: the importance of specific staff development for effective blended learning'. *Innovations in Education and Teaching International,* 49 (4)*,* 389-400.

Pajares, M. (1992). 'Teachers' Beliefs and Educational Research: Cleaning up a Messy Construct'. *Review of Educational Research,* 62 (3)*,* 307-332.

Perreault, H., Waldman, L., Alexander, M. and Zhao, J. (2002). 'Overcoming Barriers to Successful Delivery of Distance-Learning Courses'. *Journal of Education for Business,* 77 (6)*,* 313-318.

Philip, T. M. and Garcia, A. D. (2013). 'The Importance of Still Teaching the iGeneration: New Technologies and the Centrality of Pedagogy'. *Harvard Educational Review,* 83 (2)*,* 300-319.

Piper, H. and Simons, H. (2005). 'Ethical Responsibility in Social Research'. In B. Somekh and C. Lewin (Eds), *Research methods in the social sciences* (pp. xiv, 368 p.). London: SAGE.

Pope, M. (1993). 'Anticipating Teacher Thinking'. In C. Day, J. Calderhead and P. Denicolo (Eds), *Research on teacher thinking : understanding professional development* (pp. 242 p.). London: Falmer Press.

Popovich, P. M., Gullekson, N., Morris, S. and Morse, B. (2008). 'Comparing attitudes towards computer usage by undergraduates from 1986 to 2005'. *Computers in Human Behavior,* 24 (3)*,* 986-992.

Popovich, P. M., Hyde, K. R., Zakrajsek, T. and Blumer, C. (1987). 'The Development of the Attitudes toward Computer Usage Scale'. *Educational and Psychological Measurement,* 47 (1)*,* 261-269.

Potter, J. (1998). 'Discursive social psychology: From attitudes to evaluations'. *European Review of Social Psychology,* 9*,* 233-266.

Potter, J. and Wetherell, M. (1986). *Discourse and Social Psychology*. London: Sage.

Prestridge, S. (2012). 'The beliefs behind the teacher that influences their ICT practices'. *Computers & Education,* 58 (1)*,* 449-458.

Price, S. and Oliver, M. (2007). 'A Framework for Conceptualising the Impact of Technology on Teaching and Learning'. *Educational Technology & Society,* 10 (1)*,* 16-27.

Prosser, M., Trigwell, K. and Society for Research into Higher Education. (1999). *Understanding learning and teaching : the experience in higher education*. Buckingham: Society for Research into Higher Education and Open UP.

Puchta, C. and Potter, J. (2004). *Focus group practice*. London: Sage Publications Ltd.

Raths, J. (1999). 'Knowledge of Subject Matter'. In J. Raths and A. McAninch (Eds), *What counts as Knowledge in Teacher Education: Advances in Teacher Education Volume 5*. Stamford: Ablex.

Rea, L. M. and Parker, R. A. (2005). *Designing and Conducting Survey Research: A Comprehensive Guide*. San Francisco: Jossey Bass.

Reiser, R. A. and Ely, D. P. (1997). 'The Field of Educational Technology as Reflected Through Its Definitions'. *Educational Technology Research and Development* 45 (3)*,* 63-72.

Rienties, B., Brouwer, N. and Lygo-Baker, S. (2013). 'The effects of online professional development on higher education teachers' beliefs and intentions towards learning facilitation and technology'. *Teaching and teacher education,* 29*,* 122-131.

Roberts, G. (2003). 'Teaching using the Web: Conceptions and approaches from a phenomenographic perspective'. *Instructional Science,* 31 (1)*,* 127-150.

Robson, C. (2002). *Real World Research (2nd Edition)*. Blackwell: Oxford.

Roche, L. A. and Marsh, H. W. (2000). 'Multiple dimensions of university teacher self-concept'. *Instructional Science,* 28*,* 439-468.

Roehling, P. V. and Trent-Brown, S. (2011). 'Differential use and benefits of PowerPoint in upper level versus lower level courses'. *Technology Pedagogy and Education,* 20 (1)*,* 113-124.

Rogers, E. M. (1962). *Diffusion of innovations*. New York,: Free Press of Glencoe.

Rovai, A. P., Ponton, M. K., Derrick, M. G. and Davis, J. M. (2006). 'Student evaluation of teaching in the virtual and traditional classrooms: A comparative analysis'. *The Internet and Higher Education,* 9 (1)*,* 23-35.

Rowland, I. (2008). *Information behaviour of the researcher of the future*: UCL.

Ryan, S., Scott, B., Freeman, H. and Patel, D. (2000). *The virtual university : the Internet and resource-based learning*. London: Kogan Page.

Sakamoto, T. (2002). 'E-learning and Educational Innovation in Higher Education in Japan'. *Educational Media International,* 39 (1)*,* 9-16.

Säljö, R. (2010). 'Digital tools and challenges to institutional traditions of learning: technologies, social memory and the performative nature of learning'. *Journal of Computer Assisted Learning,* 26 (1)*,* 53-64.

Samuelowicz, K. and Bain, J. D. (2001). 'Revisiting academics' beliefs about teaching and learning'. *Higher Education,* 41*,* 299-325.

Sánchez-Fernández, J., Muñoz-Leiva, F. and Montoro-Ríos, F. J. (2012). 'Improving retention rate and response quality in Web-based surveys'. *Computers in Human Behavior,* 28 (2)*,* 507-514.

Sánchez-Franco, M. J., Martínez-López, F. J. and Martín-Velicia, F. A. (2009). 'Exploring the impact of individualism and uncertainty avoidance in Web-based electronic learning: An empirical analysis in European higher education'. *Computers & Education,* 52 (3)*,* 588-598.

Sapsford, R. (2007). *Survey Research (2nd Edition)*. London: Sage.

Sapsford, R. and Jupp, V. (2006). *Data collection and analysis (2nd Edition)*. London: Sage.

Savin-Baden, M. (2008). *Learning Spaces: Creating Opportunities for Knowledge Creation in Academic Life*. Maidenhead: Open University Press.

Savoy, A., Proctor, R. W. and Salvendy, G. (2009). 'Information retention from PowerPoint(TM) and traditional lectures'. *Computers & Education,* 52 (4)*,* 858-867.

Schmidt, C. (2004). The Analysis of Semi-Structured Interviews. In U. Flick, E. von Kardoff and I. Steinke (eds), *A Companion to Qualitative Research*. London: Sage.

Schneckenberg, D. (2009). 'Understanding the real barriers to technology-enhanced innovation in higher education'. *Educational Research,* 51 (4)*,* 411-424.

Schneckenberg, D. (2010). 'Overcoming barriers for eLearning in universities-portfolio models for eCompetence development of faculty'. *British Journal of Educational Technology,* 41 (6)*,* 979-991.

Schofield, W. (2006). 'Survey Sampling'. In R. Sapsford and V. Jupp (Eds), *Data collection and analysis (2nd Edition)*. London: Sage.

Schön, D. A. (1983). *The reflective practitioner : how professionals think in action*. New York: Basic Books, London : Temple Smith.

Selwyn, N. (2007). 'The use of computer technology in university teaching and learning: a critical perspective'. *Journal of Computer Assisted Learning,* 23 (2)*,* 83-94.

Selwyn, N. (2008). 'An investigation of differences in undergraduates' academic use of the internet'. *Active Learning in Higher Education,* 9 (1)*,* 11-22.

Selwyn, N. (2010). 'Looking beyond learning: notes towards the critical study of educational technology'. *Journal of Computer Assisted Learning,* 26 (1)*,* 65-73.

Selwyn, N. (2012). 'Making sense of young people, education and digital technology: the role of sociological theory'. *Oxford Review of Education,* 38 (1)*,* 81-96.

Sheely, S. (2006). *Persistent technologies: Why can't we stop lecturing online?* Paper presented at the 23rd Annual Ascilite Conference: Who's learning? Whose technology? Sydney.

Shelton, C. (2013). '"Virtually mandatory": A survey of how discipline and institutional commitment shape university lecturers' perceptions of technology'. *British Journal of Educational Technology,* doi:10.1111/bjet.12051.

Shen, C.-C. and Chuang, H.-M. (2009). 'An Investigation on User Communication Behavior in an Interactive Whiteboard Technology Environment'. *WSEAS TRANSACTIONS on COMMUNICATIONS,* 8 (1).

Shulman, L. (1987). 'Knowledge and Teaching: Foundations of the New Reform'. *Harvard Educational Review,* 57 (1)*,* 1-22.

Shulman, L. S. and Shulman, J. H. (2004). 'How and what teachers learn: a shifting perspective'. *Journal of Curriculum Studies,* 36 (2)*,* 257-271.

Skelton, A. (2012a). 'Teacher identities in a research-led institution: in the ascendancy or on the retreat?'. *British Educational Research Journal,* 38 (1)*,* 23-39.

Skelton, A. (2012b). 'Value conflicts in higher education teaching'. *Teaching in Higher Education,* 17 (3)*,* 257-268.

Smarkola, C. (2008). 'Efficacy of a planned behavior model: Beliefs that contribute to computer usage intentions of student teachers and experienced teachers'. *Computers in Human Behavior,* 24 (3)*,* 1196-1215.

Southerland, S. A., Sinatra, G. M. and Matthews, M. R. (2001). 'Belief, Knowledge, and Science Education'. *Educational Psychology Review,* 13 (4)*,* 325-351.

Spotts, T. H. and Bowman, M. A. (1993). 'Increasing Faculty Use of Instructional Technology: Barriers and Incentives'. *Educational Media International,* 30 (4)*,* 199-204.

Stacey, E. and Wiesenberg, F. (2007). 'A Study of Face-to-Face and Online Teaching Philosophies in Canada and Australia'. *Journal of Distance Education,* 22 (1)*,* 19-40.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks ; London: SAGE.

Stark, J. S. (2000). 'Planning introductory college courses: Content, context and form'. *Instructional Science,* 28*,* 413-438.

Steel, C. (2003). Investigating Concept Mapping and Stimulated Recall to Reveal Academic Teacher Beliefs and How They are Enacted Through Learning Designs for the Web. In D. Lassner and C. McNaught (eds), *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003* (pp. 2217-2224). Honolulu, Hawaii, USA: AACE.

Steel, C. (2006). *Influence of teacher beliefs on web-enhanced learning experiences: Learners and teachers*. Paper presented at the 23rd Annual Ascilite Conference: Who's learning? Whose technology? The University of Sydney.

Stiles, M. (2007). 'Death of the VLE?: a challenge to a new orthodoxy'. *Serials,* 20 (1).

Straub, E. T. (2009). 'Understanding Technology Adoption: Theory and Future Directions for Informal Learning'. *Review of Educational Research,* 79 (2)*,* 625-649.

Šumak, B., Heričko, M. and Pušnik, M. (2011). 'A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types'. *Computers in Human Behavior,* 27 (6)*,* 2067-2077.

Teo, T. (2009). 'Is there an attitude problem? Reconsidering the role of attitude in the TAM'. *British Journal of Educational Technology,* 40 (6)*,* 1139-1141.

Thach, E. (1995). 'Using Electronic Mail to Conduct Survey Research'. *Educational Technology,* 35 (2)*,* 27-31.

Tosh, D., Light, T. P., Fleming, K. and Haywood, J. (2005). *Engagement with Electronic Portfolios: Challenges from the Student Perspective*.

Trigwell, K. (2012). 'Relations between teachers' emotions in teaching and their approaches to teaching in higher education'. *Instructional Science,* 40 (3)*,* 607-621.

Trowler, P. (2008). *Cultures and Change in Higher Education: Theories and Practice*. Basingstoke: Palgrave Macmillan.

Turner, Y. and Robson, S. (2008). *Internationalizing the University*. London: Continuum.

UUK (2011). *Efficiency and effectiveness in higher education: A report by the Universities UK Efficiency and Modernisation Task Group*. London: Universities UK.

Veen, W. (1993). 'The Role of Beliefs in the Use of Information Technology: implications for teacher education, or teaching the right thing at the right time'. *Journal of Information Techology for Teacher Education,* 2 (2)*,* 139-153.

Venkatesh, V. and Davis, F. D. (2000). 'A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies'. *Management Science,* 46 (2)*,* 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003). 'User acceptance of information technology: Toward a unified view'. *MIS Quarterly,* 27 (3)*,* 425-478.

Walker, R., Voce, J. and Ahmed, J. (2012). *2012 Survey of Technology Enhanced Learning for higher education in the UK*. Oxford: UCISA.

Wang, Y. M. and Artero, M. (2005). 'Caught in the Web: university student use of Web resources'. *Educational Media International,* 42 (1)*,* 71-82.

Weller, M. (2011). *The digital scholar : how technology is transforming scholarly practice*. London: Bloomsbury Academic.

Wellington, J. and Szczerbinski, M. (2007). *Research Methods for the Social Sciences*. London: Continuum.

Wertsch, J. V. (1998). *Mind as action*. New York ; Oxford: Oxford University Press.

White, D., Warren, N., Faughnan, S. and Manton, M. (2010). *Study of UK Online Learning*. Oxford: HEFCE.

Windschitl, M. and Sahl, K. (2002). 'Tracing Teachers' Use of Technology in a Laptop Computer School: The Interplay of Teacher Beliefs, Social Dynamics, and Institutional Culture'. *American Educational Research Journal,* 39 (1)*,* 165-205.

Winner, L. (1993). 'Upon Opening the Black Box and Finding it empty: Social Constructivism and the Philosophy of Technology.'. *Science, Technolgoy and Human Values,* 18 (3)*,* 362-378.

Woody, W. D., Daniel, D. B. and Baker, C. A. (2010). 'E-books or textbooks: Students prefer textbooks'. *Computers & Education,* 55 (3)*,* 945-948.

Woolfolk-Hoy, A., Davis, H. and Pape, S. J. (2006). 'Teacher knowledge and beliefs'. In P. A. Alexander and P. H. Winne (Eds), *Handbook of educational psychology* (2nd ed.). Mahwah, N.J. ; London: Lawrence Erlbaum.

Wozney, L., Venkatesh, V. and Aprami, P. C. (2006). 'Implementing Computer Technologies: Teachers' Perceptions and Practices'. *Journal of Technology and Teacher Education,* 14 (1)*,* 173-207.

Wright, K. B. (2005). 'Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services.'. *Journal of Computer-Mediated Communication* 10 (3).

Yin, R. K. (2003). *Case Study Research: Design and Methods (3rd Edition)*. London: Sage.

Zhou, G. and Xu, J. (2007). 'Adoption of Educational Technology How Does Gender Matter?'. *International Journal of Teaching and Learning in Higher Education,* 19 (2)*,* 140-153.

Appendix A – Survey Instrument

Welcome

Thank you for viewing the Teaching with Technology Survey.

This survey is about your undergraduate teaching in higher education. It asks for your thoughts and opinions about your teaching and how you use technology. The survey is part of a PhD project exploring how university lecturers use technology when teaching. We value your opinions and would be very pleased to read your thoughts about your teaching.

The survey is entirely voluntary and completely anonymous and it should take around 10-15 minutes to complete.

To take part in the study please click on 'Continue'

If you have any questions about the survey please contact Chris Shelton at c.shelton@chi.ac.uk

About your teaching

Your role

1. What subject discipline do you primarily work within?   [Drop-down box]

Medicine & Dentistry
Subjects allied to medicine
Biological sciences
Veterinary science, Agriculture and related subjects
Physical sciences
Mathematical and Computer Sciences
Engineering
Technologies
Architecture, building & planning
Social studies
Law
Business & Administrative studies
Mass communications and documentation
Linguistics, Classics and related subjects
European Languages, Literature and related subjects
Eastern, Asiatic, African, American and Australasian Languages, Literature and related subjects
Historical and philosophical studies
Creative arts & design
Education (including teacher education and education studies)

2. In your opinion, is your university

○ Teaching-focused

○ Research-focused

○ Teaching and Research are considered equal priorities

3. How important are the following in **your job**?

	Very important	Important	Neutral	Unimportant	Very unimportant
a. Teaching	○	○	○	○	○
b. Research	○	○	○	○	○
c. Administration	○	○	○	○	○
d. Management (if applicable)	○	○	○	○	○

Your teaching

4. What level(s) do you teach undergraduates at?
(select all that apply)

☐ First year undergraduate (QAA Level 4 - Certificate Level)

☐ Second year undergraduate (QAA Level 5 - Diploma Level)

☐ Final year undergraduate (QAA Level 6 - Graduate Level)

5. How often do you teach undergraduates in the following ways?

	For most of my teaching	For some of my teaching	Never
a. Large group lectures (e.g. more than 40 students)	○	○	○
b. Small group lectures (e.g. 40 students or less)	○	○	○
c. Group seminars (e.g. 6 - 40 students)	○	○	○
d. Small group seminars (e.g. 2 - 5 students)	○	○	○
e. Practical workshops (e.g. labs, studio work, etc)	○	○	○
f. Individual supervision/tutorials	○	○	○

About technology

The following questions ask about ICTs (Information and Communication Technologies). ICTs can be defined as the range of digital technologies used to communicate or process information. These include computers, the internet, Powerpoint, online learning tools such as Blackboard or WebCT, etc.

Technology in general

6. How strongly do you agree or disagree with the following statements?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
a. I use ICTs in most of my teaching activities with students	○	○	○	○	○	○
b. I use ICTs to prepare for most of my teaching	○	○	○	○	○	○
c. I make more use of ICTs in my teaching than others in my department	○	○	○	○	○	○
d. I make more use of ICTs in my teaching than others in my university	○	○	○	○	○	○
e. I make more use of ICTs in my teaching than others who teach the same subject in other universities	○	○	○	○	○	○
f. My undergraduate students expect me to use technology in my teaching	○	○	○	○	○	○
g. My colleagues expect me to use technology in my teaching	○	○	○	○	○	○

Technology in my teaching

7. How strongly do you agree or disagree with the following statements?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
a. I think that appropriately used ICTs can enhance teaching and learning in my subject	○	○	○	○	○	○
b. I am confident about using ICTs in my subject	○	○	○	○	○	○
c. I would like to make more use of ICTs in my teaching	○	○	○	○	○	○
d. I am satisfied with the teaching methods I currently use	○	○	○	○	○	○
e. The availability of resources is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○
f. Access to technical support is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○
g. Lack of training is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○

h. Lack of time is a significant barrier to my use of ICTs for teaching

  ○   ○   ○   ○   ○   ○

About particular technologies

8. These questions ask about your use of specific technologies. Click on the 'More Info' button if you need a definition of any of them.
For each technology, please indicate how often you use it in your teaching (if ever) and how strongly you agree or disagree that it has a positive impact on your teaching.

	How frequently do you use this technology? [Drop-down box for each item]	This technology has a positive impact on my teaching					
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
a. Slideshow presentations e.g. Powerpoint	*All of the time* *Most of the time*	○	○	○	○	○	○
b. VLE (Virtual Learning Environment)	*Some of the time* *Never*	○	○	○	○	○	○
c. e-assessment		○	○	○	○	○	○
d. blogging		○	○	○	○	○	○
e. podcasts		○	○	○	○	○	○
f. e-portfolios		○	○	○	○	○	○
g. wikis		○	○	○	○	○	○
h. social bookmarking		○	○	○	○	○	○

9. Please list any other technologies that have a significant impact on your teaching

---

Your thoughts about why you use technology

10. Can you comment on the factors that influence your decisions to use (or not use) technology in your teaching

11. Can you comment on how you decide which technologies to use in your teaching?

About you

12. Are you:

○ Male ○ Female

13. How old are you?

○ Under 30 years old

○ 30 - 39

○ 40 - 49

○ 50 - 59

○ 60+

14. How long have you been working at this university?

○ 0-2 years

○ 3-5 years

○ 6-10 years

○ 11-15 years

○ 16-20 years

○ Over 20 years

15. How long have you been teaching in Higher Education (in total)

○ 0-2 years

○ 3-5 years

○ 6-10 years

○ 11-15 years

○ 16-20 years

○ Over 20 years

16. Which of these best describes your job title?

○ Professor (including Head of Department)

○ Reader

○ Senior Lecturer (including Principal Lecturer)

○ Lecturer

○ Other *(please specify)*:

17. On what basis are you employed?

○ Full-time permanent contract

○ Part-time permanent contract

○ Full-time temporary contract

○ Part-time temporary contract

○ Other

18. What is your highest level of qualification

○ Doctorate   ○ Masters degree   ○ Bachelors degree

○ Other *(please specify)*:

19. Do you hold any teaching qualifications?

○ Yes   ○ No

If yes, please list them:

Use of the internet

20. Within the last year, how frequently have you used the Internet for the following purposes?

	Several times a day	Daily	Weekly	Monthly	Less than monthly	Never	Don't Know
a. Check your email	○	○	○	○	○	○	○
b. Send attachments with an email	○	○	○	○	○	○	○
c. Getting information about local events	○	○	○	○	○	○	○
d. Making travel plans	○	○	○	○	○	○	○
e. Comparing products and prices	○	○	○	○	○	○	○
f. Buying a product online	○	○	○	○	○	○	○
g. Downloading music	○	○	○	○	○	○	○
h. Playing games	○	○	○	○	○	○	○
i. Update or create a profile on a social networking site	○	○	○	○	○	○	○
j. Post pictures or photos on the internet	○	○	○	○	○	○	○

Optional contact details

The next stage of this project will involve interviewing university staff about their teaching. If you might be willing to be interviewed, please give an email address below so that you can be contacted with further information.

21. Email address

Thank you

Thank you for completing this survey. Your responses have now been submitted.

Appendix B – Pilot Survey

This appendix contains the text of the pilot survey. Where sections were altered for the final survey instrument, these are highlighted.

About your teaching

1.(moved to Q16) Which of these best describes your job? (Wording changed)

○ Professor (including Head of Department)

○ Reader

○ Senior Lecturer (including Principal Lecturer)

○ Lecturer
(Added "Other")

2. (moved to Q17) On what basis are you employed?

○ Full-time permanent contract

○ Part-time permanent contract

○ Full-time temporary contract

○ Part-time temporary contract
Other

3. In your opinion, is your university

○ Teaching-focused

○ Research-focused

○ Teaching and Research are considered equal priorities

4. How important are the following in **your job**?

	Very unimportant	Unimportant	Neutral	Important	Very Important (Order changed)
a. Teaching	○	○	○	○	○
b. Research	○	○	○	○	○
c. Administration	○	○	○	○	○
d. Management (if applicable)	○	○	○	○	○

5. (Moved to Q1) What subject discipline do you primarily work within?   [Drop-down box]

Medicine & Dentistry
Subjects allied to medicine
Biological sciences
Veterinary science, Agriculture and related subjects
Physical sciences
Mathematical and Computer Sciences
Engineering
Technologies
Architecture, building & planning
Social studies
Law
Business & Administrative studies
Mass communications and documentation
Linguistics, Classics and related subjects
European Languages, Literature and related subjects
Eastern, Asiatic, African, American and Australasian Languages, Literature and related subjects
Historical and philosophical studies
Creative arts & design
Education (including teacher education and education studies)

Your teaching

6. What subjects do you teach? (Question removed)

7.   What level(s) do you teach undergraduates at? (Wording changed)
   (select all that apply)

☐ First year undergraduate (QAA Level 4 - Certificate Level)

☐ Second year undergraduate (QAA Level 5 - Diploma Level)

☐ Third (word changed) year undergraduate (QAA Level 6 - Graduate Level)

8.   How often do you teach undergraduates in the following ways?

Wording and order changed	Never	Occasionally	At least once a week	For most of my teaching
a. Large group lectures (e.g. more than 40)	○	○	○	○
b. Small group lectures (e.g. 40 or less)	○	○	○	○
c. Group seminars (e.g. 6 - 40)	○	○	○	○
d. Small group seminars (e.g. 2 - 5)	○	○	○	○
e. Practical workshops (e.g. labs,)	○	○	○	○
f. Individual supervision/tutorials	○	○	○	○

About technology

The following questions ask about ICTs (Information and Communication Technologies). ICTs can be defined as the range of digital technologies used to communicate or process information. These include computers, the internet, Powerpoint, online learning tools such as Blackboard or WebCT, etc.

Technology in general

9. How strongly do you agree or disagree with the following statements?

Order changed:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know
a. I use ICTs in most of my teaching activities with students	○	○	○	○	○	○
b. I use ICTs to prepare for most of my teaching	○	○	○	○	○	○
c. I make more use of ICTs in my teaching than others in my department	○	○	○	○	○	○
d. I make more use of ICTs in my teaching than others in my university	○	○	○	○	○	○
e. I make more use of ICTs in my teaching than others who teach the same subject in other universities	○	○	○	○	○	○
f. My undergraduate students expect me to use technology in my teaching	○	○	○	○	○	○
g. My colleagues expect me to use technology in my teaching	○	○	○	○	○	○

Technology in my teaching

10. How strongly do you agree or disagree with the following statements?

Order changed:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know
a. I think that appropriately used ICTs can improve teaching and learning in my subject (wording changed)	○	○	○	○	○	○
b. I am confident about using ICTs in my subject	○	○	○	○	○	○
c. I would like to make more use of ICTs in my teaching	○	○	○	○	○	○
d. I am satisfied with the teaching methods I currently use	○	○	○	○	○	○
e. The availability of resources is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○
f. Access to technical support is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○
g. Lack of training is a significant barrier to my use of ICTs for teaching	○	○	○	○	○	○

	h. Lack of time is a significant barrier to my use of ICTs for teaching	○ ○ ○ ○ ○ ○

About particular technologies

11. These questions ask about your use of specific technologies. Click on the 'More Info' button if you need a definition of any of them.

	How frequently do you use this technology? [Drop-down box for each item]	This technology has a positive impact on my teaching					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree (Order changed)	Don't Know
a. Powerpoint (wording changed)	*Wording changed:*	○	○	○	○	○	○
b. VLE (Virtual Learning Environment)	*Never Occasionally Regularly In most of my teaching*	○	○	○	○	○	○
c. e-assessment		○	○	○	○	○	○
d. blogging (word changed)		○	○	○	○	○	○
e. podcasts		○	○	○	○	○	○
f. e-portfolios		○	○	○	○	○	○
g. wikis		○	○	○	○	○	○
h. social bookmarking		○	○	○	○	○	○

12. Please list any other technologies that have a significant impact on your teaching

---

Your thoughts about why you use technology

13. What influences your decisions to use (or not use) technology in your teaching (Wording changed)

14. How do you decide which technologies to use in your teaching?   (Wording changed)

About you

15. Are you:

○ Male   ○ Female

16. How old are you?

○ Under 30 years old

○ 30 - 39

○ 40 - 49

○ 50 - 59

○ 60+

17. How long have you been working at this university?

○ 0-2 years

○ 3-5 years

○ 6-10 years

○ 11-15 years

○ 16-20 years

○ Over 20 years

18. How long have you been teaching in Higher Education (in total)

○ 0-2 years

○ 3-5 years

○ 6-10 years

○ 11-15 years

○ 16-20 years

○ Over 20 years

19. (Swop order with next Q) Do you hold any teaching qualifications?

○ Yes   ○ No

   If yes, please list them:

20. (Swop order with previous Q) What is your highest level of qualification

○ Doctorate   ○ Masters degree   ○ Bachelors degree

○ Other *(please specify)*:

Use of the internet

21. Within the last year, how frequently have you used the Internet for the following purposes?

Order changed:	Never	Less than monthly	Monthly	Weekly	Daily	Several times a day	Don't Know
a. Check your email	○	○	○	○	○	○	○
b. Send attachments with an email	○	○	○	○	○	○	○
c. Getting information about local events	○	○	○	○	○	○	○

d. Making travel plans	○	○	○	○	○	○	○
e. Comparing products and prices	○	○	○	○	○	○	○
f. Buying a product online	○	○	○	○	○	○	○
g. Downloading music	○	○	○	○	○	○	○
h. Playing games	○	○	○	○	○	○	○
i. Update or create a profile on a social networking site	○	○	○	○	○	○	○
j. Post pictures or photos on the internet	○	○	○	○	○	○	○

Optional contact details

The next stage of this project will involve interviewing university staff about their teaching.
If you might be willing to be interviewed, please give an email address below so that you can be contacted with further information.

22. Email address

Thank you

Thank you for completing this survey. Extra information added

Appendix C – Survey Response

Survey Response Rate by Institution

University	Number of Responses	Total number of staff (number supplied by contact)	Response Rate
A	43		
B	51	200	25.5%
C	10		
D	2		
E	5		
F	116	948	12.2%
G	86		
H	18	78	23.1%
I	35		
J	92	700	13.1%
K	18		
L	5		
M	45		
N	8		
O	40		
P	9		
Q	5		
R	3		
S	12		
T	10		
U	9		
V	30	1700	1.8%
W	66		
X	5		
Y	62		
Z	2		
AA	1		
Unknown	7		
Total	795		

Appendix D – Interview Schedules

Interview 1 Schedule

Interview 1: How is technology used?

Thanks for agreeing to take part in these interviews, before we talk about technology, I'd just like to ask a couple of general questions

Could you tell me a little about your role at the university?
> *Subject?*
> *Amount of teaching*
> *Types of teaching (size of groups, lecture/seminars)*
> *Other job priorities*

How would you describe your university?
> *Is it a particular type of university?*
> *Does it have a particular focus?*
> *Is there a particular culture/ (working culture)?*
> *What about your department?*

Could you tell me how you use technology in your professional life?
> *In your teaching (face-to-face, online)*
> *For preparation,*
> *For communication,*
> *For research*
> *For admin tasks*
> *Why?*

Thinking about your teaching, tell me why you use the technologies you do
> *Are some technologies more important to you than others?*
> *What made you choose that particular software/resource?*
> *Why did you use it in that particular way?*

Are there any other technologies that you would like to use?
> *Why haven't you used them already?*

Are there any particular things that prevent you from using technology?
> *Access to resources (in the places you want at the times you want)*
> *Technical support*
> *Reliability*
> *Lack of time (session time, your time)*
> *Lack of skills*
> *Fitness for purpose*

What do you think are other people's expectations of you to use technology?

> *Student attitude/expectation*
> *Colleagues' attitude/expectation*
> *Managers' attitude/expectation*

What parts of your teaching are free of technology?
> *Why is this?*
> *Do you think this might change?*

How did you use technology in your last lecture/seminar/tutorial?
> *Before/ during/ after the session*
> *Did your students use IT in the session?*
> *What might you do differently in the future?*
> *Do you think the technology (e.g. powerpoint) changed your teaching?*

Tell me about your best and worst lecture/seminar?
> *Did the IT help?*

How do you think teaching using technology might be different to other methods?
> *What about online/ face-to-face teaching?*

How do you judge what is appropriate use of technology?
> *Is this specific to your subject?*
> *Do you think you've got better at making these decisions about when to use technology? How/why?*

How does IT fit into your assessment?

What training have you had to use IT in your teaching?
> *What resources/ skills did you learn?*
> *How did it relate to your teaching?*

What does technology mean to you? What do you associate with the word technology?

How do you think your students use technology?
> *Is this a positive thing?*

Tell me about how you use IT away from work.

So this is my final question: What should I have asked? What were you expecting me to ask you?

Interview 2 Schedule

Interview 2: How did you come to use technology in these ways?

Before we start, I thought I should ask if there was anything relating to our last interview that you wanted to mention.

Initial question:

Last time we spoke about how your role and how you use technology now. Today I am interested in the past and hearing about your experiences of being a learner and being a teacher and how technology may have played a part in this or not.

I'm interested in the different experiences you have had and what you think has been important to you as a learner or teacher at different times in your life. And if technology has played any part in this.

So we can start where you like.

So, tell me about your experiences of being a learner and being a teacher.

Prompts to use where appropriate:

Start *When you look back, what was your first encounter with technology for learning and teaching?*
    How were you expected to use technology when you began teaching in HE?

Mid   *If you look at your teaching, how has the role of technology changed over your career?*
    How much of a priority has IT been at different stages?
    On what occasion (event) do you feel technology played its most important role?
    Have there been any key technologies or events?
     - *Any good or bad experiences?*
     - *Is there anyone you blame for bad experiences?*
    Can you recall when any new technologies have been introduced?
     - *How did you feel about these technologies?*
     - *Were these new practices or just the same in a different form?*
    Are there any technologies that you used to use but don't anymore?
    Who influenced your use of technology?
     - *individual, department, subject discipline, institution*
    Have you ever changed university?
    When you've started teaching new modules/courses – did this affect how you used IT?

Now   *What do you think the phrase 'good teaching and learning' means?*
    Have your ideas about teaching and learning changed over time?
    How do these relate to your own experience as a student?

Does technology fit into these ideas?
What determines if you use technology?
Do you ever make unplanned use of technology?
Are there any areas of your teaching in which you feel fear when technology enters?
Do you know how others in your department use technology? What about elsewhere?
How much control do you think you have over how you use technology?

Future　　　　*What gives you the impression that a certain technology or device is outdated?*
What do you think will be the role of technology in the future?
Is this is a positive step?

Wider Context

Thinking about the technology you use outside of teaching, what do these technologies do for you?
　-　*What are they for, how do they help/hinder you? Purpose, usefulness*
What is different about the technologies you use when teaching and the other technologies in your life?
How do you choose the technologies you choose outside of teaching? Is this different to how you choose what to use when teaching?

Interview 3 Schedule

Interview 3: Talk aloud protocol

Before we start, I wondered if there was anything relating to our previous interview that you wanted to mention.

Last time I asked if we could look at a piece of technology that you have used together – are you ready to do that?

What have you chosen to show me?

Can you tell me about the context - what are you using this artefact for? Who are you using it with? (e.g. tasks/ sessions/ context)

Where did this come from? (e.g. self-produced, borrowed from a colleague or a published source etc)

Tell me about how you created it

I'd like you to talk me through the session/resource and tell me how you used it and why? What advantages or disadvantages it has

How do you think students used the resource?

How do you think this helped or hindered student learning?

Would you do anything differently?

Does anyone else use this artifact? (Why? Why not?)

Will you use it again?

Could you have done this without technology? How would it have been different?

Issues arising from other interviewees

'My students' – some interviewees have said that their particular students can do/ need/ want certain IT uses

Some have said that technology is good for certain types of learning at certain levels (content, knowledge, understanding)

What can't IT do?

Do you think there has been too much hype about IT?

Do you think that students use too much IT or could do?

Some have said that they get into habits of using IT in certain ways – do you think you have technology habits?

Do you think how you use IT sends any messages to students about what you (or your university) considers important?

Are your department's expectations for technology use explicit or implicit?

Some people identified key events that forced change in their use.

Sample transcripts

First Interview 1

Thanks for agreeing to take part in these interviews, before we talk about technology, I'd just like to ask a couple of general questions

Could you tell me a little about your role at the university?
> Senior Lecturer for the Adult Nursing Department. So I mainly teach post Reg nurses who are working full time and they are either topping up their degrees cos they did the Diploma training or they are doing their Masters. So modules ... I teach various modules towards their Masters or for their degree. So generally they work full time, a lot of them are also not given the time off so they tend to do it in their own time. So they're working 6 days a week, 5 days a week at work plus one day coming here, which is quite a lot. So which is why and again we have problems with release time from the Trust so they are looking to online learning as a timesaver so they don't have to let their staff go from work.

So in terms of other responsibilities is teaching your main responsibility or...
> Mainly teaching. Virtually all teaching, I teach all day 3-4 days a week. And most of that is marking and prep.

Are there any other kind of other priorities which would be, do your placements have supervision or something?
> How do you mean?

Visiting your students?
> Oh, yes, I do link lecture as well, I visit the students out on their placements so I do some pre Reg stuff as well. I visit them out in their placements to see how they are doing practically. A lot of my work, I just teach 6 modules per year here and [name omitted] in the campus and the rest of my work is project work so I do a lot, most of the courses are run are out in hospitals and I design what they call bespoke courses for groups of staff depending on what they need.

Do you have a kind of particular specialism in your department?
> Yeah, Leadership and Management, yeah.

When you aren't teaching can you tell me about the kind of sessions or groups that you have?
> Yeah, hmm, The majority of my teaching is facilitating, hmm, what they, what's the word, facilitating learning that is teaching, I basically find out what they already know and add to their knowledge and that's, that's how I base a lot of my teaching so I start off with a lot of group work give them scenarios and see what they do and then add some theory into it or extra knowledge that they haven't got. So basically I assess their knowledge as I go in. But I do that with virtually every teaching session, every course I do

So what kind of group sizes would be?
> Up to 30. We generally don't take more than 25 or 30 at a push.

So tell me about the University. How would you describe your university?
> [Section deleted from transcript to ensure anonymity] So we are doing very well as such because we are very practically orientated and we do, as I say, I go out and do bespoke courses according to Trust needs and that is what the hospitals like generally. They like us rather than them coming here to see what to do courses which they think are divorced from practical, they don't want just the theory, they want to enable their people so they can work in practice. We are well known for that.

Is that kind of way of working University wide or is it about this department?
> It's just this Faculty. Yeah. I have to say, just the [name deleted] Faculty the rest don't do that.

So do you think that the Faculty has got a particular working culture.
>Yes of, how do you mean, working with our...?

Just do things in a particular way?
>Yes, definitely.

And is that kind of different from maybe other, do you have much contact with other universities?
>Yes, the other universities yes because we are always competing for the contracts basically in the Trusts so some are very, much more academically orientated.

What about other faculties within the university? Obviously this campus is a little bit separate.
>[Section deleted from transcript to ensure anonymity]

Can you tell me about how you use technology professionally?
>Are you talking about the VLEs or all technology?

You can start with VLE if you like.
>VLE is the main thing so we'll use that for teaching and learning and information repository as well generally. So that's come in big time, that's come in as a target I have to say. We, two years ago we were told, sounds really awful but we had to make all our courses 25% of them E Learning via the blackboard system that we have.

Is that in the faculty or from the university?
>That's a university wide..

What kind of things will you be doing on your VLE?
>Ahh, hmm, Very difficult. I've struggled with getting the 25% I have to say because we've cut our courses down say, for example, each module was 8 full days teaching, it's now 6 days and the other two days to be done via blackboard, so I've struggled with it as a learning tool because I facilitate learning via group work and that is very hard to do via blackboard. And I also find it very difficult to ensure that students understand what, you know, and can understand the subject as such whereas I can do that in class. I can finish the end of the day and know that every single one and I know what their understanding of the subject is. And those that are much further on I can label what we call deeper learning and those that are just struggling with the subject I can go more surface so I can gauge in the classroom, I find that very difficult to do that online. So some I have to know some of my colleagues are often using it for hmm, they will post their powerpoints online and some are going further and talking of having audio so they are doing a lecture online. For me personally that's not E Learning that's E teaching which you can't assess how they're doing. So there is a lot of that, there's, again, there is a remit in the Trust that all lecturers must put all their powerpoints of all their teaching sessions online. I don't use powerpoint, so that's very difficult to prove that I am using online.

Going back to that target, do you know are where that target has come from or what the purpose of having that 25% online target is?
>Yes. The Trusts, our hospitals our commissioners are saying they want less release time.

Ok, so that's come from the users of the course rather than from the university itself?
>Yes it has.

So that 25% wouldn't apply...
>I do apologise yes, the 25% is from the [name deleted] Faculty. It's come from our commissioners who've said they want more VLE. It's not the university, the university have asked us to use blackboard more but [name deleted] Faculty made the 25%.

You mention powerpoint. Can you tell me about powerpoint. Your use or not use of powerpoint?

I hate it. I personally, my colleagues do but I personally don't use it because I find it very restricting, restricting yourself to a set of information which often they could go and read in a book so I see my role in the classroom as facilitating their learning not just giving information. So I do find it too restricting.

Do you think that's, obviously you mention other staff are using it, but are there particular reasons why you think your use is different from someone else, is it a personal thing or something about the job you do or ...?

A bit of both I suppose. I am called a Senior Lecturer but I don't lecture as such, I don't lecture, I facilitate the learning in the classroom. Yes, it's different styles of teaching so those who are using a more didactic approach of just standing in front of a powerpoint and reading it off or telling people something. There are some people who teach like that and some people that teach differently and I teach differently.

Are there any technologies that you use in face to face sessions?

Technology, no, very rarely actually. In face to face sessions I tend to use the internet a lot more so that I am looking at sites and I am saying for example this or this and this and basically using the internet. I use, I have done quite a lot I suppose one session per module I'll use quizzes online so I will get them set up and we will do quizzes and that will generate a lot of discussion. So that I set them a quiz and say there's 15 questions and they all have to do it and then we look at their scores and who got right and who got wrong and then look at how, you know, the meaning behind the questions and giving them some more information. So for example if, I don't know, half the class got a certain subject wrong, the questions they didn't get them right then I will talk more on that subject.

Is that part of their formal assessment or just used as a stimulus?

A stimulus for teaching not for summative assessment.

So moving on from teaching how do you use technology for preparing your teaching?

Preparing, all the time, I suppose its online all the time using technology, I'm always on the internet looking up stuff, the latest stuff, the latest health websites and particularly our online library because obviously we don't have to go to the library any more which is an absolute boon for me because I work mainly from home. So all the journals and everything now we can get online and read up everything which is fantastic for me. So I can keep up to date with all the latest. So that is more for me keeping up to date with my learning I suppose. The teaching I am not sure how you mean.

That's exactly it I think, preparing things and keeping yourself up to date.

Yes that's generally what I use, all the time I'm online.

And I guess for communication, obviously if you are working at home?

Yes I access email all the time for communication.

And are there any other the tools you use to communicate with staff and students?

With the students, oh with the VLE. I am using the VLE all the time I have every course that I run. I am currently running 7, so for example so, for each one has a blog, a different blog system so sometimes I will set them a question which they have to do online and everybody has to put up a posting on the blog and obviously as a, I suppose they call it an E-moderator as such I will go into them each time and add some comments and say try thinking about this. That sort of thing. So that's how I keep up to date with groups often is by the blogs.

Is that sort of admin purposes as well, used in what way and those kind of...

Tend not to, how do you mean by admin, who has done what and where, that tends to be just by email or announcements board. Blogs I use for teaching, learning really rather than.

So thinking about things that you do with technology, VLE is the big one. Can you tell me why you use the particular things you do?

272

The particular bits of technology from the VLE you mean?

Yes. I suppose, I guess you use blackboard is that solely because that is the one the university gives you or ...
I have to. Yes and I use groupspaces.com for those that aren't because I have to do some courses where they are not enrolled in the university for credits, so non-credited courses. So we can't officially enrol them which means we can't get them onto the VLE platform system but I've found one called groupspaces.com where I can, we can share learning that way.

So when you have this problem with it, the students not enrolled and not being able to access blackboard is that something the university said that was something that you might use instead?
No I did it. No the university doesn't do that at all, they would just say that they would have no, that's it. Don't use it, don't contact them online.

And so how did you come across that then?
One of my colleagues, somebody whose.. has an interest in online learning and has done some research into it and he put me onto it.

Going back to blackboard or groupspaces within it obviously there are different tools that you could use, how do you chose which one you are choosing?
Well trial and error. So for example I use blogs because the discussion board is too, you have to use too many clicks to do a discussion board for people to put on their discussions to see it so we use the blog for discussions rather than as a blog as such because the discussion board just doesn't work very well at all. When you have too many clicks to get into everything, the students that I get put off so they tend not to. So yes the blog system I use quizzes a lot I have to say because it is more interesting for them to do. So the wrong questions for example I will give them feedback on the wrong questions as to why they got it wrong. So for example if I say who is a chief nurse and they say it's a certain person, no he's the MP for such and such, he does this, when they get it wrong. When they get a right question I will say yes you have and I might give them something more interesting to read like look at this site, and then find out more about it or have a look at this You Tube clip or something like that.

How do you, do you create those quizzes yourself?
Yes.

And are they things that you can re-use with different groups?
No. You can't cut and paste one quiz from one site to another so I have to do it all over again. It takes me two to three hours to put each quiz on I have to say. I have about 15 questions because of all the other reading they have to do around it, bits and bobs so I give feedback for every single wrong answer as well as a right answer to enable learning from it.

And then you mentioned using blogs for discussion what kind of things do you do in the discussions?
I can show you an example if you like. Often if its a paper that came out, so I've got one currently entitled 'Is liberating the NHS (which is a policy that is out) is it going to liberate the NHS?' And that is a question they all had to say something about it and refer to the website giving also a different point of view. So that was quite interesting, something like that.

And are those followed up, those are online tasks they do away from the university?
That is yes.

And so how does that work? Is there a particular time you say right here is when you need to do it or the date you need to have done it by, such a date?
They have to have done it by a certain date. What I tend to do is because I am very wary that they are working full time so I give them little tasks between each day that we see each other and something like that would be as a preparation for a discussion that we are going to have the next day we see each other. So if they

haven't done it, well they have to have done it, I say you have to have done it and they have done it to be honest with you, but if they haven't then they'll miss out on the discussion.

So we've talked about blogs and quizzes, any other things that you use within that at all?
No, any other things. No, just things like I say I use things like You Tube clips and various things like there are some good patient stories that are on You Tube for example. Where I can put on a little scenario and ask for comments or again that would be via blogs.

Those clips might they be used in the session and online?
Yes. Both of them. In session or online yes.

Are there any technologies that you would like to use?
Hmm...Well to be honest with you I would quite like to be able to do something where you could do a session, get them altogether online. I haven't done this yet, but something like Skype where everyone could sign in and perhaps they wouldn't even have to come in for that study day, they could do the whole lot at home but we could do it synchronously as such. That would be quite good, particularly on the days of tube strikes etc. Because I have done that before, every January or February I tend to get at least one day which is cancelled because of the snow. So they are all at home and it would be much easier if I could continue with that study day online. Although generally if it's snow I have to say they go into work anyway because to cover their colleagues who can't.

So why haven't you done that already?
Why haven't I?

Yes.
Hmm... I have to say it's because the students don't want to. They want to come in, they like face to face teaching, they like seeing us, they like meeting each other and they don't want to. I also have problems with students at the moment not having computers at home, because a lot of them are older, they're more of a managerial level as well or just general nurses who don't just have a computer or don't have access to a computer or have children who are doing GCSEs etc. so they can't get online so there is a lot of that as well. I had one group where only one person had a computer at home.

So how did that work when you have 25% online?
Exactly, they have to come in and use the library. And our library is open at weekends so they can come in at weekends. They use either our library or the hospital libraries or internet cafes. Which is not the best way to do when you are trying to learn and you have got all the hubbub in the background.

So some things are a kind of synchronous meeting. Any other technologies you would like to use?
No not really, in fact I almost want to slow it down a bit because it is quite difficult. I don't want to, because at the moment people are saying about using Blackberrys etc. So something hand held which I'd rather not so people are saying well you could do something while they are on their way to work and that sort of thing. Sometimes it can invade our own personal time.

So when you say our own personal time are you talking about your own time or are you talking about your students?
Both, both. They are having to do a lot in their own personal time anyway. So to add that onto it would be very difficult.

And so you mentioned about wanting to slow things down, what are the things you would like to slow down?
The lack of emphasis on the blackboard and do it. Well because we are pushed for the 25%, what's the word, sometimes we are doing things just for the sake of it being online rather than because it would be better online as such. So sometimes

we are having to take a session out of the classroom and put it online when it doesn't suit to be online and it would be much better to take bits from three or four sessions and put those online as part of the session rather than taking the whole lot and putting it online because sometimes I don't think it doesn't work as well. And some subjects are not suited for online learning.

Can you give me an example from your area about a subject that wouldn't be, that you would really resist putting online?

Yes definitely. Action learning where I do a lot of action learning sets as such so I work with people who bring their scenarios to the group in a confidential setting and it has to be confidential because some of the things they bring up really are quite poor, I have cases of bullying for example and that sort of thing. It's very difficult to facilitate that online, especially if you get someone who gets quite upset or something like that. How do you do that when it's online? So again I don't do it synchronously, I can't do it synchronously because I can't get them together so it would have to be asynchronous so I don't know how you would do that, how you would work on people's scenarios really in an action learning setting. I run a course on clinical supervision, which is again the same is about teaching people how to facilitate groups and I can't teach them how to facilitate groups online because we do a lot of it in practice. I get them to do it and then give them feedback about how to do that. You know where they went wrong, what could do better and that sort of thing. I can't work out how to do that online, I'm told it's very easy but I haven't found anyone who's been able to do it.

Who tells you that it's very easy?

Oh, all the people who're promoting e-learning. They are trying to push us to do, well you can do action, you can do this online, you can do everything online but, you know, I'm not quite sure how they do it.

Are those people within the department or within the university?

Both, mainly in the department and also, I mean, there's a lot of books, what's her name Salmon, is it Gilly Salmon? Sorry, I should know that. But Gily Salmon, she's written quite a bit on that and I was just thinking, and says you can do that and I haven't quite seen, you know people write it down and you need to see it in practice I suppose, whether it happens. Also I am concerned about confidentiality, some things that I think people bring up are really tough and you know yourself anything online is not confidential really, although people say it's confidential it's not. And some things should remain within the classroom.

So, I want to go on to things that might prevent you from using technology when you do want to. Are there any things that prevent you or hinder your use of technology?

The slowness of our VLE it's very very slow. Very slow, you can only upload for example one document at a time so it takes a few clicks, five or six clicks to upload a document then you have to come out and then you have to go in again so it, and it takes a long time it is a very slow system and certain times in the afternoon I've found actually, sounds really awful, that between 10 and midnight is a good time to upload stuff and to sort it out and between 5 and 7 in the morning, which is ridiculous really. And they are the times when it is much much easier but obviously heavy traffic between 9 and 5 its just I don't even bother now to use it during those times because its just too slow and it takes up too much of my time.

So has that had quite an impact on your working day?

Yes. So I will take the afternoon off and do some stuff on the evening and stuff so I do a lot of that. But the nice thing about this university I have to say is that we are very flexible, so nobody has to a certain place at a certain time, we only have to be in the university when we are teaching, so you can work whenever, wherever you like, which is quite good.

Those issues that you've raised, the time it takes you to do things, are those raised more widely?

Yes, its a big bugbear in the university, for both lecturers and students, because students again they are working full time so for them at home sitting waiting for it to

come up, when they are preparing the tea, getting the kids ready for a bath and all that sort of thing and they are having to wait for things to come up.

So does that change the things that you do online?
Umm, so short sharp things I do online, so not, activities that don't take too long and activities that they can save and come back to it – a lot of that. I won't do any timed activities at all. Particularly the worst thing actually I should've mentioned that is people who can't type, especially the older ones and they are one finger typists. So if you do a timed assessment or anything like that they just can't do it, they get themselves in a terrible state so. So I have to think about them as well. So usually very short small things that they can come back to.

Any other things that prevent /hinder your use?
A lot of it again is reluctance by students because the time factor for them.

What about for you, are there any other technical issues that you have come across?
I suppose the only technical, I am alright technical wise. We do various, we have got a great IT team who are brilliant, they are brilliant with the technical stuff and we have lots of courses about how to use all the different things on blackboard for example, our VLE but we don't, we have very little on how to facilitate learning and understanding online. We get a lot of how to put teaching materials online but not how to use it to enable true learning I suppose. We don't get any of that.

So the training that is there is more on how to do the technical things, is that done formally through the university or through the department?
Through the university. We have got an excellent site, we've got university and faculty wide but university wide is better at the moment.

But then the areas that are missed are the pedagogical uses?
That's it yes. They're not there. We are getting there.

And is that because the courses or the device isn't available or just not available for you when you need it?
Both. We have just had somebody appointed as a VLE facilitator as such so he is just getting up there really but we haven't had that really.

How about your own skills, do you feel you have the skills you need to do what you have to do?
Yeah. Ish. I've had to really, I've done a lot, I've pushed it because I'm interested in it and instead of just thinking oh I'll use the 25% of VLE time to put, just upload handouts for example for reading which some lecturers do, I do want to learn very much about it, in fact I did an E-Learning course myself. We have a tutor here who runs a course for E-Learning and we do it via E-Learning as such. That was helpful so I learnt a few things but not as much as I'd have liked. And any courses I do I tend to base it on that because I want to learn a lot about e-learning. So its been a personal thing, its not been...

Have you any idea what led to that interest?
Yes, just because I have to say its the 25% of time and I was quite anti the fact that everybody is told to put their powerpoints online, put up their handouts and that's online learning and my, I've got a big thing its not online learning its online teaching. So a lot of the faculty are using it as an online teaching board as such but not thinking about using it for real learning if you know what I mean.

I think you are very clear about the distinctions between online learning and online teaching?
Often it is e- teaching that people talk about not learning.

Do you have any sense of how you got into quite a clear position. How you got there? Is that, just reflects how you think about your teaching more generally?
Yes. How I got there?

Yes in terms of differentiating between online teaching and online learning, and how was that done?

I suppose, well I did my PGCE recently, I suppose in 2006/2007 but that was so, I'd looked into it then, you are looking at the different types of teaching and learning. I suppose that could be it. And also its my type, the way I teach is I suppose a bit different.

And then I think you mentioned technical support you felt that was...

Technical support is excellent, yes absolutely excellent. We have no problems and we have IT technicians who will come out and help us. If I say look I can't, I have got problems with the quizzes, something is wrong with this, the answer aren't coming up, I'll email the team and I will get an answer usually within a couple of hours. I've just sorted it for you, and you go onto your site and you can do it now. It's excellent and that's what I like because otherwise it could put you off.

You've already kind of spoken about this a little bit, but I am interested in what you think other people's expectations of you are to use technology?

Well for a start the commissioners and to a certain extent some people in the university, senior people I would say, are looking at using technology in order to save staff release time coming into the university, it's cheaper. And see it as a timesaver whereas in my experience it takes more time to facilitate learning at times then it does in the classroom. More time and effort.

It takes more time and effort, whose time and effort do you mean?

Mine, a lot more. Devising ways of ensuring that they can understand online and all that sort of thing. Trying to make it interesting, exciting and trying to assess their learning at the same time is very, very difficult.

Do you think that is appreciated by the commissioners, by the faculty?

Definitely not. No. The commissioners only see it a timesaver. Well you know in the current recession they are trying to cut down on the training. Training and development money has gone right down now in Trust. We get our main income as a [name deleted] faculty our income is generally not from the education side, we generate it from the Trusts. NHS Trusts that's where we get most of or virtually all from really.

What about students expectations?

Students also begrudge it, they don't like it all. Because they know that their Trusts are using it as a timesaver and they begrudge having to work five days a week, plus at the moment its 50/50, the Trust will pay for 50% of their time in university when they do a course, a module and they have to do their 50% in their own time. That's generally the mix so they begrudge that already so they are having to take their holiday, annual leave etc. in order to do the courses. And on top of that the Trusts are saying use the online learning as well, which again is their own time. So they mistrust it.

How do you think they view their online days?

Well I don't have online days.

Sorry, the online 25%.

The 25% which again I do bits between the days, I've had to work very very hard to get them interested in it. Very hard which is why I have to make it, whatever it is, interesting for them to use and when they come back give them lots of feedback, lots of feedback on the blogs about their entries, that sort of thing. So I have to work very very hard to get them to use it because again a lot of it is formative stuff, so its a bit like, I suppose almost like attendance, you have an attendance record. I do check who has been online.

Do you think they have any expectations of what you are going to do online?

No, none at all. They are all frightened of keeping up a lot of them really. Because there is a lot of technology and they are not very good technology wise. I mean some people I get on the courses just don't know how to use email yet. So they haven't got an email account or whatever. So that's very difficult when you are dealing with people like that. On top of the very technology savvy ones I always get a good mixture.

How about colleagues? What do you think your colleagues expectations are of you to use technology?

Of me.

Yes.

How do you mean.

Do you think other members of staff are expecting you to use more, do more, do less?

No. I think everyone is struggling with using it really so no-one has any more expectations of me. In fact, everyone is really trying hard, I suppose, to get that content, in fact some, I have to say I know quite a few, are not being able to do it online so they try and squeeze all the content into the six face to face days and that is quite difficult.

You have already mentioned some bits of your teaching that are free of technology and are there other areas that you wouldn't want to use technology apart from those kind of sensitive stuff?

Sensitive stuff. Well I have to say a lot of it is that because the majority of stuff I do is through group work so I find it still very difficult, even though I do use the blogs as a discussion board as such, I still find, it's the group work. It's the assessing of what they already know and being able to deliver teaching according to what their needs are.

Do you think that will change in the future?

Possibly, yes.

What might make it change?

Commissioners reducing the time down even further and I can see it. I know for example my colleagues at another university close to here for example, deliver whole clinical, I run a clinical leadership course one module and they run the whole lot online and I don't know how they do it. So maybe I should find out but I do know that commissions from my courses have doubled because I am doing face to face. I don't know whether it is that or not, I don't know.

So do you think there are external demands that might lead to you having to do more online?

Yes, definitely. I think very soon it will be 50/50.

And that is not something you would welcome really?

No, which is why I am preparing for it now, so I am trying to learn as much as I can, trying to use it properly or use it effectively before it gets to 50.

So I wonder if you could talk maybe about one particular session or the last session. You were saying that online or the technology things kind of fit in before and after, between sessions. So you think you could talk me through how you use the technology between some sessions recently?

Well one example, at the beginning of each day I will do a refresher session. Basically, I'll go through what we have gone through before, so I will take the first half an hour of each day where I will do a reminder for everyone of what we have gone through before. On purpose so it is repetitive really to get it into their minds. So certain things, certain central elements of leadership for example I will go through over and over again and I always used to do that half an hour at the beginning of each session and obviously I have taken that out now because, and I have put it on blackboard and their refresher is to complete a quiz and they have got to get every single question right so they can do it over and over again and they will get all of the feedback from the wrong questions until they get it right and once they have got 15 out of 15 that is what they have to do and I will check online that they have all done it. And that's my way of doing it to ensure that they understand those elements before I go on to the next bit.

So how does that compare to what you used to do?

Well I would use it as a discussion, I would fire out questions to them. I would say what's this, what's that and tell me again what you would do, and I would do it like that for the first half hour.

Maybe in terms of comparing the relative advantages and disadvantages of the quality of those two?

I suppose again I can never absolutely assess what they are learning, whereas I can assess their understanding, I can assess who is quieter and perhaps get them more involved, that sort of thing. There was one for example, I don't think it's as effective but I have to use it and therefore it's better, but for example one of the questions on the last one, as a right answer, one of the right answers had a You Tube clip – yes you're right, in fact you will find out more information - just watch this two minute clip – was a right answer. And as part of the end of it they had to write on the blog - I want, people's opinions, comments on the You Tube clip and nobody wrote comments so when I went to the next session and said why didn't anyone comment, nobody could find it. They said we didn't understand what You Tube clip because I had put the You Tube clip as part of the answer so they obviously hadn't read the answer so perhaps it is not always getting through as such. They haven't read the answer and therefore are they reading the answers I am giving them when they do their questionnaire.

And you began to suspect that some of them aren't?

Yes, some of them are not. So but I don't know that until I see them all. I can never absolutely tell.

Your students when they were doing that would you imagine they would be working at home or in some other place doing their quiz. Do you think you will carry on doing that activity in the future?

That one yes. Because it's a simple replacement in a way, like for like and I've taken so that's three hours of work, half an hour each day, so it's three hours work that I've taken out of my course and put online so that's a nice, simple replacement as such. We have to have 10 hours of the 40 hours online so...

If the expectations for hourage changed would you be keeping that quiz? If the expectations for the number of hours online / face to face changed somehow and you had the option of bringing that back to the way it used to be, or putting something else in?

That one I would probably keep actually. A bit of both. I do like doing a bit of both, something online and a bit of discussion in the classroom on the same thing. So reducing it so it wouldn't be quite so long in the morning.

So what is the advantage of doing a bit of both do you think?

You can check their understanding in classroom as well as doing something online so it is reducing the time down which is the main factor for using it.

So, moving on, I wonder if you would tell me just a little bit about what you think were your best and worst kind of teaching events?

Online or?

Either really. Whether the technology is anything to do with them or not?

I have to say one of the reasons I tend not to use technology is because I am going out to different Trusts all the time and generally our technology does not match with those of Trusts, they are always encrypted now, everything so we can't use our memory sticks in Trusts and vice versa, they can't use theirs here and so that's always a pain, so if I take anything on a memory stick I can't use it generally. So I tend not to. Whereas some staff will find all different ways of using it. So a lot of it is incompatible anyway.

So you are prevented from doing things?

Yes. And my biggest bugbear is not being able to access the internet when I am out in Trusts and I do like to be able to do that to be able to back something up and show them something and I can't do it.

So if you think back to your sessions that you think went really well, is that a session that you used technology or not?

No my sessions that go really well are the ones where you get really good discussions and really deep learning etc. where they are prepared before they come in. They tend to be the ones that go really well. I have had some sessions with technology that do work really well and it tends to be using the videos and clips and that sort of thing.

On the flip side have you had a session that maybe hasn't, I am sure it doesn't happen very often for you, but things that haven't gone as well as you might have hoped?

Yes. A lot of it could be due to lack of technology. My biggest thing is changing their activity every 20 minutes as you know, that's what we should be doing to keep their enthusiasm going, so I always try and change whatever the activity is every 20 minutes. So something like a quick clip on the You Tube or something like that does tend to break something up sometimes. Or just a different time factor, so looking at something different, rather than just me and the white board and a pen. Which I use a lot of.

If you are thinking more generally about teaching with technology and teaching face to face or other methods, what do you think are the main differences between someone teaching using technology and not?

Well I suppose it has been shown that if you use pictures and things like that people are more stimulated and people who are different learners some have, some prefer to have something in the background like a picture, or something like that. And sometimes I will use that. There is one Trust that I work at in London that has all the latest technology going, its brilliant. And you go in the classroom and they have got this screen like a TV type screen and it is just there permanently and there is no noise, there is no projector or anything like that, and it has hand held things so I can just leave a picture on the wall of something in Word and sometimes that is enough to stimulate them and that's great. It's all the hassle of having to put the projector up and having to do different things that I don't like, but that one Trust I always use their technology because it's there and it works brilliantly. It's not intrusive and no noise.

And so that must contrast with other places where it is intrusive and it is the noise from the projector?

Noise from the projector and it gets hot and all sorts of things really. And of course in these classrooms where you have projectors and its hot anyway it just makes things worse.

Obviously you make decisions about what is appropriate use of technology, so how have you made those choices about what is going to be appropriate and what's not?

I don't purposely go to introduce technology to the classroom. I will use it if it is there. Does that sound odd? I would say if there is a certain internet site that is really interesting, that has got some really good stuff, I would think oh I will take that into my session. But I won't purposely think I've got to use some technology therefore I will find something and put it in. I do it by accident.

I suppose when you come across some really good site what kind of things make it really good? Are there things you're looking for?

The relevance I suppose.

So it is kind of driven by the match to your subject?

The subject rather than anything else, definitely.

Do you think that the way you use technology is very much connected to your subject?

Yes.

Do you think you have got better at making the judgements about when and when not to use technology?

Yes.

Why is that then?

Because I've always been very reluctant to use technology and I'll only use it if it is absolutely necessary. But it has become more necessary these days with things like internet sites and bits, but I will tend to use it only, say for example, a certain patient's story which they have got which is brilliant, there's a pilot who's wife died recently in hospital due to error and he is going round now teaching about this error system and he applied to use technology in the aviation industry and its actually been applied in theatres now. He's got a couple of 10 minute You Tube clips which are so relevant I have to use them in the classroom as such so I do.

You mentioned about the assessment quizzes that you are using as part of your teaching. Do you use IT for their more formal assessments?
No, not at all, no.

So what kind of assessments would someone do on your courses?
All their assessments, all their summative assessments are non technology based. We haven't even got the, well we have got the system there but we don't use it yet for submitting anything electronically. We are still quite a bit behind with things like that. So we do nothing online summatively but formative assessments we do.

What kind of training have you had to use the technology in your teaching?
I've done a couple of days, a lot of it is workshops so a day on how to use blackboard, one day on how to do quizzes, set up quizzes, one day on how to set up discussion boards, blogs, and the module I did on supporting E-Learners. So that was a whole module.

And so they taught the skills on how to create quizzes or how to do things and then you decided how you were going to use them? Were the skills related to your teaching in the training?
No, it was just how to do this, how to do this question, how to do this, and how to do this and we've got this facility. So gradually, it is why I started with the basics and I've gradually got better and better as the more I use it, the more I find out the different facilities I can use.

And the E-Learning module, what kind of things was that?
That was more looking at other methods as well, things like use of Twitter, Skype, Second Life even.

And you have not taken on any of those three?
No. I am not going to Twitter people, my students.

The tape recorder doesn't pick up your expression as you mention that! Can you just tell me why not?
There is no way I am going to get onto Twitter and start twittering and that sort of thing, I think that technology is taking over your life. No I am not interested in twittering my students at all, which some I know, the tutor who was teaching us does.

And so, and that's their lives as well as yours you were saying before, is that what you mean? In terms of you don't want to be sending messages to them all the time?
No, and I don't want them tweeting me, absolutely not, no. Not interested in that at all.

And then obviously with Skype you said there may be possibilities in the future?
With Skype there maybe, yes. I could see the possibilities, I use that more on one to one and small groups where we have got together and talked on Skype. Which I thought this could be, and I was thinking I could use this somehow in group work but I haven't quite got my head around how I would do it.

The third one you mentioned was Second Life
Second Life I thought was awful. But the person who ran the course does teach courses on Second Life through Second Life and I couldn't get it at all.

Do you know why?

I suppose it was just, ohh, there are too many other aspects going on and sometimes people using Second Life where they are just setting up a classroom on Second Life, and you think well what's the point of doing that. No point at all. And I went into Second Life and was propositioned about four or five times before I even got anywhere, it is ridiculous. It is all, I didn't like it at all. Couldn't see the point of it and sort of gave up.

How do you think your students use technology. You mentioned about where they use or don't use technology, do you get any idea about how they use technology?

The younger ones are always using Facebook as a big thing. They are all on Facebook. The older ones don't use it quite as much. I suppose social networking is a big thing although they don't want to, generally what I have found is, I am not interested in Facebook at all. But their Facebook is their social life and I know our university has tried putting some stuff on Facebook as a site and they are just not interested, that's different thank you, Facebook is our social life and they want the cut off. So I have not even gone into that area and I wouldn't be interested either.

Just one quite general question, what does technology mean to you? We have been talking all this time about the word technology, what do you associate with that?

Computers. Anything to do with computers. Technology and education I always think of using technology to enable the learning.

And can you tell me very briefly how you use technology away from work?

Away from work. You are talking about computers or any technology? Anything at all? Well I use technology, I suppose online everything I do, I do all my shopping online, retail and food and everything online because life's busy.

But not social, not Facebook?

No I am not interested in social network. No I don't like that at all, confidentiality etc. Saying that I email mainly, I email.

This is my final question, what should I have asked? What were you expecting me to ask? Anything I missed out?

What do I think E-Learning is. I would say because that is my big thing. Because people interpret E-Learning differently.

And what's your interpretation?

Enabling facilitating students to learn via online rather than face to face. Enabling them to learn not teaching.

So what is E-Learning not?

Teaching, E-Teaching. It's not just putting a lecture on powerpoint, or doing lectures online. I've seen full online courses that are all by lectures, by just giving information, telling people to read things through but that's not learning I don't think.

END OF INTERVIEW 1

Second Interview

I wonder if there was anything related to the last interview that you wanted to mention or say before I move on?

No, no just that I realised I do use quite a bit of technology but I am sure you will talk about it.

No go on, what ...

Well I didn't mention things like using the cameras and stuff did I?

I don't remember, why don't you talk about that.

I use cameras quite a bit when I do presentation work so I teach people how to give presentations, managers, for example, and we use a lot, I video them and then we go through it afterwards. Their presentation techniques, things like that. I forgot to tell you. I didn't see that as technology but I suppose it is, isn't it.

You record them and then they watch them back and discuss them?

Yes and I use them to send off to external examiners as well when I am examining them summatively as well.

How do they respond to watching themselves on video?

They love it. Obviously they are very nervous beforehand always but when they see themselves afterwards they always relax and I give them lots of positive feedback as well to try and improve their confidence because as managers it's something they are going to have to do, so I don't criticise much I always pick on the good bits and they find it very very useful. They always evaluate it very well.

And was there anything else?

No that was it.

So last time we spoke about your role and how you are using the technology now and today I am interested in the past and hearing about your experiences of being a learner and being a teacher and how technology may have played a part in that or not. So I am interested in the different experiences you've had, what you think has been important to you both as a learner and as a teacher and if technology has played any part of that. So you can start where you like, I'd like you to tell me a bit about your experiences in learning and teaching.

As a learner, in the classroom I assume?

Wherever?

Because I was obviously a nurse first as well so learning is very different when you are learning on the wards and in the practice area so usually when you are learning on the wards and the practice area you are just doing it with patients etc. I am not sure the technology it's just all the equipment that's around the patient.

So how did you train to be a nurse, when you trained did you do a degree?

I wasn't on a degree, my training was 30 something years ago so it was certificate level at the time. So then it was just you watched people do things and then you had a go yourself and they watched you and then afterwards you were assessed once you had learned it inside out and backwards, that's how it was done. And you had two weeks in the classroom every few months and that was just classroom based teaching then when they stood up with overhead projectors it was at the time and just gave us lots of information that's how it was then all those years ago. More recently, experiences as a learner on PGCE I suppose I have to say that personally, I shouldn't say too much, yes well I can. The teacher who taught us on PGCE and ran the course is absolutely fantastic, boy did she know her stuff and she really did, she knew all the research inside out and backwards with teaching etc. but she couldn't teach for toffee. But she gave us masses of information, masses, so luckily we had quite senior people on the course so we would go off and do our own reading etc. which is brilliant. But a lot of the learning I got there in the classroom wasn't too much, it was just giving out handouts all the time and listing bullet points on a Powerpoint or even OHPs she was using at the time. A lot of the learning I did was over, a lot of it was over the net, looking up my own stuff I suppose. From the Higher Education Academy and all those sources and that sort of thing. But

283

actually in the classroom not quite so much. Not so much discussion. I do learn a lot from discussion and now with, I'm also doing a Masters actually in Education because I want to go on and teach lecturers and it's brilliant. We are doing lots and lots of discussion and of course all my peers are in education as well so I am learning loads from them.

So what is your experience of technology on that course?
Powerpoint. It always comes back to Powerpoint doesn't it. The only technology that is ever used on that course is Powerpoint and the virtual learning environment is used only as a repository for handouts or web links. But other than that the only technology that is used on that course is Powerpoint. That's it. And, sorry, I did Supporting E-learning, one module which was online, completely online.

Was that part of your MA?
Yes. That was brilliant actually and that was via a groupspaces thing and we just all basically, he would pose us a question, in fact we had no lessons whatsoever, all he would do, all the tutor would do was pose a question each week and we'd set off and do it together and just discuss it on the forum.

How did you find that?
I found it very useful that we could have pointers to go off and there were, I'll be honest with you I would say about 50-60% of the group who took part got a lot out of it. So the more you put in it, the more you get out of it really and 30-40% of the group didn't.

And didn't get anything out of it or just didn't take part?
Didn't take part at all, not at all but would obviously read up on it and take the ideas of everyone else. As you always get when you do group work you always get one or two that, when you are in a classroom I often feel that you can ensure that those, they do take part, but it's very hard online to do that.

Why was that do you think? Were you aware that they were not taking part?
Hmm, there was quite a bit of resentment but nobody said anything. And certainly no-one would say it online, so it was only when we all got together on the last day that we said why didn't you, you know, all that sort of thing but we never spoke about it because obviously what you put online you put online and it's there for everybody to see. So it was never, it was just an undercurrent.

So do you think it's different some things that you might say and everyone would hear, different from what you might write and everyone would see even though it's the same people seeing it.
Yes, definitely.

And why is that?
I don't know, sometimes you can't retract what you've said and it's not very nice it can be defamatory in a way. And also people can take it the wrong way, if you say something and you notice there are four people in this group that haven't contributed at all, if you say it in a certain way in the classroom it can come across a bit better than if you, it can come across the wrong way sometimes in an email or on a discussion board. So people are very reluctant, I know when I do this with my groups in discussion boards they are quite reluctant to say things or sometimes they say the wrong thing and you want to say no don't say that sort of thing on a discussion board.

Is there anything that you would do differently because of that experience you had?
Yes definitely, what I do is I interject a lot more in the discussion boards and I give a lot of positive feedback to say, you know, that was a really good comment has anyone else used that, I can point you to an article on this, somebody has actually researched into what you've brought up, that sort of thing and so they get some positive feedback and I know, I do notice every time I interject someone else comes in fairly quickly after that so it encourages them whereas when we did the course the tutor didn't, he just left the question with us and we just got on with it. That makes a

difference and sometimes I have said, there is a couple who have not said anything, do you have any views?

So obviously when we talked last time you had some quite strong opinions about Powerpoint, and so, I wonder how they relate to your experiences of those Powerpoint sessions that you had?
My experiences of Powerpoint is for me when somebody puts up a Powerpoint and it starts with bullet points, your stomach, your heart sinks really. You just think here we go and you just go through a load of bullet points that somebody reads out and I find, well I've said it before, it's not teaching. But I have attended a few presentations, not teaching, but presentations where people are using photographs, pictures, like this which makes it so much more interesting and often with no writing at all so they will just have it in the background and that's one thing I've found stimulates you more. You've just got this picture permanently in the background but somebody is talking, or using it as a stimulation for discussion so that's, I think is more helpful than just reading it off bullet points which people they did just transfer the overhead to the Powerpoint.

What do you think, there was a point in your, on the PGCE or at some point where you came to that conclusion or do you think back from the start, you thought well actually this Powerpoint is not helping me?
What for me as a teacher?

No, as a learner you doing your PGCE or whatever other courses you've taken?
Right from the start, I knew right from the start Powerpoint wasn't helping me at all so it is just that boring. Definitely, but when people use it as a background and it's something to look at, and they're not just referring to it, so much.

So when you look back what do you think was your first experience of technology for learning and teaching?
As a learner?

Or as a teacher?
Of technology? Technology has got to be the OHP. That was what we used all the time and now people are just into Powerpoint everywhere.

What do you think about the OHP now? If you think back to it.
What do I think about it?

Was it a good thing, was it not a good thing?
Not such a good thing I don't think. Because it stops, I think it restricts and I still think today these things restrict teaching, they restrict you being able to use and discuss things with the group and whereas you have got to keep to a timetable. Whereas the teachers that used it and in fact I remember they used to, because I've never really used Powerpoint it was before my time as a teacher, used to write on a Powerpoint as if it was I suppose writing on a whiteboard really, and that's a bit different when they are doing that so you are using some group to generate.

So you kind of write on the transparencies for the overhead?
Yes, but when you have got set stuff it is just like set stuff to deliver. Well again that is why Powerpoint in a way has taken over so you can just put all the Powerpoint slides on there. On the VLE and they don't even have to attend.

So you went from nursing, did you come straight into Higher Education or did you do some teaching or training within?
I went into management for ten years, so ten years as a nurse really up to I became a matron and then I went into management after that for ten years and then I gradually got into teaching.

When you say gradually how...?
Well I took a secondment in 2001 out of, an eighteen months secondment to the [name deleted] basically it was running and facilitating a leadership programme, leadership was the in-thing at the time so developing clinical leadership skills. So I

went in and had training etc. to learn how to facilitate groups and went and delivered this programme or helped different hospitals deliver the programme across the eastern region. So that got me into facilitating groups and teaching. And then I came back to my managerial role and I had been asked to do quite a few things privately as well going out to different Trusts and the matron role came in and said you've come in and done this stuff or something similar and would you come in and develop a matron programme for us, because all these new matrons they didn't know what to do with them, because the Government had said you will have matrons so I went into quite a few Trusts' hospitals to go and develop matron programmes and I did this privately. And at the time I was doing it in annual leave and then I found out I had so much work and I thought I actually prefer this work than being a manager. So I took the leap and left the NHS and worked privately as a consultant.

And then that turned to...?

And then I gradually got to know people from the University and then the University here asked me to do a few, some people were off sick could I cover, and then they asked me to co-ordinate a few modules and I was doing it privately and then they asked would I come and work here part time because again in this subject the more people who have been out recently within the NHS world and that sort of thing because I only had a degree so would I come and do that part time which I did I took on a part time role. On the proviso that I did the PGCE.

And you are full time now?

Yes, the work gradually increased and increased so full time yes. The consultancy went down at the time because Trusts were demanding it had to be degree level so all the courses went on to a degree level and I couldn't offer that as an independent consultant so I came to the University and did that. Although now it's all changing and they are going back to non academic courses.

You mentioned that you hadn't done the degree before you trained, when did you do your degree?

I did my degree 96/97.

So while you were working, was that in nursing?

Health studies yes, I did it when I was working full time.

Was that a part time?

Yes, a part-time degree over 4 years

And was there any use of technology in that degree?

God, long ago. Was there use of technology, no.

What was the style of learning and teaching, do you remember?

It was a tutor standing in front of the classroom with notes and reading them out to us. Occasionally we would just pop up with a question – isn't that awful. But we also used to have seminar groups, we broke up into seminar groups and we would discuss a subject and then go back. But we never had to report back so.

So last time you kind of made a quite strong distinction between teaching as delivering information and facilitating groups, and do you trace that back to that [name deleted] *training?*

Yes, definitely, because when I started doing that and seeing how much you could do, being trained really as a facilitator of groups and to me, having done that, and then go back and see what teachers do realising that you get so much more by facilitating groups, and also when I did my PGCE then that obviously all the research I did, not so much copying how I was taught but obviously with the PGCE you do all the research for your assignments etc and you find out so much more don't you, and that is when I started realising, yes definitely. That facilitating groups was actually teaching – I was quite pleased.

Do you think you had different thoughts about learning and teaching before you did that [name deleted] *course?*

I never thought about it, to be honest with you, I didn't think about it at all and I just, I never really taught. I taught bits. But no I didn't think about it because it wasn't my aim to become a teacher, I'm suddenly here now.

So when you started working as a consultant, and really doing some teaching and training, were you using any technology as part of that?

We were given Powerpoint slides to use, Powerpoint packages, Again, I'll go back to Powerpoint because that's all it was. Powerpoint packages to use and again I found them quite restricting so I would go through them but then after a while I suppose half way through the course I'd give up and do facilitating with the group because I found it too restrictive as I got used to facilitating groups.

When you say you were given these where did they come from?

[name deleted] They developed the programme so it was an eighteen month programme that we helped people deliver in Trusts. And so I trained the trainers basically and part of that was, we were given the overheads but we were also given lots of notes, lots of exercises and how to. So the Powerpoint we had but I have to admit none of us really used them because they were boring bullet points. But they did give us lots and lots of exercises. We were taught basically how to use all these different exercises to enable the discussions of the groups and to enable the learning. And action learning was a big thing as well we were taught how to facilitate groups in their action learning so they would give scenarios to the group and we would work on them and think of answers and they would go back to their environment, have a go at doing whatever it was they had decided they'd do and come back and we would reflect and learn from their actions. So I did that for about eighteen months. I think that definitely changed what I was doing.

You say that changed what you were doing do you mean doing that, the [name deleted] *course.*

Yes definitely. Oh hugely.

And was there anything in particular about that that you really grasped on to or just that seemed to make sense?

Yes, I suppose a lot of the things for us, I suppose that made sense, what in using technology wise?

No, all.

No just generally we were, I think the thing is we were taught using the same methodologies that we were expected to teach others. So we had our own action learning groups, we went through all the exercises ourselves and learnt ourselves before we went out and helped deliver them to the trainers who then used their experiences etc. and delivered them to the rest of the organisation. So watching other people do. Assimilating it that way.

So when you started at the university you were doing occasional things part time, at that point how were you expected to use technology?

I wasn't at all, the only thing that was really helpful for me because I was working part time was the fact I was given access to email at home which was a huge thing so I was using, I didn't have an office or anything obviously because I was working part time so to be able to access everything from home was huge. In the classroom nothing really.

So can you think back over your time at the university and how things have changed?

I think, I'll be honest with you, it's financial that's brought us into using more technology particularly if we use Powerpoint you have less handouts therefore at the moment we are going through another one we are restricted to how much we photocopy for example so we are not allowed to give handouts, we are asked not to give handouts in the classroom. All handouts go online and they look them up afterwards and print them off at home. So obviously we have to use technology that way we've got no choice. Even though you know that more than 50% of your group won't get them so it's a bit of a pain that way. You are expected to use Powerpoint, you are expected to put all your Powerpoint slides up on the VLE and so that when people are off sick etc. someone else can use your session you are expected to be

just able to give your Powerpoint and someone else will use it. That's the only thing with technology.

Is that kind of an official statement that you should be able to use, pick up someone else's?
Yes. Is it official, there is nothing written down but it is expected.

And does it happen?
Other people do it I'm afraid I don't. I can't teach a subject I don't know from a Powerpoint and you can't use someone else's. If I was given a lesson plan maybe. Yes, this is what you got to teach and I knew the subject and using their lesson plan but to just be given a Powerpoint it's a bit difficult. I think you have to think through what exercises you are going to do with the class to be able to get the information across. But I know people do definitely.

So going through your time at the University so are there particular points where technology has become more important, played a more important role?
Any particular points that have become more important. Important or just useful?

I suppose when has IT been most important?
Well, we have to say money, I have to admit it's used only really for finance, so like use of the VLE. When to reduce attendance.

So is ICT seen as more of a priority at certain times?
Yes.

And those are when money needs to be saved?
Yes definitely. I have to say that appears to be the priority so at the moment there is a big big run on using e-tivities and that sort of thing in order to get more money.

So thinking back I wonder what the kind of key technologies there have been at various times, obviously Powerpoint?
It's gone from OHP to Powerpoint to VLE. So that's where it been going, that's it really.

And I think you've talked about the bad experiences of Powerpoint and I wondered if you have had good experiences with Powerpoint?
That was recently but that wasn't teaching, it was just presentations, where I've been going to presentations.

What about VLE have there been, can you put your finger on particular good or bad experiences you have had with the VLE?
The VLE was when I was doing that course myself and having discussion boards actually. That is when we, but again we are quite experienced learners, we are all senior lecturers or senior educational people out in the NHS so quite responsible and also eager to learn. We are all doing a Masters because we want and not because we have to as such.

So before you did that E-Learning module, had you been using the VLE before that?
I had but not quite as extensively as I do now.

So what had you been doing beforehand?
Uploading handouts and using quizzes.

So why did you start uploading things onto the VLE?
Because we had been told to.

So that's been for quite a long of time that's been a requirement?
Yes it has

But I guess the quizzes haven't been a requirement?
No.

So when did you start to use that?

I started that when we had to reduce the number of face to face classroom sessions so basically each module that I run is 8 days, 8 full days as was and now it's been reduced to 6 full days. With so much of a blackboard component so what I had to do is to try and transfer some of my sessions from the 8 days to get the information across and what I did, used to do, at the beginning of every session was to devote the first 13 minutes to recapping what they did before so that we could move on, so we would have a recap session as such. But now what I do is I put it on a quiz so they have to do the quiz the night before and they have to do it over and over again until they get the 100% and I check them all and see to make sure they have got it so they continue doing the quiz over and over again and I give them lots of feedback on the answers so that they are ready for when I start next time that's why I started the quiz.

And then am I right in thinking that it was a result of that kind of reduction and expectation for you to do online work that you signed up for the module?

Yes.

And so what kind of things have, do you think you have done or have done differently as a result of that module?

Used the discussion boards, although I used the blog as a discussion board because the VLE is not very good discussion board, you can't see it all at once, whereas the blog you can so.

So you used it for the purposes that you have done yourself?

Yes, similar stuff yes. And pose a question and everybody's got to answer or give a different view to the other one who did it before and that sort of thing. Create a conversation so they're learning and then say you've got to refer to a piece of research and everyone will know which piece of research that was so they have got to go out and learn, read and pick something from it and put it on the discussion board. So it's a way of learning.

Have you had any bad experiences of the VLE?

As a learner or a teacher?

Either really.

As a learner I told you that is the 40% of the class who didn't, one of my colleagues I have to say, which is quite funny, we remarked about it again on the last day with a learner because he'd been away on annual leave or something and he'd come back and asked a question and the tutor had said something it obviously came across as a different way, and if you've been taking part you would have known about such and such. And he obviously took it to heart, because there is a different discussion board for each week and this had been going for 12 weeks so he put something on every single discussion board and sort of went overboard. It's quite funny so we all came and laughed about it in that session. So that's a funny thing really I suppose that happened. Misconstrued a tutor's comment. As a teacher - bad experiences not yet. People always make some funny comments, they just make me chuckle. One person said I had a go at, they had to comment on the quiz, she said I had a go at the quiz and I got 77, then I got 87 and then I kept going and I got confused because then I started getting them wrong and I was getting down to 20% so I had to give up for a while. You know the type of personality, the person who's in the classroom makes you chuckle.

Can you recall times when new technologies have been introduced?

Yes, new technologies, how do you mean?

Well when you have come across any?

Turnitin is a big one.

I guess at anytime since you have started in the university new things will have....

The problem with new things that again because we are a big organisation, I would give the example of Turnitin. because its suddenly, Turnitin, we were asked to use it a couple of years ago, some people took it up and some people haven't. And

generally then we were told to do it as such, a year ago and so people have been using it and then suddenly we have realised or somebody said that a lot of people aren't using it for their students so it's inequitable, so suddenly, it's a policy everyone will use it and then it's been realised that half the faculty don't know how to use it, so someone has quickly put on some training sessions on how to use Turnitin. Which was quite funny because it was all done really quickly and it's all done and I noticed there is nobody on this, nobody on this and somebody actually wrote back and said it is during recess. So that's why you are not going to get too many people on it but it was all done very quickly. So you can think people are using it and they are not, so I quickly got on a training sessions.

Why do you think people weren't using it
They didn't know how , didn't understand it. A lot of people are still not very IT literate.

What about other technologies that have been introduced since you've been here?
We've had new things put in the classrooms, not so much here. What other technology, I'm trying to think. Nothing really, there are some various things that I know we can do on VLE that people keep saying you can come to training sessions and nobody is bothering. I have to admit I'm a novice because none of us understand and we haven't got time. If somebody explained that it would be very very useful for you to do it then we would. Things like doing evaluations at the end of the course for example, someone said that you could put it on the survey form and you could do it online rather than having to give them out for each session. And that could save some time. And some tutors are doing it and some are not, and people are thinking well it's too much hassle to be able to learn how to do it so I will just continue doing it by paper for the moment. So things like that. And it does take a while to come in because people don't understand the usefulness of it.

Are there any technologies that you used to use that you don't anymore?
No. Are there? Not so far as I'm aware.

So I interested in how has influenced how you use technology?
The tutor who ran the course that I did the module definitely, and by having a go not so much the tutor but doing it ourselves, learning myself via a module that teaches you how to teach using E-learning, it was E-learning. So E-Learning via E-Learning. That's my biggest thing. Other ways? Remind me what the question was?

So I guess it's who influenced the use of technology so obviously the course that you've been on?
I have to admit and other people who have been using it themselves seeing what they have done, so I've got another colleague who uses discussion boards and she uses it to link with another, a Canadian university who are doing a similar course, so the students link up. So I've seen what she does. So it's learning from other's good practice but we don't tend to, it sounds really awful, but we don't tend to see each other teach much so apart from the PGCE where you do your teaching observations it's very difficult to see what others do.

With your views on learning they are obviously heavily influenced by your subject area, via the [name deleted]*, do you think your subject has influenced how you use technology or kind of people within the field?*
Yes I suppose about being proactive and going out and getting it, definitely. That's what I teach all the time is about being proactive, things won't come to you, you're going to have to go and get them that sort of thing, and that's what I do and I learnt from myself all these theories etc. So very much I go out and find it rather than waiting for it to come to me. If I did I wouldn't be doing half the stuff I'm doing. And there are a few others in the faculty like that.

I am interested in when you might have taken on new courses or new modules?
What to teach?

Yes, when you have started teaching a new module or new course or some subject, have there been any kind of new modules where you've wanted to use technology differently or not?

Yes. There's been quite a few modules I have to admit I'm getting into a, getting quite a lot actually where I need or I would like to have a classroom where everyone can access their computer so they could all do an online test for example. Myers Briggs is one, so Myers Briggs to be able to have them all do it, the online test, and then go through it altogether, so much quicker easier and those sort of things. But fitting a classroom of, especially when it is over 30, we don't have classrooms of more than 30 computers a lot of them are 10, 20 at the most. And it's quite difficult to have, to be able to do group work and to have them have computers in front of them as well. They are stuck there so you can't get them all moving around or anything. So I found that very very difficult. What I would like to do is be able to supply them all with a laptop and do that really. Put them in groups. Or a laptop per group that they would sit together and do things that would be brilliant but, obviously, I can't see that happening. But that would make a huge difference.

Any other examples like that where you have started new modules or new courses?

New modules and new courses yes. Well that was one because I wanted to make that subject a bit more exciting because the new module was a bit of a dry subject. New modules, new courses, trying to do different things. There is another one that I have been doing, a new one that I was given, clinical supervision and tried to make it, a bit like action learning, trying to make that more interesting, so I was trying to think how I would use technology, well things again, videoing and going through the video but it is very, very difficult to do that.

Because of resources again or ...

Well obviously resources. A lot of the classrooms when I teach smaller groups I get smaller classrooms and therefore you don't have the situation where you can connect up the camera to something straight away. You have to wait until the next session where I have to get one of the media technicians to download it onto a CD or something for me. Because there is no connection, that sort of thing. So when you are in smaller rooms you don't tend to get, the technology is basically in the bigger classrooms so when I have smaller groups I can't use the technology.

That is just the way the rooms are set up?

Yes, which is fair enough I suppose.

So thinking back to when you are planning one of these new courses or a new module and you are trying to think what you are going to put in, what kind of things are you thinking about?

When I'm doing it - making it interesting. How can I make, how can I do it in such a way that I can ensure the person understands the subject. What can I do to get this through to them as such.

And how does technology fit into making things interesting?

Making pictures somehow that can visualise things. There is one for example I do on the data protection act, record keeping and that sort of thing, where people think oh my gosh that's very dry. There are 27 policies in the NHS at the moment, confidentiality, record keeping, medical records, so it's very, very difficult to do that and I do that by just giving them scenarios of when the data protection act has been breached, which it often is to give them lots of scenarios and we will work on that really. And then sometimes the Department of Health will come up with some packages, Powerpoints or something and I will use some of their slides just up on the wall just to look at and that's it. It's very, it's quite hard, especially when it's a boring subject.

Do you think that's one of the key things that technology does for you that it helps you to liven up things?

Yes, definitely, definitely. When you have got to change, I mean we were taught the golden rule every 20 minutes change the activity, which I've always stuck to from the PGCE you change the activity every 20 minutes and it keeps them going. So when you change an activity having something like technology, and sometimes I will do

Powerpoint just for two minutes and put on a Powerpoint and sometimes it just takes the edge off and then we will try something else.

So what are the things that in the technology that you think are the things that motivate the students - the visual images and then the kind of tests or interactive tests? So where do the blogs and the discussions fit into that? What do you think they are doing?
They are stimulating them to talk to each other and learn from each other and go off and do things themselves. They also have a bit of fun interacting as well.

So they just are a replacement for having a discussion face to face or do you think they are slightly different?
I suppose slightly different in the fact that they will go off and do things whereas in a classroom you wouldn't, you'd stimulate them to go off and do it afterwards and you could never absolutely prove that they did or they usually by the assignment you can. They will go off and do things by themselves and sometimes in the week because it's in their own time, lots of people I teach have got families and lots of other restrictions so they can do it, some of them are on it 2 o clock in the morning. When the kids have all gone to bed and that sort of thing.

So I am wondering whether you think the discussions you are having in the blogs are kind of second best to the discussions that you'd have in face to face or that they are just doing something different?
Yes, I do, definitely.
They are not as in-depth. And they are not as stimulating and challenging because you can't really challenge quite so much over online. You can't, it will come across the wrong way. Because I can at least say look I am going to challenge you don't take this the wrong way, let's think completely outside, and a completely hypothetical situation, you know let's try this. And you will do it off the cuff where it's very difficult to do that online. I think you don't go quite as in-depth as you could do. And they are not learning as much from me they are learning from each other.

When?
When they are online.

So they are learning more from each other when they are online?
Yes in the classroom they learn more from me. And themselves, but more from me.

Which is better?
I think in the classroom they get more value for money. Because they are getting more from me.

Tell me what you think the phrase good teaching and learning means?
Good teaching and learning is helping people to understand. If that person comes away feeling enthused and understands that subject then they have been taught well. If they don't then they haven't really. Facilitating and understanding.

So tell me how those ideas might have changed over time?
Over time is all the learning that I have done I suppose, all the work that I have done, the PGCE taught me the general principles, things like instead of changing every 20 minutes using different ways of learning, even just different colour pens and that sort of thing. Even using pictures on handouts and all those little things that I learnt, that's another small bit of technology I suppose using pictures on handouts. Which again is restricted that because the photocopies are black and white which is not so interesting. So that I have learnt a lot through my own education and through PGCE and that sort of work. But also through experience and learning from others. What works, what doesn't work. If a group is a little bit bored afterwards I think how can I make that more stimulating for the next group.

And so how does technology fit into those ideas about what good teaching and learning is?
Technology has to fit in. I don't know I just think it's just another aid to help vary teaching, make it more varied, that's all. Make it more visual, more stimulating.

And so when you are designing your modules and choosing to use things, the technologies tend to vary and to stimulate ideas in terms of your, this kind of idea of facilitating the understanding, is the technology helping you do that?

Not so much. The only time I facilitate. No, not in the classroom. A lot of that is just through the teaching style and drawing on what people have said.

Do you think some technologies are more helpful to facilitate understanding than others?

Ish, it depends how it's used. Technology is there it just depends how it's used. Well things like, say for example, videoing a group, if I sit and go through it with them and we go through each bit and give them the positive feedback and learning and that sort of thing then they have learnt from it. If I just videoed it and then gave them it to go home with and look at it then it is not. If you see what I mean, so it depends how it is used really. And again with Powerpoint, if you use bullet points and read off it then it's not but if you use it as a visual background to stimulate, perhaps to stimulate ideas, just a picture of something that's not being done properly then it is.

You mentioned before about planning and about how something like Powerpoint can be like a rigid plan, are there any times when you have made unplanned use of technology?

Yes usually when somebody has stimulated something, a discussion, and then I will say oh yes there is an internet, there is a website to this or the Department of Health have just realised this document and I will quickly go to the internet and I will show them it. That's the only time really when I have used it without thinking beforehand.

And so what is the benefit of the technology there?

Instant accessibility to the worldwide web is just fantastic or even just being able to go straight into the library, bring up an article and say this is the article. Look what such and such said, that's great to be able to do that instantly in a classroom is fantastic and I have to admit that when I go out to various, because I teach everywhere, I just take whiteboard pens with me because often that is all I have but when I have access to the internet in a classroom which I do here on site it's brilliant and when they don't I find it quite restrictive. So the internet, the internet access must be the most useful tool ever in the classroom.

Because of the access to the range of things...

Straight away.

About the quizzes how do they fit into your idea of facilitating understanding?

Facilitating understanding just being, well I suppose the quizzes just help them go through it over and again. The quizzes do help them, I make sure they can do it over and over again until they get the right answer but when they get the wrong answer I give them the feedback so they are learning from the feedback. No that was such and such, and when I ask say, who is the boss of the NHS, and they say Peter Carter, I say not he's the person who is charge of the RCN. That sort of thing so I do it that way. So they are learning from their wrong answers as well as their right answers. But that's all, really a lot of it is revision and the quiz is to help them revise what they already know not learn new stuff.

So what do you reckon are the things that determine if you use technology or not in a particular case?

When it's out of the classroom I do it for financial reasons only because we have to. When it's in the classroom it's to make it more interesting. More interesting and stimulating.

If you think about a particular technology what would give you the impression that that particular technology or resources is outdated?

When it takes a very long time to fire up whatever it is, yes that's it I suppose. And I do think that any technology that is computer related, so anything that is not like a camera or something, although the cameras they give us these days video cameras are all the new stuff. But if it's complicated or you have to do different things with it.

What do you think is going to be role of technology in your teaching in the future?

The role. To access wider resources I suppose, that's the main thing and wider resources in the classroom.

Do you think that's a positive thing?
Yes, definitely.

And do you think there is a tension between using technology and your views of teaching?
There is only with something like Powerpoint. So set stuff that you take in to use so Powerpoint is set and therefore that's restricting but to have access to the internet is liberating I suppose, the other way round.

Just thinking about the technologies that you use outside of teaching, any kind of technology can you give me an example of a technology and how you think it helps you or hinders your life?
Well it has to be the mobile phone. I suppose.

Can you tell me how that helps or hinders?
It helps and hinders. It helps because I have instant access to everyone and they all have instant access to me which means I can be very flexible in my working hours, particularly students can access me at any time which means I don't have to be here between 9-5, and I'm not, and I can do other things during the day if I want to. However, it can be restricting that I am always available. And I often get called by a student at 11 o'clock at night or 2 o clock on a Saturday afternoon that sort of thing. So that can be, which I don't mind too much. It can be, infiltrate your personal life a bit.

Do you think there are any differences between the kind of technologies that you use when you are teaching and the kind of technologies you use in the rest of your life?
The technologies in the rest of your life I suppose are, you take them on to make your life easier and everything quicker, whereas technologies in the classroom yes they are made to make it more interesting. I know I say this quite often but technologies are used to save money in teaching. Not always though obviously they are used to make it more interesting.

And do you think they save money?
I think, oh gosh, this is controversial, I think at times they reduce the level of learning and teaching, they can do.

Do you think that they save money?
Do I think they save money, yes. And they lower the level of learning.

How do they save money?
By the fact that students don't have to come into the classroom.

So how do they lower the level of learning?
Because they don't get such deep learning. And they don't get quite so much from the tutor as well.

Do you think those two are the same thing or do you see them differently, not getting as deep learning and getting as much from the tutor?
Both, by not getting as much from the tutor the learning is not quite so deep. I have to admit I think again it's the way it's been introduced. If we had the full 8 day module for example with the blackboard and all that on top then it would be extra. But at the moment it is used instead of classroom learning, that's with the VLE. I don't think it's enhanced.

What do you understand by the term deep learning?
Looking more in depth, being able to analyse different views, being able to critically evaluate literature that sort of thing, being able to do that and discuss it in depth in the class whereas some people won't go so deep when they're at home on their own. And I know that from the discussion boards, some will and some won't.

So what would you contrast it against?

The classroom where you can facilitate and if someone comes up with something you can go deeper, delve deeper.

What activity would be the opposite of that deep learning?
Surface learning.

And so what do you mean by that?
They just talk about a subject, define it and just give some general stuff that they could find anywhere on Google.

Are those the kind of terms that you consider as something that you came across in your PGCE or is that something that was covered before?
Yes I can't remember all the ins and outs about it but yes.

And is that something that you've found quite useful as you are thinking about your teaching?
I suppose so yes because I would have to say the biggest thing is because nursing used to be certificate level which is why, then it was diploma, then it's degree and everybody is always saying what's the difference between a degree level nurse and a certificate or diploma level nurse, there is always this big thing. It is supposed to be that a degree level nurse would think deeper about things and question more and have a higher knowledge base, officially. Some say that's because they can write academic essays and others are more practical but there is always a big argument.

Just going back to where we started about technology outside and the rest of your life, I wonder how do you chose the technologies that you use outside teaching for the rest of your life, is that different from how you chose the technologies that you use to teach with?
Yes, because I have more choice. I can chose whereas when you are in an institution they chose what you use.

How much control do you feel you have?
Oh none, I would never have chosen Blackboard for example, but then I don't know what else there is, but I am told it is slow and it is very slow at times and there are lots of issues. Every time I upload a document it takes 5 minutes and if I am doing 5, that's 25 minutes that I have got to sit and wait, it's very, very slow.

But obviously you mention before that you have a lot of choice also it is really important what technology you use but how you use it, so although you don't have a choice about which technology do you feel you have got choice about how you use whatever it is?
Yes definitely. We are encouraged to use it more and more for learning.

So is that taking choice away if you are being encouraged to use it more and more? I am wondering how in control you feel you are?
At the moment I am quite in control so we are given full, not they would say, there is none of you can only use quizzes, you can only do this, for this, how you use it is entirely up to you. You have just got to use it really, that's down to us, and try and use it for legitimate, not just use it as a repository for handouts, use it for learning. No, we are given carte blanche as to how we use it. They're quite good here. It is not restricted. How we use technology in the classroom is down to us as well, completely.

Do you feel anyone is watching?
No, not at all. And that's great actually, we get given complete and utter freedom. I know people more senior probably look into the sites but no-one's watching, no-one's checking and no-one is saying you should be doing this or that.

END OF INTERVIEW 2

Third Interview

Last time I asked if you could change something and we talked about maybe a Powerpoint or one of the blogs that you have been doing or something like that. Is that OK?

I have looked into Blackboard actually in the stuff, and that is basically all the stuff. Mind you, you have probably been shown that this morning haven't you by my colleague?

I did actually see a Blackboard page. I think them use it in quite a different way to you.

I am trying to think what I have got. I assume you are familiar with Blackboard are you?

I don't really know Blackboard but I know very similar things.

This is on the course I am teaching.

You put several copies of each of your courses is that for different cohorts or....?

No this is because I teach Level 6 and Level 7 both in one group and they can't amalgamate the courses so I have to copy.

So what is the difference between them? Is it in terms of the assignment they do at the end?

Degree and Masters. They have different seminar groups for the degree and Masters level and they have different, different assignments etc. so, but unfortunately a lot of the actual, even though I teach them all as one group and a lot of the handouts are the same, a lot of the group work is the same they have to do it separately because the system doesn't allow them to be joined. Which is a bit of a pain unfortunately because the other, there is often less of one group and they can't talk to each other. If I show you generally what I do is...

So this is a clinical leadership course?

This is a clinical lead, this is a general one that I do, just a general course that I do lots of. If I take my edit on mode off then you can see what they see, generally that is what they see.

And so is this one of the groups that are working now?

Yes.

And so they are coming in in evenings or are these daily blocks?

The whole day, I give them a whole day so basically for each one so for example for this one I give them, let me have a look what I've done. That's just information, so the information - there are copies of handouts for the session, some further reading that you may find useful, those sort of things, oh they needed that for their assignment. So that is just general information. However what I do tend to do also is they have some homework after each session so I will show you what they are doing now actually. They have to do a revision questionnaire so there's a 20 minute Youtube clip so I tell them basically how long they have got to do.

And is this the one I think you mentioned before where you have to get the answer correct and then you get to see the...

That's right. So there is basically, so do you want to look at this? So the first thing they do is a questionnaire which is like that, so I don't know whether, do you want to go through this all?

Can you just show me one or two questions?

I can show you some. There you go - One theory of motivation asserts that there are…, which one is it? So things like that, just general stuff. But when they get it wrong, [e.g.] "willingness is things to do against their better judgement", so when they get it wrong for each wrong answer I tell them what that is.

So looking at the answers obviously you made: Milgram, Hawthorn effect, they are all kind of things that you would hope that actually they would know the wrong ones as well as the right ones.

Yes well they have to do with this, they have to, I tell them although it is not true but I tell them to do it over and over again until they get it right so they have to look at the wrong answers and so it gives them an idea of what the right answer is and then they have to do it until they get it right and I look on the thing to ensure that they have all got the top marks but I give them as much time as possible because I did some, well I did a little research study of my own for my own PGCE looking at this and what other colleagues have been doing is timing it. So they have to do it in a certain time and all these people who are not very savvy on the computers kept getting timed out. So I have told them they can take as long as they like, come back into it etc. and just use it as a learning tool so they keep going into it over and over again, they have to go back to their notes often to check it and then come back and do that. So there's not many.

How many questions?
> How many of that, there was only six in that one?

Is that kind of normal, is that?
> It's between six and ten. It will be on purpose because the answers I will often say look at this clip or something like that and so for example the answer I think of the first one, if I say, if I just say the right answer to that one, say submit, OK. Completed one question, there you go I would like you to watch this 18 minute talk on the website so they have to look at that but also they then have to, if I come out of this, and go into this one, they actually have to write on this discussion and I give them instructions about how long did you spend doing the quiz and which questions didn't you get right so I can have some examples. I can have some idea but the reason that I ask them that is so that I can have some idea of what I am getting across in sessions. If I am getting through, if they are understanding.

So when you get the results of the quiz as a teacher, because they've gone through it lots of times and hopefully they have got the right answer because it's multiple choice, do you just get a list of everyone who has got it all right or do you, do you see that actually they took four goes at it?
> I don't see any of that, all I see I just see if they got it right. So that is why I am asking them to say which ones they didn't get right. That's one example.

So I guess it would actually be quite useful for you to know, who got it first time and who got it fourth time?
> Yes it would but I can't get that. I try to just use what I get out of the system but because it is not a test as in that I am testing their answers I don't, I am not really bothered about what they get I just want them to understand this and know the information, so that's my way of doing it.

And then when they have written their comments so how long did it take and what do you think about it, they put them up here onto this page, can they see each other's?
> Yes they look at each other's, so generally, they will comment on each other's well actually this took three goes and about 20 minutes and I found it harder than the previous one you know so there is test reading so I get some idea and sometimes they will talk about each other's as well.

Ah yes so this one says "like that person I find reading from the screen difficult" and they are responding to each other's
> I do do double negatives, which one is not such and so they have to really think about it as they get caught out all the time. But I've also, which is good, lots of unanswered questions and I am doing this on purpose and I have told them, this is a newish group, to I want them to give me a bit more and so I pointed out that in the first, Julie has given us this which she's actually questioned things and I am actually asking them to question she has here a bit more.

So will you be responding to these as you go?
> I can't respond because there is about 30 in this group so generally what I do is after every six or eight I will do just a general "that's good Julie for such and such" or just a general which I learnt again keeps them going if they realise that you, I can't do it all the time because there are so many, but after a few I will read them all and give

them a general summary. And give them some feedback particularly what is good I won't criticise it because they are all so new, they are so new to this system that I am just introducing them still. Every group I get in which is, they only have six whole days with me.

Obviously these are working in the NHS at the moment, will they, will this be a kind of a one off module that they are doing, or is it part of a bigger course?
It depends. Some of them, it will be a one off, the majority will be on a pathway, a BSc or an MSc pathway for this one.

But on the previous part, their previous experience on that pathway might not have involved Blackboard at all?
No, I'm one of, there is not a lot of us who are using Blackboard for anything other than, a lot of my colleagues are using it as an information repository type thing whereas there are a few of us doing it for a bit more.

How would you kind of summarise the benefits of doing this kind of thing on top of...?
The thing is, on top, because we have to, as I said before, they have taken off as such, this used to be a course delivered over eight days, so it's 40 hours' worth and now it's only delivered over six days and so the rest has to be on Blackboard so I have to deliver this stuff, I can't do it face to face so I am sort of doing it that way so I am trying to make them think this way and I'll bring it back to class so instead of doing this in class which we would, we would watch a Youtube clip in class and I would generate discussion from them. I can't do that now because it takes too much time so I do this, they have done the initial bit and I can finish it off in class.

So this is a direct replacement for something you do face to face?
Yes, definitely, a direct replacement.

Are there other examples on the site of direct replacement?
Yes, well I suppose a lot of it is using this, oh gosh I don't know what to think. There was one where, let's have a look – managing leading Again it is mostly I have to admit the majority is quizzes and blogs and things like that. I call it blogs, it's not a blog it's discussion board, it just the discussion board doesn't work very well.

So on that one I saw that it said the blog tool at the top but you are using it not for them to create a blog but actually discussion?
Discussion board doesn't bring it, you can't see it very well and it doesn't, it is just messy and they can't see what the other person said and that sort of thing whereas with a blog you can see it all on one screen. So it's not a blog but it is [an alternative]. So this one, another one, I had started them off with a question again to finish which I normally ask, your task is to read that, they have to read the white paper, the current government white paper, and give their opinion but they also had to back it up with evidence from somewhere else. They had not only to look at the white paper, they had to look at somewhere else and that is when, for example, they give their bit and then they have to go on from someone else's.

OK so they have, so there are kind of two tasks. Put your point of view across from your own research and respond to someone else's?
Yes and that's what they had to do for all questions, so it's not perfect but they are doing things. It just takes a while so again they are just giving, so you have a sort of conversation on this where they are just giving their opinions. So you can see they are actually questioning and this was at the beginning of the course. I've just finished this course now, it's a six month one, much longer, and I had to get them in to starting to think for themselves and that was just one of them, start discussing together as a group quite quickly.

Do you think the quality of the discussion changed, a lot of the quality of the online discussion developed over the months?
Sorry, six months.

Over the period of that course?

Over the six months yes, it takes a while. As they get to know each other it's much much better and they can go deeper, definitely. But I will start off each course now straight away with just introductions, so I just literally have again actually it is the blog system, see what I mean you just have to click out and click in and you can understand why people get fed up with it. I will go back to this one again. You have just got the introductions. Literally there, so on the first day, their first assignment always is they have to write about themselves and talk about everyone else here. So that's it, that's your starting off getting used to it and then I give them something a little bit extra. Right this time I want you to try the next time, and yes, over, when you first start they hardly, as you can see they hardly give anything. Somebody has put one on the wrong thing they shouldn't have put the quiz on there. They have, there is a book quiz thing on there but generally it is just my name is and [what's my job]. But they didn't. I just realised that is what they have done there, a few have gone into the wrong blog which is why I can't find the answers.

Is it difficult for you to move them? Can you move them out?
No.

You just have to go with it.
So I just give them feedback, well done for your blogs, excellent, you've put them on the wrong side, and it might be a good thing, so I do that a lot. Yes, so it just, I just build on it as it goes really.

So on the site you have got, sessions, you've got the quizzes and the blogs and then sessions for each day which have got your resources in them?
Yes, further reading, so examples of further reading. Handouts we have been told not to give handouts in the sessions as well so.

So you put them on there?
Actually I do both but no-one knows. Well sometimes if they don't download I'm not concerned, and often handouts - you are discussing them in the classroom anyway. So you can't discuss it if you are going to say do it when you get home. So generally I will give out the handout in session, it's very good for those that miss a session and they just know they can just look it up and download it.

And I guess with these kind of part time students does that happen quite often in your sessions?
80% attendance is what we, they are not allowed to hand in their assignments if they have less than 80% attendance so they know that yes.

And so this one here, the days, there are six days now is that right?
Six days for this course, yes.

And how long are they spread out over?
It's ten weeks. The assignment has to be given in at ten weeks. And we have got six face to face sessions.

And so all the resources within that that you have shown me, are those all things that you created yourself?
How do you mean?

Well I mean that the quizzes and the ...
Oh yes gosh yes

Because the handouts you found somewhere?
Yes, yes.

And the questions you are asking in the blog and the design for those is kind of all...?
No, just myself.

And then obviously I can see the same module comes up several times so you are kind of reusing the same set of questions?

No. You can't, they get lost, you can't transfer one quiz to another so you actually have to redo it all again.

So is that the same questions, you are writing the same questions again that you wrote last time?
Yes. Absolute pain.

That is interesting. One of the claims that is made for technology is the ease with which you can reuse things again and again.
This you can't. Yes, I do my best to try and work my way around the system but look at these two courses, Level 6, Level 7, Level 6, Level 7, they have virtually got exactly the same on each one. And again I have got them all for next year, I have written it all down here and I have got some for next year again.

And have you found any shortcuts or ways round?
No.

Just keeping looking?
I keep looking. I know I have done, we go on various days updates and stuff they are very very helpful our IT lot but they just say you can't do that on the system. And for each, when you are doing a quiz for example you have got to go in, put your question, the answer for number one come out again, wait and go back in to put your answer for question two. Then come back out again same with the handouts, if you want to attach a handout to something, and you want to attach four handouts, you have got to go in attach one, come back out and then go again and put the next one in. It is very very time consuming, laborious.

So for you though, you have carried on and kept on doing it, have there been any things that you have not done then because, well you've thought, actually this is going to just be too long?
Oh sometimes yes, I have just given up and just thought I haven't got time this week to do it I'll do it in class it's quicker.

Just photocopy them and pass them around.
Or I'll print it off and give it into the class and say take it home and do it by hand.

So obviously that module I guess you will be teaching it again for another group at some point? So obviously you have to copy things.
Which is, no you can't my next one is September.

So obviously you can't copy them over but will you be doing the same things again?
Similar. I have to update all the materials.

So what kind of things will stay the same and what things will be updated?
Well all the handouts will change because they will be updated generally because of new information that has come in and stuff like that.

Changes in policies?
Yes stuff like that. Quizzes again I have to reload all the quizzes back on and generally as I am reloading I will just update them as I am going anyway.

But you intend to have a quiz, have something very similar actually the little details will be updated?
Yes.

So I guess...
So I have got to do it all again for all those ones.

There is quite a lot of them there to do aren't there?
Yes.

Thinking about all the different kinds of activities within one of those courses, I wonder what you think are the kind of advantages and disadvantages of things you ask them to do?

Well the advantages I know straight away that it is because they are part time and they work and therefore they can do the Blackboard at any time which they like. Disadvantages are they don't have the time off to do it. So before they had the eight days which they were sponsored from their Trust to come over here for a whole day off in which they would have to study. Now it is for six days and all the other stuff they have to do in their own time so some of them have problems keeping up. And, but I have told them basically I know it counts for the 80% of their attendance you see so I won't accept assignments until they have done their assignments on the Blackboard. So it makes them do it and they have to do it.

So adding your entry onto the blog counts as part of attending?
Yes. If they haven't added the entry then, yes, so it makes them do it.

Obviously one of the things you are trying to do is to try and get discussion going between them and with you and I wonder how well you find that works?
Not hugely. Well it does, because, it does because the problem is in a classroom when you have discussions and you get certain people that, what's the word contribute more in the classroom you can work things out so the quieter ones can contribute more, you can change the groups round accordingly, so whatever you can just notice what is happening whereas here you can't do that so certain ones who are more enthusiastic will take part in discussions. You can see it online but the quieter ones won't and I can't see, I haven't worked out a way about how I can do that because I don't.

Are the ones who are quiet online the same as the ones who are quiet in class?
No actually, no in fact one of the people who has been writing quite a lot is quite quiet in class really. Yes I hadn't thought of that. There are a few of them, but yes you're right.

Any ideas why that is?
Different ways of learning I suppose, they, the ones who are actually writing a lot more on these are the more senior ones who are tend to be quieter in the class and I think they are quieter in the class because they are more senior and much more higher up, in their level of work. So for example I have got some newly qualified staff nurses and I will have some very senior and experienced matrons, some of the matrons who have been in 20 or 30 years but they have been told you have got to get your degree. So they are very experienced people, they tend to be quieter in class and I hadn't noticed this, it was only when you just asked they are quieter in the class obviously they don't want to look silly when they don't know in front of their colleagues but they are definitely doing a lot more online so that I haven't really thought of that. So maybe it is better to have definitely both.

So that is quite interesting isn't it?
The way I deal with it in class is I split them up, I split up the matrons and put them into different groups so they do talk.

And kind of get them the experience?
Yes that's how I've done it.

I guess I could have imagined it working the other way and actually someone with a lot of experience actually saying well I know all this already?
No, it's the opposite, they are quite good in class because they realise they should have done their degree and academic study years ago.

And so do you think on here then why is it different for them?
I don't know because they have time to think and consider their answers possibly, and they don't look foolish in front of the junior members and that's possibly why.

And so who are the people then are who are being quiet online?
I know exactly the people who are quiet online, they are the people who speak English as a second language. They find it hard. They are always quite difficult to draw out, as they are in class.

But I guess it is easy to imagine somebody whose spoken language is far in advance of their written one, especially English. So that's quite an issue for you, is that something that the University has any policy about? How do you support students for whom English is not their first language?

We haven't got a lot of support, we should do but we haven't got as much as I might like to. No there isn't really, not a lot of support for those, well saying that we have learning and language skills centre which they can go to but obviously all my students are part time and they haven't got time to go off to Southwark to go to this centre that would help them. No in fact I refer my students to a website in Toronto, the University of Toronto which has quite a bit of help for people who speak English as a second language how to write down, how to sort out your verbs and tenses and the different words to use, describing words and all that sort of thing. Because we don't have it here, or if we do I don't know about it. In fact, funnily enough my colleague next door [Name omitted] is actually looking into how we support these sort of students here she is doing a piece of research into it.

Be interesting actually to think about the difference between online and face to face because it sounds like they are quite different?

They are.

Challenges?

Because they are challenging in the classroom if English is a second language. Definitely challenging in the classroom and I won't push them too much because I can imagine it for myself it must be awful. I speak with French as a second language and the thought of speaking academic, going to a French university, I would just probably do what they do half the time look a bit blank or whatever. But what I tend to do what I have learnt as part of my PGCE when I am teaching is to slow down what I am doing and to have the written word as well as pictures as well as me. I suppose with this you don't get quite, you can't do that can you? Unless I just keep replying to those who, focus on those who speak English as a second language and reply to them and give them feedback say how good whatever they said was. I haven't given them any extra special attention.

I guess one thing about a lot of the online things is that what you write stays there so that there are models do you find people who are writing later on copying the structure or the content?

Of others?

Yes.

Yes. So I just do it halfway through so after 6-8 people I say yes you've done very well you've looked at this site and this site for the next lot, because I do tell them, I say if you get it on first then you might, so the more savvy get it on first and they don't ask extra questions so I say for the next lot what I want you to do is now look at the other side and have a look at this so that is what I do. So change it. If I just left them to do it all the way through I would just get the same comments.

I wonder how you think the students are using the Blackboard site, as they are coming in at all different times with their little bits and then with the handouts you mentioned before that you give them paper ones because people don't look at them or don't bring them, so you think they are looking at them?

The handouts, well I don't know. I give them out and I go through them in class whether they are at the end I have no idea to be honest. That's why I've said it's not learning so I don't know whether they are reading them unless I say this is a handout and again I want you to discuss it, I use specifically a discussion board and ask them to ask some questions on it. What was the other question I forgot?

No, no I think you've answered that just about what the students do.

Some of them go straight on after the session and they will go on a few times some of them it will be, like at the moment I am teaching a course on Monday morning and I will get stuff on Sunday night or Monday morning put it up quickly. Which means that I have got to go in just before the session to read it before I can, which is a bit of a pain. And some do, some don't. It is all so new still. Healthcare workers particularly just aren't IT savvy so I am really going slowly with this.

I guess there has been quite a lot of, I don't know what you would call it, computerisation of NHS systems so they will be filling in lots of online or computer forms.

And they hate it. Which is why they are taking so long, it puts them off. Because a lot of them are spending a few hours, in fact what happens is they do it all by, what is happening very much on the wards and departments in hospitals, they do everything by hand and then the night staff come on and they will take the hand stuff and they will put it onto the computer. Because they can't get access to the computers, there are only a few terminals per ward and they are always in use. And that is what happens. So the night staff have extra work in that they are putting all their colleagues stuff on. And that is happening a lot.

Do you think that there is anything in the system that hinders student learning, I think you have mentioned a couple of things?

That hinders it? Yes - slow. That's the biggest thing it's slow, it's not user friendly really, it is not easy to navigate and I think the other thing is everyone's site is very different and is being used differently throughout the Trust so how they look, we don't have a standard, well we do but nobody knows what it is. People could say there is a standard uniform way of using Blackboard but I am not sure what it is. And it's just not there so everyone's site is different, so every student that goes onto the next module of their degree they have got to work it all out again. And, unfortunately every tutor is using it differently which makes that.

So I guess do you see other tutors modules? I don't mean unless you go and sit next to them and look over their shoulder?

I have no idea. So I don't know what my colleagues are doing. All I know is some are just using it for information others, my colleague next door for example, is using discussion groups with a university over in Canada that she has been and they all basically do their course together. Which is really very good so they can then talk about each other's practice and stuff. So she is much further ahead, I am still sort of middling and there are some that are struggling. We're all different.

So when you come to do clinical leadership the next time round, anything you plan on doing differently?

I do do it differently, every single course I do differently I have to say. I will add a little bit more in, is there anything I would do differently? I am not sure actually, each time I do the next one I add some different but it's like teaching, even if it is face to face I will change it according to what happened last time. So the next time what would I do differently? I suppose the big thing is to put my comments in earlier because sometimes I leave it, when I am really busy that week sometimes my comments don't go in until like five days, and they are a bit late and they have gone off and it takes me a while.

How long will there be between day 3 and day 4?

It's only one week. Sometimes one sometimes two it depends but generally they will have finished because they have their assignment between the last day and the hand in date which is ten weeks, which is not a lot. So I try and finish around seven, week seven and the assignment is week ten.

And one of those weeks in the middle will be an online week, one of the ones that has dropped?

So its basically a week between each apart from one of them where it is two weeks. And then of course I am online for support for when they are doing their assignments as well, for the next three weeks. But generally I won't see them over those next three weeks.

So I was going to ask if anyone else uses the kind of resources and quizzes but I guess there is no way for them to use them?

What that I've used?

Yes.

There is a system but...

But I mean if you create something for your group and then someone else thought that would be useful for my session is there any way?

People don't share here. I put it up for them but people don't share at all. Someone actually came to me once when I was doing my, I had something because before we could see each other's sites and they have changed something I don't know what, and so we can't see each other's sites. And somebody came to me and said you do realise people are taking your stuff and copying it and I said it doesn't matter. I'm a teacher it's, everyone can use my stuff it really doesn't matter but so there is a bit of that as well.

Is anyone teaching kind of the same topics as you?

Yes there are but I don't know them very well. They are in different departments. Oh saying that yes there is someone I am working with, like facilitating change for example, that is not my unit. It's somebody else's unit but I am using it for other things and he, so that site we're sharing, I can show you. Yes, this is his site, so what I've done, shall I take edit mode off and then you can see what they see. This is [Name omitted], this is his site, so all this stuff is his apart from mine, so I use his unit. So I basically go out and teach them and use his unit and add that on. So that's one programme, Clinical Practice, this is another one this one here. If you look at those again it's the same thing: 1,2,3,4. Just published today - all sorts of things really, discussion board, project process.

And if you were to take one of those days there?

Which days? The information days?

Where you were, those days, so what would be inside one of those folders?

Again very, because I teach similar stuff so it's similar stuff but it's according to their group so whatever comes up during the day. So if I do sessions on say, for example, political awareness, let me have a look, I can't remember what I put in there now, so stuff like that. Proposed changes, stuff like that, they will brought up some stuff on blogs for example. How do you find information within the NHS so we talked about different websites and stuff and I just gave them some extras which wouldn't be on the other ones. So things like that I suppose. They are adapted according, but what I have to do is I have to remember it so when I've come home from that day's session I have to go into Blackboard that evening and put it all up at once.

I guess you can't do it during lessons, there and then if you like, if you are looking at things there and then?

I would love to but unfortunately with these programmes are out in the Trust and I can't access internet.

When you have, here you have got handouts and articles, articles are obviously from published sources I guess obviously copyright allowed sources of information and then you have got above there are those ones that you have created?

These are ones that I have created yes.

So kind of Word and Powerpoint and those kind of things?

Yes, well yes. Pdf. I have to put them all in Pdf because a lot of the students don't, they can't open a Word doc.

So how do you create them, do you create them in Word and then save them as a Pdf?

I save them as a Pdf and then put them on there as Pdf but the Word documents they can't print off. So we have to convert them all.

And so are they all four Word documents?

Yes. Those were so then they are Pdfs, they were Word.

You wrote them in Word and then you saved them?

Saved them in Pdf and put them in which is a bit of a pain for when I do handouts they have got to fill in. So I say you have got a print it off and do it by hand unless you can open as a doc.

Oh, I see because they can't type it onto it?
　　Yes. Or I have put both up - the doc and the Pdf.

For those who can and those who can't. So you are doing extra things to make up for the fact that they might not have access to the things you need.
　　Is it Word 2007, I can't remember, a lot of them don't have 2007 is it?

Right yes, the later versions?
　　Yes, because they don't have it and therefore, we have to go by what computers they have at home. A lot of them don't even have Acrobat when they can't open certain things.

And I guess they don't have any access to the computers in the workplace because the way they're locked down and they can't access this?
　　No they can't access computers in the workplace. Certainly not for their own stuff, they can barely access it for their work. They should be according to all our NHS links they should all have full access.

Are any of these courses ones that you taught before you were using Blackboard?
　　All of them.

How do you think, if you could pick one how has it changed apart from you have lost a day or two, how else do you think it has changed since before then?
　　So what my actual courses? I suppose I keep in touch with them more whereas before they would come in for a day and I wouldn't see them for a week whereas I am keeping in touch with them throughout and also when they go off as I say, just keeping in touch so it keeps them, they are mindful about what they are doing I suppose rather than shutting off and then seeing them the next day and often, I have to admit it's easier because before I used to have to do some sort of revision session and it used to really disappoint me, I would have people saying I don't remember any, who couldn't remember any of it whereas now if I do some sort of revision session at the beginning we just go through what we have done last week they are much better at remembering it because they have active at it between sessions.

So it is kind of making them work between sessions?
　　Or making them think, even if it just, quite a few of them said when I did that quiz she said I spent ages because what I did is I went off and looked at this website which took me to another website which took another website and I go yes that's what you are supposed to do.

That is interesting so the quiz isn't just revising?
　　No, no it gives them sites to look at.

To look at and it's encouraging them to do things that maybe you wouldn't have had time to cover even before when you had extra days?
　　Definitely. Yes it just takes them off and some of them will go off and do things and others won't, some don't even look at the answers. So I can tell the ones who haven't especially if they haven't commented on the Youtube clip and quite a few said I didn't find it. Well you didn't look at the answer the answer says now that you have looked at this go and look at, so you can tell which ones don't look and which ones do.

And so is it because of them saying I never saw it that now on the instructions it says one of these questions has got a Youtube clip?
　　That's why I do it. Because I started off by doing it on purpose to make sure that they were and I realised actually obviously to see if they were looking at the answers and obviously I worked out they weren't, they just wanted to get the numbers quickly so they wanted to get it over and done with. Whereas now because I've said things, you've got to look out for this, you've got to look out for this they have to do it now, whereas before I assumed they were and found out they weren't. So I just learn as I go really. Change it, that's what I did changed it all.

305

Have you had the opportunity to share with other colleagues how you are using quizzes
No. We don't at all, although a lot of others say they are using quizzes but I don't know how they are using them. I think some of them are using I don't know as a quick summative type thing maybe but I am using it, and definitely the quizzes are a way to learn, to stimulate them or try anyway. Sometimes I feel like, what do they call it? Get blood out of a stone sort of thing, we have to work very hard at it.

So do you think you are getting better at it then?
Yes, I am definitely getting better at it. I just get frustrated with the system if we can't do any more, and it's very repetitive having to transfer material, well you can't transfer you have to download it.

To the...
Yes. Which is why I am doing a few little things that perhaps I shouldn't.

So I wondered if, obviously you started using this because you kind of were forced to because to by the days being cut, and I guess maybe in a dream land you could imagine the days coming back, what are the things that you couldn't bear to lose now?
I would like to keep it all now I have to say, I definitely would keep it all. But yes.

So if the days came back you would be using them for new things?
Possibly the only thing is if the days came back I just couldn't force them to do it, it would be extra. And in a way it would be an extra for those who were really really keen to learn. Rather than forcing everyone to do it. So those, and you often get that in, I am sure you do yourself where you get groups where you get some people who are really keen on the subject and they want to learn so much and sometimes you see ones who don't, it can bring them down but you have to give as much to both don't you. Whereas the ones who really want to learn can get the extra from the site and those who don't are just, they just go with the face to face.

One of the things you said last time was that the feeling that some of the students don't go as deep online as they did in the face to face, and I wonder if that is, have you any idea why you think that might be?
Because I am there as such they can bounce it off me, I can say oh have you thought about such and such, you can't do that quite so much online. So when they go into, I can pick up on things quickly and I can't pick up on things there. Or even just a comment that they would say well that's not going to happen is it. They wouldn't say things like that on the Blackboard and I can say actually it will happen because the Department of Health have looked at this and they have done comments on this and I would be able to say that, oh really. Whereas you don't get the little comments on Blackboard because it is so considered what they're writing.

So the kind of less off the cuff controversial things are less likely to happen? Actually some of those might be kind of quite good.
They are good for learning in the classroom but you don't get that quite so much in Blackboard it's too controlled. And people are worried about what they write on Blackboard whereas in the classroom if they say something is wrong you just forget it don't you. Whereas on Blackboard they are worried about what they say.

How long do things stay?
Up to the end of the course and it's gone.

And do they know that it's gone?
Yes they are taken off, their enrolment takes them off and they don't have access to it any longer. And I often, I have to say what I do do is ensure that I put in for extra two or four week extensions for the whole group so they can get into it afterwards because what I am finding is those that fail want to go back and look at it and do some more stuff and they can't get in. So for mine I actually have to sign and put in a special chitty for every single course to say, to keep it open for another four weeks. For every single one. It's an automatic thing.

Thanks for showing me that, I've got a few other things to ask you about. Basically some things that various people have talked about when I've been interviewing them. So quite a

few people have talked about my students and what their particular students can do or can't do or want or need with technology and I wondered if that was the case for you. That you have got a particular group of students that if you were teaching somewhere else or to a different group at a different time…?

Oh definitely it would be different, the reason I have got, well you mean all of the students that I teach basically are part time. They are part time students, they are full time workers and they are part time students and at the moment because they only get 50/50 with their study time they are doing half these courses, half the days are in their own time, in annual leave so they taken holiday to come here, and they are obviously having to deal with families, young kids and all the other things that they have at home as well. So they are a different type of student and a lot of them are mature 40s, 50s as well, so whereas the different style of student to usual 18-20 year old who would be doing a course full time. I've never taught 18-20 year olds so I don't know.

Other people have said that they use technology more for maybe certain levels or for certain types of learning, do you kind of think that your use of technology kind of fits in with a certain level on particular types of things that you are doing?

A certain level, I don't know.

You know you are more of less likely to use it, I don't know on whatever levels you have, Level 7 or Level 4 courses?

Oh I see right, yes I suppose yes. The lower down it will be more basic so if you are teaching people at sort of Level 5 or 6 standard, we stop at Level 5 but until recently I was teaching Level 5 as well but the lower levels yes, you would make it more basic and the higher levels you would push them a bit more. Like this is the latest report from the King's Fund – I want you to comment on it.

So in terms of the content. What about in terms of the actual activities you ask them to do with that?

It's quite similar the sort of stuff I do actually. None of it is hard so, I don't think. No, no I think remember I'm still just introducing all this stuff to the students, so I am not at a level where they are all au fait with that so every course I get in I would say about half the group have never used the system, never used a VLE, they haven't really never heard of what VLE is. So I am starting all over again and I am sure in two or three year's time that will stop and they will all become a bit more savvy with these but at the moment they are not at all, well a lot of them aren't, some are, some aren't.

Do you think that...

Some of the people don't even know how to, they don't have an email account. You are teaching somebody who just doesn't use a computer.

Do you think technology kind of fits better for certain kinds of learning, some people have just said they use it more for just giving some content, others use it more for discussion?

I can't deliver content, I can't deliver content, because I can't check their understanding. So all the handouts I give all those handouts but it is not teaching them because you can't, you can't deliver content. Perhaps a bit more if you do a 20 minute lecture and then you have got all your questions and answers afterwards and you have got something but you can't do that online, I don't know how you would do that.

So why can't you do that?

Because you can't check their understanding it has to be two way in my mind. It has to be something where they give something back which is why when I do the quiz, if I just did the quiz I can't check their understanding whereas at least if I am right, they have got to write on the discussion board afterwards what they learnt, which bits they didn't know then I can get a bit of an understanding. If it's in class it's even better because I can then explain, find out why and explain a bit more but it's something.

That's interesting. Do you think that that, there is some connection between what you just said about checking on learning and the size of groups that you teach?

Yes I never teach over 30. And I purposefully, I will not allow, I say I can't teach more than 30 because I can't.

Obviously it gets very difficult if you have got 100 people in the room?
Yes I know other colleagues who teach 100-150 and I can't see how they can ensure the learning of understanding among the whole 150 students, you can't do that. So I suppose for them it would different you would have to just, you practically just have to do a lecture and just hope that when write their notes they have got some understanding, don't you. So, yes that's much easier for me. Smaller groups

So what are the things that technology can't do?
Quicken things up. It's slow and at the moment I always thought technology should make your life a lot easier but at the moment having to use the technology actually makes my life more difficult at the moment. I am sure it will get easier over time and as we start developing new systems and they get quicker and they are more user friendly because this is just not very user friendly.

Some people that I have spoken to at other universities have got very frustrated with their university systems and they have tried to find some other way of doing it. And do you kind of sometimes feel tempted to just find a alternative, well you did, didn't you with group spaces?
Yes I tried that with one other group out somewhere else but it was only a three day course and then they have to come back for a fourth day and so between the three days and the fourth day I said well use this group space, but they couldn't work out, they couldn't work it out at all. I'd left instructions but obviously they had missed certain things and it was just disaster but I have used group spaces for myself I did a module where the tutor did use group spaces here and it worked. But no I haven't gone elsewhere just because it would take so long to show them how to do it and for me to learn how to do it as well.

Some people feel that there has been too much hype around media technology and teaching?
Yes I agreed I think it should just be brought in slowly instead of this, it is all this wonderful thing that, as I say I know of colleagues in other nearby universities who are running whole courses and I teach clinical leadership, they run the whole thing online and I can't see how it can, they can actually ensure the understanding of, how can you ensure a certain level, I know you have got the assignment, how can you ensure they have written the assignment and not someone else? I don't know, with the assignments I can check I do it with them, and go along with them. I am not sure how good the learning is if you do a whole course online. I think it's a bit questionable but it is definitely being pushed.

And I guess it is something that could happen?
Yes. I am pushed to use technology in the classroom all the time but I don't.

What do you mean use technology in the classroom, do you mean...?
Well because I suppose there is a big thing at the moment is you have got to put all your Powerpoints up on, everyone has to put their Powerpoints up and I'm being told sometimes your Powerpoints not on there because, the reason they are not there is because I don't use Powerpoint. So a lot of people do use Powerpoints and expect you should use them in the classroom.

But your word documents which have got outlines of what you are doing those are there aren't they?
They are, oh that sort of thing just not Powerpoint sessions. There is a lot of concentration on that which I don't agree with.

Do you know why that is, why there is such a concentration on?
Because people don't know there are other things you can do on Blackboard, I think a lot of people are just thinking oh it's just Powerpoint because it's technology. I don't avoid technology, I've tried it and I can't use it. I've definitely tried Powerpoint but I find it restricting, too restricting because you have got to go through. I just go ...

So would you have used Powerpoint on any of those five days?
Sometimes but very very little.

But you would have been showing them?
I have to say the majority of the time I use that is when I look up things on the internet to show them. Yes, internet sites or even going to the library and say this journal article is really good. If you read that first paragraph, you know what do you think, that sort of thing I do.

So I was just wondering what the outlines of the day look like?
Here you go: Outline of the day – pick one.

And so is the kind of the framework?
Oh, I can't. Sorry I've not got Pdf on this. I know it's a real pain but what I can do is show you something from, you see what I mean you just get so restricted, I know it's there but it doesn't read. I can read Pdf but I can't read it from Blackboard on this computer.

And that's on a University computer?
That's a university computer, I can only do it at home. [laughing] I know, you just sort of get used to it really, that's awful. So I generally give the aims, the learning outcomes and then outline of the day.

Do you have notes that you work from?
Lesson plans you mean, oh yes.

So here you have got timings of activities, theory questions and then materials like a little reminder as you go through?
Yes, I have something like that for every session, as I say they...

It is quite interesting, I mean when I ask the question about Powerpoint a lot of them are using Powerpoint actually to do something like this, just as a framework to follow and it doesn't really do anything for the students as much as for them or yes I am onto group questions now here they are and move on. But actually this activity has got much more detail and so I guess this is no different to what you are doing by hand I guess if you didn't have the Word.
How do you mean? The reason I do that is just so that just in case somebody, if I go sick and somebody has to do it for me they have got an idea of what I teach. And also if I get run over by a bus tomorrow they can access all my materials.

And then I guess you have got this for the next time you do it and you can just change the bits that you want to and update them?
Yes and that group work takes much longer than.

So it's a little table of time, activity and materials.
Yes I got that from PGCE actually. So that's what I do for all the sessions. Make it a little bit, stuff like that. Some handouts that I use for the actual thing.

I wonder, some of the people who have worked with, I guess, more traditional undergraduates have kind of felt that maybe some students use IT a bit too much but I guess for your students that's not the case. They are just not...
Although saying that they are often on their Iphones. So there is one say for example like that one actually where I do, it's not the lesson plan is it, it's this one, I do a quiz, like a little pub quiz sort of thing I said right you are going to go into teams, we have going to sort of compete against each other and I ask them certain questions, up to date questions about the NHS. Who is the boss of the NHS for example and there are a few of them looking it up so I have to ban all of them. No – put it away, put it away! There is a lot of that so they are using but it is just this that is different.

It is different isn't it. There is a difference between technology they use in everyday life and technology they are using for their university course.

Definitely. Because I know half of them are on Facebook doing things and stuff but...

And in some ways Facebook is a similar idea to Blackboard isn't it. You put up comments and you talk to people?

Absolutely but they see Facebook as very different. I know why universities try to get into Facebook and they don't like that because they see it as different, that's Facebook that's life, this is work and the two remain, they don't see it as similar stuff. It's weird I don't use Facebook so I don't... Do you?

No.

I can't bear it

Some people I have spoken to have said that they feel they get into habits of how they use technology, do you think you have any technology habits?

Habits? No, my only habit is now because I am having to do it all at home. So it becomes a habit that I'm using it between 8 and 10, my Blackboard time to do all the stuff. Which is not a good habit to be in because my habit now is that I am doing a lot more work out of work times than I ever used to. And it's become a habit.

And that is a lot to do with the system not being up to it during the day?

Yes.

I wonder if you look at the different courses that you teach, are there things that you always do without thinking about them?

Yes, things like the introductions straight away I put them on so that to get them into Blackboard so that they know what to do. I always put all my handouts up there which I never used to, everything now and that is just a routine. I will do that with every single course. Other than that that's it, it is just a habit that I always do with the MA programme.

Do you think how you use technology sends any kind of messages to the students about what you expect or what you think is important.

Yes I think all the referring to internet sites a lot of the time, click on this and talk about this, yes so they are using the internet a lot more. I still have a few students for example who will go to the library and get a load of books out and I say you just don't have to do that anymore or they will go and photocopy it and in fact there are still a few like I say I have said you don't have to do that you can get free access, library online you don't have to go in there. Oh but I like to look through and photocopy journal articles and that's what I do. But when I actually show them that is what they say like to do and then I will show them in classroom this is how you get to the library, this is how you look up leadership, that's the e-resource as such so they can look at it. Those are all the journal articles, which one do you want, that one, go into that, look you can see. [They respond] "oooh". So I often have that you can say it but if you demonstrate it in the classroom and I have found it even on the first day of each course now I get them all into the computer classroom so they are all sitting at a screen and we go in to the Blackboard site and I have found that makes them use it much quicker and easier than if I just demonstrate it in the class. And in fact I have to do that now, I make sure I always do that otherwise I have problems with them getting into Blackboard.

And I guess you are kind of telling them in what you have done on the Blackboard say sites and you go on the message that online sources are OK you can use them?

Oh definitely, the online sources yes. I have to admit though some of our library hasn't got very good data, what's the word,

Access to...

Yes, to Medline and those sort of things.

Oh the kind of general databases?

That's it the database of journals. Basically so if they want to put in a subject the journal titles will come up on whatever and they can't get in to the journal title which they don't realise but if you find that journal title and go and look up the journal title from the A-Z and then try and get in it, you can get it. So that's a problem so what I

often say is to be honest with you Google Scholar is often better and comes up with some better articles than the online library service so what I say is for those who have difficulty and in fact I say it to them all actually, sometimes it is better to go into Google Scholar, find the articles, if you can't get into the library of course but you can via the library so you find those articles and you go to the library and look up the journal and you will be able to get it from there. So it's a bit of a pain to do that but our library for some reason I think we can't afford to keep up all the subscriptions to all these journals.

Do you think your personality comes through from the kind of things you do online? Do you think it reflects your personality?

No. And I hate that. Because the whole point of my teaching is, a lot of it is the personality, the enthusiasm you have for your subject and I can't get that enthusiasm over online and I find that really frustrating.

So are there things that you do online to try and make up for that?

Yes like by giving them little Youtube clips and things like that. But it is so much more different to be able to say look at this article, look at that see what he says there? And you can't do that online to say that and they will say, what do you think about that and you just can't do that. I can't get that passion across online and I wish, I don't know I haven't read anything or seen anything how you can do that, but I have great difficulty doing that. Yes, if there is anything that you know about how you can do that let me know. But I don't know. I think sometimes it can be quite boring. I try to make it interesting as much as I can but I can't, I can't get that passion over.

You mentioned before about the kind of expectations for how powerpoint slides are meant to be online, are your department's values, expectations for how you use technology, are they kind of written down and very explicit or are they kind of implied?

Implied. There's nothing explicit. No, nothing. All implied yes, Put all your Powerpoints on site. Yeah.

END OF INTERVIEW 3

Appendix E – Interview Codes

Codes used for analysing interview data

Set 1: Codes relating to uses and contexts for technology (Research Questions 1 and 2)

Contextual drivers for use:
- o Cultural context
- o Department level context
- o Individual context
- o Institutional level context
- o Perception of students
- o Sector level context
- o Subject context
- o Teaching group context
- Describing technologies used
- Explaining why technology was used:
  - o Confidence
  - o Response to economic drivers
  - o Expectations
  - o Keeping up with technological advances in society
  - o Perceived requirements
  - o Resources
  - o Role models
  - o Time
  - o Transmission of information
  - o Types of student
- Habitual uses
- Powerpoint:
  - o Presentation culture
- Changes in use of technology over time
- Working around university systems

Set 2: Codes relating to shaping beliefs and practice (Research Question 2)

- Learning:
  - o Accepting tradition - received view
  - o Formal learning about teaching
  - o Formal learning about technology
  - o Inspired by others
  - o Networking
  - o Self-taught
- Managing conflict:
  - o Belief and context
  - o Belief and practice
- Reflecting on change:
  - o Change of beliefs about teaching
  - o Change of beliefs about technology
  - o Change of course
  - o Change of institution
  - o Coming across new technology

- o Giving up on a technology
- o Social change
- o Using a technology more often
- Reflecting on experience
  - o Experiences as a learner
  - o First experiences as a teacher
  - o Successful experiences with technology
  - o Unplanned use of technology
  - o Unsuccessful experiences with technology

Set 3: Codes relating to beliefs, knowledge and identity (Research Question 3)

- Pedagogic beliefs:
  - o Connecting beliefs and use of technology
  - o Facilitating learning
  - o Technology and subject content
  - o Transmission of knowledge
- Perceptions of technology:
  - o Flexibility
  - o Hype-disappointment cycle
  - o Negative side effects:
    - ▪ Changing student attitudes
    - ▪ Distraction or disruptiveness
    - ▪ Encouraging laziness or overdependence
    - ▪ Information overload
    - ▪ Policing technology
    - ▪ Reducing attendance
    - ▪ Reducing interpersonal skills
  - o Sold to lecturers
  - o Speed of technological change
  - o Stressing value of non-tech approaches
  - o Benefits for students:
    - ▪ Deepening learning
    - ▪ Motivating students
    - ▪ Personalising learning
    - ▪ Supporting new students
    - ▪ Transfer of knowledge
  - o Benefits for teachers:
    - ▪ Communicating with students
    - ▪ Improving access to information
    - ▪ Improving assessment
    - ▪ Making life easier
    - ▪ Professional presentation
- Role of technology:
  - o Additional to face-to-face learning:
    - ▪ Extending learning
    - ▪ Providing alternative approach
    - ▪ Revising face-to-face learning
  - o Replacement for face-to-face learning
- Teacher identity:
  - o Describing own relationship to technology:
    - ▪ Becoming a role model
    - ▪ Fear of technology
    - ▪ Forced luddite
    - ▪ Loss and regret
    - ▪ Own enjoyment of technology

- Own knowledge of technology
- Speed to adopt
- The technology I don't know about

  - Fitting with teaching style
  - Personal values
  - Sharing their personality

Appendix F – Coding Extract

Each interview was coded three times to identify extracts relevant to the research questions. The following short extract from the first interview with Interviewee A (lines 98 - 115) shows how this was achieved.

First pass: Codes relating to uses and contexts for technology

Initially, interviews were coded to identify uses of technology and the contexts in which they were used. The extract below describes aspects of the teaching context relating to pressures on time and expectations from others ("the Trust"). As the expectations came from outside the higher education sector this was also coded as "cultural context". Finally, the extract referred specifically to the use of Powerpoint and this was also coded. As a result, the codes overlap as the extract below demonstrates. The codes used were:

[1] Explaining why technology was used: Time

[2] Contextual drivers for use: Cultural context (underlined in extract)

[3] Explaining why technology was used: Expectations (underlined in extract)

[4] Powerpoint (in bold type in extract)

What kind of things will you be doing on your VLE?

> Ahh, hmm, Very difficult. I've struggled with getting the 25% I have to say because we've cut our courses down say, for example, each module was 8 full days teaching, it's now 6 days and the other two days to be done via blackboard [1], so I've struggled with it as a learning tool because I facilitate learning via group work and that is very hard to do via blackboard. And I also find it very difficult to ensure that students understand what, you know, and can understand the subject as such whereas I can do that in class. I can finish the end of the day and know that every single one and I know what their understanding of the subject is. And those that are much further on I can label what we call deeper learning and those that are just struggling with the subject I can go more surface so I can gauge in the classroom, I find that very difficult to do that online. So some I have to know some of my colleagues are often using it for hmm, they will post their powerpoints online and some are going further and talking of having audio so they are doing a lecture online. For me personally that's not E Learning that's E teaching which you can't assess how they're doing. So there is a lot of that, there's,

again, there is a remit in the Trust that **all lecturers must put all their powerpoints of all their teaching sessions online. [23] I don't use powerpoint, so that's very difficult to prove that I am using online [4].**

Second pass: Codes relating to shaping beliefs and practice

For the second coding pass, codes were identified that were related to Research Question 2 regarding the relationships between teacher thinking and practice. Only one code was used on the extract this time to highlight the tension the interviewee felt between their pedagogic beliefs and the context within which they worked:
[1] Managing Conflict: Belief and context

What kind of things will you be doing on your VLE?

Ahh, hmm, Very difficult. I've struggled with getting the 25% I have to say because we've cut our courses down say, for example, each module was 8 full days teaching, it's now 6 days and the other two days to be done via blackboard, so I've struggled with it as a learning tool because I facilitate learning via group work and that is very hard to do via blackboard. [1] And I also find it very difficult to ensure that students understand what, you know, and can understand the subject as such whereas I can do that in class. I can finish the end of the day and know that every single one and I know what their understanding of the subject is. And those that are much further on I can label what we call deeper learning and those that are just struggling with the subject I can go more surface so I can gauge in the classroom, I find that very difficult to do that online. So some I have to know some of my colleagues are often using it for hmm, they will post their powerpoints online and some are going further and talking of having audio so they are doing a lecture online. For me personally that's not E Learning that's E teaching which you can't assess how they're doing. So there is a lot of that, there's, again, there is a remit in the Trust that all lecturers must put all their powerpoints of all their teaching sessions online. I don't use powerpoint, so that's very difficult to prove that I am using online.

Third pass: Codes relating to beliefs, knowledge and identity

For the third coding pass, codes were identified relating to Research Question 3. The extract provided data relating to how Interviewee A struggled to connect her pedagogic beliefs about facilitating learning with the ways she used technology. This was coded with the following code:

[1] Pedagogic Beliefs: Connecting belief and use of technology

What kind of things will you be doing on your VLE?

Ahh, hmm, Very difficult. I've struggled with getting the 25% I have to say because we've cut our courses down say, for example, each module was 8 full days teaching, it's now 6 days and the other two days to be done via blackboard, so I've struggled with it as a learning tool because I facilitate learning via group work and that is very hard to do via blackboard. [1] And I also find it very difficult to ensure that students understand what, you know, and can understand the subject as such whereas I can do that in class. I can finish the end of the day and know that every single one and I know what their understanding of the subject is. And those that are much further on I can label what we call deeper learning and those that are just struggling with the subject I can go more surface so I can gauge in the classroom, I find that very difficult to do that online. [1] So some I have to know some of my colleagues are often using it for hmm, they will post their powerpoints online and some are going further and talking of having audio so they are doing a lecture online. For me personally that's not E Learning that's E teaching which you can't assess how they're doing [1]. So there is a lot of that, there's, again, there is a remit in the Trust that all lecturers must put all their powerpoints of all their teaching sessions online. I don't use powerpoint, so that's very difficult to prove that I am using online.

Appendix G – Interview Consent

Teacher Thinking about Technology in Higher Education

Research Information Sheet

This interview is being carried out by Chris Shelton as part of a PhD study supervised by the Institute of Education, University of London.

Purpose of the Study

The purpose of the study is to research how university lecturers use technology in their teaching and the interview is intended to explore your ideas, opinions and beliefs about how you use technology.

Contact Details

Chris Shelton

Email: c.shelton@chi.ac.uk

Telephone: 01243 812028

Confidentiality

Your interview will be recorded and transcribed. All recordings will be erased once the study is complete. Your contact details will be kept separately from the interview transcripts. You will be given an opportunity to read and comment on your interview transcriptions.

It is intended that the results of the study will be published through the PhD thesis, conference papers and papers in academic journals. In the thesis and any other publications, your name and the name of your university will be kept confidential. Any comments used will be referred to by a pseudonym.

Withdrawing from the Study

Participation in this study is entirely voluntary and you may end the interview or withdraw from the study at any time, without giving a reason.

Interview Consent Form

Please read the following carefully before signing and dating the form.

- I confirm that I have received a copy of the research information sheet and have read and understood it

- I confirm that I have had the opportunity to ask questions about the research project and interview process

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.

- I agree to take part in the study

- I agree to my interview being recorded in accordance with the research information sheet and anonymised quotes being used in publications.

Signed:

Name:

Date:

v1 – 16/3/2010

Appendix H – Survey Results

Table H1 - Reported Use of ICT in teaching[2]

I use ICT in most of my teaching activities with students: Responses by demographic

		Agree or Strongly Agree
Gender	Male	88.1% (295)
	Female	87.4% (333)
Age	Under 30 years old	87.0% (20)
	30 - 39	89.7% (130)
	40 - 49	86.0% (202)
	50 - 59	91.0% (232)
	60 and over	80.4% (45)
Subject Group	Administrative, business & social studies	90.5% (143)
	Design and Arts	78.0% (64)
	Education	89.9% (71)
	Humanities and language based studies	84.1% (69)
	Medicine, dentistry and health	91.2% (114)
	Science, Technology, Engineering and Mathematics	88.0% (110)
Time working in Higher Education	0-2 years	91.3% (42)
	3-5 years	90.9% (110)
	6-10 years	87.7% (171)
	11-15 years	88.5% (116)
	16-20 years	84.8% (84)
	Over 20 years	86.0% (104)
Time working at current institution	0-2 years	87.5% (84)
	3-5 years	91.6% (152)
	6-10 years	89.0% (194)
	11-15 years	84.5% (87)
	16-20 years	89.1% (57)
	Over 20 years	81.8% (54)
Job Title	Professor (including Head of Department)	88.2% (45)
	Reader	83.3% (20)
	Senior Lecturer (including Principal Lecturer)	88.1% (401)
	Lecturer	88.2% (120)
	Other	85.2% (46)
Full or Part time	Part time	83.6% (107)
	Full time	89.1% (521)

---

[2] For all tables in this Appendix:
* significant at 95% level, p<0.05
**significant at 99% level, p<0.01

Permanent or Temporary Contract	Temporary	81.0% (34)
	Permanent	88.5% (594)
Highest qualification	Doctorate	86.2% (256)
	Other	89.2% (372)
Teaching qualification	Yes	89.4% (446)
	No	86.1% (174)
University	A	88.6% (31)
	B	82.0% (41)
	F	91.9% (102)
	G	84.6% (66)
	J	86.0% (74)
	M	85.4% (35)
	O	78.4% (29)
	W	82.8% (53)
	Y	79.6% (43)

Table H2 - Reported Use of ICT in preparation for teaching

I use ICT to prepare for most of my teaching: Responses by demographic

		Agree or Strongly Agree
Gender	Male	94.9% (318)
	Female	97.1% (369)
Age	Under 30 years old	100.0% (23)
	30 - 39	96.6% (140)
	40 - 49	95.7% (225)
	50 - 59	96.9% (246)
	60 and over	91.1% (51)
Subject Group	Administrative, business & social studies	99.4% (157)
	Design and Arts	95.1% (78)
	Education	94.9% (75)
	Humanities and language based studies	95.1% (78)
	Medicine, dentistry and health	96.8% (120)
	Science, Technology, Engineering and Mathematics	95.2% (119)
Time working in Higher Education	0-2 years	100.0% (46)
	3-5 years	99.2% (120)
	6-10 years	95.9% (186)
	11-15 years	95.4% (125)
	16-20 years	93.9% (93)
	Over 20 years	95.0% (115)
Time working at current institution	0-2 years	97.9% (94)
	3-5 years	97.0% (161)
	6-10 years	97.2% (211)
	11-15 years	95.1% (98)
	16-20 years	92.2% (59)
	Over 20 years	93.9% (62)

Job Title	Professor (including Head of Department)	98.0% (50)
	Reader	91.7% (22)
	Senior Lecturer (including Principal Lecturer)	95.8% (435)
	Lecturer	97.8% (133)
	Other	94.4% (51)
Full or Part time	Part time	96.1% (122)
	Full time	96.4% (564)
Permanent or Temporary Contract	Temporary	95.2% (40)
	Permanent	96.4% (646)
Highest qualification*	Doctorate	94.3% (279)
	Other	97.8% (408)
Teaching qualification	Yes	97.0% (483)
	No	94.6% (191)
University	A	97.1% (34)
	B	90.0% (45)
	F	98.2% (109)
	G	92.3% (72)
	J	95.3% (81)
	M	100.0% (41)
	O	91.9% (34)
	W	98.4% (63)
	Y	90.7% (49)

Table H3a – Use of Powerpoint

How frequently do you use slideshow presentations e.g. Powerpoint?
Responses by demographic

		Percentage who are frequent users of slideshow presentations, e.g. powerpoint
Gender	Male	76.1% (249)
	Female	77.7% (283)
Age	Under 30 years old	91.3% (21)
	30 - 39	83.1% (118)
	40 - 49	75.8% (172)
	50 - 59	75.3% (183)
	60 and over	68.5% (37)
Subject Group**	Administrative, business & social studies	83.4% (126)
	Design and Arts	47.5% (38)
	Education	85.9% (67)
	Humanities and language based studies	66.7% (54)
	Medicine, dentistry and health	83.6% (97)
	Science, Technology, Engineering and Mathematics	79.4% (100)

Time working in Higher Education	0-2 years	84.1% (37)
	3-5 years	83.8% (98)
	6-10 years	73.1% (136)
	11-15 years	78.1% (100)
	16-20 years	75.8% (72)
	Over 20 years	77.1% (91)
Time working at current institution	0-2 years	83.0% (78)
	3-5 years	82.3% (130)
	6-10 years	73.7% (157)
	11-15 years	74.5% (73)
	16-20 years	73.0% (46)
	Over 20 years	77.4% (48)
Job Title	Professor (including Head of Department)	80.0% (40)
	Reader	87.5% (21)
	Senior Lecturer (including Principal Lecturer)	75.3% (332)
	Lecturer	84.6% (110)
	Other	68.0% (34)
Full or Part time**	Part time	66.9% (81)
	Full time	79.6% (452)
Permanent or Temporary Contract	Temporary	66.7% (26)
	Permanent	78.0% (507)
Highest qualification**	Doctorate	82.9% (237)
	Other	73.6% (298)
Teaching qualification	Yes	77.9% (374)
	No	76.0% (149)
University	A	74.3% (26)
	B	71.4% (35)
	F	73.8% (79)
	G	70.3% (52)
	J	72.0% (59)
	M	90.0% (36)
	O	80.6% (29)
	W	68.8% (44)
	Y	73.6% (39)

Table H3b – Use of VLE

		Percentage who are frequent users of a VLE
Gender	Male	55.1% (179)
	Female	59.6% (217)
Age**	Under 30 years old	56.5% (13)
	30 - 39	73.0% (103)
	40 - 49	52.0% (118)
	50 - 59	56.1% (137)
	60 and over	50.0% (26)

Subject Group	Administrative, business & social studies	55.0% (82)
	Design and Arts	53.8% (43)
	Education	61.5% (48)
	Humanities and language based studies	66.7% (54)
	Medicine, dentistry and health	52.6% (61)
	Science, Technology, Engineering and Mathematics	58.7% (74)
Time working in Higher Education	0-2 years	40.9% (18)
	3-5 years	61.5% (72)
	6-10 years	57.5% (107)
	11-15 years	61.7% (79)
	16-20 years	54.7% (52)
	Over 20 years	59.5% (69)
Time working at current institution	0-2 years	55.3% (52)
	3-5 years	62.0% (98)
	6-10 years	56.1% (119)
	11-15 years	55.7% (54)
	16-20 years	60.3% (38)
	Over 20 years	58.1% (36)
Job Title	Professor (including Head of Department)	55.1% (27)
	Reader	37.5% (9)
	Senior Lecturer (including Principal Lecturer)	58.1% (257)
	Lecturer	59.4% (76)
	Other	60.0% (30)
Full or Part time**	Part time	47.1% (57)
	Full time	60.1% (340)
Permanent or Temporary Contract	Temporary	53.8% (21)
	Permanent	58.0% (376)
Highest qualification**	Doctorate	65.6% (187)
	Other	52.2% (211)
Teaching qualification	Yes	57.2% (274)
	No	59.0% (115)
University**	A	57.1% (20)
	B	32.7% (16)
	F	50.0% (53)
	G	48.0% (36)
	J	54.9% (45)
	M	23.7% (9)
	O	52.8% (19)
	W	79.7% (51)
	Y	45.3% (24)

Table H3c – Use of e-assessment

		Use e-assessment
Gender	Male	49.2% (158)
	Female	50.0% (181)
Age	Under 30 years old	39.1% (9)
	30 - 39	50.0% (69)
	40 - 49	47.3% (107)
	50 - 59	55.0% (133)
	60 and over	46.2% (24)
Subject Group*	Administrative, business & social studies	47.3% (70)
	Design and Arts	40.5% (32)
	Education	53.2% (41)
	Humanities and language based studies	45.7% (37)
	Medicine, dentistry and health	49.6% (57)
	Science, Technology, Engineering and Mathematics	62.4% (78)
Time working in Higher Education	0-2 years	46.5% (20)
	3-5 years	55.7% (64)
	6-10 years	46.7% (86)
	11-15 years	50.0% (64)
	16-20 years	46.3% (44)
	Over 20 years	52.6% (61)
Time working at current institution	0-2 years	48.9% (46)
	3-5 years	51.9% (80)
	6-10 years	49.0% (103)
	11-15 years	54.6% (53)
	16-20 years	44.4% (28)
	Over 20 years	50.0% (31)
Job Title	Professor (including Head of Department)	51.0% (25)
	Reader	54.2% (13)
	Senior Lecturer (including Principal Lecturer)	50.1% (220)
	Lecturer	46.8% (59)
	Other	53.1% (26)
Full or Part time	Part time	47.1% (56)
	Full time	50.2% (282)
Permanent or Temporary Contract	Temporary	39.5% (15)
	Permanent	50.2% (323)
Highest qualification	Doctorate	48.6% (138)
	Other	50.9% (203)
Teaching qualification	Yes	51.5% (245)
	No	46.9% (90)

University*		
	A	40.0% (14)
	B	26.5% (13)
	F	40.6% (43)
	G	39.7% (29)
	J	56.1% (46)
	M	44.7% (17)
	O	62.9% (22)
	W	49.2% (31)
	Y	52.8% (28)

Table H3d – Use of blogging

		Use blogging
Gender	Male	27.9% (90)
	Female	27.6% (100)
Age	Under 30 years old	21.7% (5)
	30 - 39	28.1% (39)
	40 - 49	31.3% (71)
	50 - 59	27.7% (67)
	60 and over	17.3% (9)
Subject Group**	Administrative, business & social studies	19.5% (29)
	Design and Arts	46.2 % (37)
	Education	35.1% (27)
	Humanities and language based studies	33.3% (27)
	Medicine, dentistry and health	20.0% (23)
	Science, Technology, Engineering and Mathematics	25.8% (32)
Time working in Higher Education	0-2 years	25.6% (11)
	3-5 years	29.1% (34)
	6-10 years	30.3% (56)
	11-15 years	27.3% (35)
	16-20 years	21.3% (20)
	Over 20 years	27.8% (32)
Time working at current institution	0-2 years	21.3% (20)
	3-5 years	30.6% (48)
	6-10 years	29.4% (62)
	11-15 years	32.0% (31)
	16-20 years	25.8% (16)
	Over 20 years	21.3% (13)
Job Title	Professor (including Head of Department)	20.4% (10)
	Reader	20.8% (5)
	Senior Lecturer (including Principal Lecturer)	30.8% (135)
	Lecturer	21.3% (27)
	Other	30.0% (15)
Full or Part time	Part time	28.9% (35)
	Full time	27.2% (153)
Permanent or Temporary Contract	Temporary	20.5% (8)
	Permanent	28.0% (180)

Highest qualification*	Doctorate	23.3% (66)
	Other	30.8% (124)
Teaching qualification	Yes	27.0% (129)
	No	27.5% (53)
University**	A	40.0% (14)
	B	16.3% (8)
	F	14.2% (15)
	G	40.0% (30)
	J	28.0% (23)
	M	21.1% (8)
	O	26.5% (9)
	W	31.7% (20)
	Y	28.3% (15)

Table H3e – Use of podcasts

		Use podcasts
Gender	Male	32.8% (106)
	Female	31.9% (115)
Age	Under 30 years old	26.1% (6)
	30 - 39	32.1% (45)
	40 - 49	32.3% (73)
	50 - 59	31.5% (76)
	60 and over	40.4% (21)
Subject Group	Administrative, business & social studies	34.5% (51)
	Design and Arts	30.4% (24)
	Education	39.0% (30)
	Humanities and language based studies	28.4% (23)
	Medicine, dentistry and health	33.0% (38)
	Science, Technology, Engineering and Mathematics	31.2% (39)
Time working in Higher Education	0-2 years	29.5% (13)
	3-5 years	31.6% (37)
	6-10 years	29.7% (55)
	11-15 years	33.9% (43)
	16-20 years	30.9% (29)
	Over 20 years	37.4% (43)
Time working at current institution	0-2 years	31.9% (30)
	3-5 years	32.5% (51)
	6-10 years	31.8% (67)
	11-15 years	36.5% (35)
	16-20 years	25.8% (16)
	Over 20 years	37.7% (23)
Job Title**	Professor (including Head of Department)	36.7% (18)
	Reader	16.7% (4)
	Senior Lecturer (including Principal Lecturer)	33.7% (148)
	Lecturer	23.8% (30)
	Other	42.0% (21)
Full or Part time	Part time	32.5% (39)
	Full time	32.0% (180)

Permanent or Temporary Contract	Temporary	38.5% (15)
	Permanent	31.7% (204)
Highest qualification	Doctorate	28.2% (80)
	Other	35.0% (140)
Teaching qualification	Yes	33.4% (159)
	No	30.1% (58)
University*	A	48.6% (17)
	B	26.5% (13)
	F	17.0% (18)
	G	41.3% (31)
	J	29.3% (24)
	M	10.8% (4)
	O	41.2% (14)
	W	37.1% (23)
	Y	24.5% (13)

Table H3f – Use of e-portfolios

		Use eportfolios
Gender	Male	29.5% (95)
	Female	28.7% (103)
Age	Under 30 years old	13.6% (3)
	30 - 39	24.5% (34)
	40 - 49	30.5% (69)
	50 - 59	31.2% (75)
	60 and over	38.5% (20)
Subject Group **	Administrative, business & social studies	20.4% (30)
	Design and Arts	43.0% (34)
	Education	36.4% (28)
	Humanities and language based studies	18.5% (15)
	Medicine, dentistry and health	38.3% (44)
	Science, Technology, Engineering and Mathematics	29.3% (36)
Time working in Higher Education	0-2 years	24.4% (10)
	3-5 years	29.9% (35)
	6-10 years	23.2% (43)
	11-15 years	30.2% (38)
	16-20 years	35.1% (33)
	Over 20 years	33.9% (39)
Time working at current institution	0-2 years	30.4% (28)
	3-5 years	22.3% (35)
	6-10 years	30.0% (63)
	11-15 years	30.2% (29)
	16-20 years	37.1% (23)
	Over 20 years	36.1% (22)

Job Title	Professor (including Head of Department)	22.4% (11)
	Reader	29.2% (7)
	Senior Lecturer (including Principal Lecturer)	30.0% (131)
	Lecturer	31.0% (39)
	Other	24.0% (12)
Full or Part time	Part time	25.8% (31)
	Full time	29.7% (166)
Permanent or Temporary Contract	Temporary	26.3% (10)
	Permanent	29.2% (187)
Highest qualification	Doctorate	23.0% (65)
	Other	33.8% (135)
Teaching qualification**	Yes	30.4% (144)
	No	26.0% (50)
University	A	32.4% (11)
	B	18.4% (9)
	F	23.8% (25)
	G	25.3% (19)
	J	35.4% (29)
	M	40.5% (15)
	O	24.2% (8)
	W	19.0% (12)
	Y	22.6% (12)

Table H3g – Use of wikis

		Use
Gender	Male	23.8% (77)
	Female	23.6% (85)
Age*	Under 30 years old	4.5% (1)
	30 - 39	27.3% (38)
	40 - 49	27.0% (61)
	50 - 59	23.6% (57)
	60 and over	11.5% (6)
Subject** Group	Administrative, business & social studies	15.0% (22)
	Design and Arts	36.2% (29)
	Education	31.2% (24)
	Humanities and language based studies	27.2% (22)
	Medicine, dentistry and health	20.9% (24)
	Science, Technology, Engineering and Mathematics	21.0% (26)
Time working in Higher Education	0-2 years	23.8% (10)
	3-5 years	26.5% (31)
	6-10 years	27.0% (50)
	11-15 years	16.5% (21)
	16-20 years	30.9% (29)
	Over 20 years	17.4% (20)

Time working at current institution	0-2 years	22.6% (21)
	3-5 years	25.5% (40)
	6-10 years	27.0% (57)
	11-15 years	18.8% (18)
	16-20 years	22.6% (14)
	Over 20 years	19.7% (12)
Job Title	Professor (including Head of Department)	20.4% (10)
	Reader	20.8% (5)
	Senior Lecturer (including Principal Lecturer)	22.1% (97)
	Lecturer	24.6% (31)
	Other	40.0% (20)
Full or Part time	Part time	20.8% (25)
	Full time	24.2% (136)
Permanent or Temporary Contract	Temporary	23.7% (9)
	Permanent	23.6% (152)
Highest qualification*	Doctorate	19.5% (55)
	Other	26.7% (107)
Teaching qualification	Yes	25.2% (120)
	No	19.8% (38)
University**	A	17.6% (6)
	B	8.2% (4)
	F	10.4% (11)
	G	52.0% (39)
	J	18.3% (15)
	M	21.6% (8)
	O	29.4% (10)
	W	27.0% (17)
	Y	13.2% (7)

Table H3h – Use of social bookmarking

		Use social bookmarking
Gender	Male	14.3% (46)
	Female	15.6% (56)
Age	Under 30 years old	18.2% (4)
	30 - 39	17.3% (24)
	40 - 49	14.7% (33)
	50 - 59	14.0% (34)
	60 and over	15.4% (8)
Subject Group	Administrative, business & social studies	12.3% (18)
	Design and Arts	22.5% (18)
	Education	22.4% (17)
	Humanities and language based studies	18.5% (15)
	Medicine, dentistry and health	11.3% (13)
	Science, Technology, Engineering and Mathematics	10.5% (13)

Time working in Higher Education	0-2 years	7.1% (3)
	3-5 years	18.3% (21)
	6-10 years	14.1% (26)
	11-15 years	18.9% (24)
	16-20 years	19.1% (18)
	Over 20 years	8.7% (10)
Time working at current institution	0-2 years	12.9% (12)
	3-5 years	16.8% (26)
	6-10 years	19.0% (40)
	11-15 years	12.5% (12)
	16-20 years	11.3% (7)
	Over 20 years	9.8% (6)
Job Title*	Professor (including Head of Department)	4.1% (2)
	Reader	8.3% (2)
	Senior Lecturer (including Principal Lecturer)	14.7% (64)
	Lecturer	17.5% (22)
	Other	26.0% (13)
Full or Part time	Part time	13.3% (16)
	Full time	15.4% (86)
Permanent or Temporary Contract	Temporary	10.5% (4)
	Permanent	15.3% (98)
Highest qualification	Doctorate	12.8% (36)
	Other	16.5% (66)
Teaching qualification	Yes	15.2% (72)
	No	14.6% (28)
University*	A	23.5% (8)
	B	12.2% (6)
	F	5.7% (6)
	G	17.8% (13)
	J	13.4% (11)
	M	10.8% (4)
	O	26.5% (9)
	W	11.1% (7)
	Y	9.4% (5)

Table H4 – Expectations of others

Expectations to use technology in my teaching: Responses by demographic

		Students expect me to use technology	Colleagues expect me to use technology
Gender	Male	75.7% (253)	68.7% (230)
	Female	77.0% (291)	72.7% (274)
Age	Under 30 years old	78.3% (18)	69.6% (16)
	30 - 39	73.8% (107)	66.2% (96)
	40 - 49	73.8% (172)	67.4% (157)
	50 - 59	81.5% (207)	77.6% (197)
	60 and over	74.5% (41)	69.1% (38)

Subject Group	Administrative, business & social studies	78.5% (124)	70.5%** (110)
	Design and Arts	75.6% (62)	69.5%** (57)
	Education	77.9% (60)	82.1%** (64)
	Humanities and language based studies	72.0% (59)	54.9%** (45)
	Medicine, dentistry and health	73.4% (91)	76.0%** (95)
	Science, Technology, Engineering and Mathematics	75.8% (94)	69.4%** (86)
Time working in Higher Education	0-2 years	75.6% (34)	67.4% (31)
	3-5 years	67.5% (81)	63.6% (77)
	6-10 years	79.4% (154)	73.3% (143)
	11-15 years	82.4% (108)	69.8% (90)
	16-20 years	73.7% (73)	76.5% (75)
	Over 20 years	79.2% (95)	71.7% (86)
Time working at current institution	0-2 years	73.7% (70)	64.6% (62)
	3-5 years	74.5% (123)	67.3% (111)
	6-10 years	78.2% (169)	73.1% (158)
	11-15 years	77.7% (80)	71.8% (74)
	16-20 years	81.2% (52)	77.8% (49)
	Over 20 years	78.8% (52)	74.2% (49)
Job Title	Professor (including Head of Department)	72.5%* (37)	64.0% (32)
	Reader	62.5%* (15)	62.5% (15)
	Senior Lecturer (including Principal Lecturer)	78.7%* (355)	70.4% (319)
	Lecturer	79.4%* (108)	75.0% (102)
	Other	61.1%* (33)	71.7% (38)
Full or Part time	Part time	66.9%** (85)	74.8% (95)
	Full time	78.7%** (458)	69.6% (405)
Permanent or Temporary Contract	Temporary	69.0% (29)	65.9% (27)
	Permanent	77.1% (514)	70.8% (473)
Highest qualification	Doctorate	75.0% (222)	66.6%* (197)
	Other	77.5% (321)	73.7%* (305)
Teaching qualification	Yes	77.9% (387)	71.2% (354)
	No	73.6% (148)	70.5% (141)
University	A	70.6%* (24)	54.3%** (19)
	B	75.5%* (37)	74.0%** (37)
	F	87.3%* (96)	71.2%** (79)
	G	70.5%* (55)	80.5%** (62)
	J	70.9%* (61)	67.4%** (58)
	M	65.9%* (27)	80.5%** (33)
	O	67.6%* (25)	51.4%** (19)
	W	70.3%* (45)	73.4%** (47)
	Y	61.1%* (33)	53.7%** (29)

Table H5 – Confidence with technology

Responses by demographic for 'strongly agree'

		Confidence with technology
Gender	Male	43.7%** (146)
	Female	32.8%** (125)
Age	Under 30 years old	47.8% (11)
	30 - 39	38.2% (55)
	40 - 49	41.3% (97)
	50 - 59	34.5% (88)
	60 and over	35.7% (20)
Subject Group	Administrative, business & social studies	32.3%** (51)
	Design and Arts	43.9%** (36)
	Education	37.5%** (30)
	Humanities and language based studies	37.8%** (31)
	Medicine, dentistry and health	28.0%** (35)
	Science, Technology, Engineering and Mathematics	50.4%** (63)
Time working in Higher Education	0-2 years	39.1% (18)
	3-5 years	35.5% (43)
	6-10 years	37.6% (73)
	11-15 years	40.5% (53)
	16-20 years	39.4% (39)
	Over 20 years	36.4% (44)
Time working at current institution	0-2 years	41.7% (40)
	3-5 years	36.4% (60)
	6-10 years	38.1% (83)
	11-15 years	41.7% (43)
	16-20 years	35.9% (23)
	Over 20 years	34.8% (23)
Job Title	Professor (including Head of Department)	39.2% (20)
	Reader	54.2% (13)
	Senior Lecturer (including Principal Lecturer)	36.0% (164)
	Lecturer	38.5% (52)
	Other	46.3% (25)
University focus	Teaching-focused	35.4% (166)
	Research-focused	40.4% (23)
	Teaching and Research are considered equal priorities	42.2% (81)
Full or Part time	Part time	32.8% (42)
	Full time	39.0% (228)
Permanent or Temporary Contract	Temporary	52.4%* (22)
	Permanent	37.0%* (248)
Highest	Doctorate	42.9%* (127)

qualification	Other	34.1%* (142)
Teaching qualification	Yes	36.3% (181)
	No	42.3% (85)
University	A	44.4%* (16)
	B	28.0%* (14)
	F	33.3%* (37)
	G	37.7%* (29)
	J	23.3%* (20)
	M	34.1%* (14)
	O	48.6%* (18)
	W	40.6%* (26)
	Y	48.1%* (26)

Table H6 – Perceived Barriers

		Availability of resources is a barrier	Access to technical support is a barrier	Lack of training is a barrier	Lack of time is a barrier
University	A	25.0%** (9)	27.8%** (10)	44.4% (16)	61.1% (22)
	B	32.0%** (16)	24.0%** (12)	30.0% (15)	58.0% (29)
	F	43.2%** (48)	39.1%** (43)	33.6% (37)	64.0% (71)
	G	38.5%** (30)	25.6%** (20)	27.3% (21)	74.0% (57)
	J	10.5%** (9)	18.6%** (16)	34.9% (30)	70.9% (61)
	M	39.0%** (16)	29.3%** (12)	26.8% (11)	68.3% (28)
	O	64.9%** (24)	56.8%** (21)	45.9% (17)	64.9% (24)
	W	25.4%** (16)	39.1%** (25)	31.2% (20)	57.8% (37)
	Y	27.8%** (15)	28.3%** (15)	27.8% (15)	51.9% (28)